External Evaluation Report for the Bush Foundation Grant 2005-2007

Submitted by:

MGT OF AMERICA, INC.

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EXTERNAL EVALUATION REPORT FOR THE BUSH FOUNDATION GRANT 2005-2007

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Executive Summary

EXECUTIVE SUMMARY

Through two three-year grants beginning in March 2001, the Bush Foundation has supported initiatives to enhance student learning on the four University of Minnesota campuses—Crookston, Duluth, Morris, and Twin Cities—by fostering the development of faculty skills for integrating innovative teaching practices.

Through the 2005-07 grant, the four campuses focused on three goals to unite their efforts and design specific program activities that:

- Align grant efforts with current campus initiatives.
- Keep student learning in the forefront.
- Foster a scholarly and collaborative approach to addressing student learning issues.
- Integrate the assessment and evaluation of student learning initiatives into the campus mainstream.

The University has reached the end of the second three-year grant and the following evaluation pertains to the cumulative results of the campus's activities over this three-year period.

Evaluation

The external evaluation was designed to fulfill data needs that go across campuses, and to answer questions of common interest. For the purposes of mainstreaming the evaluation, a coordinating team was established with members responsible for ensuring that data were collected for multiple levels of the evaluation. The external evaluator for this project was MGT of America, Inc., (MGT).

Evaluation Approach

An evaluation plan was developed that would ensure that qualitative and quantitative data were collected and analyzed to measure the impact of the grant on student learning in relation to the aforementioned goals.

Evaluation Procedures and Documentation Tools

Several different data gathering techniques and documentation tools were employed during the grant including a faculty survey, focus groups and interviews, and course profiles. Information on each of these data collection instruments and procedures are detailed in **Chapter 2.0** of this report, and copies are included in **Appendix B**. Additional data beyond what was gathered through these instruments were collected as needed. Data were assimilated and analyzed to evaluate progress in addressing the goals of the grant, using the Statistical Package for the Social Sciences (SPSS) software where applicable. These data are reported in **Chapter 3.0** of this report.

Evaluation Summary and Highlights of Campus Participation

Through review of the data that has been collected thus far, MGT conducted a comprehensive review and analysis of the implementation of the Bush Foundation grant on each campus and systemwide by focusing on the progress made in Years 1 through 3 towards meeting the goals of the grant. Supporting documentation for the sections below may be found in **Chapter 3.0** and the appendices of this report.

Alignment of Grant Efforts with Current Campus Initiatives

All campuses met or exceeded their goals for engaging the desired number of instructional staff and students in grant-related projects, and expectations for the number and types of courses involved. Evaluation data collected from interviews with faculty and course profiles revealed that the four campuses have inspired faculty participants to directly relate their research for the Bush continuation grant to the strategic campus initiatives underway on their campuses. Bush grant research impacted a total of 70 faculty and an average of 5,246 students per semester.

Fostering a Scholarly and Collaborative Approach to Learning

Survey data revealed that faculty viewed a scholarly and collaborative approach to teaching as important. Survey questions regarding collaboration were grouped into the following categories: collaborating with students for the purpose of learning; collaborating with students to inform course redesign; and collaboration with colleagues. Based on the survey data, faculty gave a higher priority to collaborating with students for the purpose of learning, and the lowest priority to collaborating with colleagues.

With regard to scholarship, faculty gave the highest priority to updating their knowledge of their discipline, followed by using interdisciplinary knowledge to inform their course design and participating in conferences, seminars, or workshops on teaching or student learning.

There has been little change in the faculty's attitudes toward using a collaborative and scholarly approach to teaching over the three years of the grant. However, it is important to note that the faculty viewed collaboration and scholarship in teaching as important from the beginning, so only marginal change was possible. In some instances, faculty perceptions were not as high in Years 2 and/or 3 as they were in Year 1, as noted by the decreases. Additionally, as with any longitudinal project, little change could be expected over only a few years.

It should be noted that survey data were collected at the beginning of the grant period for each Cohort to establish a baseline against which future data could be compared. Since fewer faculty completed the survey each year and surveys were completed anonymously, statistically valid comparisons and growth could not be measured. These data are assumed based on anecdotal information collected during monthly conference calls and site visits.

Based upon survey results; information submitted in course profiles; and interviews conducted with consultants, faculty, and students; it would appear that various modes of collaboration and scholarship have played prominent roles in grant proceedings across

the system. Regarding collaboration, while limited inconsistencies in definitions or understanding continue to exist, and some gaps in opportunities were cited by participating faculty, it is evident that all grant participants have seen an increase in experiences working with others as part of the development, implementation, and assessment and evaluation stages of their grant work. Additionally, understandings of the scholarship of teaching among participants has evolved substantially, with some faculty gaining their first introduction to the concept, while others have significantly advanced their understandings of how to employ the ideals of scholarship in refining their teaching methodologies, as well as disseminating their findings to others in their fields. Increased appreciation for both of these aspects of the grant—collaboration and scholarship—is apparent among almost all participants.

Assessment and Evaluation of Student Learning

Survey data revealed that fewer faculty used graded or quantitative methods (quizzes, tests, etc.) to assess student learning by the end of the grant period. More faculty were using interactive techniques such as student response systems (i.e., clickers) to assess performance. Faculty were also more prone to assess students on individual performance than outcomes from groups throughout the course of the grant period; however, group assessment has increased across all Cohorts.

Additionally, faculty felt that motivating students to improve study skills, using classroom assessment to prompt student thinking, and understanding what the class, as a group, is learning were the most important factors for improving student learning. Faculty believed that collecting entry level knowledge, identifying students who need extra help, and helping students assess their own progress were the least important factors.

Site visit interviews and focus groups revealed some progress in terms of courses being redesigned based on the results of assessment and evaluation efforts. However, a small proportion of faculty had not yet processed the data for the current year's projects, so these refinements had not yet been applied on a universal scale.

Faculty Professional Development Opportunities

Faculty systemwide reported numerous opportunities for development associated with the grant throughout the three years, especially the small group meetings, which proved to be the most beneficial to grant efforts. As a whole, faculty expressed appreciation for the content of these programs and also greatly valued the opportunities to meet and share ideas with other faculty. Faculty said that the opportunities to meet with colleagues were the key to keeping their projects on track.

Faculty referenced workshops as having "broadened horizons" through exposure to others' ideas and discussion topics and through exposure to materials and resources (in terms of literature and people/experts) made available to assist or inform efforts. Professional development has moved faculty toward more of a cooperative research-based focus with an emphasis on outcomes, and also fostered peer-driven (rather than top-down) motivation toward adoption of new methods and technologies. Grant administrators felt that development efforts created through the Bush grant represented significant opportunities for faculty.

Faculty from several campuses noted the study of published assessment techniques as helpful to their efforts. A large amount of information with universal application that circulated through small and large groups also proved to be helpful in informing assessment and evaluation techniques. In addition, course team meetings and consultants provided strong support in areas of assessment and evaluation.

Program Leadership

Program leaders continued to oversee grant-related issues at the system level (e.g., budgeting, recruitment of participants, participating in coordinating team meetings, scheduling professional development opportunities, meeting with faculty participants, working with external evaluators to collect data, and preparing the annual evaluation report) into Year 3. At a campus level, leaders continued to recruit faculty to commit and participate in the grant, ensured faculty stayed on task and on schedule with their research, and kept up with reporting deadlines. Among the challenges encountered throughout the grant period, faculty leaders found turnover in administrative personnel, resistance from more established faculty, and underestimating of the learning curve on projects.

Campus coordinators also mentioned the heavy engagement by several faculty, despite large teaching loads, demonstrated commitment to student learning. Publication and presentation of research findings over the three-year period were also counted among the most significant successes.

Coordinators mentioned that because of the grant a number of methods/interventions have spread to other courses within departments or downstream in line of curriculum and would appear to have definite ongoing influence. Representatives from various support departments are now meeting together on a regular basis to further goals towards a seamless support system.

2005-2007 Accomplishments and Challenges

Accomplishments

The University of Minnesota has realized a number of significant accomplishments during the three years of the continuation grant. To better illustrate their relationship to the grant outcomes, they have been divided into two sections—Student and Faculty Learning and Grant Processes and Procedures. A brief summary of these accomplishments is outlined below, with more detail provided in **Chapter 4.0**.

Student and Faculty Learning

- The grant improved faculty opinions about teaching and research.
- Projects were focused on enhancing student learning by implementing innovative teaching techniques and strategies.

- The grant inspired active participation in publishing and presenting findings.[1]

- The grant enhanced collaboration among participants.

Grant Processes and Procedures

- The development of formal operating procedures facilitated the implementation of the grant and was used to enhance networking and the sharing of resources across campuses.

- The grant has allowed the four campuses to improve communications and develop closer working relationships.

- Grant administrators made significant strides towards standardizing the definition of scholarship for all grant participants.

- Evaluation data revealed that the four campuses have directly related their research for the grant to the existing strategic initiatives on their campuses.

- The Center for Teaching and Learning at the Twin Cities campus initiated contact with Campus Administration on the Crookston campus to extend resources to the smaller campuses.

Challenges

Throughout the 2005-2007 Bush grant, MGT and grant PIs identified challenges that the university would face in the coming year without continued funding. They are divided into two sections—Student and Faculty Learning and Grant Processes and Procedures—and are areas that grant PIs and campus coordinators should address to affect the funding challenges and continued grant efforts. More detail can be found in **Chapter 4.0** of this report.

Student and Faculty Learning

- Faculty desire further opportunities to meet with faculty outside of their teams, small groups, or campuses.

- A substantial segment of faculty were not able to provide a summary of research outcomes and findings at the end of the grant due to time constraints or the lack of resources.

Grant Processes and Procedures

- Many of the resources and training opportunities made possible through the grant would be beneficial to a broader audience of faculty on the four campuses. Campus leaders should continue to find ways to share these resources now that funding has ended.

[1] A list of all presentations and publications resulting from Bush grant efforts is included in Appendix E.

- The continuance of a faculty development infrastructure that will persist now that the grant has concluded is a concern. The Bush grant has served as a major entity driving faculty development for the smaller campuses.

Recommendations

These are recommendations that the evaluation team believes will improve the University of Minnesota's ability to continue to implement the research and activities of the Bush Foundation grant effectively now that the grant has ended. They are designed to address the challenges identified above. These recommendations are in no particular order but are divided into two categories—Student and Faculty Learning and Grant Processes and Procedures. More detail on these recommendations can be found in **Chapter 5.0**.

Student and Faculty Learning

1. Emphasize the need to continue data collection, analysis, and communication of research outcomes from local evaluation activities.

2. Continue to promote a scholarly and collaborative approach to teaching and learning by employing resources outside of the grant.

3. Create more networking opportunities for grant participants and formalized information-sharing channels to continue to promote cross-campus collaboration and dissemination of information now that grant funding has concluded.

Grant Processes and Procedures

4. Promote collaboration to enable campuses to share resources and staff development opportunities.

5. Explore funding opportunities beyond the Bush Foundation to allow for grant activities and research in these areas to continue.

CHAPTER 1.0:

Grant Overview

1.0 GRANT OVERVIEW

Since March 2001, through two three-year grants, the Bush Foundation has supported an initiative to enhance student learning on the four University of Minnesota campuses—Crookston, Duluth, Morris, and Twin Cities. The goal of the initiative has been to foster the development of faculty skills for integrating innovative teaching practices, including new developments in technology-enhanced learning, to address problems of student learning. The University recently completed the second three-year grant.

1.1 2005-07 Bush Foundation Grant

Each of the four campuses reviewed 2001-04 grant efforts in light of lessons learned. In response to the evaluation findings, each campus determined specific ways to extend and/or adapt efforts to enhance student learning through instructional technology and other innovative teaching strategies for the 2005-07 grant period.

The four campuses proposed the following three goals to unite their efforts and design specific program activities:

- **Goal 1: Align grant efforts with current campus initiatives to keep student learning in the forefront.**

  Given the competing demands for their time, faculty need to: (1) know that they are part of an institutional culture that values enhancing student learning and (2) have ready access to programming that promotes their growth as teachers. When institutional priorities and faculty commitments are aligned with each other and keep student learning in the forefront, the result is a win-win situation for faculty, students, and the institution.

- **Goal 2: Foster a scholarly and collaborative approach to addressing student learning issues.**

  A key characteristic of a learning organization is the ability of its members to learn together and to add value to the organization by converting individual information into organizational knowledge. Each of the campuses designed program components to encourage faculty and instructional staff to reflect on their experience as teachers, discuss their insights with teaching colleagues, read literature to inform their thinking, and use the classroom as a laboratory to systematically investigate questions about enhancing student learning.

- **Goal 3: Integrate the assessment of student learning and the evaluation of student learning initiatives into the campus mainstream.**

  Assessment of student learning has become an important and highly visible component of higher education institutional improvement, accountability, and accreditation. Faculty use both informal classroom assessment techniques and formal course assessment procedures to understand what their students are learning, then use these findings to shape their teaching. In the proposed grant continuation, each campus plans to use assessment to create better conditions for teaching and learning.

The learning issues to be addressed by each campus during the grant continuation are outlined in **Chapter 3.0 Evaluation Summary and Highlights of Campus Participation**. The chapter also outlines each campus's implementation plan, along with its methods of evaluating those efforts and disseminating related findings.

The University of Minnesota has completed the final year of their Bush Foundation Continuation Grant.

1.2 Evaluation

The external evaluation of the grant continuation was designed to fulfill information needs that spread across campuses, and to answer questions that are of common interest. The external evaluator is working with campuses in a variety of ways to coordinate activities at the system-level. Campuses have been encouraged to engage in local evaluation activities that can be reported in their annual project reports. The evaluation plan was modified somewhat at the beginning of Year 2 to address the following guiding questions to allow for more longitudinal analysis:

A. Evaluation of Program

1. To what extent did the faculty development activities on each campus help participants:

   a) Meet their campus program needs and expectations?

   b) Use scholarly and collaborative approaches to address student-learning issues?

   c) Use classroom assessment techniques and course evaluation findings to shape their teaching?

2. To what extent did each campus meet its goals in terms of:

   a) Engaging the desired number of instructional staff and students in grant-related projects?

   b) Involving the desired number and types of courses?

B. Evaluation of Program Participants

1. To what extent did program participants:

   a) Align their projects with strategic campus initiatives?

   b) Use a collaborative and scholarly approach to teaching?

   c) Assess student learning in their courses?

   d) Use information gathered from assessment and evaluation to inform their course redesign?

   e) Change their attitude toward a scholarly and collaborative approach to teaching?

C. Evaluation of Program Leadership

1. What lessons did program leaders (campus coordinators, consultants, and Principal Investigators) learn?

   a) What tasks did leaders need to complete?

   b) What challenging issues did leaders need to address?

   c) What were the most important successes?

   d) What processes emerged that were critical in managing the program?

The following outlines the roles and responsibilities of the grant coordinating team for the purposes of the evaluation:

- Grant Principal Investigators (PIs):
  - Monitor project implementation at each campus and conduct monthly conference calls with campus coordinators.
  - Serve as the primary contact to the external evaluator for the systemwide evaluation.
  - Monitor monthly progress reports from the external evaluator and disseminate information to campus coordinators; make adjustments to the implementation process as necessary.
- Campus Coordinators:
  - Write annual program reports describing implementation of program activities, local evaluation findings, coordination with other campus initiatives, and lessons learned.

- Submit annual process data to the external evaluator according to a standardized form.
- Participate in planning sessions with the external evaluator to develop a common faculty survey.
- Provide feedback on other system-level evaluation tools and procedures.
- Share findings generated by the external evaluation with campus colleagues.
- Work with external evaluators to finalize campus evaluation designs and develop data collection instruments.
- Participate in annual coordinator interviews.
- Report Bush grant activities and/or outcomes monthly to the external evaluator.

- External Evaluator (see **Appendix A** to learn more about MGT):
  - Upon request, provide recommendations to campus coordinators with regard to evaluation designs and data collection instruments for local evaluations.
  - Develop protocol for reviewing evidence that supports and documents course redesign on a per term basis.
  - Develop, administer, analyze, and report faculty survey findings per term or year as appropriate.
  - Conduct faculty focus groups annually and report summary data.
  - Collect monthly evaluation reports from campus coordinators.
  - Suggest common report format for annual campus coordinator reports.
  - Write two annual reports and one final report describing the external evaluation, and summarize themes from annual campus reports.

CHAPTER 2.0:

Methodology

2.0 METHODOLOGY

The purpose of this project was to evaluate how each campus extended and/or adapted its efforts to enhance student learning through the use of instructional technology and other innovative teaching strategies. As previously mentioned in **Chapter 1.0**, the four University of Minnesota campuses proposed the following three goals to unite their efforts and design specific program activities:

- Goal 1: Align grant efforts with current campus initiatives to keep student learning in the forefront.
- Goal 2: Foster a scholarly and collaborative approach to addressing student learning issues.
- Goal 3: Integrate the assessment of student learning and the evaluation of student learning initiatives into the campus mainstream.

2.1 Evaluation Approach

In Year 1, MGT of America, Inc., (MGT) developed an evaluation plan, in consultation with grant Principal Investigators (PIs) that would ensure that qualitative and quantitative data were collected and analyzed to measure the impact of the grant on student learning in relation to the aforementioned goals. The plan was also structured to address the guiding evaluation questions listed in **Chapter 1.0** of this report.

To evaluate the project, MGT:

- Developed evaluation procedures and documentation tools.
- Conducted data collection and analysis as outlined in the evaluation plan.
- Participated in monthly video conference calls with grant coordinators.[1]
- Conducted a minimum of 13 conference calls with campus coordinators.
- Conducted site visits to each of the four participating campuses.
- Prepared and delivered 13 evaluation progress reports.
- Prepared the year-end evaluation report for the Bush Foundation.

At the beginning of Year 2, MGT met with the grant PIs to revise the evaluation plan for the upcoming grant year based on lessons learned in Year 1. These modifications are

[1] Monthly video conference calls were suspended during the summers of 2005, 2006, and 2007.

reflected in the methodology that follows and were continued in Year 3, with some minor modifications.

2.2 Evaluation Procedures and Documentation Tools

Several different data gathering techniques were employed during Year 1, including faculty reflection logs, a faculty survey, focus groups, and interviews. In Year 2, MGT replaced the faculty reflection logs with course profile forms. These data collection activities continued in Year 3.

Copies of all data collection instruments are included in **Appendix B** of this report.

2.2.1 Faculty Reflection Logs/Course Profiles

At the beginning of Year 1, MGT collaborated with the campus coordinators to develop an electronic faculty reflection log for grant participants to complete on a monthly basis to journal their grant activities and research. The reflection logs were developed in January 2005 for faculty to begin reporting in February.

During focus groups with faculty at the end of Year 1, MGT consultants learned that faculty did not find the faculty reflection logs useful for tracking their grant progress because not all participants were implementing on the same schedule. In some instances, faculty could not report on progress due to the complexity of the data they were collecting. As a result, faculty suggested they complete a course profile that reflected much of the same information as was to be recorded in the logs, with several additions, such as key findings and outcomes. The majority of participants agreed that completing these at the end of each semester would enable them to provide more meaningful data.

MGT discussed this change with the grant PIs and campus coordinators, and resolved that course profiles would be completed by participants for Year 2 within a timeframe to be determined by the campus coordinator. MGT and the grant PIs drafted a course profile form that would be a journaling document for participants to update at the end of each semester, at a minimum. On three of the campuses, participants are completing these forms at the end of each semester, and on the fourth they are completing them bi-monthly.

MGT consultants used course profiles to monitor the progress of faculty and stay updated on the research for each campus. Profiles were also reviewed to identify successful innovative teaching strategies implemented by faculty. Outcome data on these strategies are reported in the summary sections of **Chapter 3.0**.

Additionally, data collected from these profiles, as summarized by campus coordinators, are used to supplement data collected from MGT's site visits and the annual faculty survey. Final course profiles for Year 3 are included in **Appendix D** of this report.

2.2.2 Faculty Survey

During Year 1 in January 2005, MGT developed a faculty survey. The electronic survey was customized to ensure that it addressed the specific goals of the Bush grant project. Prior to administering the survey from mid-February to mid-March, MGT submitted it to the campus coordinators and grant PIs for review.

In Year 2, minor revisions were made to the survey to allow MGT to group grant participants into cohorts based on when they started the research under the continuation grant, with the understanding that all faculty who completed the survey in Year 1 were considered Cohort 1, and new faculty participants were considered Cohort 2. Letters instructing faculty to complete an electronic survey were developed by MGT and the grant PIs. The PIs distributed the letters to grant participants in February 2006.

In February 2007, the PIs distributed letters to grant participants beginning their research in Year 3 requesting completion of the faculty survey. For evaluation purposes, these faculty are identified as Cohort 3, and the survey results established the baseline for this group. At the end of Year 3, PIs distributed letters to all faculty who participated in any or all years of the continuation grant requesting completion of the final faculty survey.

Along with other data collection efforts, survey data collected at the beginning of the year for each Cohort—2005 for Cohort 1, 2006 for Cohort 2, and spring 2007 for Cohort 3—was considered the baseline for which annual data would be compared. For valid measurements, it was imperative that all participating faculty members completed the survey annually because surveys are completed anonymously. Analyses of these data are reported in **Chapter 3.0**.

Surveys were analyzed using the Statistical Package for the Social Sciences (SPSS). MGT consultants and analysts examined the frequency of responses in relation the number of faculty responding to the survey for Cohorts 1, 2, and 3. The mean, median, mode, and standard deviation were also calculated and reported for each survey item.

Data collected from the annual survey are reported in **Chapter 3.0** and **Appendix C** of this report.

2.2.3 Interview and Focus Group Guides

In order to conduct the interviews and focus groups with grant participants, MGT visited each of the participating campuses annually in the fall. Interview and focus group guides were developed to ensure consistency among the visiting consultants. These guides provided detailed questions, areas to be probed, follow-up topics, and a general format for the visits. Interview and focus group guides were revised in Year 3 to address more of the issues facing grant participants.

Stakeholder focus groups included faculty participants, consultants, and graduate and undergraduate students. At the conclusion of the site visits, MGT conducted an interview with the grant PIs and orally reported on data collected from the interviews and focus groups. Summaries of these visits are provided in **Chapter 3.0**.

Data collected from these interviews and focus group were analyzed and used to supplement faculty survey responses. Additionally, these data were compared with data

collected in Years 1 and 2 to look for common themes, changes in grant activities and outcomes, how the grant impact had changed, common successes and challenges, how support systems may or may not have improved and/or changed, and any differences between faculty that began the grant in Years 1, 2, or 3. These data were also compared with faculty survey responses.

2.2.4 Other Data Collection Activities

In addition to the aforementioned data collection activities, MGT participated in monthly video conferences with campus coordinators and grant PIs during the spring and fall semesters in Years 1 through 3. During these calls, campus coordinators provided brief updates on campus activities related to the Bush grant and systemwide evaluation issues were discussed. MGT consultants conducted follow-up conference calls with campus coordinators to discuss campus activities in more detail, as well as local evaluation issues or concerns.

In Years 1 and 2, MGT submitted a progress report to the grant PIs and campus coordinators detailing campus activities and systemwide issues or concerns following conference calls. These progress reports also highlighted key upcoming evaluation activities. In Year 3, these progress reports were suspended in lieu of written monthly coordinator reports submitted electronically to MGT.

Other data collected by MGT included minutes submitted by campus coordinators from meetings and workshops with participants, information on workshops and training opportunities available to campus participants through Bush grant resources, and PowerPoint presentations from monthly meetings/presentations by campus participants.

2.3 Year-End Evaluation Report

When all the data had been gathered and all the site visits had been completed, MGT began the process of preparing the evaluation report for Year 3. The following activities, among others, were completed during this process:

- Analysis of the final data for Year 3, as described in the data collection subsections above, with comparisons to Years 1 and 2 where appropriate.
- Identification of the issues to be addressed in the report.
- Description of the background of the project and the methodology employed to complete the evaluation.
- Preparation of a draft report for review by the grant PIs and campus coordinators.
- Modification of the report based on corrections and/or omissions suggested by those reviewing the draft.
- Finalization of the report and submission to the Bush Foundation.

CHAPTER 3.0:

Evaluation Summary and Highlights of Campus Participation

3.0 EVALUATION SUMMARY AND HIGHLIGHTS OF CAMPUS PARTICIPATION

This chapter provides a comprehensive review and analysis of the implementation of the Bush Foundation Grant on each campus and systemwide by focusing on the progress made in meeting the goals of the grant from 2005-07. It is organized into the following sections:

3.1 Alignment of Grant Efforts with Current Campus Initiatives
3.2 Fostering a Scholarly and Collaborative Approach to Learning
3.3 Assessment and Evaluation of Student Learning
3.4 Faculty Professional Development Opportunities
3.5 Program Leadership

Supporting documentation for the aforementioned sections may be found in the appendices of this report.

3.1 Alignment of Grant Efforts with Current Campus Initiatives

Data and documents compiled by the Principal Investigators (PIs) and campus coordinators provided an overview of the activities planned as the grant moved into its second year. Surveys and interviews were conducted with grant participants to provide in-depth detail on the research projects implemented at each of the campuses. Faculty participants also updated course profiles from Years 1 and 2 to expand research activities and report outcomes. The information collected addressed the following research questions:

- To what extent did each campus meet its goals in terms of engaging the desired number of instructional staff and students in grant-related projects?
- To what extent did each campus meet its goals in terms of involving the desired number and types of courses?
- To what extent did program participants align their projects with strategic campus initiatives?

To what extent did each campus meet its goals in terms of engaging the desired number of instructional staff and students in grant-related projects?

Campuses generally met their goals for involving staff and students in support of the research projects being funded at each site.

- The Crookston campus experienced varying levels of engagement among its faculty and had some turnover on project teams due to faculty interest as well as departures. For the final year of the grant, seven faculty were engaged in a joint project reaching 248 students. Turnover among administrators, as well as competing interests

(such as accreditation efforts), led to difficulty in recruiting campus support for grant-related efforts. The segment of faculty that followed through on projects reported successful experiences and satisfaction with the scale and level of impact among students.

- The Duluth campus was successful in engaging a large number of faculty and students, with 29 faculty/courses reaching approximately 2,200 students. A wide variety of disciplines/departments are encompassed, and efforts have impacted both large, lower-division, and other courses.

- The Morris campus was also successful in its efforts to extend the Bush grant across the campus. Eleven projects involving 13 faculty and courses enrolling over 500 students were involved in the third year of the grant, spanning a variety of disciplines and course frameworks.

- The Twin Cities campus engaged ten course teams involving 17 faculty and reaching 2,200 students. The grant began with 12 course teams; however, the two faculty members leading these teams left the institution.

To what extent did each campus meet its goals in terms of involving the desired number and types of courses?

Across all campuses, efforts generally met or exceeded goals and expectations for the number and types of courses involved.

- One of the goals of the project on the Crookston campus was to engage a cross-disciplinary group of faculty, which was successfully achieved. The research team for Year 3 involved faculty from education, hospitality, agriculture, biology, and communications disciplines and impacted students in one or more classes within each of these areas.

- Project work on the Duluth campus involved a total of 27 courses for the three years and covered a variety of disciplines, as well as both upper- and lower-division courses.

- The Morris campus engaged faculty in 11 projects (more than double the allocated funding levels, which covered only five projects), spanning a wide variety of disciplines. The overall effort on campus engaged 18 faculty (in terms of direct project or consulting involvement), nearly double the campus's goal of ten.

- The Twin Cities campus involved ten course teams. The projects covered a broad range of disciplines and upper- as well as lower-division undergraduate courses.

To what extent did program participants align their projects with strategic campus initiatives?

Participants from each of the campuses engaged in projects that were well aligned with strategic campus initiatives. Goals and successes in this regard, as reported by participants and administrators, are detailed below.

On the Crookston campus, the following observations were made:

- Consistent with the over-arching goals of the grant, two of the six elements of the vision for the Crookston campus (developed as part of the campus's recent strategic positioning exercise) relate to student learning. The first, which entails "excellence in undergraduate teaching and learning," is parallel to the general goals of the grant, while the second, "active, participatory learning that prepares can-do employees and future leaders," directly coincides with the specific experiential learning elements that were present in all of the research projects.

- One of the student learning goals of the institution emphasizes the importance of "working with others." Relative to this goal, each of the projects on the campus involved collaborative learning.

- Faculty were aware of these campus initiatives and felt their efforts to improve teaching and learning through the grant directly related to many of these ideals.

- Faculty noted campus emphases relating to:

  - Cross-disciplinary work.
  - Active learning.
  - Communication.
  - Problem solving.
  - "Real world" application.

Reports of efforts towards aligning projects with strategic campus initiatives on the Duluth campus included the following:

- Faculty indicated an alignment with the general system goals of improving teaching and publication of research – a means of striving towards both goals.

- Faculty indicated that the local focus of the grant, teaching students to become reflective learners, was consistent with campus ideals.

- Faculty cited a campus emphasis on student retention and graduation, consistent with the grant-related efforts to engage students in material, as well as to help freshmen connect with their peers, and the integration of practices into later course material.

- The campus is attempting to refine its liberal education component, part of which entails improvements and enhancements to dynamics in larger classes and improving student appreciation for value.
- The campus encourages increasing use of technology in the classroom.
- The grant efforts made some advances towards the systemwide goal of unifying campuses.
- Faculty members indicated alignment with more specific campus initiatives including:
  - Emphasis on field work in College of Education.
  - Critical thinking skills are essential, especially for practice in business, marketing, and related fields.
  - Improving written and verbal communication skills for job market.
  - Increasing IT literacy is a strong emphasis in the College of Business.
  - Allowing borderline students to succeed.
  - Improving gender diversity by facilitating varied learning styles.

Participants and administrators from the Morris campus indicated the following goals and efforts with regard to aligning projects with campus initiatives:

- Efforts aligned with strategic initiatives relating to diversity; particularly, work in diverse learning styles relating to first-year seminars met multicultural ideals. Technology has been employed as a means of reaching these varied learning styles. This effort also coincides with the campus initiative to increase international enrollments.
- Student retention was another initiative cited by interviewees that was also addressed, in part, by efforts to meet the needs of students with diverse learning styles.
- Increased collaboration between faculty and staff, with infrastructures established to continue to provide a more seamless support structure.
- Faculty cited the institutions' liberal arts mission, which entails more interaction and engagement between students and faculty.
- Technology and various interventions allow a better approach to increased retention and enrollment growth goals and, consistently, better methods for teaching larger classes.

On the Twin Cities campus, the following observations can be made relative to aligning projects with strategic campus initiatives:

- Consultants expressed sentiment that pedagogical research was consistent with the University's desire to achieve Top 3 status among public research institutions. Assessment of critical thinking, which has been a focus of grant efforts, will be among components used to measure institutional effectiveness.

- Consultants noted efforts relating to class size, and the use of technology coincided with the campus initiative to expand "smart classroom" capacities.

- Grant administrators noted several strong results associated with student engagement that will impact the University's direction in particular respects.

- Many faculty noted the University's transition to larger class sizes and the importance of the grant's efforts to maintain and improve upon student engagement and promote active learning in such environments. The assessment efforts will be valuable toward objectively determining what does or does not work.

- Faculty also noted desirability of mentoring graduate students in teaching methods as part of grant efforts.

Exhibit 3-1 summarizes the research projects being conducted systemwide as a part of the Bush grant based on data collected from faculty course profiles completed at the end of Year 3. Specifically, Bush grant research is impacting the following:

- Crookston: Six projects, approximately six faculty covering 14 courses, and an average of 278 students per semester.

- Duluth: 27 projects, 29 faculty, and approximately 2,274 students per semester.

- Morris: 11 projects, 18 faculty, and an average of 512 students per semester.

- Twin Cities: Ten projects/course teams, 17 faculty, and approximately 2,182 students per semester.

Analysis of the data from these research projects is included throughout the sections of this chapter as it relates to the grant's goals and objectives. Complete copies of course profiles for each campus may be found in **Appendix D**.

EXHIBIT 3-1
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Crookston	Econ 2101 – Microeconomics	Is a collaborative learning teaching method more effective than a traditional lecture method in enhancing student achievement in economics?	Estimation of the educational production function using regression analysis will show whether collaborative learning teaching method is more effective than the traditional lecture method. Regression analysis allows to controls for the effect of other variables that have been shown in the research literature to affect student learning (such as student gender and minority status, ability, effort, prior economic and algebraic knowledge, etc.) and detects any effect on student learning that is due to collaborative learning.	Preliminary results from estimations indicate that collaborative learning teaching method positively and significantly affects students' stock of knowledge at the end of the semester as compared to a traditional lecture method. Collaborative teaching method also seems to have positive influence on the flow of student learning from the beginning to the end of the semester.
Crookston	Biol 2012 – General Zoology and Biol 1009 – General Biology	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	We used the following survey system to evaluate the students' perceptions of their learning in formal learning groups: 1) Flashlight Online licensed software for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning. 2) Flashlight Online license for creation of custom questions for Group-Work Evaluation. We plan to use histograms, cross-case analysis and themes with supporting quotes to analyze and combine the research team's data.	The data has not been analyzed to the extent that any real conclusions can be stated other than some interesting student's perceptions of formal learning groups seems to be very positive and improve the learning environment.
Crookston	ECE 4702 – Developmentally Appropriate Preprimary Education II, ECE 4720 – Understanding and Supporting Parenting, and ECE 4880 – Administration of Early Childhood Programs	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	1) Flashlight Online licensed software for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning. 2) Flashlight Online licensed software was used for creation of custom questions for Group-Work Evaluation and other open-ended questions to students. 3) I also created Group Work Evaluation forms to assist in the assessment of individual student contributions, which was a factor contributing to assignment values earned (grade). In the Fall, I had students individually submit answers to me regarding their work and the process of completing work with partner (how, when, where, what).	Spring 2007 This semester ended last week and we have not completed analysis individually or collectively. I have reviewed student survey data for my course. Results are clear, however, with my small class size, individual course data has less significance in terms of research results. Thankfully, the collective results with my 5 other research partners, will increased significance. Currently, we each have the numerical responses and a histogram indicating individual student responses for each question on formative and summative surveys. Cross-case analysis and themes with supporting quotes will be used as we continue this research project Fall semester 2007. Fall 2007 Because of the positive results from data collected from students last spring, I decided to use formal cooperative learning groups in two classes this fall.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Crookston	ANSC 2104 – Feeds & Feeding	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	An anonymous summative survey containing 23 questions was generated from flashlight online software of WSU and used to evaluate students' perception about their learning in this course.	Twenty-two students out of 27 in the class completed the survey. The majority of students agreed that because of this project used Formal Cooperative Learning groups they: 1) Learned how to work in a team/group. 2) Gained more confidence in their ability to learn the subject matter. 3) Learned how to take responsibility for their learning. 4) Understood ideas and concepts. 5) Acquired more problem-solving ability. A small percent of students expressed the difficulty of working in groups.
Crookston	HRI 4451 – Cases and Trends in Hospitality Management, HRI 1111 – Introduction to Food Preparation, and HRI 2231 – Menu Design and Analysis	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	Both a formative and summative survey was used in Spring 2007 and a summative survey was used in Fall 2007. The Flashlight system has been used to collect the data. The results will be compared to the other members in the group to look for similarities and differences. Flashlight produces a histogram for a quick visual.	Flashlight software will be used at the conclusion of the semester. 1) Flashlight Online license for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning. 2) Flashlight Online license for creation of custom questions for Group-Work Evaluation.
Crookston	SPCH 1101 – Public Speaking and COMM 3704 – Business and Professional Speaking	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	To determine student perceptions of their learning in formal cooperative learning groups within the Public Speaking course (Spring 2007), I used two primary methods of evaluation, formative and summative evaluation. These online surveys were designed using Flashlight software. To determine student perceptions of their learning in formal cooperative learning groups within the Business and Professional Speaking course (Fall 2007), I used the summative evaluation that the Research Partners created. This evaluation was conducted using an online survey designed using the Flashlight application. I also conducted a "Supplemental Evaluation" at the end of the course to obtain additional data. I also conducted informal discussions with the class to gage progress, status, and overall attitudes.	The results of the summative evaluation showed that the majority of respondents believed that the formal cooperative learning groups helped them learn the course material pertaining to the project. While the survey results were positive toward these activities, they also showed that it was challenging for some students to engage in cooperative learning groups. A small percentage of students expressed concerns or difficulties regarding communicating with international students in their group or group members who were not prepared with their assignment ahead of time (which reduced the effectiveness of their group work and discussions).

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Crookston	ECE 3410 – Learning Environments for Infants and Toddlers and ECE 4750 – Family, School and Community Relations	What are the students' perceptions of their learning in Formal Cooperative Learning Groups?	The use of Flashlight Online program was used as a way of collecting data for the summative survey. Students were provided in-class time to complete their survey. The method of data analysis is transforming raw data into histogram and cross-case analyses. The open-ended questions will be analyzed by using themes with supporting quotes from the subjects.	The data collected in this research project will be combined with the data that was collected in Spring 2007 (courses ECE 3410 and ECE 4750). Because of the nature of this research that involves other disciplines, the data collected will also be combined with other discipline involved in this research project.
Duluth	CS-1511 – Computer Science I and CS-1121 – Intro to Programming in Visual Basic	This project seeks to improve the learning environment in several large lecture classes by introducing a series of reflective opportunities that students can use to 1) come to understand themselves as learners, 2) state their initial goals and strategies for the course, 3) determine whether their strategy was effective after each exam and allow them to reformulate a new one based on dropping unproductive methods, and 4) reflect back on the course as a whole and their growth as learners.	The four areas listed in the research question are served by four measurement tools:1) An online learning styles survey (Soloman-Felder ILS) 2) A first week statement of goals and strategies 3) Post-exam reflection (online survey, done after each exam) 4) Web logs tracking student use of online materials. Data is currently being assembled in a master database from which comparative analyses can be run. At present there are over 1,900 cases with up to 90 variables per case. Preliminary profiles of learners have been made and correlations are beginning to emerge as I have time to look at the data.	Learning style profiles reveal strong visual learning preferences and tendencies toward sequential, sensory approaches to learning. Sequential and Sensory learning appear to be moderately correlated. All other learning styles are independent of one another. Unlike 4 years ago, neither the active/reflective scale or the visual-verbal scale are correlated with outcomes (which is very good news). However, I believe that I have come to an important realization about visual learners. I believe that their correlation with outcomes is a statement about the verbal learner advantage more than visual learner disadvantage. The size of the visual learner probably means that other factors characterize those populations. Specifically, I am now looking into the relationship between visual and active learning.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	PEP 3720 – Elementary Physical Education Methods and PEP 3730 – Secondary Physical Education Methods	1) What is the focus (Technical, Situational, Sensitizing) and level (Description, Justification, Critique, Justification & Critique) of the preservice physical education teachers self reflection in a field experience? 2) How often do preservice physical education teachers, university supervisor and cooperating teacher "significant event" response correlate per field experience teaching? When correlated, what was the "significant event" and rating of the teaching on a 1 to 15 scale? 3) How often do preservice physical education teachers, university supervisor and cooperating teacher "teaching effectiveness" (strength of the lesson) response correlate per field experience teaching? When correlated, what at was the "teaching effectiveness" and rating of the teaching on a 1 to 15 scale? 4) How often do preservice physical education teachers, university supervisor, cooperating teacher "rating of the teachings" correlate per field experience teaching? When correlated, what was the rating of the teaching on a 1 to 15 scale?	The University of Minnesota Duluth preservice physical education teachers after each of their twelve teachings will voluntarily write a reflection log, rate the focus and level, identifying one significant event, an area of teaching effectiveness, a quality of the field experience, rate the teaching performance, view a video and complete a video analysis about the most important thing they learned. Research Question #1 will be answered quantitatively. Research Question #2 and #3 will use the qualitative data from open-ended questions. Research Question #4 will be answered quantitatively.	The data collected for one semester has been entered into an Excel format. Currently, It has not been analyzed to reveal outcomes. Informally, several cooperating teachers not involved in the study stated that students who were involved in the study could effectively self reflect their own teachings.
Duluth	EdSe 4501 – Educational Psychology	1) Which scaffolded disorienting dilemmas were most effective in helping teacher candidates understand how to effectively use learning theory in support of student learning? 2) Which scaffolded disorienting dilemmas were least effective in helping teacher candidates understand how to effectively use learning theory in support of student learning? 3) What action that anyone (teacher or student) took in class did you find most affirming and helpful? 4) What action that anyone (teacher or student) took in class did you find most puzzling or confusing? 5) What about the class surprised you the most?	I read the wiki postings, conducted qualitative thematic analysis in order to better understand the essence of perspective transformations fostered in this college curriculum.	1) Students reported feeling most engaged when being challenged to reflect on professional decisions with advanced notice in a community of peer support and gentle scrutiny. 2) Students reported feeling most distanced when being challenged to reflect on professional decisions while their sense of confidence and efficacy were low. 3) Students found most affirming and helpful receiving feedback on how they're doing as learners. 4) Students found most puzzling or confusing feeling that insufficient empathy is shown for their struggles as new professionals. 5) Students found most surprising feeling strangely engaged by the uninvited burden of professional decision making.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Hlth 1470 – Human Nutrition	Does the use of a personal response system in a large lecture class increase student learning outcomes? Can the use of personal response systems accommodate different learning styles? Does the use of a personal response system increase instructor effectiveness?	Plant key questions/applications in classroom lectures using the PRS system. Plant other key questions/applications in online interactive format. Log students who choose to use TA study sessions. Determine which intervention (PRS, online interaction, or TA assistance) made the most difference in student outcomes as evidenced by scores on specific exam questions and the overall exam score.	The data gathering and analysis involves two phases. The first phase has gathered data (for one exam) being entered into Excel. This data includes: student attendance at TA study sessions, use of an interactive study guide, participation in the classroom with a prs clicker, and performance on three key exam questions and the exam score. An attempt was made to try to help students perform at a higher level on Bloom's Taxonomy (i.e., analysis or application rather than at a lower level of simply knowledge). This phase of data entry was completed with the assistance of a student (paid through Bush Grant funds). The analysis of the data now needs to be completed. The second phase was a survey that was administered to two large lecture Human Nutrition classes on November 1, the class period after the exam under study. This was reported in the Course Profile for 12/06 and presented to other Bush Grant Participants on March 8, 2007.
Duluth	FMIS 2201 – IT in Business	What qualifies as the perfect set of "IT skills?" Minimum skills today will likely change tomorrow. How much IT skills should a nurse learn in order to function well in a healthcare environment? Literate group is often those that are schooled. But many talented programmers and CEO are NOT schooled, or trained in IT skills. How can this be explained? If IT skills can be so easily trained, why is it that adults (who are capable) have problems learning IT compared to kids (who are less capable)? How do you go about training Congress to better understand IT? How can we measure such emerging IT literacy?	Emergent IT Literacy is better developed in people as they reconstruct the world through discourse with others in a computer-mediated environment rather than in formal training sessions. Students are evaluated using individual homework grades, individual test grades and extra credit for undertaking an assignment requiring skills beyond what is taught in class. This evaluation is done to test the ability of the students not only to reproduce what they learned in class but to transfer existing knowledge and skills into unfamiliar technological challenges.	The students that interacted in groups performed better than the students that did not interact as much as they learned the technology.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Comp 1120 – College Writing	1) Will students write longer reflection statements regarding their work for Comp 1120 after answering straight-forward survey questions about their writing process than students who did not respond to such surveys? 2) Will students recognize ways in which they could alter the writing process they chose to use in order to improve the future products they produce? 3) Will students' reflection statements make connections between the writing they do for the first-year writing course and the writing they anticipate doing or are doing in other college courses by referring to specific lessons learned in completing a particular assignment? 4) Will students' reflection statements make connections between the writing they do for a first-year writing course and the writing they may do beyond college by referring to specific lessons learned in completing a particular assignment?	My plan for evaluating the project is to analyze the reflection statements (as typed into the portfolio) of the group of students who completed the survey instruments, comparing them with reflection statements written by students prior to the time the surveys were used. I plan to do a qualitative assessment of the content of the comments as well as a quantitative assessment of the length of the statements. I have now analyzed reflection statements written Fall semester 2005 as well as Fall semester 2006. Although data has been collected for fall 2007, I have not yet decided whether to include it as part of the study. At some point I need to stop collecting data and write the article for publication. I am confident I have enough data to do that without adding any from yet another semester.	Most students (75% to 85%) over estimate the grade they believe they will receive on any given assignment by, on average, a full letter grade. Over 60% of students believe they revise their papers "thoroughly" and half to three-fourths say they pay a "great deal" of attention to their peer reviewers' as well as my comments on their papers. The number of students who reported having questions they needed to have answered outside of class fluctuated, from 21% to 29% at the beginning of the semester to nearly two-thirds at the mid-point to 45% to 60% at the end; however, they consistently reported that the place they most commonly seek answers to their questions is from their classmates (one-half to two-thirds go to a peer for answers). The average length of end-of-the-semester portfolio reflection statements increased from an average of 3 words per student in 2001 to 125.5 in 2006 (over a 4,000% increase).
Duluth	MU 1111 – Tonal Harmony I	Following extensive research over the past three semesters as part of this grant, I am trying to pull together all of my findings and provide an integrated approach in my freshman harmony class. I want to know if using technology in the classroom (in a more sophisticated way than I knew how to apply just a year ago), supported with online resources that I developed for the students in the class, and group activities can provide the young music professional with the ability to be significantly more independent as a learner and be able to critically assess their own work as well as their peers.	First, I have changed the physical location of the class to a room that supports technology better than any of the music department's current rooms. I project the score onto a screen and apply virtual instrument sounds rather than piano to create more realistic renditions of the class projects. Already supported by my online resources, I am trying to use group projects that can then be projected and listened to realistically to engage the student better and see if this makes them better prepared to be intelligently critical, not only of the technical aspects of the musical problems but also the aesthetic. I will assess the progress of each group from assignment to assignment separately as well as making an overall class assessment. This will be followed by surveys that allow me to see if my strategy is appropriate or if there are means for me to improve how I approach the class topics. Finally, homework will be assessed regarding each group member against how they performed together in class.	Group work and individual homework seemed to be generally on par with one another; students in each group were scoring similarly to how their groups scored in class. Surveys revealed that additional examples by me in class before turning the projects over to the groups in class could be important. Using the technology was across the board extremely valuable and engaging.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Improving Student Learning: What We Know/What We're Learning	How can we assist our Bush group in presenting and sharing their research projects on and/or off campus, in print or in person, with or without technological-assistance?	To plan and present a series of workshops. There were nine in all, counting four Bush colloquiums (two by members of the cohort presenting practical applications of their research). Finding co-sponsors for inviting 3 nationally recognized guest speakers to present workshops on issues pertinent to the Bush group focus. Serving as consultants for members of the cohort on classroom pedagogy and research analysis.	Use of the individual response systems (clickers) revealed that the number of students using them is increasing on campus, that they are a method of engaging students, yet they can be used in more pedagogically profitable ways than they are now being used. Faculty members have been intrigued at the potential of using Bloom's Revised Taxonomy and seemed to think favorably about using it themselves. This is a very positive outcome. High levels of interest in and satisfaction with the 9 workshops presented.
Duluth	HLTH 3115 – Consumer Health	Students are used to a great deal of memorization and taking words at face value without consideration of deeper meanings, social influence, bias, etc. I would like to help them develop critical thinking skills, which are imperative for helping students become informed and intelligent health consumers. Students seem to be driven by external motivators, such as grades. They say things like, "Just tell me what's on the test" and are stressed out over grades instead of focusing on the personalization of the learning experience. I would like to help them connect with their intrinsic motivation for learning by creating an environment in which the students drive the educational process.	The purpose of this project is to explore, design, implement, and evaluate learning experiences that promote critical thinking and intrinsic motivation among students. I will need to research current pedagogical practices and motivation theories that relate to critical thinking and learning. I can create an assessment, assess student needs, re-design the course to meet those needs, implement the interventions, and evaluate the effectiveness of the new approach to improve critical thinking and intrinsic motivation. The preparatory findings will inform the pedagogical practices and, in turn, influence the type of evaluation. Qualitative, quantitative, or combined measures might be used. Reflective measures will be used as part of the formative and evaluative processes. Calibrated Peer Review (CPR) is the technology being used to facilitate increased critical thinking and intrinsic motivation among students. CPR scores (quantitative) and student reflections (qualitative) will be assessed.	1) Students are improving in critical thinking and writing. Reflections describe instances where students have applied critical thinking in other classes, medical situations, and life in general. 2) CPR is linked to improvements in critical thinking and writing. One student wrote, "after doing the first exam I have understood a little better of what is expected from me in my responses and critical thinking as a whole. I hope to continue to think critically about topics in the future and not just accept what I hear." 3) CPR is a viable technological tool for promoting and developing critical thinking and writing in an undergraduate consumer health course.
Duluth	Phar 6171 – Pharmacy Skills 1 and Phar 6173 – Pharmacy Skills 3	Does self-reflection about patient care skills and IV technique improve student learning and contribute to self-learning processes?	Inclusion of prompted self-reflection in the electronic post lab activity evaluation for aseptic compounding and direct patient care lab activities. I plan to look for learning themes within student reflection and see what develops. I may also look for changes in activity ratings on student assessments in the future.	Pending.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	TH 1001 – Introduction to Theatre Arts	What technology is available to help students better critique theatre production?	This project researched methods of moving a large enrollment liberal education course from a lecture based course to a course where students are more active in their own learning experience. Divide the course into four parts – none of which involve a traditional lecture. 1) Invite guests speakers to visit with the class and discuss their specific discipline as it relates to theatre production, including playwrights, directors, producers, actors, and designers. 2) Watch video clips of classic theatre productions as described in the textbook. 3) Create on-line small discussion groups that will discuss topics addressed in the textbook. 4) Create an on-line web log for students to critique plays they have seen.	Students have responded well to the hybrid on-line course structure. While not as interactive as I would have liked, the on-line discussion forum seems to have enough structure to hold each student responsible for reading the textbook. Students responded well to the play review blog. They enjoyed reading each others work and the writing quality steadily improved because they received timely responses from the instructor on how to improve their writing skills. Students enjoyed the guest speakers. Students, for the most part, appreciated the in class video clips that were shown.
Duluth	Math 1296 – Calculus and Math 1250 – Precalculus	How can personal response systems be used effectively to help improve teaching and learning?	I implemented daily personal response system (clicker) questions and surveyed the student to gain perspective about their perspective of the effectiveness of the technology. Tracking end of the semester surveys and overall course results to try to gauge the effectiveness of clickers.	Initial indications are that students are more involved in lecture (attendance has increased) and they perceive a benefit from the technology. Further analysis is required to gauge whether overall student performance has actually increased.
Duluth	Math 1296 – Calculus	Does the inclusion of visualization for key concepts in a calculus lecture improve student learning?	Students in a typical large lecture introductory calculus course have been shown visualizations that are either static or animated figures while a concept is being taught in lecture. The students have been surveyed to determine how much they thought the use of the visualization impacted their learning. Additionally, their responses to questions on either homework, exams or in class 'clicker' questions will be analyzed to determine the effectiveness of the visualization. The use of the visualizations will be evaluated through a survey given to the students at the end of each course. Additionally, their performance on exams, quizzes and homework on concepts presented both with and without visualizations/animations will be assessed.	Data has been collected and tabulated for the previous semester in Math 1297. It is still ongoing this semester in Math 1296. I have found that it is much more difficult than I could have imagined to really determine ways to measure student learning. Using the clickers to determine the students perspective of the use of technology in the class, in Spring 2007 Math 1297 students responded (n=125) that 76% either agreed or strongly agreed that the technology used enhanced the course. In the previous spring semester (2006) when I was not yet part of the Bush Grant project Math 1297 students responded (n=121) that 90.08% either agreed or strongly agreed that the technology used enhanced the course. There were no students in the strongly disagree category in Spring 2006, but 3 in Spring 2007. More recently, in Fall 2007 Math 1296 students (n=111) responded that 80% either agreed or strongly agreed that the technology used enhanced the course.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Math 3280 – Differential Equations and Linear Algebra	Can projects and assignments which encourage self-reflection improve the understanding of mathematics? More specifically, can reflection upon the process of learning affect the depth of understanding of students in calculus and differential equations classes? Can group work during class increase reflection and understanding? How we can increase reflection in a course without sacrificing content?	The broad goal of my research is to improve the level of understanding of mathematics and its connection to applications in the courses I teach, with an emphasis on the courses Math 3298 (Calculus III) and Math 3280 (Differential Equations and Linear Algebra). Survey questions and reflective assignments will be my main evaluation methods. I will also use test questions and assignments that I have used before to help measure whether or not students are attaining a deeper understanding.	The response of three classes of Math 3280 to my group assignments has been extremely positive, so I have increased my use of these. I have adjusted my assignments so that I am not sacrificing any content, although I am also doing less reflective assignments than initially. Overall, I think my changes have been very successful. In my latest iteration of this project, I succeeded in covering more content than I have ever been able to before. Until I grade the final exams I cannot be sure, but my impression is that my changes to the course have also resulted in better understanding of the material by the students.
Duluth	CS 1301 – Solving Problems with Computers	How do interactive/reflective lecturing techniques affect students with different learning styles?	Felder and Soloman Index of Learning Styles survey – presented to students at the beginning of the term. Clickers (ConcepTest, peer instruction) – Approach: I lecture on a conceptual topic for 10 to 15 minutes. Then a multiple-choice question is posed to students using the TurningPoint extension to Microsoft PowerPoint. Students must respond to this question on the own. After all responses have been collected, students are asked to turn to their immediate neighbors and discuss their answers. After a few minutes of interaction, the exact same question is posed a second time. In this way, peer instruction occurs between the two presentations of the question. And I have data to assess to indicate how effective the interactive portion was in increasing student understanding. Data collected for both Fall and Spring 2007 terms. Have yet to find time to evaluate data from either term. If all goes well, I should have some results generated during the mid-winter break. I plan to use a spreadsheet to collate all data and generate charts that show important relationships.	Student survey data has revealed that the Spring 2007 cohort was relatively well balanced across the Active/Reflective, Sensing/Intuitive, and Sequential/Global scales of the Felder/Soloman Index of Learning Styles survey. On the Visual/Verbal scale, they were skewed toward the Visual end of the scale (I feel that this would probably be true with the majority of our cohorts today). The Fall 2007 cohort is very similar. The use of clickers during lecture (and the extra credit that is available from participating with them) has dramatically increased attendance levels. While this is not directly part of my study, I believe that regularly attending lecture will benefit the majority of students. I will include this in my analysis.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Chem 4351 and Phar 6151	I am addressing multiple issues in my research. The first is the use of personal response systems ("clickers") to evaluate the comprehension of the students during lecture. The second issue is to help the students develop critical thinking abilities and to critically assess their own understanding and take responsibility for areas of deficiency.	The subset of the Bush group working with the personal response systems (clickers) prepared and presented one additional workshop at the beginning of this semester in relation to our work. This was sponsored by IDS and was similar to the ones presented in the spring at UMD sponsored by the Instructional Development Service (IDS) and another workshop at the *Enhancing Student Learning: Conversations about Research and Teaching* conference at the University of Minnesota Twin Cities campus. All three workshops focused on the value of using clickers in a lecture-type format, but more importantly we emphasized the need and value of asking questions that get to the higher levels of Bloom's revised taxonomy. Our group presented personal examples of questions that get to higher levels of Bloom's revised taxonomy, which was followed by a hands-on session by the participants. We also presented tips for effective use of clickers.	Both workshops in the spring were very successful and valuable as evaluated by the participants. The workshop offer this semester had poor attendance and so its broader impact was minimal. I also personally presented a similar type of presentation to the College of Pharmacy Faculty on the UMD campus in addition to the Twin Cities campus via ITV. A colleague from the UMTC College of Pharmacy Office of Educational Development requested that I present a brown bag luncheon to both campuses. The College of Pharmacy is planning on using the clickers and ITV in tandem utilizing a new software package that is currently in the beta testing phase. The reviews that I received after the seminar from the 40 or so that attended were very positive, and should have an immediate impact on the use, and hopefully thoughtful use, of the clickers.
Duluth	SW 8331 and EdSe 4100	I am having students engage in reflective practice by: 1) having them use online asynchronous discussion forum (in Moodle) to engage in reflective posts and discussions that connect their classroom learning, readings for the course, and practicum experiences. 2) Students will then self-evaluate (a) their own posts to identify the effectiveness of their reflection (using a rubric) (b) the effectiveness of the learning strategies that they are using in the course, identifying what they can do to direct and improve their own learning.	Methodology: 1) use of pre-survey in which students self-evaluated their beginning competence in course objectives. 2) students analyze their written contributions in course web forum discussions (using detailed guidelines). 3) I will analyze both students' forum posts and their self-evaluations (qualitative analysis – seeking themes). 4) Post-survey – students self-evaluation exit competence. Evaluation: 1) Comparison of pre and post surveys. 2) From analysis of student online work, identify strategies that students used that enabled them to become more reflective. 3) From analysis of student self-evaluation, identify effective and ineffective strategies that students have used in self-monitoring.	For Online group: My colleagues and I have completed the article that we have been writing on the results of our study, and are in the process of final editing. Our plan is to submit the article to a journal before the start of the spring 2008 semester. For my study of my Human Relations classes: I have not completed the analysis yet, but I have the data gathered and my initial analysis shows a significant improvement in student self-ratings between the pre- and post-surveys. My initial analysis of student reflections in their self-evaluations at the mid-point and the end shows a depth of reflection and quality of self-reflection that I have not seen in previous courses that I have taught. I am very excited about doing further analysis on these data!

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	GEOG 5612 – Field Techniques	My first principle concern that led me to apply for this grant is the apparent difficulty of students to come up with their own independent, creative and original research projects in my GEOG 5612 Field Techniques class. My second concern was to improve the opportunities in this class for shaping a student group that is more self-motivated and reflective.	First, I will use the student's notes on their own progress, and these will allow me to see their thought processes develop. Second, and probably most important, is that students who take GEOG 5612 will eventually complete a senior project in the geography department, and I should see significant improvements in the quality of these projects. The senior project presentation is the final course that students complete before they leave our department, and it is also an assessment tool for the geography department to evaluate our overall efforts to prepare them for their life as professional geographers. Senior project presentations are evaluated by all faculty members in the department in a standardized form with both qualitative and quantitative measures, and these forms will be available to me. Successive groups of students who take my class and then prepare their senior project could be compared this way, to see if the course has made a significant impact on the quality of student's work.	This project will help me in redesigning the GEOG 5612 capstone course, to assist students in becoming independent researchers who are confident in their ability to come up with and design their own research project. After a year of analyzing data and observing students, I have decided to completely revamp the course, and offer it as a 5-credit, year-long, two-semester class that will allow students to follow through with a research project.
Duluth	Writing Studies 1120	1) Can a collaborative model—groups of students assisting each other to access and evaluate sources for their own and each other's papers—be of use in helping students learn good scholarly research methodologies? 2) What can we learn about selecting such groups? 3) Will collaboration both face-to-face in small groups and through Web Crossing in the same small groups help students (freshmen are not experienced at working in groups and participation is an issue)? 4) Will such a model yield sources that are more highly qualified than those we have seen in the past? 5) Will attaching points (that will affect grades) to collaboration be important? 6) What is the best possible role for the teaching faculty in teaching research methods in this class?	Students earn grades in Writing Studies 1120 based on the number of points of 1,000 they accumulate throughout the semester. One challenge, mentioned above, is that traditionally there has been no opportunity for students to earn points directly for the quality of their research and the sources they use in writing scholarly essays. (Rather, we state that poor research and inadequate sources are the biggest drivers of poor quality essays.) For this project, I added a 75-point component to the class grading scheme called "Collaborative Research Project." Students were able to earn points for participating in group activities and for evaluating the activities.	On April 2, 2007, I surveyed two classes regarding the project and its value. Results are contained within Appendix D.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Duluth	Comm 3505 – Media Communications	I am most interested in developing new strategies for managing the grading process. I tend to make the grading process a "career" in that I spend too much time on each paper. The process of grading becomes overly burdensome which sets up a terrible cycle of extensive effort on my part and not much appreciation for it on the part of students. This results in resentment and dread every time I face a new set of assignments.	Last spring I had students respond to the peer review process in an open-ended survey. This semester I followed up every peer review session with a request for in-class written feedback on how well the process was working. I had individual meetings with each student and assessed the effectiveness of the peer review process. In the in-class surveys I also asked students to give me suggestions or recommendations for change. When I met with the students individually, I was able to discuss their recommendations with them. They were able to provide me with more detail about why they made the recommendations they did. I implemented a few suggestions, but later decided not to continue using them.	Students were most frustrated by the varying levels of preparedness of their partners. Some students were very well prepared. If partnered with an individual who had not come to class with a document for review, or only a minimal amount of work, the prepared student felt disadvantaged (and reasonably so). It was this disparity in preparedness that led me to implement the multi-stepped peer review process described in the Evaluation Plan. I had students give final presentations about the writing process they followed in preparing their final paper. The overwhelming majority of the students proclaimed the two-step peer review (track changes exchanged via email followed by in-class discussions) to be very helpful. They encouraged me to continue using this system in the future. I have decided to begin the class next term by modeling peer review and then moving to the two-step process.
Duluth	Biol 1001 – Biology and Society	I am investigating whether using team-based learning (TBL) in a large lecture, non-majors biology class is effective in improving student learning, retention, and attitude toward the course.	Evaluation will be based upon scores of students in individual-based exams. I am also conducting surveys with each exam in order to get student feedback. These surveys contain questions about the amount of time students study, grade expectations, and feedback about teaching methods. In order to evaluate student learning, I will compare student performance on duplicate cumulative final exam questions to those obtained in semesters using traditional lecture methods. One of my hypotheses is that students will better retain long-term knowledge and perform better on the cumulative final.	Preliminary results suggest that TBL had little impact on student performance on common cumulative multiple choice final exam questions in comparison to a traditional lecture control group. However, student populations differed significantly between the two treatments. Control (traditional F06 lecture) contained 67% freshmen (n = 189), TBL contained 11% freshmen (S07, n = 191). TBL students obtained an average of 74.1% (SE = 2.7), while traditional lecture students obtained 72.5% (SE = 2.8). This difference was not significantly different (P = 0.32). Students approved of TBL, but not clickers. Perceived benefits of TBL correlated inversely with expected exam score. Overall, students responded positively to the RAP quizzes. In general students felt the RAP quizzes helped them learn more than the group problems.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Morris	Expanding the Innovative Teaching Prototype Course	The focus of this project is to develop a course prototype with technology examples that support the "Seven Principles for Good Practice in Undergraduate Education."	This course has developed from spring 2006 to fall 2007 for the Bush Technology Grant to demonstrate the various tools that can be used to promote elements of the Seven Principles for Good Practice in Undergraduate Education. Katherine Benson joined the project team to create the module for WebVista. We began by utilizing the UMWiki as a course container during the first phases of the project, and in summer 2007 moved course content to Moodle. The course has integrated many tools and examples of student-teacher contact through technology that are closely tied to the seven principles of effective learning. Our research included identifying appropriate readings to go along with the seven principles and these readings are included where appropriate in the course.	We hope that this project will enhance faculty (participant) awareness of the Seven Principles of Good Practice in Higher Education, and that after completing this course they will be able to apply what they have learned to specific applications in their own teaching of undergraduate students at UMM. Our project will provide resources for faculty to read about multiple learning styles, as well as to provide a list of technologies that can be used to develop course materials in various formats (audio, video, text, other). Content delivery in our course will be enhanced by providing actual examples of what can be created using many of the tools suggested, and by allowing faculty to use the tools as a participant in this course (such as a discussion board or e-mail).
Morris	Fundamentals of Genetics, Evolution, and Development	A new course is being developed this summer, Fundamentals of Genetics, Evolution, and Development, to replace the Biology Discipline's existing freshman introductory biology course. He will be developing new course content that will be both presented in class and available to the students online. In addition, he'll also be trying to enhance the interactivity of the lectures with a Personal Response System.	1) A Moodle course page was set up. 2) All lecture materials were made available as pdf files. 3) Supplementary discussion questions were placed online. 4) Online discussion tools were made available.	Almost all of my effort was directed towards developing the course content – these were all new lectures at the freshman level. A PRS was not used this term; it was too much to add on top of everything else. My initial plans were to give roughly equal weight to the four main topics of the course: the basics of the scientific method, and an introduction to evolutionary biology, genetics, and development. Genetics is a relatively abstract exercise in logic, and gave the students the most difficulty; I'll be expanding the time invested in that particular subject in the future. I made a conscious effort to avoid straight lecture, and spend 1/3 of the class time in small group work and discussion. This has been successful; when I expand the unit on genetics, I will mainly be adding extra in-class work on genetics problems.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Morris	Hist 3204 – Nazi Germany	A new course will be taught in the fall entitled Nazi Germany. She would like to develop a web component for this new course that would offer as many diverse exercises and opportunities to expose her students to interactive course material through course management software. With this added component, she hopes that her students will understand how and why Nazism was so effective in attracting true believers and eliminating the potential for dissent.	I have a number of resources on the site at this point, which I would be happy to demonstrate; I've also responded to student requests for specific additions – Moodle makes this very convenient. For example, the students are regularly using the "forum" feature for additional discussion outside of class. This also allows me to assess participation for those who speak less in class but are more comfortable with the written format/web-based communication/the opportunity to "synthesize overnight" and comment on something later.	The students have completed one evaluation relative to Moodle and will be asked to complete three more. Additional individual responses have largely been very positive, once the students learned the basic skills for navigating the site. The upload feature is very popular, since it saves students the cost of printing.
Morris	Online version of Introduction to Psychology	An online version of Introduction to Psychology will be developed this summer. He has started taping all of his lectures and converting them into PowerPoint presentations so that students can stream them onto their computers at home. He hopes to incorporate both the video lectures and the PowerPoint presentations into his course on WebCT.	I have finalized the online course. It now has video files, audio only files and PowerPoint files.	I will assess it through student feedback.
Morris	Pol 1401 – World Politics	The instructor intends to make his lectures available in "streaming video" in the course website (WebVista) for students' easy access. He will also make lecture outlines available in Power Point slide shows in the course website. Additionally, he will expand and enrich his course website by including visual components (tables, graphs, and pictures) and useful website links. The outcomes will be used during classes, and will be made available online for students' preview and review. He expects the addition of streaming videos. Power Point slide shows, and other visual components will enhance students' learning and engagement by exposing them to diverse and stimulating course materials in multiple formats.	1) Collected and compiled videos (clips from documentary films and movies) and converted them into "streaming video" (June-Aug. 2007). 2) Requested copyright permits on these materials through Karen Cusey, Continuing Education (Aug. 2007). 3) Video recording lectures and converting them into "streaming video" (to be complete by Dec. 15, 2007). 4) Preparing lecture outlines in Power Point and uploading them in the course website. (to be completed by Dec. 15, 2007). 5) Adding supplementary course materials (links to websites, readings, etc.) (to be completed by Dec. 15, 2007).	This project will be complete by the end of the Fall 2007 semester. The assessment/evaluation on it will be made during the spring 2008 semester.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Morris	Chem 1101 – General Chemistry I and Chem 2321 – Introduction to Research	The instructor hopes to maximize efficiency in the Chemistry Discipline's courses this summer. He would like to 1) develop video lab manuals to supplement existing hard copies of manuals, and 2) utilize NetFiles to maximize the efficiency of data collection in chemistry labs. The videos were produced in summer 2007. The use of NetFiles in for data handling and analysis was also explored at this time. The use of these materials will be evaluated in 2008.	Worked with a colleague in the production of videos for use in general chemistry laboratory; had students test NetFiles for transfer and analysis of experimental data.	Implementation, evaluation, and assessment will occur in 2008.
Morris	ELED 3102 – Reading Methods: Literacy and Language Instruction in the Elementary School	This project will employ research on Kolb's learning styles, content delivery tools and blended learning, to engage preservice teachers (ELED 3102) in meaningful learning of literacy and language methods. Application of Kolb's Learning Cycle will address students' multiple learning styles during lesson presentations and learning activities. Content ordering and sequence of concepts within lessons will be researched.	I have been using the Q/A forum in the Moodle Discussion Board for reflection exercises in my course. It is working well in that students all have the opportunity to respond, before reading others' posts. I've made use of the glossary tool within Moodle. It's been a fantastic tool for use in my reading methods course. The blog has been up and running since August. I devoted some class time to instructing students in use of tools, including the blog, which supported their use of the tools. I feel the focus is now on the content and process verses the tools—just what I wanted. I continue to work on task analysis—looking carefully at the components of assignments to identify who might benefit from the assignments and to identify what I might do to make tasks clear for students. This is in an attempt to help students use learning behaviors (style characteristics) that would help them access, comprehend, and demonstrate knowledge of course concepts.	I will know if this project is successful through data collection and analysis. Data to be collected will be course grades, students' survey comments, and frequency of use of resources on my course webpages. Grades and students' comments will be analyzed by learning style mode. The data I will collect will provide important information on the usefulness of the technology tools I have incorporated for content delivery. In the future, the Moodle quiz will replace work previously done "by hand." Separate quizzes for the four learning style modes will help me more efficiently analyze data collected.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Morris	Vertically Integrated Course Material Development for Different Learning Styles in Statistics	The instructor hopes to develop various content delivery tools (e.g., visual simulations) for various statistics and probability courses. In addition, he hopes to smooth the integration of statistical software into the various courses and to incorporate all of this material onto the course websites.	1) Student opinion on instructional technology has been collected by using an electronic survey instrument from the past 5 years. 2) Student learning has been analyzed by using the data obtained from electronic learning checks that includes 4000 data points from past 9 years. 3) Learning challenge areas has been determined. 4) Online learning materials including interactive course materials, lecture notes, learning checks have been developed/updated. 5) Statistical computing tools have been developed and integrated throughout the all statistics courses. Common resources have been developed and tested. 6) First stage of student assessment of learning data has been completed.	Learning checks after the implementation showed a statistically significant change compared to before implementation. Student performance/motivation increased significantly in all of the aspects of the course. Vertical integration of the tools helped the statistics faculty to manage their time effectively and efficiently.
Twin Cities	Agronomy 1101 – Biology of Plant Food Systems and the Environment	Our over-arching question was, how can we improve our use of PBL? In response to changes we made in our approaches and information we gathered in the second year of the program we asked: 1) Can we enhance the use of PBL in a non-majors course by delivering content needed to understand the issue during the early part of the problem (first two weeks) rather than throughout the duration of the problem? 2) Can we improve students' attitudes toward group work by focusing on the benefits of shared understanding and the opportunities for discussion that are provided by small groups? 3) Can we reduce the extent and frequency of course surveys and still obtain useful information about students' attitudes toward PBL?	We will use survey data to evaluate students' attitudes toward delivery of background material during the first two weeks of each problem as well as group work and the PBL approach. We will compare the distribution of course grades to previous semesters to determine if how these approaches might have affected student performance in the course. We will use results of the Felder and Soloman Learning Style Inventory and the ASI in interpreting students' evaluation of course approaches.	Use of scratch-off tests was a success. For each of the three sets of tests, mean group scores were higher than mean individual scores. Students responded positively to the tests and generally had positive attitudes about working in small groups in class. Outside-of-class group work continues to be a burden, largely due to unequal workloads. Placement of reading material online was not met with unanimous approval from students, largely due to problems downloading large files and student access to printers. In the future we will provide several options, including online access as well as hard copies for purchase. Other outcomes will be determined after analysis of student surveys.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Twin Cities	ARCH 3711 – Environmental Design and the Sociocultural Context	How can we use the web more effectively? How can we improve the lectures (both PowerPoint presentations and in-class exercises)? How can we increase the links between the different aspects of the course, especially lecture and recitation? Can we actually teach students to read and write by developing materials on critical reading and by improving the critical paper assignments? What can we do to improve the Teaching Assistants' effectiveness? How can we work with the Student Advisory Board more effectively?	The final year we developed web materials. We created several learning modules, each associated with one of the four critical papers. We also used web postings more successfully. Finally the web was used to provide students with resources for their projects. Although we had planned to provide opportunities for students to work together online, the students preferred to work face to face. This year we once again evaluated the first week's lectures in terms of comprehension of the course material. We evaluated the course again at mid-term to see if any interventions were needed at that time. The Student Advisory Board focus group discussion was the main technique used to idenfiy successes and weaknesses of the course,. This was supplemented by a classwide assessment of growth along the three course objectives.	The first week evaluation showed continuing improvement from the two previous years, but also indicated that there is room for more. The syllabus is too long and intimidating. Next time the class is taught, to increase the effectiveness of the syllabus we will shorten it by as much as 50%. Rather than include paragraphs on the philosophy and suggestions for approaching the assignments, the syllabus will simply list objectives and requirements. Other, more substantive material will be put on the website for student reference. The new web materials were generally well-received. The learning modules were useful to some of the students. There were no criticisms of access to project materials as in the past when they were on reserve in the library. The postings had mixed reviews from the students, some greatly appreciating them and others finding them extraneous. From the perspective of the instructor and TAs, however they were valuable.
Twin Cities	Biology 1001	Course enrollment has traditionally been about 95% non-majors, many of whom come to the lecture part of the course with low motivation and interest level. Our research questions were whether we could increase engagement, preparedness and success of students in the course.	Over the three-year grant period, in which our team taught more than 3500 students in several sections, we initiated multiple changes to the course. Frequent low-stakes assessment in the form of 15 quizzes per semester were added to lecture. Increased efforts were made to provide exam preparation throughout the semester in the form of exam-level questions that got at deep learning. Scratch-off immediate feedback forms (IF-AT forms), group work on in-class activities, and an experiment in one section with clickers were used to generate interest in learning course material. Pre-class and end-of semester surveys were used to determine student attitude, and pre-class knowledge levels of course material were compared with performance on exams. We also planned assessment of course grades relative to previous offerings of the course.	Use of various interventions that increased student activity in class (quizzes, active learning exercises, IF-AT activities, clickers, games, some case studies) increased student attendance and engagement in lecture. Some increase in performance (grades) was observed in some sections of the course. Instructor satisfaction was also increased.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Twin Cities	CSci 1901 – Structure of Computer Programming I	How to increase student engagement with the course material, given the size of the class and the complexity of the material we teach, and how to improve student retention without reducing the material covered and the level of skills we expect the students to master.	1) Do multiple (3-4) questionnaires to get students opinions. 2) Assess overall class performance (grades, number of students passing the class, etc). 3) Use the student management team to get student opinions and feedback.	1) Pop quizzes were used as a way of assessing student progress but also as a way of cooperating with other students. Students were free to talk to other students while answering the pop quizzes but were evaluated individually on their submissions. This provided an incentive for them to discuss with other students and increased their understanding of the material. 2) The use of the robot dogs in the lab created a sense of excitement and a sense of belonging to a group. 3) The student management team provided a valuable way of sensing the pulse of the class. 4) Pair programming in the lab helped the students avoid frustration. 5) The non-mandatory game project attracted a large number of students (almost 40% of the class) and created a sense of community since students had to write parts of programs and connect all them together.
Twin Cities	FSoS 3101 – Personal and Family Finances	Research has shown the use of case studies to be an effective means for approaching these tasks in this field of study. Our research questions centered on how to maximize the utility of the case study approach in large lecture based classrooms? How do we design an academic exercise (case studies) so that the students find them relevant to their lives and will continue to use financial management skills after they leave the class, and after they graduate?	Our research focused on 1) methods to best implement the case study discussions; 2) methods to effectively integrate the case study with course content; and 3) making the course more relevant to the students. We have updated the case study so that it makes it more relevant to our college students and so it is integrated with the concepts taught in lecture for each chapter. We also rewrote many of the test questions to include case study situations and have the students analyze the material as they would have in their groups. We used an iterative mixed methods approach. Each round of qualitative and quantitative surveys (every time the course was taught) was used to evaluate the effectiveness of the previous intervention (modification of the case study). Field notes from classroom observation and formal and informal interviews with students were also used in conjunction with the surveys to formulate new questions about how to adapt the case studies to make a better intervention.	68% of students preferred having case studies integrated into the lecture rather than devoting an entire class period to case study discussions. In year 2, qualitative findings indicated that students asked that the case studies to be more like them versus the married couple case study that was currently being used. In year 3, qualitative findings indicated that students could relate to the newly developed case study that featured a college coed like themselves. Students did not request that we also include a married couple case study. Students were able to take what they learned and apply it to their own situation. Student Evaluation of Teaching (SET) scores increased from year 1 to year 2.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Twin Cities	PsTL 1135 – Human Anatomy and Physiology	We are in a transition time for our whole department (Post Secondary Teaching and Learning). The total number of students in PsTL is declining quickly and we are trying to work on curriculum issues or the future, (e.g., developing new courses, programs, and majors). PsTL 1135 will still exist in the future, but will probably take on new pedagogical strategies. Less "large group lecture" and more "small group projects."	I have been working on students using "The Anatomy Bowl" (my own software program) and "Anatomy and Physiology Revealed" – which is a DVD by McGraw Hill. I have students use the Anatomy Bowl in group and individually – and compare student reaction and performance on exams. I have students work on Anatomy Physiology Revealed to complete a course assignment. I have students using their regular text books to complete a couple of assignments. Comparisons are made between students using the text and students using the DVD.	The Anatomy Bowl is a wonderful tool to help students learn basic anatomy. Results indicate that the program does not help promote higher order thinking skills. Anatomy Physiology Revealed is equal to a "book" in terms of students ability to complete a course assignment. Additionally, students "prefer" using the computer / DVD over the regular course text.
Twin Cities	GEO 1001/1101	Over 80% of the students entering our 'introductory' earth science classes have no intention of ever taking another physical science class, and less than 1% foresee any possibility of continuing on in earth science. So for the vast majority of our students, this is really their concluding science course. Our goal is to design an effective 'concluding earth science course' - one that provides students with the knowledge and skills they need to become more informed citizens of an increasingly global community. For this particular program, the basic question is how do we more effectively engage students in this concluding earth science course?	1) A historical approach was taken to highlight the many interactions of earth processes and human society. 2) Targeted interventions were used to try to offset known misconceptions and improve students' understanding of earth processes. 3) A second approach of multiple repetitions of the information from targeted interventions were used throughout the semester to gauge whether this improved performance. 4) Students used IF-AT's in small groups to review course material and prepare for quizzes. Evaluations was a crucial component of our program and involved qualitative measures such as changes in student evaluations of teaching or opinion surveys and a robust quantitative measurement of pre-instruction and post-instruction changes in student knowledge.	The targeted interventions were extremely successful in offsetting and correcting student misconceptions about the Earth. The historical approach and use of IF-AT quizzes were both very well received by students and were frequently cited on evaluations as helping students to understand the course material. Repetition of the information from targeted interventions though did not significantly improve student performance beyond the initial intervention.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Twin Cities	HMED 3001W, HMED 3001V, and HMED 5200	How can instruction be individualized and enhanced in the large-lecture format, writing-intensive survey course without sacrificing traditional course structures (lecturing, written exams and assignments)?	In year three, we have focused on implementing fully peer-reviewing of required essay assignments, further development of on-line instructional aids, and Power-Point-mounted lecture outlines that can be accessed on-line and printed off. Evaluation has been and will continue to be based on 1) student performance on assigned writing tasks (essays and exams), 2) qualitative assessment based on teaching assistant responses, and 3) quantitative and qualitative feedback on the end-of-year course evaluations.	Student performances on the mid-term examinations (qualitative assessment) were not significantly better than in previous years. The causes of this are unknown, but are a matter for some further consideration in course development. Teaching assistants report that students performed better on the multiple-draft writing assignments that are a core requirement of the teaching-intensive course, and they ascribe this to the implementation of peer-reviewing. This is a positive development, and an effort will be made to regularize and streamline the peer-reviewing process further next year. It is too early to report on end-of-year course evaluations for year three, but key questions on the year two survey indicate positive trend in critical thinking and reflective learning (more students reported that they believed that good writing reflected good thinking and that their writing had improved as a result of the course in Fall 2006 than in the corresponding 2005 survey).
Twin Cities	MKTG 3001 – Principles of Marketing	Research project focuses on staffing costs and staff/student ratios and the impact on student satisfaction and engagement. Can we increase class size without negatively impacting outcomes by utilizing Bush grant tactics/techniques?	Mixed methods quasi-experimental design. Data include survey data from two treatment groups, costs of two vs. four peer assistants, self-evaluation of progress notes and meetings with team members about the teaching and learning process.	UM Student Evaluation of Teaching (SET) scores were compared between the large enrollment sections (those covered by the current study) and the usual 48-60 count enrollment sections. The average SET for the large enrollment sections was 6.17 (Scale = 1-7, 7 is the highest) across 8 sections offered over six semesters. The average for the regular enrollment sections was 5.84 across thirty-two sections over six semesters. An additional measure—Student Self-Evaluation of Learning—was created. The instrument asked students to assess how much they knew about an item prior to taking the class and how much they knew upon completing the class. The scale ranges from: 0= No Knowledge to 4= Enough Knowledge to Teach This. In the large enrollment sections students reported a gain of 1.48 in knowledge, versus a gain of 1.38 for the other sections.

EXHIBIT 3-1 (Continued)
SUMMARY OF BUSH GRANT RESEARCH PROJECTS BY CAMPUS

Campus	Course(s) Impacted	Research Question(s)	Methodology/Evaluation Plan	Outcomes
Twin Cities	OMS 2550 – Business Statistics	How do you measure student achievement and attitude when assessing the benefits of pedagogic innovations?	The discussion section was eliminated and time added to the lecture session. Lectures were twice a week for an hour and forty minutes. The Experimental group – lecture consists of Active Learning Techniques – Classroom Assessment Techniques (ALT-CATs) completed in collaborative groups of 2-4 students. The Control group – consists of the same lectures and same problem-based learning but no ALT-CATs and no collaborative groups.	Data from Spring 2006 was analyzed.

3.2 Fostering a Collaborative and Scholarly Approach to Learning

To assess participants' definitions of and attitudes towards collaborative and scholarly approaches to learning, MGT analyzed information gathered from faculty surveys, course profiles, and focus groups. Information was also gathered from consultants working with faculty on the campuses, and from campus coordinators through onsite interviews and monthly conference calls. These data were used as multiple points of reference for data triangulation. The data addressed the following research questions:

- To what extent did program participants use a collaborative approach to teaching?
- To what extent did program participants use a scholarly approach to teaching?
- To what extent did program participants change their attitude towards using a collaborative and scholarly approach to teaching?

To what extent did program participants use a collaborative approach to teaching?

As previously mentioned, survey data were collected from participating faculty at the end of the grant period.[1] Cohort 1 faculty (62) began participation in the Bush Foundation grant in 2005, and 38 of these faculty completed the final evaluation survey. Seventeen Cohort 2 faculty began participating in the grant in 2006, and eight completed the final survey. For Cohort 3 faculty, 16 began their research at the beginning of 2007, and 11 completed the final survey in the fall of 2007.

With regard to collaboration, survey analysis for the final evaluation year revealed the information displayed in **Exhibit 3-2**.

EXHIBIT 3-2
FACULTY SURVEY RESPONSES: COLLABORATION
FINAL EVALUATION SURVEY

To what degree has each of the following factors motivated you to change your course?		% of Respondents			
		None	Low	Moderate	High
Desire to facilitate communication between students and instructors					
Cohort 1	n=38: Mean=5.79, Median=7, Mode=7, Std. deviation=1.580	3	11	32	55
Cohort 2	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	--	13	50	38
Cohort 3	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.375	--	9	36	55

[1] The complete systemwide survey analysis is presented in Appendix C.

EXHIBIT 3-2 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION
FINAL EVALUATION SURVEY

To what degree has each of the following factors motivated you to change your course?		% of Respondents			
		None	Low	Moderate	High
Desire to help students work more collaboratively					
Cohort 1	n=38: Mean=5.63, Median=7, Mode=7, Std. deviation=1.683	3	16	29	53
Cohort 2	n=8: Mean=4.5, Median=5, Mode=5, Std. deviation=1.414	--	38	50	13
Cohort 3	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.335	18	--	27	55
Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		% of Respondents			
		None	Low	Moderate	High
Implementing team teaching or other collaborative approaches in courses.					
Cohort 1	n=38: Mean=3.32, Median=3, Mode=1, Std. deviation=2.107	34	29	24	13
Cohort 2	n=8: Mean=3, Median=3, Mode=1, Std. deviation=1.852	38	25	38	--
Cohort 3	n=11: Mean=3.18, Median=1, Mode=1, Std. deviation=2.601	55	--	27	18
Meeting informally with students outside of class, labs, or studios.					
Cohort 1	n=38: Mean=4, Median=4, Mode=3, Std. deviation=2.013	18	32	32	18
Cohort 2	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	25	25	38	13
Cohort 3	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	18	18	18	46
Discussing with colleagues your course content, materials, assessment techniques, and the like.					
Cohort 1	n=38: Mean=5.37, Median=5, Mode=5, Std. deviation=1.460	--	18	45	37
Cohort 2	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.512	--	25	50	25
Cohort 3	n=11: Mean=5.36, Median=5, Mode=5, Std. deviation=1.502	--	18	46	36
Presenting on your discipline in a colleague's class.					
Cohort 1	n=38: Mean=2.84, Median=3, Mode=1, Std. deviation=1.824	42	26	29	3
Cohort 2	n=8: Mean=2.75, Median=3, Mode=3, Std. deviation=1.282	25	63	13	--
Cohort 3	n=11: Mean=2.64, Median=1, Mode=1, Std. deviation=2.157	55	18	18	9

EXHIBIT 3-2 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION
FINAL EVALUATION SURVEY

To what degree has each of the following factors motivated you to change your course?		% of Respondents			
		None	Low	Moderate	High
Inviting colleagues to review your syllabi or teaching materials.					
Cohort 1	n=38: Mean=3.95, Median=3, Mode=3, Std. deviation=1.659	11	42	37	11
Cohort 2	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=1.488	13	38	50	--
Cohort 3	n=11: Mean=3.18, Median=3, Mode=1, Std. deviation=2.442	46	18	18	18
Making your course syllabi available to anyone on the Internet or other public sources.					
Cohort 1	n=38: Mean=4.74, Median=5, Mode=7, Std. deviation=2.333	21	11	29	40
Cohort 2	n=8: Mean=4.25, Median=5, Mode=5, Std. deviation=2.375	25	13	38	25
Cohort 3	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	18	18	18	46
Preparing a portfolio or dossier to support your teaching performance.					
Cohort 1	n=38: Mean=3.11, Median=3, Mode=1, Std. deviation=2.024	40	24	29	8
Cohort 2	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	25	25	38	13
Cohort 3	n=11: Mean=3.55, Median=1, Mode=1, Std. deviation=2.979	55	--	9	36
Working with an undergraduate to further inform your course design.					
Cohort 1	n=38: Mean=3.84, Median=3, Mode=3, Std. deviation=2.260	26	29	21	24
Cohort 2	n=8: Mean=2.5, Median=1, Mode=1, Std. deviation=2.070	63	--	38	--
Cohort 3	n=11: Mean=3.91, Median=3, Mode=1, Std. deviation=2.737	36	18	9	36
Working with a Teaching Assistant to further inform your course design.					
Cohort 1	n=38: Mean=3.53, Median=3, Mode=1, Std. deviation=2.357	37	21	21	21
Cohort 2	n=8: Mean=2.75, Median=3, Mode=1, Std. deviation=1.669	38	38	25	--
Cohort 3	n=11: Mean=3.73, Median=3, Mode=3, Std. deviation=2.412	27	36	9	27
Working with other faculty to further inform your course design.					
Cohort 1	n=38: Mean=4.42, Median=5, Mode=5, Std. deviation=1.968	13	26	37	24
Cohort 2	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	13	38	38	13
Cohort 3	n=11: Mean=3.36, Median=3, Mode=3, Std. deviation=1.963	27	36	27	9

EXHIBIT 3-2 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION
FINAL EVALUATION SURVEY

To what degree has each of the following factors motivated you to change your course?		% of Respondents			
		None	Low	Moderate	High
Working with consultants to further inform your course design.					
Cohort 1	n=38: Mean=3.47, Median=3, Mode=1, Std. deviation=2.298	37	21	24	18
Cohort 2	n=8: Mean=2, Median=1, Mode=1, Std. deviation=1.512	63	25	13	--
Cohort 3	n=9: Mean=1.91, Median=1, Mode=1, Std. deviation=1.375	64	27	9	--

Source: MGT Faculty Survey, November 2007.

Data from **Exhibit 3-2** revealed the following faculty opinions regarding collaboration at the end of the grant:[2,3]

For Cohort 1 faculty:

- Over half (55%) of faculty in Cohort 1 revealed that they were highly motivated to change their course because of their desire to facilitate communication between students and instructors. Fifty-three percent of these faculty also stated that they were highly motivated to change their course because of their desire to help students work more collaboratively.

- One-third (34%) of Cohort 1 faculty said that they had given no priority to implementing team teaching or other collaborative approaches in their courses, while an additional 29 percent said this was a low priority. Only 13 percent said this was a high priority for them at the end of the grant period.

- Over one-third (37%) of faculty in Cohort1 said that they gave a high priority to discussing their course content, materials, and assessment techniques with colleagues, while an additional 45 percent said this was a moderate priority.

- Over two-thirds (68%) of faculty in Cohort 1 revealed they gave low or no priority to presenting their discipline in a colleague's class. However, 11 percent said having colleagues review their syllabi or teaching materials was a high priority, and an additional 37 percent said it was a moderate priority.

- Sixty-nine percent of the faculty in Cohort 1 said that it was a moderate to high priority to make their course syllabi available to

[2] The Statistical Package for the Social Sciences (SPSS) software was used to analyze the statistical importance of all survey data.
[3] Survey responses represent faculty participants from all four University of Minnesota campuses.

anyone on the Internet or other public sources. However, a similar percentage (64%) said that it was a low to no priority for them to prepare a portfolio to support their teaching performance.

- Cohort 1 faculty revealed that it was more of a priority for them to work with other faculty to further inform their course design, than it was for them to work with undergraduates, teaching assistants, or consultants.

For Cohort 2 faculty:

- Half (50%) of faculty in Cohort 2 revealed that they were moderately motivated to change their course because of their desire to facilitate communication between students and instructors, and 38 percent said this was a highly motivating factor. Fifty percent of these faculty also stated that they were moderately motivated to change their course because of their desire to help students work more collaboratively, and 13 percent said this was a highly motivating factor for them.

- Over one-third (38%) of Cohort 2 faculty said that they had given no priority to implementing team teaching or other collaborative approaches in their courses, while an additional 25 percent said this was a low priority. The remaining faculty said this was a moderate priority for them at the end of the grant period.

- One-fourth (25%) of faculty in Cohort 2 said that they gave a high priority to discussing their course content, materials, and assessment techniques with colleagues, while an additional 50 percent said this was a moderate priority.

- Over three-fourths (88%) of faculty in Cohort 2 revealed they gave low or no priority to presenting their discipline in a colleague's class. However, 50 percent said having colleagues review their syllabi or teaching materials was a moderate priority.

- Sixty-three percent of the faculty in Cohort 2 said that it was a moderate to high priority to make their course syllabi available to anyone on the Internet or other public sources. However, 50 percent said that it was a low to no priority for them to prepare a portfolio to support their teaching performance.

- Like Cohort 1 faculty, Cohort 2 faculty revealed that it was more of a priority for them to work with other faculty to further inform their course design, than it was for them to work with undergraduates, teaching assistants, or consultants.

For Cohort 3 faculty:

- Over half (55%) of faculty in Cohort 3 revealed that they were highly motivated to change their course because of their desire to facilitate communication between students and instructors. The same percentage of these faculty, also stated that they were highly motivated to change their course because of their desire to help students work more collaboratively.

- Over half (55%) of Cohort 3 faculty said that they had given no priority to implementing team teaching or other collaborative approaches in their courses.

- Over one-third (36%) of faculty in Cohort 3 said that they gave a high priority to discussing their course content, materials, and assessment techniques with colleagues, while an additional 46 percent said this was a moderate priority.

- Nearly three-fourths (73%) of faculty in Cohort 3 revealed they gave low or no priority to presenting their discipline in a colleague's class.

- Sixty-four percent of the faculty in Cohort 3 said that it was a moderate to high priority to make their course syllabi available to anyone on the Internet or other public sources. However, 55 percent said that it was not a priority for them to prepare a portfolio to support their teaching performance.

- Like faculty in Cohorts 1 and 2, Cohort 3 faculty revealed that it was more of a priority for them to work with other faculty to further inform their course design, than it was for them to work with undergraduates, teaching assistants, or consultants.

Survey questions regarding collaboration can be grouped into the following categories—collaborating with students for the purpose of learning, collaborating with students to inform course redesign, and collaborating with colleagues. Based on the survey data, faculty gave a higher priority to collaborating with students for the purpose of learning, and the lowest priority to collaborating with colleagues.

Faculty completed course profiles at the end of Year 3. This included documenting how they used collaboration in their research projects. A summary of data reported on the profiles revealed the following at the system level:

- Faculty used student forums and small groups to facilitate learning and student collaboration.

- Faculty participating in the grant collaborated with others within their departments, as well as networking with faculty from other departments and disciplines.

- Faculty participated in regularly scheduled grant meetings/ workshops, and in some instances met as small groups.

- Faculty participants conducted focus groups with students or distributed surveys to students to evaluate course design and discuss potential changes.

- Faculty participants provided collaborative learning opportunities for their students.

Faculty, consultants, campus coordinators, and students involved with the grant were also asked about collaboration during the focus groups and interviews MGT conducted on each campus. The following were among the strongest sentiments expressed by participants in these data collection activities:

For faculty on the Crookston Campus:

- Cross-disciplinary interaction allowed for a beneficial exchange of ideas and sharing of techniques that were surprisingly applicable and/or transferable between varied fields.

- Newer faculty expressed gratitude for opportunities to work with other faculty and learn from them, as well as the specific assistance that was offered to developing methodologies for assessment and evaluation.

- Faculty indicated an appreciation for assistance offered by the campus coordinator and/or consultants.

- Consultants observed increasing levels of collaboration, exemplified by joint presentations by faculty in varying disciplines, as well as the general collaboration associated with the project team assembled for the third year of the grant.

- Faculty noted opportunities to interact at faculty learning community meetings, which assisted in stimulating ideas for projects as well as refining approaches as work progressed.

- The campus coordinator reflected that broader participation (approximately 90 percent of faculty) occurred in the earlier phases of the grant, which was more visible, but the more recent activities (though much smaller in number) have had much more depth.

- In addition to inter-disciplinary interaction, the campus coordinator and others noted beneficial interaction between tenured and tenure-track faculty, those teaching upper- versus lower-level courses, older and younger faculty, and those teaching courses for majors versus non-major courses.

- Faculty noted interaction with non-participant faculty within and outside of their disciplines, stimulating interest and sharing ideas with regard to enhancing student learning.

- Efforts have led to some “desegregation” of faculty across campus.

For faculty on the Duluth Campus:

- Faculty referenced a “climate change” that has been realized through community engagement and interactive learning exercises, in that students are more willing to interact with faculty and peers.
- Faculty noted that they would not have met one another, otherwise, and, generally, the opportunity for cross-disciplinary interaction has been unique to activities stemming from grant.
- Interaction provided resources (expertise) for qualitative research methods, and able to implement ideas from seemingly unrelated areas/courses.
- New faculty cited their involvement with the grant as an important catalyst for integrating into the campus community.
- Collaboration with colleagues served as valuable support system (means of validation) and opportunity to learn from one another through shared challenges.
- Faculty reported that peers within common as well as other departments now appreciate certain aspects of grant efforts (e.g., technological upgrades to classroom); possible advances in technology department expenditures.
- Instructional Development Services sponsored presentations to entire campus, helped to extend knowledge to colleagues and broader community.
- Coordinator reported that collaboration seemed to grow over cycle of grant as relationships developed and comfort/trust was established.

For faculty on the Morris Campus:

- Faculty from variety of disciplines and divisions working together on personal response systems.
- Consultants often play role of facilitating communication between participants with related research efforts.
- Faculty expressed appreciation for coaching performed by consultants, particularly as it related to the use of new technology.
- Informal collaboration between colleagues is prevalent.
- Faculty with education backgrounds served to mentor faculty that were less familiar with classroom research.
- Some faculty worked with grant-specific student assistants and/or teaching assistants.

- Some faculty projects developing resources that can be shared by others in department (e.g., image library in arts).

For faculty on the Twin Cities Campus:

- Faculty work in teams with consultants and student assistants. Students expressed that they felt they offered an important perspective to faculty.

- Faculty valued opportunities to interact and connect with others at conferences and presentations relating to their research.

- Faculty noted opportunity to hear what others are doing in "real time" as a result of course team and larger group meetings versus simply hearing polished presentation, which allows for greater appreciation of processes involved with conducting research.

- Faculty appreciated "allies" that were available to them in the form of consultants and student assistants on their course teams; noted guidance and affirmation received from consultants and reflective dialogue between themselves and student assistants.

- Also, collaboration occurring between course teams and community (e.g., geology faculty partnering with museum for lab space).

- Consultants noted collaboration also taking place between project teams and staff members from the Center for Teaching and Learning and the Digital Media Center.

- Some faculty have recruited undergraduate students to assist with grant efforts; offer unique perspective/insight into course dynamics and student engagement.

- Students noted collaboration as a surprisingly effective instructional method in classroom.

- Consultants indicated that strong variance remains among teams in terms of collaborative structure (horizontal versus vertical). Dispute among consultants as to whether vertical structure does or does not represent "collaboration."

- Large group meetings include faculty from variety of disciplines working together and sharing ideas.

- Grant administrators noted promise in Breeze technology, but recognized shortcomings in its use, to date. Would like to explore further opportunities to use in its full/appropriate capacity.

To what extent did program participants use a scholarly approach to teaching?

Exhibit 3-3 presents the final evaluation survey data on following faculty views on using a scholarly approach to teaching systemwide.

EXHIBIT 3-3
FACULTY SURVEY RESPONSES: SCHOLARSHIP
FINAL EVAULUATION SURVEY

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		% of Respondents			
		None	Low	Moderate	High
Using interdisciplinary knowledge to inform your course design.					
Cohort 1	n=37: Mean=4.62, Median=5, Mode=5, Std. deviation=1.816	8	27	41	24
Cohort 2	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.982	13	--	50	38
Cohort 3	n=11: Mean=4.45, Median=5, Mode=5, Std. deviation=2.382	27	--	46	27
Implementing team teaching or other collaborative approaches in courses.					
Cohort 1	n=38: Mean=3.32, Median=3, Mode=1, Std. deviation=2.107	34	29	24	13
Cohort 2	n=8: Mean=3, Median=3, Mode=1, Std. deviation=1.852	38	25	38	--
Cohort 3	n=11: Mean=3.18, Median=1, Mode=1, Std. deviation=2.601	55	--	27	18
Updating your knowledge of your discipline.					
Cohort 1	n=38: Mean=5.05, Median=5, Mode=5, Std. deviation=1.770	8	13	47	32
Cohort 2	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.282	--	13	63	25
Cohort 3	n=11: Mean=5.18, Median=7, Mode=7, Std. deviation=2.442	18	9	18	56
Participating in conferences, seminars, or workshops on teaching or student learning.					
Cohort 1	n=37: Mean=2.96, Median=3, Mode=3, Std. deviation=.806	3	24	43	30
Cohort 2	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	13	38	38	13
Cohort 3	n=11: Mean=5, Median=5, Mode=3, Std. deviation=1.789	--	36	27	36

Source: MGT Faculty Survey, November 2007.

Data from **Exhibit 3-3** revealed the following faculty opinions regarding scholarship at the end of the grant period:

For Cohort 1 faculty:

- Nearly one-fourth (24%) said they gave a high priority to using interdisciplinary knowledge to further inform their course design, and 41 percent said this was a moderate priority.

- Seventy-nine percent said it was a moderate to high priority for them to update their knowledge of their discipline.

- Nearly three-fourths (73%) said it was a moderate to high priority for them to participate in conferences, seminars, or workshops on teaching or student learning.

For Cohort 2 faculty:

- Over one-third (38%) said they gave a high priority to using interdisciplinary knowledge to further inform their course design, and 50 percent said this was a moderate priority.

- Eighty-eight percent said it was a moderate to high priority for them to update their knowledge of their discipline.

- Nearly two-thirds (63%) said it was a moderate to high priority for them to participate in conferences, seminars, or workshops on teaching or student learning.

For Cohort 3 faculty:

- Over one-fourth (27%) said they gave a high priority to using interdisciplinary knowledge to further inform their course design, and 46 percent said this was a moderate priority.

- Fifty-six percent said it was a high priority for them to update their knowledge of their discipline, and 18 percent said it was a moderate priority.

- Nearly two-thirds (63%) said it was a moderate to high priority for them to participate in conferences, seminars, or workshops on teaching or student learning.

Course profiles, completed by Bush grant faculty at the end of the grant, documented how they used a scholarly approach to teaching. Data analysis of these documents revealed the following at the system level:

- Faculty made presentations to colleagues to summarize and reveal outcomes of their research.

- Participants applied to and presented at regional, state, national, and international conferences and meetings.

- Literature reviews and white papers were written and submitted for publication.

- Faculty used articles to identify other teaching methods and ways to improve teaching to impact student learning.

- Participants used various innovative teaching strategies to enhance their courses and learning experiences for their students.

A list of all presentations and publications resulting from Bush grant efforts is maintained by the University of Minnesota's Center for Teaching and Learning on the Twin Cities campus, and is available through the grant Web site. This list is also included in **Appendix E** of this report.

Project participants and administrators on each campus were also asked about using a scholarly approach to teaching during the fall site visits. Findings from focus groups and interviews included the following:

On the Crookston Campus:

- Faculty used research articles to help generate research questions as well as to analyze data.
- The campus coordinator provided books and articles to inform research, while individual faculty also investigated articles relating to their particular topic areas.
- Participants presented findings individually and in partnership with one another (including presentations at regional disciplinary association meetings).

On the Duluth Campus:

- Some faculty indicated that they have made efforts to delve into related research, but areas of study are too new to find helpful materials/insight.
- Faculty noted publication and presentation of work (including national/regional journals and conferences within disciplinary or pedagogical areas) among their advances relative to the grant's goals of increasing scholarship.
- One faculty member is authoring a textbook as a product of their research activities.
- Faculty noted fewer formal publications (such as Web tutorials) among scholarship-related activities.
- Instructional Development Services served as a primary resource in collecting and distributing scholarly publications to inform work, distributed a newsletter to keep participants aware of relevant information, and assisted faculty in carrying research efforts to publication.
- The campus coordinator indicated that scholarship appeared to be maturing on the campus, evidenced by multiple publications and presentations resulting from grant efforts.

On the Morris Campus:

- Faculty and consultants researched literature to gain understanding of methods used to employ experimental technologies.
- Many faculty published and presented the findings resulting from their research efforts.
- A library of relevant scholarly materials was compiled and maintained by staff on the campus; awareness among faculty regarding available resources increased over the grant cycle.
- Faculty have participated in various campus, system, and external forums to present findings.
- Faculty indicated broad use of resources (academic journals and others) provided by consultants or individually located.
- Among faculty, there was a realization regarding technology's role in improving teaching.
- Faculty indicated that size of the campus tends to promote informal scholarship in terms of sharing of ideas and knowledge.
- Education faculty, consultants, and participants played a strong role in directing participants towards relevant research and other resources.
- Veteran participants fulfilled a mentorship role with new faculty in some cases.

On the Twin Cities Campus:

- Consultants noted a wealth of important findings being published and presented by project teams. Faculty noted publications and presentations in both disciplinary and pedagogical forums.
- Grant administrators noted an increased awareness of pedagogical literature and the value of regular team and group meetings to share findings.
- Faculty appreciated the experts that were brought to the campus to provide methods and instruction.
- Consultants (and student assistants) often provided research to course teams to inform project design.

To what extent did program participants change their attitude towards using a collaborative and scholarly approach to teaching?

As previously mentioned, Cohort 1 faculty have participated in the Bush Foundation grant for three years. As a result, survey data collected in 2005 are compared with the

final evaluation survey conducted in the fall of 2007 to measure a three-year change in attitude towards collaboration and scholarship. Likewise, data collected in 2006 are compared with the final evaluation survey data for Cohort 2 to measure a two-year change. For Cohort 3, a one-year change is measured using data collected from the baseline survey conducted at the beginning of 2007 with the final evaluation survey.

As mentioned in the evaluation methodology, survey data collected at the beginning year for each Cohort—2005 for Cohort 1, 2006 for Cohort 2, and spring 2007 for Cohort 3—established the baseline for which annual survey data could be compared. However, as noted in the following exhibits in this chapter, within each Cohort, fewer faculty completed the survey each year. Furthermore, statistically valid comparisons and growth cannot be measured because surveys were completed anonymously.

Exhibit 3-4 shows the annual survey responses for all Cohorts, systemwide.

EXHIBIT 3-4
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

To what degree has each of the following factors motivated you to change your course?		Year	% of Respondents			
			None	Low	Moderate	High
Desire to facilitate communication between students and instructors						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.708	2005	--	13	35	52
	n=47: Mean=3.23, Median=3, Mode=3, Std. deviation=.729	2006	--	17	43	40
	n=38: Mean=5.79, Median=7, Mode=7, Std. deviation=1.580	2007	3	11	32	55
Cohort 2	n=15: Mean=3.40, Median=3, Mode=3, Std. deviation=.632	2006	--	7	47	47
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.632	Spring 2007	--	6	38	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	36	55
Desire to help students work more collaboratively						
Cohort 1	n=63: Mean=2.98, Median=3, Mode=3, Std. deviation=.871	2005	5	24	40	32
	n=47: Mean=3.23, Median=3, Mode=3, Std. deviation=.729	2006	4	26	30	40
	n=38: Mean=5.63, Median=7, Mode=7, Std. deviation=1.683	2007	3	16	29	53
Cohort 2	n=15: Mean=3.40, Median=3, Mode=3, Std. deviation=.632	2006	--	40	53	7
	n=8: Mean=4.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	38	50	13
Cohort 3	n=16: Mean=3.25, Median=3.5, Mode=4, Std. deviation=.931	Spring 2007	6	13	31	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.335	Fall 2007	18	--	27	55

EXHIBIT 3-4 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
Using interdisciplinary knowledge to inform your course design.						
Cohort 1	n=63: Mean=2.89, Median=3, Mode=3, Std. deviation=.918	2005	8	24	40	29
	n=47: Mean=2.66, Median=3, Mode=3, Std. deviation=.915	2006	13	26	45	17
	n=37: Mean=4.62, Median=5, Mode=5, Std. deviation=1.816	2007	8	27	41	24
Cohort 2	n=16: Mean=2.69, Median=3, Mode=2, Std. deviation=1.014	2006	13	31	31	25
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.982	2007	13	--	50	38
Cohort 3	n=15: Mean=2.33, Median=2, Mode=2, Std. deviation=.816	Spring 2007	13	47	33	7
	n=11: Mean=4.45, Median=5, Mode=5, Std. deviation=2.382	Fall 2007	27	--	46	27
Implementing team teaching or other collaborative approaches in courses.						
Cohort 1	n=63: Mean=2.14, Median=2, Mode=2, Std. deviation=.965	2005	30	35	25	10
	n=46: Mean=2.02, Median=2, Mode=1, Std. deviation=.954	2006	37	31	26	7
	n=38: Mean=3.32, Median=3, Mode=1, Std. deviation=2.107	2007	34	29	24	13
Cohort 2	n=16: Mean=1.94, Median=1.5, Mode=1, Std. deviation=1.124	2006	50	19	19	13
	n=8: Mean=3, Median=3, Mode=1, Std. deviation=1.852	2007	38	25	38	--
Cohort 3	n=16: Mean=2.00, Median=2, Mode=2, Std. deviation=.894	Spring 2007	31	44	19	6
	n=11: Mean=3.18, Median=1, Mode=1, Std. deviation=2.601	Fall 2007	55	--	27	18
Updating your knowledge of your discipline.						
Cohort 1	n=62: Mean=3.37, Median=4, Mode=4, Std. deviation=1.044	2005	10	13	8	69
	n=47: Mean=3.28, Median=4, Mode=4, Std. deviation=.852	2006	2	19	28	51
	n=38: Mean=5.05, Median=5, Mode=5, Std. deviation=1.770	2007	8	13	47	32
Cohort 2	n=16: Mean=3.31, Median=3, Mode=3, Std. deviation=.704	2006	--	13	44	44
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.282	2007	--	13	63	25
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.964	Spring 2007	6	13	13	69
	n=11: Mean=5.18, Median=7, Mode=7, Std. deviation=2.442	Fall 2007	18	9	18	56

EXHIBIT 3-4 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
Meeting informally with students outside of class, labs, or studios.						
Cohort 1	n=62: Mean=2.69, Median=3, Mode=3, Std. deviation=1.065	2005	18	23	32	27
	n=46: Mean=2.65, Median=3, Mode=3, Std. deviation=.924	2006	11	33	37	20
	n=38: Mean=4, Median=4, Mode=3, Std. deviation=2.013	2007	18	32	32	18
Cohort 2	n=16: Mean=2.88, Median=3, Mode=4, Std. deviation=1.088	2006	13	25	25	38
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	2007	25	25	38	13
Cohort 3	n=16: Mean=2.69, Median=3, Mode=3, Std. deviation=1.078	Spring 2007	19	19	38	25
	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	Fall 2007	18	18	18	46
Discussing with colleagues your course content, materials, assessment techniques, and the like.						
Cohort 1	n=63: Mean=3.25, Median=3, Mode=4, Std. deviation=.761	2005	2	14	41	43
	n=47: Mean=3.26, Median=3, Mode=3, Std. deviation=.706	2006	--	15	45	40
	n=38: Mean=5.37, Median=5, Mode=5, Std. deviation=1.460	2007	--	18	45	37
Cohort 2	n=16: Mean=2.69, Median=3, Mode=3, Std. deviation=.946	2006	13	25	44	19
	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.512	2007	--	25	50	25
Cohort 3	n=16: Mean=3.00, Median=3, Mode=4, Std. deviation=1.033	Spring 2007	6	31	19	44
	n=11: Mean=5.36, Median=5, Mode=5, Std. deviation=1.502	Fall 2007	--	18	46	36
Participating in conferences, seminars, or workshops on teaching or student learning.						
Cohort 1	n=63: Mean=3.19, Median=3, Mode=3, Std. deviation=.780	2005	2	18	41	40
	n=47: Mean=5, Median=5, Mode=5, Std. deviation=1.633	2006	3	24	43	30
	n=37: Mean=2.96, Median=3, Mode=3, Std. deviation=.806	2007	3	24	43	30
Cohort 2	n=16: Mean=2.88, Median=3, Mode=3, Std. deviation=1.025	2006	13	19	38	31
	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	2007	13	38	38	13
Cohort 3	n=16: Mean=3.06, Median=3, Mode=3, Std. deviation=.929	Spring 2007	6	18	38	38
	n=11: Mean=5, Median=5, Mode=3, Std. deviation=1.789	Fall 2007	--	36	27	36

EXHIBIT 3-4 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
Presenting on your discipline in a colleague's class.						
Cohort 1	n=62: Mean=2.31, Median=2, Mode=2, Std. deviation=.879	2005	19	36	34	8
	n=47: Mean=1.87, Median=2, Mode=1, Std. deviation=.992	2006	45	34	11	11
	n=38: Mean=2.84, Median=3, Mode=1, Std. deviation=1.824	2007	42	26	29	3
Cohort 2	n=16: Mean=1.81, Median=1.5, Mode=1, Std. deviation=1.047	2006	50	31	6	13
	n=8: Mean=2.75, Median=3, Mode=3, Std. deviation=1.282	2007	25	63	13	--
Cohort 3	n=16: Mean=1.56, Median=1, Mode=1, Std. deviation=.727	Spring 2007	56	31	13	--
	n=11: Mean=2.64, Median=1, Mode=1, Std. deviation=2.157	Fall 2007	55	18	18	9
Inviting colleagues to review your syllabi or teaching materials.						
Cohort 1	n=62: Mean=2.69, Median=3, Mode=3, Std. deviation=.985	2005	16	19	44	21
	n=46: Mean=2.39, Median=2.5, Mode=3, Std. deviation=.954	2006	22	28	39	11
	n=38: Mean=3.95, Median=3, Mode=3, Std. deviation=1.659	2007	11	42	37	11
Cohort 2	n=16: Mean=2.19, Median=2, Mode=1, Std. deviation=1.047	2006	31	31	25	13
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=1.488	2007	13	38	50	--
Cohort 3	n=16: Mean=2.44, Median=2.5, Mode=3, Std. deviation=1.094	Spring 2007	25	25	31	19
	n=11: Mean=3.18, Median=3, Mode=1, Std. deviation=2.442	Fall 2007	46	18	18	18
Making your course syllabi available to anyone on the Internet or other public sources.						
Cohort 1	n=62: Mean=2.85, Median=3, Mode=4, Std. deviation=1.053	2005	15	19	32	34
	n=47: Mean=2.85, Median=3, Mode=4, Std. deviation=1.083	2006	15	21	28	36
	n=38: Mean=4.74, Median=5, Mode=7, Std. deviation=2.333	2007	21	11	29	40
Cohort 2	n=16: Mean=3.06, Median=3.5, Mode=4, Std. deviation=1.063	2006	6	31	13	50
	n=8: Mean=4.25, Median=5, Mode=5, Std. deviation=2.375	2007	25	13	38	25
Cohort 3	n=16: Mean=3.06, Median=3.5, Mode=4, Std. deviation=1.181	Spring 2007	19	6	25	50
	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	Fall 2007	18	18	18	46

EXHIBIT 3-4 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
Preparing a portfolio or dossier to support your teaching performance.						
Cohort 1	n=62: Mean=2.55, Median=3, Mode=2, Std. deviation=1.051	2005	19	29	29	23
	n=47: Mean=2.21, Median=2, Mode=1, Std. deviation=1.062	2006	32	30	23	15
	n=38: Mean=3.11, Median=3, Mode=1, Std. deviation=2.024	2007	40	24	29	8
Cohort 2	n=16: Mean=2.25, Median=2, Mode=2, Std. deviation=1.183	2006	31	38	6	25
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	2007	25	25	38	13
Cohort 3	n=16: Mean=2.06, Median=2, Mode=1, Std. deviation=1.063	Spring 2007	44	13	38	6
	n=11: Mean=3.55, Median=1, Mode=1, Std. deviation=2.979	Fall 2007	55	--	9	36
Working with an undergraduate to further inform your course design.						
Cohort 1	n=61: Mean=2.52, Median=3, Mode=3, Std. deviation=1.134	2005	27	20	30	25
	n=47: Mean=2.30, Median=2, Mode=1, Std. deviation=1.178	2006	36	19	23	21
	n=38: Mean=3.84, Median=3, Mode=3, Std. deviation=2.260	2007	26	29	21	24
Cohort 2	n=16: Mean=1.75, Median=1, Mode=1, Std. deviation=1.000	2006	56	19	19	6
	n=8: Mean=2.5, Median=1, Mode=1, Std. deviation=2.070	2007	63	--	38	--
Cohort 3	n=16: Mean=1.94, Median=1.5, Mode=1, Std. deviation=1.063	Spring 2007	50	13	31	6
	n=11: Mean=3.91, Median=3, Mode=1, Std. deviation=2.737	Fall 2007	36	18	9	36
Working with a Teaching Assistant to further inform your course design.						
Cohort 1	n=61: Mean=2.13, Median=2, Mode=1, Std. deviation=1.132	2005	41	21	21	16
	n=47: Mean=1.96, Median=1, Mode=1, Std. deviation=1.197	2006	55	11	17	17
	n=38: Mean=3.53, Median=3, Mode=1, Std. deviation=2.357	2007	37	21	21	21
Cohort 2	n=16: Mean=1.88, Median=1, Mode=1, Std. deviation=1.088	2006	56	6	31	6
	n=8: Mean=2.75, Median=3, Mode=1, Std. deviation=1.669	2007	38	38	25	--
Cohort 3	n=16: Mean=2.13, Median=2, Mode=2, Std. deviation=.885	Spring 2007	25	44	25	6
	n=11: Mean=3.73, Median=3, Mode=3, Std. deviation=2.412	Fall 2007	27	36	9	27

EXHIBIT 3-4 (Continued)
FACULTY SURVEY RESPONSES: COLLABORATION AND SCHOLARSHIP

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
Working with other faculty to further inform your course design.						
Cohort 1	n=61: Mean=2.90, Median=3, Mode=3, Std. deviation=.978	2005	10	23	34	33
	n=46: Mean=2.48, Median=2.5, Mode=3, Std. deviation=.960	2006	17	33	35	15
	n=38: Mean=4.42, Median=5, Mode=5, Std. deviation=1.968	2007	13	26	37	24
Cohort 2	n=16: Mean=2.25, Median=2, Mode=2, Std. deviation=.856	2006	19	44	31	6
	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	2007	13	38	38	13
Cohort 3	n=16: Mean=2.63, Median=3, Mode=3, Std. deviation=.957	Spring 2007	13	31	38	19
	n=11: Mean=3.36, Median=3, Mode=3, Std. deviation=1.963	Fall 2007	27	36	27	9
Working with consultants to further inform your course design.						
Cohort 1	n=61: Mean=2.20, Median=2, Mode=1, Std. deviation=1.093	2005	34	28	21	16
	n=47: Mean=2.26, Median=2, Mode=1, Std. deviation=1.188	2006	38	19	21	21
	n=38: Mean=3.47, Median=3, Mode=1, Std. deviation=2.298	2007	37	21	24	18
Cohort 2	n=16: Mean=1.75, Median=1.5, Mode=1, Std. deviation=.931	2006	50	31	13	6
	n=8: Mean=2, Median=1, Mode=1, Std. deviation=1.512	2007	63	25	13	--
Cohort 3	n=16: Mean=2.13, Median=2, Mode=1, Std. deviation=1.204	Spring 2007	44	19	19	19
	n=9: Mean=1.91, Median=1, Mode=1, Std. deviation=1.375	Fall 2007	64	27	9	--

Source: MGT Faculty Surveys, February 2005, 2006, and 2007, and November 2007.

As shown in **Exhibit 3-4**, there has been little change in the faculty's attitude towards using a collaborative and scholarly approach to teaching. However, it is important to note that the faculty viewed collaboration and scholarship in teaching as important from the beginning, so little change was anticipated. In some instances, faculty perceptions were not as high in Years 2 and/or 3 as they were in Year 1, as noted by the decreases. Additionally, as with any longitudinal project, little change is to be expected over so few years.

Participants in focus groups and interviews, conducted during MGT's visits to each campus, indicated substantial changes in attitudes towards the concepts of scholarship and collaboration as they relate to teaching. Findings relative to this aspect of the data collection activities include the following:

At Crookston:

- Faculty indicated that their experience with the Bush grant has formalized their understanding of classroom research including assessment and evaluation. This was the first actual experience for some participants.
- Faculty have realized the importance of assessment and evaluation, and bringing methods into classes outside of the Bush grant.

At Duluth:

- Faculty primarily indicated heightened awareness of scholarship of teaching and learning, though some were entirely unaware of this field prior to their participation in the Bush grant work.
- The attitudes of some faculty mentors have become more reflective, looking at all pedagogical elements of content and changing delivery where beneficial.

At Morris:

- Understanding and appreciation for the scholarship of teaching and learning has generally improved, and sophistication has advanced.
- Faculty are more confident that technology can be used to improve teaching (scholarship can assist in planning effective ventures).

At Twin Cities:

- Students indicated an appreciation for rapid feedback and continual improvement, leading to a more adaptive instructional model.
- Students noted that the realization that change in course delivery was possible was a significant shift.
- Consultants observed that many faculty were relying more heavily on solid evidence stemming from assessment and evaluation to direct their efforts (development of a “data feedback loop”).
- Grant administrators noted that many grant participants were beginning to see teaching as a “team sport” with increased camaraderie and interaction among more diverse groups.

Based upon survey results; information submitted in course profiles; and interviews conducted with consultants, faculty, and students; it would appear that various modes of collaboration and scholarship have played prominent roles in grant proceedings across the system. Regarding collaboration, while a few inconsistencies in definitions or understanding continue to exist, and some gaps in opportunities were cited by participating faculty, it is evident that all grant participants have seen an increase in experiences working with others as part of the development, implementation, and

assessment and evaluation stages of their grant work. Additionally, understanding of the scholarship of teaching among participants has evolved substantially, with some faculty gaining their first introduction to the concept, while others have significantly advanced their understanding of how to employ the ideals of scholarship in refining their teaching methodologies as well as disseminating their findings to others in their fields. Increased appreciation for both of these aspects of the grant—collaboration and scholarship—is apparent among almost all participants.

3.3 Assessment and Evaluation of Student Learning

As previously mentioned, data were collected from faculty surveys, course profile updates, and onsite focus groups to determine how faculty were using assessment and evaluation of student learning to inform course design/redesign. Information gathered from consultants and campus coordinators was used as an additional reference. Data collected addressed the following research questions:

- How did participants assess student learning?
- How was assessment information used to inform course design/redesign?

How did participants assess student learning?

A section of the faculty survey focused on how grant participants had assessed student learning throughout the grant. Again, it should be noted that within each Cohort, fewer faculty completed the survey each year; thus, statistically valid comparison and growth for each of the Cohorts cannot be measured and reported.

Exhibit 3-5 shows the annual survey responses for all of the Cohorts, systemwide.

EXHIBIT 3-5
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT LEARNING

How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
Interactive techniques (e.g., voting, debates, small group problem-solving						
Cohort 1	n=63: Mean=2.57, Median=2, Mode=2, Std. deviation=.962	2005	10	48	19	24
	n=46: Mean=2.74, Median=3, Mode=2, Std. deviation=1.021	2006	11	35	24	30
	n=38: Mean=5, Median=5, Mode=7, Std. deviation=1.973	2007	8	24	29	40
Cohort 2	n=15: Mean=2.80, Median=3, Mode=3, Std. deviation=1.082	2006	20	7	47	27
	n=8: Mean=4.75, Median=5, Mode=5, Std. deviation=1.982	2007	13	13	50	25
Cohort 3	n=16: Mean=3.38, Median=3.5, Mode=4, Std. deviation=.719	Spring 2007	--	13	38	50
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	27	64

EXHIBIT 3-5 (Continued)
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT LEARNING

How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
Qualitative methods (e.g., journals, reflection papers, essays, short answer)						
Cohort 1	n=63: Mean=2.57, Median=3, Mode=3, Std. deviation=1.043	2005	19	27	32	22
	n=47: Mean=2.40, Median=2, Mode=2, Std. deviation=.970	2006	19	36	30	15
	n=38: Mean=4.26, Median=5, Mode=3, Std. deviation=2.101	2007	16	32	26	26
Cohort 2	n=15: Mean=2.33, Median=2, Mode=2, Std. deviation=.900	2006	13	53	20	13
	n=8: Mean=3.50, Median=3, Mode=3, Std. deviation=1.773	2007	13	63	13	13
Cohort 3	n=16: Mean=2.75, Median=3, Mode=2, Std. deviation=1.065	Spring 2007	13	31	25	31
	n=11: Mean=4.64, Median=5, Mode=5, Std. deviation=1.963	Fall 2007	9	27	36	27
Quantitative methods (e.g. quizzes or tests, surveys)						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.853	2005	6	5	32	57
	n=47: Mean=3.32, Median=3, Mode=4, Std. deviation=.783	2006	2	13	36	49
	n=38: Mean=5.47, Median=5, Mode=7, Std. deviation=1.704	2007	3	18	32	47
Cohort 2	n=15: Mean=3.47, Median=4, Mode=4, Std. deviation=.743	2006	--	13	27	60
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.669	2007	--	25	38	38
Cohort 3	n=16: Mean=3.06 Median=3, Mode=4, Std. deviation=.998	Spring 2007	6	25	25	44
	n=11: Mean=4.64, Median=5, Mode=7, Std. deviation=2.501	Fall 2007	18	27	9	46
Anonymous student response techniques						
Cohort 1	n=62: Mean=2.24, Median=2, Mode=2, Std. deviation=.803	2005	15	55	23	8
	n=47: Mean=2.21, Median=2, Mode=2, Std. deviation=.954	2006	21	51	13	15
	n=38: Mean=2.84, Median=3, Mode=3, Std. deviation=1.763	2007	25	38	25	13
Cohort 2	n=15: Mean=2.07, Median=2, Mode=2, Std. deviation=.884	2006	27	47	20	7
	n=8: Mean=3.5, Median=3, Mode=3, Std. deviation=2.070	2007	25	38	25	13
Cohort 3	n=16: Mean=2.25, Median=2, Mode=3, Std. deviation=.931	Spring 2007	25	31	38	6
	n=11: Mean=2.64, Median=3, Mode=1, Std. deviation=1.748	Fall 2007	46	27	27	--

EXHIBIT 3-5 (Continued)
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT LEARNING

How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
Identified student response techniques						
Cohort 1	n=60: Mean=1.95, Median=2, Mode=2, Std. deviation=.852	2005	35	38	23	3
	n=46: Mean=2.20, Median=2, Mode=2, Std. deviation=.980	2006	26	41	20	13
	n=37: Mean=3.7, Median=3, Mode=3, Std. deviation=2.066	2007	24	32	27	16
Cohort 2	n=15: Mean=2.00, Median=2, Mode=1, Std. deviation=1.069	2006	40	33	13	13
	n=8: Mean=3.25, Median=3, Mode=3, Std. deviation=1.669	2007	25	38	38	--
Cohort 3	n=16: Mean=2.31, Median=2, Mode=2, Std. deviation=.946	Spring 2007	25	38	19	19
	n=11: Mean=2.64, Median=3, Mode=1, Std. deviation=1.963	Fall 2007	46	36	9	9
Un-graded performance measures						
Cohort 1	n=62: Mean=2.27, Median=2, Mode=2, Std. deviation=.908	2005	19	45	24	11
	n=47: Mean=2.30, Median=2, Mode=2, Std. deviation=.976	2006	21	43	21	15
	n=38: Mean=3.37, Median=3, Mode=3, Std. deviation=1.852	2007	26	37	29	8
Cohort 2	n=15: Mean=2.20, Median=2, Mode=2, Std. deviation=1.014	2006	27	40	20	13
	n=8: Mean=4.5, Median=4, Mode=3, Std. deviation=2.33	2007	13	38	13	38
Cohort 3	n=16: Mean=2.31, Median=2, Mode=2, Std. deviation=.946	Spring 2007	19	44	25	13
	n=11: Mean=3, Median=3, Mode=1, Std. deviation=2.00	Fall 2007	36	36	18	9
Graded performance measures						
Cohort 1	n=63: Mean=3.57, Median=4, Mode=4, Std. deviation=.615	2005	--	6	30	64
	n=46: Mean=3.37, Median=3, Mode=4, Std. deviation=.679	2006	--	11	41	48
	n=38: Mean=5.84, Median=7, Mode=7, Std. deviation=1.443	2007	3	5	40	53
Cohort 2	n=15: Mean=3.00, Median=3, Mode=3, Std. deviation=.926	2006	7	20	40	33
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.282	2007	--	13	63	25
Cohort 3	n=16: Mean=3.19, Median=3, Mode=4, Std. deviation=.911	Spring 2007	6	13	38	44
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.044	Fall 2007	--	--	46	55

EXHIBIT 3-5 (Continued)
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT LEARNING

How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
Voluntary measures of performance						
Cohort 1	n=60: Mean=1.85, Median=2, Mode=1, Std. deviation=.880	2005	43	32	22	3
	n=46: Mean=1.96, Median=2, Mode=1, Std. deviation=.918	2006	37	37	20	7
	n=36: Mean=2.83, Median=3, Mode=1, Std. deviation=1.748	2007	39	33	25	3
Cohort 2	n=15: Mean=1.73, Median=2, Mode=1, Std. deviation=.799	2006	47	33	20	--
	n=8: Mean=2.75, Median=3, Mode=3, Std. deviation=1.982	2007	38	50	--	13
Cohort 3	n=16: Mean=1.5, Median=1, Mode=1, Std. deviation=.894	Spring 2007	69	19	6	6
	n=11: Mean=2.09, Median=1, Mode=1, Std. deviation=1.640	Fall 2007	64	18	18	--
Required measures of performance						
Cohort 1	n=60: Mean=3.13, Median=3, Mode=3, Std. deviation=.911	2005	8	10	42	40
	n=46: Mean=3.17, Median=3.5, Mode=4, Std. deviation=.973	2006	7	20	24	50
	n=36: Mean=5.22, Median=5, Mode=7, Std. deviation=	2007	11	11	33	44
Cohort 2	n=15: Mean=3.00, Median=3, Mode=3, Std. deviation=.926	2006	7	50	40	33
	n=8: Mean=4.25, Median=5, Mode=5, Std. deviation=2.375	2007	25	13	38	25
Cohort 3	n=16: Mean=3.00, Median=3, Mode=4, Std. deviation=1.155	Spring 2007	19	6	31	44
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
Individual student performance						
Cohort 1	n=63: Mean=3.35, Median=4, Mode=4, Std. deviation=.883	2005	8	3	35	54
	n=46: Mean=3.24, Median=3.5, Mode=4, Std. deviation=.947	2006	9	9	33	50
	n=36: Mean=5.67, Median=5, Mode=7, Std. deviation=1.512	2007	3	8	42	47
Cohort 2	n=15: Mean=3.13, Median=3, Mode=3, Std. deviation=.743	2006	--	20	47	33
	n=8: Mean=4.75, Median=5, Mode=5, Std. deviation=1.982	2007	13	13	50	25
Cohort 3	n=16: Mean=3.19, Median=4, Mode=4, Std. deviation=1.109	Spring 2007	13	13	19	56
	n=11: Mean=5.73, Median=7, Mode=7, Std. deviation=1.618	Fall 2007	--	18	27	55

EXHIBIT 3-5 (Continued)
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT LEARNING

How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
Group performance						
Cohort 1	n=62: Mean=2.42, Median=2, Mode=2, Std. deviation=1.017	2005	19	39	23	19
	n=45: Mean=2.27, Median=2, Mode=2, Std. deviation=.939	2006	22	40	27	11
	n=36: Mean=3.89, Median=3, Mode=3, Std. deviation=2.053	2007	19	36	25	19
Cohort 2	n=15: Mean=2.07, Median=2, Mode=1, Std. deviation=1.100	2006	40	27	20	13
	n=8: Mean=2.50, Median=2, Mode=1, Std. deviation=1.773	2007	50	25	25	--
Cohort 3	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=1.047	Spring 2007	13	25	31	31
	n=11: Mean=3.91, Median=5, Mode=5, Std. deviation=2.256	Fall 2007	27	18	36	18

Source: MGT Faculty Surveys, February 2005, 2006, and 2007, and November 2007.

In summary, the data reveal that fewer faculty used graded or quantitative methods (quizzes, tests, etc.) to assess student learning by the end of the grant period. More faculty were using interactive techniques, such as student response systems, to assess performance. Faculty were also more prone to assess students on individual performance than outcomes from groups throughout the course of the grant period; however, group assessment was increasing across all Cohorts.

The survey also asked faculty to rate the importance of assessment of student knowledge in improving student learning. Annual survey data collected from this section of the survey are presented in **Exhibit 3-6**, for each Cohort, systemwide.

EXHIBIT 3-6
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT KNOWLEDGE

How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
Collecting information to assess students' entry-level knowledge or abilities						
Cohort 1	n=63: Mean=2.81, Median=3, Mode=3, Std. deviation=1.05	2005	16	18	37	30
	n=48: Mean=3.06, Median=3, Mode=3, Std. deviation=.861	2006	8	8	52	31
	n=38: Mean=5.11, Median= 5, Mode=7, Std. deviation= 1.97	2007	8	21	29	42
Cohort 2	n=15: Mean=2.53, Median=3, Mode=3, Std. deviation=.990	2006	20	20	47	13
	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.852	2007	13	--	63	25
Cohort 3	n=16: Mean=3.26, Median=3, Mode=3, Std. deviation=.856	Spring 2007	6	6	44	44
	n=11: Mean=4.64, Median=5, Mode=5, Std. deviation=2.157	Fall 2007	18	9	46	27
Collecting information to diagnose learning problems or identify individuals who need extra help						
Cohort 1	n=62: Mean=2.77, Median=3, Mode=3, Std. deviation=.990	2005	13	24	36	27
	n=48: Mean=2.44, Median=2.5, Mode=3, Std. deviation=.796	2006	13	38	44	6
	n=38: Mean= 4.63, Median=5, Mode=5, Std. deviation=1.965	2007	11	26	34	29
Cohort 2	n=15: Mean=2.73, Median=2, Mode=2, Std. deviation=1.03	2006	7	47	13	33
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=1.488	2007	13	38	50	--
Cohort 3	n=16: Mean=2.63, Median=3, Mode=3, Std. deviation=.957	Spring 2007	13	31	38	19
	n=11: Mean=4.09, Median=5, Mode=5, Std. deviation=2.256	Fall 2007	27	9	46	18
Using classroom assessment strategies to prompt student thinking during lecture or class discussion						
Cohort 1	n=64: Mean=3.24, Median=3, Mode=4, Std. deviation=.946	2005	10	6	35	49
	n=48: Mean=3.46, Median=4, Mode=4, Std. deviation=.743	2006	2	8	31	58
	n=38: Mean=6.05, Median=7, Mode=7, Std. deviation=1.593	2007	3	11	18	68
Cohort 2	n=15: Mean=3.47, Median=4, Mode=4, Std. deviation=.915	2006	7	7	20	67
	n=8: Mean=6, Median=6, Mode=5, Std. deviation=1.069	2007	--	--	50	50
Cohort 3	n=16: Mean=3.69, Median=4, Mode=4, Std. deviation=.793	Spring 2007	6	--	13	81
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.157	Fall 2007	9	18	18	55

EXHIBIT 3-6 (Continued)
FACULTY SURVEY RESPONSES: ASSESSMENT OF STUDENT KNOWLEDGE

How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
Helping students learn to assess their own progress						
Cohort 1	n=63: Mean=2.97, Median=3, Mode=4, Std. deviation=.967	2005	6	29	27	38
	n=47: Mean=2.85, Median=3, Mode=3, Std. deviation=.834	2006	6	23	49	21
	n=38: Mean=5.47, Median=7, Mode=7, Std. deviation=1.942	2007	8	13	26	53
Cohort 2	n=15: Mean=2.93, Median=3, Mode=3, Std. deviation=.799	2006	0	33	40	27
	n=8: Mean=6, Median=7, Mode=7, Std. deviation=1.572	2007	--	13	25	63
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.727	Spring 2007	--	13	31	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.640	Fall 2007	--	18	18	64
Motivating students to improve their study skills						
Cohort 1	n=63: Mean=3.45, Median=4, Mode=4, Std. deviation=.737	2005	3	5	35	57
	n=48: Mean=3.44, Median=4, Mode=4, Std. deviation=.796	2006	2	13	25	60
	n=38: Mean=5.95, Median=7, Mode=7, Std. deviation=1.524	2007	--	16	21	63
Cohort 2	n=15: Mean=3.27, Median=4, Mode=4, Std. deviation=.961	2006	7	13	27	53
	n=8: Mean=5.75, Median=5, Mode=5, Std. deviation=1.035	2007	--	--	63	38
Cohort 3	n=16: Mean=3.31, Median=3.5, Mode=4, Std. deviation=.873	Spring 2007	6	6	38	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.157	Fall 2007	9	18	18	55
Getting a better sense of what the class as a group is learning						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.814	2005	3	11	29	57
	n=47: Mean=3.38, Median=3, Mode=4, Std. deviation=.677	2006	--	11	40	49
	n=38: Mean=5.79, Median=7, Mode=7, Std. deviation=1.891	2007	8	8	21	64
Cohort 2	n=15: Mean=3,47, Median=4, Mode=4, Std. deviation=.640	2006	--	7	40	53
	n=8: Mean=6, Median=6, Mode=5, Std. deviation=1.069	2007	--	--	50	50
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.814	Spring 2007	--	19	19	63
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	27	64

Source: MGT Faculty Surveys, February 2005, 2006, and 2007, and November 2007.

Shown by the faculty survey responses received at the end of the grant, faculty felt that motivating students to improve study skills, using classroom assessment to prompt student thinking, and understanding what the class as a group is learning were the most important for improving student learning. Faculty believed that collecting entry level knowledge, identifying students who need extra help, and helping students assess their own progress were the least important.

Grant participants described assessment and evaluation techniques and strategies during MGT's onsite visits. Some highlights from interviews and focus groups conducted on each campus in the fall include:

Data from the Crookston Campus revealed:

- These were new concepts to faculty who joined grant for year 3.
- Many faculty used formative and summative surveys, relying on questions from their subscription to Flashlight.
- Faculty relied on informal feedback to supplement formal evaluation.
- Faculty employed experiment versus control groups and performed regression analyses to determine the effects of interventions.

Data from the Duluth Campus revealed:

- Faculty indicated the use of the following measures in their assessment and evaluation of efforts:
  - Content exams.
  - Survey questions (quantitative and qualitative; rating scales, open-ended, etc.).
  - Informal conversations with students.
  - Peer evaluation.
  - Correlation to learning styles (Bloom's Taxonomy).
  - Pre-, mid-, and post-assessment tools.
- A small segment of faculty indicated that they are ill-equipped to conduct formal assessment, perhaps due to competing interests that will not allow for the investment of time needed to gain an understanding of the methods.

Data from the Morris Campus revealed:

- Some methods employed by faculty included:
  - Self-assessment.

  - Peer review.
  - Pre-, post-, and intermediate testing.
  - Personal response systems (immediate feedback).
  - Surveys of learning styles (e.g., Kolb's).
  - Web site tracking (e.g., use of Google™ Analytics© on course site).
  - Longitudinal surveys.
  - Anonymous feedback.

- Consultants were primary drivers in implementing assessment and evaluation techniques.

- Assessment has substantiated the benefits of some interventions.

- Some faculty have received positive feedback in student evaluations.

Data from the Twin Cities Campus revealed:

- Some of the assessment and evaluation techniques noted in interviews included:

  - Qualitative and quantitative surveys.

  - Interviews.

  - Pre-, post-, and intermediate assessments.

  - Content exams and pop quizzes.

  - Student advisory boards.

  - Focus groups.

  - Surveys of student motivation (NSSE).

  - Real-time assessment tools such as Active Learning Techniques–Classroom Assessment Techniques (ALT-CATs) or, more specifically, Immediate Feedback Assessment Technique (IF-AT) scratch-off quizzes.

- Some consultants reflected that initial practices of comparing Student Evaluation of Teaching (SET) scores or grades between prior sections and modified sections was a flawed assessment technique and did not provide objective analysis.

- Consultants speculated that the use of tools such as the Collegiate Learning Assessment or the National Survey of Student Engagement might be preferable and could provide broader baseline data, but standards would need to be established at the beginning of a project.

- Grant administrators noted heightened appreciation for implementation of assessment, towards the development of student learning outcome-based metrics.

How was assessment information used to inform course design/redesign?

Several questions on the faculty survey focused on how grant participants used information collected from assessments to inform course design/redesign. Annual survey data collected from this section of the survey are presented in **Exhibit 3-7**, for each Cohort, systemwide.

EXHIBIT 3-7
FACULTY SURVEY RESPONSES: USE OF ASSESSMENT DATA TO MAKE COURSE CHANGES

How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
Using assessment strategies to help make mid-course corrections in teaching strategies or materials						
Cohort 1	n=63: Mean=3.13, Median=3, Mode=4, Std. deviation=.959	2005	8	16	32	44
	n=47: Mean=3.17, Median=3, Mode=4, Std. deviation=.816	2006	2	19	38	40
	n=38: Mean=5.05, Median=5, Mode=7, Std. deviation=2.053	2007	13	11	37	40
Cohort 2	n=15: Mean=2.87, Median=3, Mode=3, Std. deviation=.915	2006	7	27	40	27
	n=8: Mean=4.75, Median=5, Mode=3, Std. deviation=1.669	2007	--	38	38	25
Cohort 3	n=16: Mean=3.38, Median=4, Mode=4, Std. deviation=.957	Spring 2007	6	13	19	63
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
Using feedback to improve mid-term or final exams						
Cohort 1	n=60: Mean=3.15, Median=3, Mode=3, Std. deviation=.820	2005	3	7	42	38
	n=48: Mean=2.90, Median=3, Mode=3, Std. deviation=1.02	2006	13	19	35	33
	n=38: Mean=4.53, Median=5, Mode=5, Std. deviation=2.102	2007	16	21	34	29
Cohort 2	n=15: Mean=3.00, Median=3, Mode=4, Std. deviation=1.07	2006	13	13	33	40
	n=8: Mean=4.50, Median=5, Mode=5, Std. deviation=1.414	2007	--	38	50	13
Cohort 3	n=16: Mean=3.19, Median=3.5, Mode=4, Std. deviation=1.047	Spring 2007	13	6	31	50
	n=11: Mean=3.91, Median=3, Mode=1, Std. deviation=2.427	Fall 2007	27	27	18	27

EXHIBIT 3-7 (Continued)
FACULTY SURVEY RESPONSES: USE OF ASSESSMENT DATA TO MAKE COURSE CHANGES

How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
Using student feedback to evaluate the overall course						
Cohort 1	n=63: Mean=3.29, Median=4, Mode=4, Std. deviation=1.04	2005	5	3	25	67
	n=48: Mean=3.58, Median=4, Mode=4, Std. deviation=.647	2006	2	2	31	65
	n=38: Mean=5.63, Median=5, Mode=5, Std. deviation=1.478	2007	3	8	45	45
Cohort 2	n=15: Mean=3.53, Median=4, Mode=4, Std. deviation=.640	2006	0	7	33	60
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.669	2007	--	25	38	38
Cohort 3	n=16: Mean=3.63, Median=4, Mode=4, Std. deviation=.806	Spring 2007	6	19	75	--
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		**Year**	**% of Respondents**			
			None	**Low**	**Moderate**	**High**
Informally studying the effects of your teaching on student learning.						
Cohort 1	n=62: Mean=3.11, Median=3, Mode=3, Std. deviation=.812	2005	3	18	44	36
	n=47: Mean=2.96, Median=3, Mode=3, Std. deviation=.806	2006	4	21	49	26
	n=38: Mean=5.16, Median=5, Mode=5, Std. deviation=1.882	2007	11	8	45	37
Cohort 2	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=.750	2006	--	38	44	19
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=15: Mean=2.60, Median=3, Mode=2, Std. deviation=.986	Spring 2007	13	33	33	20
	n=11: Mean=5.73, Median=7, Mode=7, Std. deviation=2.054	Fall 2007	9	9	18	64

EXHIBIT 3-7 (Continued)
FACULTY SURVEY RESPONSES: USE OF ASSESSMENT DATA TO MAKE COURSE CHANGES

How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
Using comments from students to alter teaching practices or materials.						
Cohort 1	n=63: Mean=3.27, Median=3, Mode=4, Std. deviation=.787	2005	3	11	41	44
	n=47: Mean=3.34, Median=3, Mode=4, Std. deviation=.700	2006	--	13	40	47
	n=38: Mean=5.68, Median=6, Mode=7, Std. deviation=1.561	2007	3	11	37	50
Cohort 2	n=16: Mean=2.94, Median=3, Mode=3, Std. deviation=.772	2006	--	31	44	25
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.632	Spring 2007	--	6	38	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	36	55

Source: MGT Faculty Surveys, February 2005, 2006, and 2007, and November 2007.

Data collected from faculty on course profiles at the end of Year 3 revealed the following outcomes that appeared to be prevalent throughout the campuses.

- Preliminary project results across several projects showed that using a collaborative learning teaching method positively affected students' knowledge at the end of the semester, as compared with a traditional lecture method.
- Students were most engaged when being challenged to reflect on professional decisions with advanced notice in a community of peer support and gentle scrutiny.
- Small groups performed better than students who worked independently.
- Faculty researching the use of individual student response systems (i.e., clickers), systemwide, found that more students were engaged with this instruction.
- Students showed improvement in critical thinking and writing, applying critical thinking in other classes, medical situations, and life in general.
- Students preferred having case studies integrated into the lectures.
- Students have responded well to the hybrid online course structures and blogs.

- As a whole, systemwide, technology has enhanced course material.
- Gaming projects attracted larger numbers of students and created a sense of community.

Site visit interviews and focus groups revealed some progress in terms of courses being redesigned based on results of assessment and evaluation efforts. Few faculty had not yet processed the data for the current year's projects, however, so these refinements had not yet been applied on a universal scale. Among those projects for which assessment and evaluation data were available, key findings include the following:

Refinements at Crookston:

- Faculty continuing from previous years have used data/findings to modify course design. For example, some faculty are incorporating more rubrics and structured assignments, as well as formalizing group structures.
- Other examples of changes based on assessment/evaluation include:
  - Working to ensure participation/contribution by all students in groups based on prior experience.
  - Adoption of full-class case solutions.

Refinements at Duluth:

- One faculty member indicated a complete course redesign (including development of a new textbook) manifested from grant research, leading to the elimination of course related "handicaps" stemming from diverse learning styles.
- Other faculty indicated smaller scale adjustments ("tweaks") to course design and/or delivery.
- Personal response (immediate feedback) interventions allowed for midstream adjustment to tailor content delivery to student needs in real-time.
- Some faculty were gradually increasing depth of evaluation based on initial findings (e.g., first semester use of peer evaluations and successively grading these evaluations to provide more accountability).

Refinements at Morris:

- Some faculty indicated courses had been refined based on results of assessment and evaluation.

- Faculty subjected the results of assessment to both students and colleagues to help tailor adjustments appropriately.
- The campus had a consultant with the role of assessing and evaluating visual appeal/design of project work.
- Faculty indicated the addition of an online discussion forum based on feedback from students.

Refinements at Twin Cities:

- Faculty and graduate students indicated adjustments were made based on assessment and evaluation (e.g., feedback led to dividing the class into 12 segments versus four in the previous semester).
- Immediate feedback tools (e.g., IF-ATs) allowed for midstream adjustments to course delivery and focus.
- Consultants argued that results of assessment and evaluation would likely correlate with the sustainability of various methods employed.
- Grant administrators noted changes stemming from activities not only to specific courses, but to broader departments and colleges, though efforts are still needed to disseminate to the broadest possible audience.
- Some other examples of adjustments based on assessment or evaluation include:
  - Shift from outside group work to in-class group work.
  - Change in focus from tests to case studies.
  - Targeted interventions based on misconceptions revealed by immediate feedback.
  - Shift from group assignments to individual assignments.
  - Replacement of exams with a course notebook that tracks development and papers that induce critical thinking.

3.4 Faculty Professional Development Opportunities

Faculty professional development was a primary component of the grant funding. Data collected from onsite faculty focus groups, interviews with campus coordinators and consultants, and updates provided during monthly conference calls were analyzed to answer the following research questions:

- How did faculty professional development meet the needs of grant participants?

- How did faculty professional development help faculty use scholarly and collaborative approaches to address student learning issues?
- How did faculty professional development help participants use and understand classroom assessment techniques and course evaluation findings to shape teaching?

How did faculty professional development meet the needs of grant participants?

Site visits and interviews with representatives from each campus revealed the following with regard to how faculty/professional development opportunities met the needs of grant participants.

Professional development on the Crookston campus:

- Development activities included regular group and project team meetings; participants discussed what is/what is not working on respective projects.
- Activities included campus events to inform understanding of the scholarship of teaching and learning and benefits of active learning.
- Faculty expressed sentiment that offerings and opportunities exceeded expectations, particularly the close interaction among project teammates.
- Experts were brought in to discuss specific methods (e.g., Steadman in previous grant, Ehrman in current).
- Faculty meetings had overwhelmingly positive feedback (between 80 and 90 percent favorable ratings).

Professional development on the Duluth campus:

- Faculty expressed appreciation for and satisfaction with development opportunities, and many noted small group meetings, particularly, as the most beneficial investments towards their efforts.
- Faculty indicated meetings and other development opportunities were key to keeping them on track and engaged in research, and in validating and encouraging participants in their efforts to improve their teaching.
- Mini-presentations at meetings allowed for good feedback and learning experiences for both presenters and observers.

Professional development on the Morris campus:

- “Wine and Wikis” served to increase awareness, provided concrete examples of technology uses, and encouraged others’ consideration for use in their own classes.

- Breeze sessions served as opportunity to learn about the proceedings on each of the Minnesota campuses.
- "Lunch and Learns" provided another forum for small group interactions and informal discussion, centered around the presentation of a particular research project.
- Departments have successively hosted workshops for training in the use of various methods.
- Many faculty indicated that deskside coaching (either by consultants or fellow project participants with expertise in an area/technology) was the most effective means of integrating methods into their own courses.
- For the third year of the grant, the campus grant administrators surveyed faculty about development needs and attempted to coordinate schedules to maximize benefit and participation.
- Some Bush-related training activities were open to the entire campus.
- Grant activities helped to create general awareness of development needs on the campus.
- Faculty appreciated the opportunity to work with colleagues from other disciplines at workshops and other events.

Professional development on the Twin Cities campus:

- Students expressed appreciation for development opportunities (course team and larger group meetings), which allowed exposure to new ideas and heightened awareness of available resources.
- Students expressed a desire for more opportunities to see more guest speakers or experts in various techniques.
- Consultants felt that the grant activities had resulted in the development of a good model for faculty development.
- Money was provided to participants by grant administrators to pursue development, while, concurrently, faculty joined with support staff and consultants to bring research to fruition.
- Consultants also expressed sentiment that development activities led to a significant increase in appreciation for qualitative research methods and mixed-method research models.
- Faculty expressed appreciation for opportunities given to students to travel to conferences and presentations, which was only possible due to the flexibility of the grant funds.

- Faculty also valued opportunities where experts were brought to the campus to share their knowledge.
- Some faculty expressed a desire for more extensive coaching with regard to new technologies.

How did faculty/professional development help faculty use scholarly and collaborative approaches to address student learning issues?

Development opportunities assisted in the use and integration of scholarly and collaborative approaches to teaching in the following ways:

At Crookston:

- Faculty referenced workshops as having "broadened horizons" through exposure to others' ideas and discussion topics using materials and resources (in terms of literature and people/experts) available to assist or inform efforts.
- Opportunities helped faculty move research toward publishable material.

At Duluth:

- Professional development has moved faculty toward more of a cooperative research-based focus with an emphasis on outcomes.
- More faculty are publishing and presenting findings, as well as presenting to colleagues.

At Morris:

- Faculty had the opportunity to try new and different methods; typically in casual settings encouraging introduction of new ideas.
- Development activities fostered peer-driven (rather than top-down) motivation toward the adoption of new methods and technologies.
- Successes are recognized and quickly spread through community.
- Activities heightened participants' ability to rely on others' experiences to learn what has or has not worked.
- Hands-on demonstrations were very beneficial.

At Twin Cities:

- Grant administrators felt that development efforts represented significant opportunities for faculty.

- Participants were directed toward conferences, presentations, and other events that would assist with research, and funds were provided toward these ends.

How did faculty/professional development help participants use and understand classroom assessment techniques and course evaluation findings to shape teaching?

In discussions with representatives from each campus, the following information was revealed with regard to development opportunities intended to strengthen assessment and evaluation:

For Crookston:

- Faculty noted the distribution and study of a Classroom Assessment Techniques book at Faculty Learning Community meeting.
- Faculty were able to attend conferences to learn about assessment.
- Flashlight workshops were conducted to assist with assessment and evaluation.

For Duluth:

- Karl Smith's visit to discuss classroom assessment was mentioned by faculty as a beneficial effort.
- Generally, a great deal of information with universal application circulated through small and large groups, which helped inform assessment and evaluation techniques.

For Morris:

- IT Core Group reviewed all methods and associated assessments to replicate successful efforts.

For Twin Cities:

- Course team meetings and consultants provided strong support in areas of assessment and evaluation.
- Grant administrators felt that there still needed to be a structure to promote dissemination of results regarding processes and findings.
- Administrators expressed sentiment that more progress had been made with regard to classroom assessment technique than with regard to formal educational research.

3.5 Program Leadership

As with any grant, leadership is key to participant success. Data collected from faculty participants and campus coordinators were analyzed to determine the effectiveness of program leadership at both the campus level and the system level. The analysis addressed the following research questions:

- What tasks did leaders need to complete?
- What challenging issues did leaders need to address?
- What were the important successes?
- What processes emerged that were critical in managing the program?

What tasks did leaders need to complete?

The typical roles and responsibilities of campus coordinators included:

- Overseeing grant budget and allocation of funds to best facilitate the achievement of grant goals on the campus, and in some instances, seeking and acquiring additional funds to supplement efforts or support related efforts falling outside of grant capacity or purview.
- Recruiting faculty to participate (submit proposals) and overseeing successive refinement and award of grants.
- Recruiting consultants with appropriate knowledge and expertise to serve as mentors and support for the project participants.
- Participating in monthly video conferences with other campuses, Principal Investigators, and external evaluators.
- Communicating and resolving any administrative issues with the Principal Investigators.
- Participating in monthly updates with external evaluators.
- Assisting in scheduling focus groups with faculty, staff, and students associated with the grant for the visit by the external evaluator.
- Helping to coordinate development events on campus.
- elping to create awareness of grant proceedings on campus among non-participating faculty and campus administrators.
- Working with instructional and technology support staff on campus to ensure adequate support for projects.

- Compiling an annual report of grant proceedings on campus in relation to goals that was submitted to the external evaluator.

What challenging issues did leaders need to address?

Challenges encountered by leaders on each of the campuses included:

For Crookston:

- The campus coordinator noted that reporting to six different administrators over a three year period had led to difficulty in administering the grant.
- A challenge noted by faculty was that the effort to "dig deeper" into the scholarship of teaching and learning continuously resulted in new questions that needed to be answered.
- Time constraints were noted as a challenge, particularly relating to processing assessment and evaluation data.
- Other challenges highlighted by faculty included:
  - Difficulty integrating methods into the classroom, given physical limitations of space/technology (environmental factors) and divergence from more traditional methods.
  - Managing and directing a large number of student groups while performing exercises during class.
  - Having to accommodate for the specific needs of all students each semester.
  - Difficulty bringing research to publication.
- The coordinator and faculty expressed that a significant challenge was gaining an appropriate assignment of value to efforts relating to teaching research.

For Duluth:

- Some faculty indicated that, rather than aligning with strategic initiatives, efforts can be perceived as challenging departmental paradigms, and therefore can be a risky undertaking for participants.
- Faculty noted that the task of analyzing data was a major challenge given time and resource constraints as well as competing interests.
- More front-end investment towards assessment and evaluation is needed to generate effective tools for measuring impact of various interventions.
- Third year faculty indicated that they had fewer opportunities to interact as compared to prior cohorts.

- Many faculty expressed a desire for more training opportunities in assessment/evaluation techniques.
- Faculty expressed concerns as to how to market/disseminate benefits of reflective learning to outsiders.
- Keeping up with technological advances/changes/upgrades was reported as a challenge by some faculty.

For Morris:

- Some resistance to change was observed among older or more established faculty with regard to changes that were being employed.
- Assessment and evaluation requires substantial investments of time to generate results and inhibits the ability to publish or present findings.
- Trying to connect faculty with similar interests in independent research and implementation.
- Keeping up with the technology curve was cited as a challenge (frustration) for some faculty; platform upgrades sometimes led to obsolete methods over very short timeframes.
- Many faculty experienced difficult learning curves with regard to technologies, did not have enough time to become self-sufficient, and, therefore, had to rely on consultants and others for support.
- Some challenges regarding employment of student assistants included the gaps in availability as well as difficulty in paying competitive wages.
- Other challenges cited by the campus coordinator included the task of keeping faculty engaged for the duration of grant (three years) as well as the difficulty in coordinating events and participant schedules to maximize participation.
- Many faculty expressed frustration with balancing project activities and traditional activities.
- Some faculty indicated a challenge relating to giving up control over some content in order to promote more interactivity and engagement among students.

For Twin Cities:

- Some students indicated that they underestimated the learning curve associated with roles on project teams and speculated that more focus on the front-end would be beneficial.

- Students indicated difficulty in finding the time/resources to conduct data analysis.
- Consultants noted that the personal commitment of project team members (particularly faculty) was a very important determinant in the degree of success realized by each team.
- Grant administrators felt that changeover in local (Twin Cities) staff led to some fall-off in terms of maintaining and fostering connections between and with other campuses.
- Administrators also expressed sentiment that the three-year span led to some difficulty in maintaining momentum and energy over the full cycle; a two-year duration might have been preferable.
- Faculty noted difficulty attempting to publish/generate scholarship due to the time investment required.

What were the important successes?

Important successes noted by campus coordinators included:

At Crookston:

- There was heavy engagement by several faculty despite large teaching loads demonstrates commitment to student learning.
- Faculty noted that the ability to have more structured learning experiences, and, thereby, enhanced student learning was a success.
- Some faculty were able to transfer improvements into other classes within their discipline or department.
- Consultants indicated buy-in in terms of the belief that collaboration among faculty and between students can have a positive impact on the learning experience.
- Other faculty indicated success in terms of:
  - Deeper understandings of methods and techniques.
  - Relationship development with other faculty (opportunity to learn from others).
  - Students connected despite internships across the country, bringing real world experiences into a common forum for discussion and analysis.
  - Increased student engagement; the class was “more alive” than before and not afraid to ask questions.

At Duluth:

- Faculty noted development of both personal and professional relationships among the successes on the campus.
- Publication and presentation of research findings are counted among the most significant successes.
- Student acceptance of methods that challenged expectations (no "rebellion") was seen as a major success by some faculty.
- Some assessment and evaluation techniques offered a better understanding of students, allowed faculty to focus on delivery of content that was most needed to reach goals and conveyed to students that faculty are interested in their experience.
- Faculty commended and appreciated the organization and overall efforts of campus coordinator.
- Faculty felt that students have become better, more reflective learners and critical thinkers.
- Faculty reported positive changes in the climate of classrooms and student interaction.

At Morris:

- Faculty noted some specific achievements in courses such as:
  - A video lecture for online psychology courses was well received by students and supplemented the text well.
  - Increased use of PRS (5-6 faculty).
- Faculty became more independent in the use of technologies, more actively seeking support as new methods were attempted.
- Some faculty were surprised that practices evolving from the Bush grant have become campus "norm" and can continue.
- Faculty were also proud of the time that they were able to invest in the projects.
- Increased communication has occurred on the campus among faculty and staff, particularly across disciplines.
- Grant money has allowed a team approach to teaching between faculty and staff.

- The Chancellor and/or Associate Vice Chancellor have attended various Bush events, demonstrating buy-in and appreciation of efforts.
- Faculty have realized that new technologies and interventions eventually can work.
- Collaboration between and among faculty was cited as a success.
- Faculty indicated that the campus coordinator was very supportive and encouraging of participants' efforts and collaboration and made great effort to integrate pursuits with broader campus initiatives.

At Twin Cities:

- Students noted a large number of impacted students and enthusiasm for courses (evidenced by increasing registrations).
- Students suggested that a success was offering students in large classes the same or similar opportunities as those in smaller classes through creative teaching delivery methods.
- Consultants noted that the redesign in the business courses will have ramifications throughout the Carlson School of Management and that the biology project will have substantial departmental or college-wide impact.
- Consultants noted that some individuals had been "transformed" by their involvement, evidenced by their appreciation (or advocacy) for the scholarship of teaching and learning.
- Grant administrators were pleased with the generation of scholarship and dissemination of clear, objective, results and ideas (particularly within context of strategic positioning efforts).
- Administrators expressed appreciation for connections created between campuses as a function of grant activities.
- Faculty appreciated that working with the Bush grant gave them legal standing to change their classes.

What processes emerged that were critical in managing the program?

The following processes were identified by campus coordinators as important to maintaining and improving upon the program.

For the Crookston Campus:

- Faculty commended the campus coordinator for her effort as an administrator and fellow project participant.

- Faculty mentioned the need for additional support/staff to assist the local coordinator with her efforts, including experts that could help publish research (possibly co-author).

- The campus has plans to implement a new Center for Teaching, Learning, and Technology, employing a full-time staff member, that should help to support efforts beyond the Bush grant.

- The relatively short amount of turnaround time given and ambiguity regarding no-cost extension parameters and expectations.

For the Duluth Campus:

- Faculty suggested that some materials on the scholarship of teaching and learning should be required reading for new faculty.

- Small group framework could be beneficial for continuing efforts to improve teaching and learning.

- A number of methods/interventions have spread to other courses within departments or downstream in line of curriculum and would appear to have definite ongoing influence in the campus (e.g., computer science, music).

- The faculty desired ongoing support, similar to that provided by Center for Teaching and Learning staff on the Twin Cities campus and suggested the possibility of employees that could rotate between campuses that could direct faculty to resources and help/promote the sharing of ideas.

For the Morris Campus:

- Campus administrators have created an interdisciplinary major, and are continuing discussions about increased inter-disciplinary studies.

- Administrators at the campus are developing formalized methods to assist faculty via support departments.

- Representatives from various support departments are meeting together on a regular basis to further goals toward a seamless support system.

- The campus has recently established the Academic Support Services Committee (under the Curriculum Committee), which includes representatives from IT, library, and physical plant (telecommunications) departments to oversee related support roles.

For the Twin Cities Campus:

- Some students suggested an alternative approach for future efforts, focusing more on specific/limited areas to allow for a broader range

of ideas and inputs into solving more manageable issues, in order to have a more targeted impact.

- Consultants pointed to a need to sustain the teaming of resources between units like the Digital Media Center and Center for Teaching and Learning that has taken place as part of the grant, and pointed to relationships that have been established as an important element in achieving that end.

- Consultants expressed sentiment that more technologically oriented (capital intensive) projects may not be as sustainable beyond the duration of the grant due to a loss of funding.

- Grant administrators valued Bush funds as a vital “seed” to usher broader efforts and campus direction and the desire to use methods with successful outcomes to shape other areas (e.g., employ methods to combat high drop-out rates in math classes).

CHAPTER 4.0:

Bush Foundation Grant Accomplishments and Challenges 2005-07

4.0 BUSH FOUNDATION GRANT ACCOMPLISHMENTS AND CHALLENGES 2005-07

4.1 Accomplishments

The University of Minnesota has benefited greatly from grant funding received from the Bush Foundation since 2001, realizing a number of significant accomplishments throughout the three years of the continuation grant (2005-07). A summary of major accomplishments is listed below, divided into two sections, according to grant outcome —Student and Faculty Learning and Grant Processes and Procedures.

Student and Faculty Learning

- **Changing the Views of Faculty.** One of the most significant developments was the grant's impact on faculty opinions about research. As learned during annual focus groups with faculty over the three-year grant period, a large proportion of grant participants (about three-fourths according to final course profiles) found themselves experimenting with new technologies and reported that they were comfortable implementing research in their courses through the support and resources made available through the Bush grant. Moreover, faculty participating in the grant on an annual basis chose to continue to be part of the grant. These faculty, in some instances, mentored newer participating faculty.

- **Enhancing Student Learning.** Course profiles and focus group data, collected from faculty annually over the past three years, revealed that faculty participating in the Bush grant focused their projects on enhancing student learning by implementing innovative teaching techniques and strategies. (See **Exhibit 3-1** for specific research questions addressed by faculty through their grant projects.) Moreover, faculty implemented their research using a more interdisciplinary and collaborative approach, thus impacting students across multiple courses that may not have faculty directly participating in the Bush grant project. Most faculty or faculty teams have embraced evaluation and outcomes for measuring the success of innovative teaching strategies and their impact on student learning.

- **Active Generation of Scholarship.** The majority of participating faculty working on projects over the first three years are now publishing and presenting findings from their classroom research experiments. Each campus has seen multiple faculty carry through with their project efforts by publishing findings in journals or presenting findings at regional or national disciplinary conferences. A list of all presentations and publications resulting from the three years of Bush grant efforts is being maintained by the University of Minnesota's Center for Teaching and Learning on the Twin Cities

campus, and is available through the program Web site. This list is also included in **Appendix E** of this report.

- **Stronger Collaboration Among Faculty Participants.** Collaboration among faculty and between faculty, consultants, and student assistants has increased over the course of the continuation grant. At the campus level, course teams and small groups developed camaraderie and synergy, allowing ideas to flow freely towards finding solutions to problems and continually enhancing overall efforts. In terms of inter-campus collaboration, the campus coordinator from the Morris campus worked closely with grant leadership to organize interactive, Web-based video conferences so that grant participants across all four campuses could network together. These events, which were held each of the last three years, involved a grant participant from each campus presenting data on his/her research efforts and outcomes. Though some technical issues were encountered by some campuses, participants reported that they enjoyed hearing about the work on other campuses, and they felt better about the status of their own research.

  Additionally, throughout the three years, other events sponsored through the grant have hosted participants from all four of the campuses and showcased their efforts to a broad community of faculty. For example, Bush grant administrators secured slots for participating faculty from each of the four campuses to present at the Academy of Distinguished Teachers conference that took place in April 2007. Furthermore, grant coordinators held an end-of-the-grant celebration in the Twin Cities for participating faculty at the end of the Fall 2007 semester, which involved poster displays and summary exhibits of activities from each of the four campuses.

Grant Processes and Procedures

- **Effective Operational Procedures.** The Principal Investigators (PIs) for the 2005-07 Bush grant established formal operating procedures that facilitated the implementation of the grant and, in the future, can be used to enhance networking and sharing of resources across campuses. One of the main thrusts of this effort was that campus coordinators participated in monthly video conference calls with grant PIs and external evaluators. These processes not only kept all parties informed and connected, but also helped to alleviate grant-related obstacles as they arose. This approach funneled down to the campus level, in that all campuses held monthly or even more frequent meetings for grant participants.

- **Improved Working Relationships and Inter-Campus Collaboration Among Grant Leaders.** The four University of Minnesota campuses have much in common and share many of the same concerns. The new Bush grant allowed them to improve communications and develop closer working relationships. The monthly video conference calls enabled campus coordinators to highlight activities more regularly and discuss concerns.

- **Promoting a Scholarly and Collaborative Approach to Teaching.** In its first annual report, MGT cited the need for standardization of definitions for scholarship and more centralized efforts to make applicable research available to all grant participants. At the campus level, grant administrators made significant strides towards meeting this goal, as publications appear to be freely circulating within each community. While a small proportion of faculty may still be resistant to these efforts, scholarship inevitably is occurring through monthly meetings and reports.

  To promote a collaborative approach, each campus engineered effective structures for ensuring collaboration among participants through large group meetings and development opportunities, small group meetings, course team meetings, and other interaction with consultants.

  Furthermore, as the grant moved into its final year, grant administrators offered faculty more professional development that focused on all aspects of scholarship – from the research design stage, to implementation, to assessment/evaluation, and, finally, to publication/presentation.

- **Coordination with Other Campus Initiatives.** Evaluation data revealed that the four campuses directly related their research for the Bush continuation grant to the strategic campus initiatives underway on their respective campuses and for the system. Participants were cognizant of the broader effects and importance of their research to each of their campuses, and grant administrators took an active role in promoting and mainstreaming the lessons learned from grant-related efforts. In some instances, faculty were less aware of overall campus initiatives and the explicit connections between their efforts and the ideals of their respective campuses, and grant administrators worked with them to further the cohesion of efforts on their campuses to maximize impact of the grant.

- **Inter-Campus Resource Sharing.** The Center for Teaching and Learning at the Twin Cities campus initiated contact with Campus Administration on the Crookston campus. These efforts will result in the development of a system for resource sharing between the two campuses. This was directly related to a recommendation from the Year 1 and Year 2 evaluation reports that discussed the need to

sustain grant research and collaboration beyond the Bush Foundation Grant.

4.2 Challenges

Throughout the 2005-07 Bush grant, MGT and grant PIs identified challenges that the university would face in the coming years without continued funding for research and professional development. The intent was to identify areas that the grant PIs and campus coordinators should address in order to offset any challenges to the greatest extent possible. These challenges are outlined below so as to reinforce efforts to reduce their impact and allow for further consideration on the campuses and among faculty in the coming years now that grant funding has ended. They are listed in no particular order but have been divided into two sections—Student and Faculty Learning and Grant Processes and Procedures.

Student and Faculty Learning

- **Inter-Campus Collaboration.** As stated previously in regard to grant successes, participants and consultants had positive, fruitful experiences working together at the local level, and some efforts were made to extend this collaboration beyond the more provincial groupings. Faculty participating in focus groups indicated that they still desire more opportunities to meet with faculty outside of their teams, small groups, or campuses. Though scheduling difficulties frequently inhibited such inter-campus collaboration, campus leadership explored other potential mediums of bringing participants together for campus and systemwide events to share ideas and experiences. Grant leaders proved to be very creative in this area throughout the grant.

- **Lack of Time and Resources to Analyze Data.** As evidenced by the course profile reports received at the end of the grant, a substantial segment of faculty were not able to provide a summary of research outcomes and findings by the end of the Fall 2007 semester. During focus groups, faculty reported that they did not have the time or the proper resources to adequately analyze the volumes of data that they had collected. Though many of the findings presented in this report have had profound effects and influences on participants and their respective areas of local influence, some remain anecdotal in nature until further assessment and evaluation efforts can substantiate participants' conclusions. A commitment of resources, beyond the conclusion of Bush funding, to bring all research efforts to maximum fruition (i.e., publication/ presentation) would be a beneficial investment towards rippling the impact of the grant research to the widest possible audience.

Grant Processes and Procedures

- **Resource Sharing.** As the campuses implemented the Bush grant, they acquired many resources and in-depth knowledge of research available to support grant initiatives. The campuses also organized many professional development and training opportunities for staff that included bringing in experts for workshops and presentations. Due to the nature of the grant activities across the four campuses, many of these resources and training opportunities would have been beneficial for all grant participants. While the logistics of travel across campuses proved to be difficult for faculty due to time constraints and funding, the grant leaders found ways to continue to share resources following the grant.

  As reported in the Year 2 evaluation report, the Center for Teaching and Learning at the Twin Cities campus initiated contact with the Chancellor and Vice President for Academic Affairs at Crookston, and put in place a plan for resource sharing.

- **Continuance of Development Structures.** An item of concern that was brought up by representatives from the Crookston and Morris campuses is the continuance of some type of faculty development infrastructure that would persist now that the grant has concluded. The Bush grant served as the sole formal entity driving faculty development on each of these campuses. Citing considerable need and appreciation for what the Bush grant has allowed over this period, each of these campuses expressed the desire either to utilize resources from the Twin Cities campus or to establish independent or semi-independent development offices at each site.

CHAPTER 5.0:

Recommendations

5.0 RECOMMENDATIONS

This chapter presents recommendations that the evaluation team believes will improve the University of Minnesota's ability to continue to implement the work and research of the Bush Foundation grant. Most of these recommendations are designed to address the challenges identified in **Chapter 4.0**. It should be noted that these recommendations are in no particular order, but are divided into two categories according to grant outcomes—Student and Faculty Learning and Grant Processes and Procedures.

5.1 Recommendations: Student and Faculty Learning

1. Emphasize the need to continue data collection, analysis, and communication of research outcomes from local evaluation activities.

The formal plan developed for the systemwide evaluation included collecting data from grant participants on the outcomes of their research. One of the more significant goals of the evaluation was to collect and analyze data on student outcomes, the impact of the research on student learning, and, in particular, how the innovative teaching strategies and methods that were implemented affected courses and students. During the analysis of the course profiles and site visit data, MGT learned that many faculty members did not report the data they collected on their various interventions through channels developed for the external evaluation, though they discussed these outcomes in group/team meetings.

As indicated earlier in this report, this occurred for several reasons. The first was that faculty collected so much data that they did not have sufficient time or resources to complete the analysis. In other instances, the faculty used the data for their own research but did not report the information through the various data collection opportunities available (again, due to the extra burden this represented and a perceived lack of resources to meet this need).

As cited in the Year 1 report, in the article "*Mainstreaming Evaluation or Building Evaluation Capacity? Three Key Elements*," Dr. Paul Duignan states that the three key aspects of mainstreaming evaluation are: (1) using an appropriate evaluation model; (2) developing evaluation skills appropriate for each participating level/organization; and (3) each level/organization strategizing to identify priority evaluation questions, rather than just relying on evaluation planning at the individual levels.

It will be important in the next few years for grant PIs and campus coordinators to establish a format for the continuance of communicating and reporting success in researching student learning in the classes, so faculty can continue to learn and network with each other.

Finally, campus coordinators should focus on continuing to bring research efforts to fruition now that the grant has ended. On several campuses, this process is already underway, as resources have been dedicated to funding additional

assistance for data processing and analysis, or promoting efforts to attend and present at regional and national academic conferences. Other available funds and resources should be amended and re-allocated, as appropriate, and participants should then be made aware of available resources, so as to foster efforts to publish and present findings and outcomes. It is important to note that while formal publication and presentation of findings is not the necessary end, faculty should attempt to document outcomes in the best manner possible.

2. Promote a scholarly and collaborative approach to teaching and learning.

The second goal of the grant continuation proposal stated that the university will foster a scholarly and collaborative approach to addressing student learning. As cited in previous chapters, participants and consultants had more experiences working together at the local level throughout the grant, and these experiences yielded fruit in terms of the volume of applicable existing research and expertise that fed into various efforts. While attempts were made to extend this collaboration beyond the more provincial groupings, faculty participating in focus groups indicated that they desire more opportunities to meet with faculty outside their teams, small groups, or campuses. Further, the similarity in some projects across campuses is notable, though having different/separate outcomes can certainly be recognized as a reason for differentiating these projects.

3. Create more networking opportunities for grant participants and formalized information-sharing channels to continue to promote cross-campus collaboration and dissemination of information now that grant funding has concluded.

On each campus, faculty reported that, through their monthly meetings, they were able to learn from one another and maximize grant funding by sharing data collection techniques and other resources. Furthermore, evaluation data revealed that faculty on the smaller campuses had more success than their counterparts on larger campuses in disseminating information on their research to their broader campus communities.

During interviews and focus groups with faculty, MGT consultants recognized that many of the research projects implemented on the four campuses were similar in nature, even if they addressed different outcomes. With the notable exceptions of the three Breeze sessions, the Academy of Distinguished Teachers Conference, and the most recent reception held for all grant participants, cross-campus collaboration seemed to end at the boundaries of each campus.

The grant PIs and campus coordinators should continue to explore the possibility of networking grant participants, as well as non-participants, together more frequently to maximize the potential impact of respective grant activities (and future related efforts) across the system.

It should also be noted that while the Breeze technology proved somewhat successful, there were several instances where technical difficulties and understanding of the platform prohibited participants and broader faculty communities from realizing the maximum benefit from the presentations. Grant

leaders should either correct errors that have been encountered with the current technology or explore other technologies/mediums that might serve as better platforms for sharing experiences across campuses. If a viable solution can be implemented and used with success, it could contribute towards extending collaborative efforts between the campuses now that the grant has ended.

5.2 Recommendations: Grant Processes and Procedures

4. Promote collaboration to enable campuses to share resources and staff development opportunities.

During the monthly video conference calls and site visits, consultants learned of many resources available, or being developed, to support faculty as they implement their research projects. Some campuses have an abundance of resources in this respect, while others are more limited.

Campuses organized workshops for faculty that included presentations from field experts. While all of these opportunities were beneficial for the grant implementations on each of the four campuses, in many instances these resources could have benefited faculty across the system. For example, some campuses had staff who could have shared specific knowledge and expertise on a systemwide basis, such as the evaluation consultant(s) on the Twin Cities and Morris campuses. Sharing resources of this nature between campuses could have reduced the need to outsource for such efforts in the future (as well as incidentally increasing collaboration between campuses).

Campus leaders should continue to collaborate each semester, at a minimum, on training and staff development offerings to see where mutual/shared workshops could be beneficial. Grant leaders proved to be creative when addressing challenges such as limited travel funds or time constraints.

As stated earlier in this report, the Center of Teaching and Learning at the Twin Cities campus initiated contact with the campus leaders at Crookston in Year 2, to plan and implement more ways to share resources across campuses.

5. Explore funding opportunities beyond the Bush Foundation to allow for grant activities and research to continue.

Smaller campuses within the University of Minnesota system do not have the same resources available as larger campuses to support faculty development and research. Leaders from these campuses would like to see the synergy developed by the Bush funding continue. However, due to a restructuring of focus within the Foundation, it is not certain that funding for faculty development grants will continue. Leaders would like to see the funding and related efforts continue beyond the end of the grant, citing appreciation and definite need for the opportunities provided by the Bush grant.

Grant leaders should continue discussions with the Bush Foundation to explore opportunities for additional funding, but should also look for alternate opportunities

to minimize any lapse in funding that may occur. The university system could also examine ways to utilize resources available on the larger campuses for faculty development and research through the establishment of independent or semi-independent development offices on each University of Minnesota campus.

APPENDICES

APPENDIX A:

External Evaluator Qualifications

APPENDIX A
EXTERNAL EVALUATOR QUALIFICATIONS

The University of Minnesota contracted with MGT of America, Inc., to conduct the external evaluation for this continuation project. MGT was established over 30 years ago in Tallahassee, Florida, for the purpose of providing high-quality management and research consulting services to public sector entities. In addition to our corporate office in Tallahassee, MGT has established regional offices in Olympia, Washington; Sacramento, California; and Austin, Texas.

The firm's full-time staff of over 130 professionals brings a wealth of knowledge and depth of understanding to all their client engagements, delivering the quality services clients expect and deserve. The organizational mission is supported by their capacity to deliver an extensive range of services to a variety of public sector institutions, nonprofit groups, private businesses, and other organizations.

MGT is recognized as one of the nation's premier higher education planning and management research consulting firms. As a result of our extensive experience in higher education, we have a keen understanding of university, college, and state system operations that far exceeds that of the competition. More than half of MGT's 2,900 client engagements have involved educational institutions or state education agencies.

A great advantage MGT offers to clients is our understanding of educational structures and operations, and how best business practices can be applied to those structures and operations. Our staff includes individuals who have served in various roles throughout the education community; many were educators before they became consultants. Thus, we have credibility with the educational community.

The MGT staff fully understands the process of grant evaluation. Our relevant past experience make us exceptionally qualified to serve as the external evaluator for the Bush Foundation Grant.

APPENDIX B:

Data Collection Instruments

APPENDIX B
DATA COLLECTION INSTRUMENTS

B.1 Faculty Survey Instrument

University of Minnesota
Enhancing Student Learning Through Innovative Teaching and Technology Strategies
A Bush Foundation Grant
Annual Evaluation Survey
End of Grant

Dear Bush Foundation Grant participant:

You have entered the electronic version of the "Enhancing Student Learning through Innovative Teaching and Technology Strategies" survey. Use your mouse to click on the responses you choose for each question.

For text response items, position your mouse in the box for the response and type your answer. You will not need to hit "enter" or "tab" after you input responses. At the end of the survey, please remember to click on the "submit" button so your information will be sent to MGT of America, Inc. MGT will aggregate the data by campus and share the data with the grant PIs and Campus Coordinators.

Please answer all items to the best of your ability. The information you provide is extremely useful and will generate valuable feedback for your campus and the grant evaluation.

If you experience any problems with this electronic survey, please contact Sean Friend with MGT at sfriend@mgtamer.com or 850-386-3191.

We thank you in advance for your cooperation.

Carol Carrier, Vice President of Human Resources
David Langley, Director, Center for Teaching and Learning Services, Human Resources
Linda Jorn, Director, Digital Media Center, Office of Information Technology

SECTION A: BACKGROUND INFORMATION

Name: _____
(MGT assures you that all survey data received will remain anonymous)

Campus: (this will be a drop down box with each campus listed)

When did you first join the Bush grant on your campus?

- ❑(1) Spring 2005
- ❑(2) Summer 2005
- ❑(3) Fall 2005
- ❑(4) Spring 2006
- ❑(5) Summer 2006
- ❑(6) Fall 2006
- ❑(7) Spring 2007
- ❑(8) Summer 2007
- ❑(9) Fall 2007

1. Gender:

❑(1) Female ❑(5) Male

2. Appointment Type:

- ❑(1) Tenured Faculty
- ❑(3) Tenure-track Faculty
- ❑(5) Full-time non-regular faculty or professional academic staff
- ❑(7) Part-time non-regular faculty or professional staff

3. Percent of time devoted to teaching in current position:

- ❑(1) 25% or less
- ❑(3) Between 26% and 50%
- ❑(5) Between 51% and 75%
- ❑(7) More than 76%

4. Number of years you have been teaching post-secondary students

_____ Years

5. How much time do you expect to invest in the Bush grant program?

- ❑(1) 0 to 2 hours per month
- ❑(3) 3 to 5 hours per month
- ❑(5) 6 to 10 hours per month
- ❑(7) 11 to 15 hours per month
- ❑(9) more than 15 hours per month

6. Please describe your role as a Bush Foundation Grant Participant?

SECTION B: PROJECT ACTIVITIES AND OUTCOMES

7. In the past year, how important have the following been for improving student learning?

	No Importance	Little Importance	Somewhat Important	Very Important
a. Collecting information to assess students' entry-level knowledge or abilities	❑(1)	❑(3)	❑(5)	❑(7)
b. Collecting information to diagnose learning problems or identify individuals who need extra help	❑(1)	❑(3)	❑(5)	❑(7)

7. In the past year, how important have the following been for improving student learning? (Continued)

		No Importance	Little Importance	Somewhat Important	Very Important
c.	Using classroom assessment strategies to prompt student thinking during lecture or class discussion	❑(1)	❑(3)	❑(5)	❑(7)
d.	Helping students learn to assess their own progress	❑(1)	❑(3)	❑(5)	❑(7)
e.	Motivating students to improve their study skills	❑(1)	❑(3)	❑(5)	❑(7)
f.	Getting a better sense of what the class as a group is learning	❑(1)	❑(3)	❑(5)	❑(7)
g.	Using assessment strategies to help make mid-course corrections in teaching strategies or materials	❑(1)	❑(3)	❑(5)	❑(7)
h.	Using feedback to improve mid-term or final exams	❑(1)	❑(3)	❑(5)	❑(7)
i.	Using student feedback to evaluate the overall course	❑(1)	❑(3)	❑(5)	❑(7)

8. How often have you used the following forms of assessment over the past year?

		Never	Sometimes	Often	Very Often
a.	Interactive techniques (e.g., voting, debates, small group problem-solving)	❑(1)	❑(3)	❑(5)	❑(7)
b.	Qualitative methods (e.g., journals, reflection papers, essays, short answer)	❑(1)	❑(3)	❑(5)	❑(7)
c.	Quantitative methods (e.g., quizzes or tests, surveys)	❑(1)	❑(3)	❑(5)	❑(7)
d.	Anonymous student response techniques	❑(1)	❑(3)	❑(5)	❑(7)
e.	Identified student response techniques	❑(1)	❑(3)	❑(5)	❑(7)
f.	Un-graded performance measures	❑(1)	❑(3)	❑(5)	❑(7)
g.	Graded performance measures	❑(1)	❑(3)	❑(5)	❑(7)
h.	Voluntary measures of performance	❑(1)	❑(3)	❑(5)	❑(7)
i.	Required measures of performance	❑(1)	❑(3)	❑(5)	❑(7)
j.	Individual student performance	❑(1)	❑(3)	❑(5)	❑(7)
k.	Group performance	❑(1)	❑(3)	❑(5)	❑(7)
l.	Other _____				

9. Over the past year, to what degree has each of the following factors motivated you to change your course?

		None	Low	Moderate	High
a.	Desire to address varied learning styles and needs	❑(1)	❑(3)	❑(5)	❑(7)
b.	Desire to encourage students to spend more time on learning tasks	❑(1)	❑(3)	❑(5)	❑(7)
c.	Desire to facilitate communication between students and instructors	❑(1)	❑(3)	❑(5)	❑(7)
d.	Desire to help students work more collaboratively	❑(1)	❑(3)	❑(5)	❑(7)
e.	Desire to build on students' familiarity with technology	❑(1)	❑(3)	❑(5)	❑(7)
f.	Desire to increase students' access to course materials	❑(1)	❑(3)	❑(5)	❑(7)
g.	Desire to use technology simulations to teach topics that may have been too dangerous or expensive previously	❑(1)	❑(3)	❑(5)	❑(7)
h.	Desire to teach my course more efficiently	❑(1)	❑(3)	❑(5)	❑(7)
i.	Desire to expect higher quality work from my students	❑(1)	❑(3)	❑(5)	❑(7)

10. Which items below describe the work you intend to do or have done as part of the Bush grant?

		Yes	No
a.	New course syllabus, readings or materials	❑(1)	❑(5)
b.	New website	❑(1)	❑(5)
c.	New presentation tools	❑(1)	❑(5)
d.	New communication tools	❑(1)	❑(5)
e.	New student assignments	❑(1)	❑(5)
f.	New instructional strategies	❑(1)	❑(5)
g.	New technology-enhanced learning strategies	❑(1)	❑(5)
h.	New reflection strategies	❑(1)	❑(5)
i.	New collaborative strategies	❑(1)	❑(5)
j.	New ways to address student learning styles	❑(1)	❑(5)
k.	New classroom assessment methods or instruments	❑(1)	❑(5)
l.	New grading techniques	❑(1)	❑(5)
m.	New software or tailored application	❑(1)	❑(5)
n.	Other_____		

SECTION C: SCHOLARSHIP AND COLLABORATION

For the past year, please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.

		None	Low	Moderate	High
11.	Using active learning techniques such as small group discussions and team projects.	❑(1)	❑(3)	❑(5)	❑(7)
12.	Using information in your course(s) from recent articles, books, or topics.	❑(1)	❑(3)	❑(5)	❑(7)
13.	Using technology in your teaching.	❑(1)	❑(3)	❑(5)	❑(7)
14.	Overseeing student independent research or creative work.	❑(1)	❑(3)	❑(5)	❑(7)
15.	Informally studying the effects of your teaching on student learning.	❑(1)	❑(3)	❑(5)	❑(7)
16.	Taking into account differences among students in how they learn.	❑(1)	❑(3)	❑(5)	❑(7)
17.	Using interdisciplinary knowledge to inform your course design.	❑(1)	❑(3)	❑(5)	❑(7)
18.	Implementing team teaching or other collaborative approaches in courses.	❑(1)	❑(3)	❑(5)	❑(7)
19.	Updating your knowledge of your discipline.	❑(1)	❑(3)	❑(5)	❑(7)
20.	Including multicultural perspectives in appropriate courses.	❑(1)	❑(3)	❑(5)	❑(7)
21.	Using comments from students to alter teaching practices or materials.	❑(1)	❑(3)	❑(5)	❑(7)
22.	Helping students make connections between their prior learning and new knowledge.	❑(1)	❑(3)	❑(5)	❑(7)
23.	Using a variety of techniques in assessing student learning in your courses.	❑(1)	❑(3)	❑(5)	❑(7)
24.	Relating concepts in your courses to real life, such as through problem-based or service learning.	❑(1)	❑(3)	❑(5)	❑(7)
25.	Making connections to other disciplines for students.	❑(1)	❑(3)	❑(5)	❑(7)
26.	Meeting informally with students outside of class, labs, or studios.	❑(1)	❑(3)	❑(5)	❑(7)
27.	Providing written comments to students on their assignments and exams.	❑(1)	❑(3)	❑(5)	❑(7)
28.	Providing prompt feedback to students about their exam results and assignments.	❑(1)	❑(3)	❑(5)	❑(7)
29.	Using examples or illustrations to clarify course material.	❑(1)	❑(3)	❑(5)	❑(7)
30.	Setting high expectations for all students.	❑(1)	❑(3)	❑(5)	❑(7)

For the past year, please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. *(Continued)*

31.	Providing syllabi with course objectives, assignments, and grading procedures.	❑(1)	❑(3)	❑(5)	❑(7)
32.	Discussing with colleagues your course content, materials, assessment techniques, and the like.	❑(1)	❑(3)	❑(5)	❑(7)
33.	Participating in conferences, seminars, or workshops on teaching or student learning.	❑(1)	❑(3)	❑(5)	❑(7)
34.	Presenting on your discipline in a colleague's class.	❑(1)	❑(3)	❑(5)	❑(7)
35.	Inviting colleagues to review your syllabi or teaching materials.	❑(1)	❑(3)	❑(5)	❑(7)
36.	Making your course syllabi available to anyone on the Internet or other public sources.	❑(1)	❑(3)	❑(5)	❑(7)
37.	Preparing a portfolio or dossier to support your teaching performance.	❑(1)	❑(3)	❑(5)	❑(7)
38.	Working with an undergraduate to further inform your course design.	❑(1)	❑(3)	❑(5)	❑(7)
39.	Working with a Teaching Assistant to further inform your course design.	❑(1)	❑(3)	❑(5)	❑(7)
40.	Working with other faculty to further inform your course design	❑(1)	❑(3)	❑(5)	❑(7)
41.	Working with consultants to further inform your course design.	❑(1)	❑(3)	❑(5)	❑(7)

42. At the end of the grant, what criteria will you use to determine whether your participation in the grant was worthwhile?

Thank you very much for your cooperation!

MGT of America, Inc. expresses appreciation to JA Centa/Syracuse University for their permission to modify their Inventory on the Scholarship of Teaching and Learning.

B.2 Course Profile Instrument

University of Minnesota
Enhancing Student Learning Through Innovative Teaching and Technology Strategies
A Bush Foundation Grant
Research Course Profiles
Year 3

Campus:

Faculty Member(s)/Instructor:

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171):

Course Description: (Please provide the course overview that appears in course bulletins)

Student Learning/Teaching Issue/Research Question:

Description of Research Project/Interventions/Methodology: (Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)

Evaluation Plan:

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

What successes have you experienced with your work/project?

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

How are you using collaboration within your project?

How are you utilizing a scholarly approach to teaching within your project? (i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

B.3 Grant Principal Investigator Interview Guide

BUSH FOUNDATION GRANT
SYSTEM WIDE GRANT ADMINISTRATOR INTERVIEW GUIDE
FALL 2007

Date: _____ Interviewer: _____

1. To what extent do you believe program participants throughout the system are aligning their projects with strategic campus initiative(s)?

2. To what extent do you believe faculty are utilizing a collaboration in their approach to teaching systemwide?

3. To what extent, in your opinion, do you believe faculty are utilizing a scholarly approach to teaching systemwide?

4. What are some examples of assessment/evaluation have you learned faculty were using to gauge student learning systemwide?

5a. To what extent do you believe faculty are utilizing data from assessment and evaluation to make adjustments to their teaching and/or course design systemwide?

5b. What adjustments are you aware of that have been made across the system?

5c. Are you aware of any adjustments that are planned for faculty projects systemwide?

6a. What changes have you noticed in the faculty's definitions and attitudes towards the importance of a scholarly approach to teaching since the implementation of the current Bush Grant systemwide?

6b. What changes have you noticed in the faculty's definitions and attitudes towards the importance of a collaborative approach to teaching since the implementation of the current Bush Grant systemwide?

7a. To what extent do you believe faculty development activities have assisted faculty with using scholarly and collaborative approaches to address student learning issues systemwide?

7b. To what extent have those development activities assisted faculty with assessment and evaluation systemwide?

7c. What faculty development activities are still needed to assist faculty systemwide?

8a. What have been the faculty's greatest successes since the implementation of the current Bush Grant?

8b. What have been the faculty's greatest challenges?

8c. What lessons have faculty learned while implementing Bush Grant activities?

9. As the grant PIs, what obstacles did you face and how did you overcome them?

10. What new processes emerged that you believe are critical in managing the Bush Grant?

11. What changes will you make for the administration of the grant

12. Additional Comments.

B.4 Campus Coordinator Interview Guide

BUSH FOUNDATION GRANT
CAMPUS COORDINATOR INTERVIEW GUIDE
FALL 2007

Date: _____ Campus: _____

1. How are program participants on your campus aligning their projects with strategic campus initiative(s)?

2a. How are faculty utilizing collaboration in their approach to teaching on your campus?

2b. How are faculty utilizing collaboration in their approach to teaching systemwide?

3c. How are faculty utilizing scholarly approaches to teaching on your campus?

3b. How are faculty utilizing scholarly approaches to teaching systemwide?

4. What forms of assessment/evaluation are faculty utilizing to gauge student learning?

5a. To what extent have faculty utilized data from assessment and evaluation to make adjustments to their teaching and/or course design?

5b. What adjustments have you noticed?

5c. What adjustments are planned?

6. What are some of the major challenges you have faced as you work to mainstream local evaluation for the Bush Grant on your campus?

7a. What changes have you noticed in the faculty's definitions and attitudes towards the importance of a collaborative approach to teaching since the implementation of the current Bush Grant?

7b. What changes have you noticed in the faculty's definitions and attitudes towards the importance of a scholarly approach to teaching since the implementation of the current Bush Grant?

8a. What faculty development activities have been provided on your campus to assist faculty with the research projects?

8b. To what extent do you believe these activities met their needs?

8c. What faculty development activities are still needed to assist faculty on your campus?

9. To what extent did faculty development activities assist faculty with using scholarly and collaborative approaches to address student learning issues?

10. How did these faculty development activities assist faculty with using classroom assessment techniques and course evaluation findings to shape their teaching?

11a. What have been the faculty's greatest successes since the implementation of the current Bush Grant?

11b. What have been the faculty's greatest challenges?

11c. What lesson have faculty learned while implementing Bush Grant activities?

12. As the campus coordinator, what obstacles did you face and how did you overcome them?

13a. What changes will you make for the administration of the grant as you go into Year 3?

13b. Do you have any recommendations for changes for the grant administration at the system level?

14a. How would you rate the support you received at the system level from the Grant PIs?

14b. Do you have any recommendations for changes for the grant administration at the system level?

15. Additional Comments.

B.5 Faculty Focus Group Guide

BUSH FOUNDATION GRANT
FACULTY FOCUS GROUP GUIDE
FALL 2007

Date: _____ Campus: _____ Number of Faculty: _____

1. How has the focus of your research project changed since your work with the Bush Grant began?

2. How is your project aligned with strategic campus initiatives?

3a. To what extent is collaboration a part of your teaching?

3b. How has your definition of collaboration changed since your became involved with the Bush Grant?

4a. To what extent are you utilizing research articles and publication to inform your Bush Grant project?

4b. Have you published or presented your findings and research? If so, where and when?

4c. How has your definition of a scholarly approach to teaching changed since you became involved with the Bush Grant?

5. What forms of assessment/evaluation are being used to assess the impact of innovative teaching strategies in your courses?

6a. To what extent have you utilized data from assessment and evaluation to make adjustments to your teaching and/or course design?

6b. What adjustments have you made?

6c. What adjustments are being planned?

7a. What faculty development activities have been provided on your campus to assist you with your research project?

7b. To what extent do you believe these activities met your needs?

7c. How could faculty development activities be improved?

8. To what extent did staff development activities assist you with using scholarly and collaborative approaches to address student learning issues?

9. How did these faculty development activities assist you with using classroom assessment techniques and course evaluation findings to shape your teaching?

10a. What have been the your greatest successes since the implementation of the current Bush Grant?

10b. What have been the your greatest challenges?

10c. What lessons have you learned while implementing Bush Grant activities?

11. Do you feel your campus coordinator did enough to engage instructional staff and students in grant related projects?

12a. Do you have any recommendations for changes to the grant administration on your campus?

12b. Do you have any recommendations for changes to the grant administration at the system level?

13. Additional Comments.

B.6 Consultant Focus Group Guide

BUSH FOUNDATION GRANT
CONSULTANT FOCUS GROUP GUIDE
FALL 2007

Date: _____ Campus: _____ Number of Consultants: _____

1a. How would you define your role as a consultant?

_____

_____

1b. What types of activities do you most often perform?

_____

_____

2. How are program participants on your campus aligning their projects with strategic campus initiative(s)?

_____

_____

3a. How are faculty utilizing collaboration in their approach to teaching on your campus?

_____

_____

3b. How are faculty utilizing collaboration in their approach to teaching systemwide?

_____

_____

4a. How are faculty utilizing scholarly approaches to teaching on your campus?

_____

_____

4b. How are faculty utilizing scholarly approaches to teaching systemwide?

_____

_____

5. What forms of assessment/evaluation are faculty using to gauge student learning?

_____

_____

6a. To what extent have faculty utilized data from assessment and evaluation to make adjustments to their teaching and/or course design?

_____

_____

6b. What adjustments did they make?

_____

_____

6c. What adjustments are planned?

7a. How have the faculty's definitions and attitudes towards the importance of a scholarly approach to teaching changed since they became involved with the current Bush Grant?

7b. How have the faculty's definitions and attitudes towards the importance of a scholarly approach to teaching changed since they became involved with the current Bush Grant?

8a. What faculty development activities have been provided on your campus to assist faculty with the research projects?

8b. To what extent do you believe these staff development activities met their needs?

8c. What faculty development activities are still needed to assist faculty on your campus?

9. To what extent have staff development activities assisted faculty with using scholarly and collaborative approaches to address student learning issues?

10. How have faculty development activities assisted faculty with using classroom assessment techniques and course evaluation findings to shape their teaching?

11a. What were the faculty's greatest successes this past year?

11b. What have been the faculty's greatest challenges?

11c. What lesson have faculty learned while implementing Bush Grant activities?

12a. Do you have any recommendations for changes to the grant administration as the campus level?

12b. Do you have any recommendations for changes to the grant administration as the system level?

13. Additional Comments.

B.7 Graduate Student Focus Group Guide

BUSH FOUNDATION GRANT
GRADUATE STUDENT FOCUS GROUP GUIDE
FALL 2007

Date: _____ Campus: _____ Number of Consultants: _____

1. How were you chosen to participate with the Bush Foundation Grant research projects?

2a. What activities are you involved in for the research project(s)?

2b. What activities are other on your team responsible for?

3. What forms of assessment/evaluation is your project utilizing?

4a. To what extent is that data utilized to make adjustments to the teaching and/or course design?

4b. What types of adjustments have been made?

4c. Are any adjustments planned?

5a. How has your definition and attitude towards the importance of a scholarly approach to teaching changed since you became involved with the Bush Grant?

5b. How has your definition and attitude towards the importance of a collaborative approach to teaching changed since you became involved with the Bush Grant?

6a. What faculty development activities have you participated in on your campus to assist you with your research project?

6b. To what extent did these activities meet your needs?

6c. How could faculty development activities be improved?

7a. What have been the your greatest successes since the implementation of the current Bush Grant?

7b. What have been the your greatest challenges?

7c. What lessons have you learned while implementing Bush Grant activities?

8a. How did you learn of the Bush Foundation Grant projects?

8b. Do you feel your campus coordinator did enough to engage instructional staff and students in grant related projects?

9a. Do you have any recommendations for changes to the grant administration on your campus?

9b. Do you have any recommendations for changes to the grant administration at the system level?

10. Additional Comments.

B.8 Campus Coordinator Reflections/Summary Instrument

BUSH FOUNDATION GRANT
COORDINATOR REFLECTIONS/SUMMARY QUESTIONNAIRE
YEAR 3

Dear Campus Coordinators,

As in the past we are asking that you supply a summary to reflect on the research being conducted through the Bush grant on your campus so that we can provide the Bush Foundation with a more complete picture of the activities and outcomes. The data you supply will be used in conjunction with the data collected from site visits, surveys, and monthly conference calls to determine the extent to which the goals and objectives for the grant are being met. As you respond to these questions below, please take time to reflect upon **meetings** you have had with participants, and review the **course profiles** for more detailed examples.

Please return these completed questionnaires to Cindy Seitel via email by December 28. We realize that many of you will be finished up with course work and be on break at this time, but in the event you needed extra time beyond to review profiles we wanted to extend the deadline. Please feel free to submit this feedback earlier if you would like.

We thank you in advance for your assistance.

Campus: _____

1. How were the research projects on your campus aligned with current campus initiatives?

2. Please summarize the research questions for projects on your campus?

3. In reviewing the course profiles from faculty, do you believe faculty understood how their research aligns with campus initiatives? Why or Why not?

4. Based on data from the course profiles, please summarize how faculty participants and their research on your campus fostered a scholarly approach to learning.

5. How have the participants' attitudes and definitions of a scholarly approach to learning changed since the beginning of the grant?

6. Please summarize how faculty on your campus disseminated their research.

7. In reviewing the course profiles, how did faculty use a collaborative approach to learning? How did this changed since the beginning of the grant?

8. What professional development has been provided to faculty participants on your campus during Year 3?

9. What types of assessments were being used to gather data to inform the research of grant projects?

10. Please summarize the key research findings from projects on your campus (i.e., test data revealed that students who participated in a course where individual response systems were used performed better than those who did not participate in these courses; additionally, attendance was reported to be higher in courses using these systems as well.).

11. Please summarize the successes faculty have experienced while conducting their research?

12. Please summarize the more common challenges faculty have experienced while conducting their research?

13. What are the key lessons you have learned from overseeing the grant?

14. How did the grant PIs supported/assisted you with coordinating the grant activities?

15. Please provide a list of publications, presentations, and workshops faculty have written or presented as a result of their work with the Bush Grant?

APPENDIX C:

Survey Analysis: Systemwide by Cohort

APPENDIX C
SURVEY ANALYSIS: SYSTEMWIDE BY COHORT[1]

SECTION A: BACKGROUND INFORMATION

When did you first join the Bush grant on your campus?	N	% of Faculty Responding to the Survey	% of Faculty Representing Cohort
Cohort 1 (2005)	38	67	1
Cohort 2 (2006)	8	14	47
Cohort 3 (2007)	11	19	19

Gender	Cohort 1		Cohort 2		Cohort 3	
	N	%	N	%	N	%
Female	19	51	3	38	7	64
Male	18	49	5	62	4	36

Appointment Type	Cohort 1		Cohort 2		Cohort 3	
	N	%	N	%	N	%
Tenured Faculty	19	50	3	38	3	27
Tenure-track Faculty	7	18	4	50	4	36
Full-time non-regular faculty or professional academic staff	9	24	1	13	4	36
Part-time non-regular faculty or professional staff	3	8	--	--	--	--

Percent of time devoted to teaching in current position.	Cohort 1		Cohort 2		Cohort 3	
	N	%	N	%	N	%
25% or less	5	13	--	--	0	--
Between 26% and 50%	5	13	1	13	1	9
Between 51% and 75%	7	18	6	75	5	46
More than 76%	21	55	1	13	5	46

Number of years teaching post-secondary students.	Cohort 1	Cohort 2	Cohort 3
Minimum	1	3	4
Maximum	39	16	28
Mean	19.1	8.8	10.7
Median	20	8	7
Mode	20	3	7
St. Dev	10.287	4.683	7.030

[1] Sixty-two (62) Cohort 1 faculty began participation in the Bush grant during Year 1 (2005. Seventeen faculty began their participation in 2006 and are considered Cohort 2. Finally, 16 faculty began participating in the Bush grant in 2007 and are identified as Cohort 3.

Faculty members vary in their ability to devote time to the Bush grant programs. How much time do you expect to invest in the program.						
	Cohort 1		Cohort 2		Cohort 3	
Response	N	%	N	%		
0 to 2 hours per month	8	16	--	--	--	--
3 to 5 hours per month	13	27	7	41	2	13
6 to 10 hours per month	15	31	8	47	7	44
11 to 15 hours per month	8	16	2	12	2	12
more than 15 hours per month	5	10	--	--	5	31

Please describe your role as a Bush Foundation Grant Participant?
Based on the qualitative analysis of open-ended responses, BFG participants surveyed appear to fall into four basic groups: those who are developing the projects, those who are conducting the research, team members and campus coordinators leading faculty, and those faculty teaching the courses. It is important to note that some faculty may fall into more than one of the basic groups.

SECTION B: PROJECT ACTIVITIES AND OUTCOMES

7. How important have the following been for improving student learning?		Year	% of Respondents			
			None	Little	Somewhat	Very
a. Collecting information to assess students' entry-level knowledge or abilities						
Cohort 1	n=63: Mean=2.81, Median=3, Mode=3, Std. deviation=1.05	2005	16	18	37	30
	n=48: Mean=3.06, Median=3, Mode=3, Std. deviation=.861	2006	8	8	52	31
	n=38: Mean=5.11, Median= 5, Mode=7, Std. deviation= 1.97	2007	8	21	29	42
Cohort 2	n=15: Mean=2.53, Median=3, Mode=3, Std. deviation=.990	2006	20	20	47	13
	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.852	2007	13	--	63	25
Cohort 3	n=16: Mean=3.26, Median=3, Mode=3, Std. deviation=.856	Spr. 2007	6	6	44	44
	n=11: Mean=4.64, Median=5, Mode=5, Std. deviation=2.157	Fall 2007	18	9	46	27
b. Collecting information to diagnose learning problems or identify individuals who need extra help						
Cohort 1	n=62: Mean=2.77, Median=3, Mode=3, Std. deviation=.990	2005	13	24	36	27
	n=48: Mean=2.44, Median=2.5, Mode=3, Std. deviation=.796	2006	13	38	44	6
	n=38: Mean= 4.63, Median=5, Mode=5, Std. deviation=1.965	2007	11	26	34	29
Cohort 2	n=15: Mean=2.73, Median=2, Mode=2, Std. deviation=1.03	2006	7	47	13	33
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=1.488	2007	13	38	50	--
Cohort 3	n=16: Mean=2.63, Median=3, Mode=3, Std. deviation=.957	Spr. 2007	13	31	38	19
	n=11: Mean=4.09, Median=5, Mode=5, Std. deviation=2.256	Fall 2007	27	9	46	18

7. How important have the following been for improving student learning? (Continued)		Year	% of Respondents			
			None	Little	Somewhat	Very
c. Using classroom assessment strategies to prompt student thinking during lecture or class discussion						
Cohort 1	n=64: Mean=3.24, Median=3, Mode=4, Std. deviation=.946	2005	10	6	35	49
	n=48: Mean=3.46, Median=4, Mode=4, Std. deviation=.743	2006	2	8	31	58
	n=38: Mean=6.05, Median=7, Mode=7, Std. deviation=1.593	2007	3	11	18	68
Cohort 2	n=15: Mean=3.47, Median=4, Mode=4, Std. deviation=.915	2006	7	7	20	67
	n=8: Mean=6, Median=6, Mode=5, Std. deviation=1.069	2007	--	--	50	50
Cohort 3	n=16: Mean=3.69, Median=4, Mode=4, Std. deviation=.793	Spr. 2007	6	--	13	81
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.157	Fall 2007	9	18	18	55
d. Helping students learn to assess their own progress						
Cohort 1	n=63: Mean=2.97, Median=3, Mode=4, Std. deviation=.967	2005	6	29	27	38
	n=47: Mean=2.85, Median=3, Mode=3, Std. deviation=.834	2006	6	23	49	21
	n=38: Mean=5.47, Median=7, Mode=7, Std. deviation=1.942	2007	8	13	26	53
Cohort 2	n=15: Mean=2.93, Median=3, Mode=3, Std. deviation=.799	2006	0	33	40	27
	n=8: Mean=6, Median=7, Mode=7, Std. deviation=1.572	2007	--	13	25	63
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.727	Spr. 2007	--	13	31	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.640	Fall 2007	--	18	18	64
e. Motivating students to improve their study skills						
Cohort 1	n=63: Mean=3.45, Median=4, Mode=4, Std. deviation=.737	2005	3	5	35	57
	n=48: Mean=3.44, Median=4, Mode=4, Std. deviation=.796	2006	2	13	25	60
	n=38: Mean=5.95, Median=7, Mode=7, Std. deviation=1.524	2007	--	16	21	63
Cohort 2	n=15: Mean=3.27, Median=4, Mode=4, Std. deviation=.961	2006	7	13	27	53
	n=8: Mean=5.75, Median=5, Mode=5, Std. deviation=1.035	2007	--	--	63	38
Cohort 3	n=16: Mean=3.31, Median=3.5, Mode=4, Std. deviation=.873	Spr. 2007	6	6	38	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.157	Fall 2007	9	18	18	55

7. How important have the following been for improving student learning? (Continued)		Year	% of Respondents			
			None	Little	Somewhat	Very
f. Getting a better sense of what the class as a group is learning						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.814	2005	3	11	29	57
	n=47: Mean=3.38, Median=3, Mode=4, Std. deviation=.677	2006	--	11	40	49
	n=38: Mean=5.79, Median=7, Mode=7, Std. deviation=1.891	2007	8	8	21	64
Cohort 2	n=15: Mean=3,47, Median=4, Mode=4, Std. deviation=.640	2006	--	7	40	53
	n=8: Mean=6, Median=6, Mode=5, Std. deviation=1.069	2007	--	--	50	50
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.814	Spr. 2007	--	19	19	63
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	27	64
g. Using assessment strategies to help make mid-course corrections in teaching strategies or materials						
Cohort 1	n=63: Mean=3.13, Median=3, Mode=4, Std. deviation=.959	2005	8	16	32	44
	n=47: Mean=3.17, Median=3, Mode=4, Std. deviation=.816	2006	2	19	38	40
	n=38: Mean=5.05, Median=5, Mode=7, Std. deviation=2.053	2007	13	11	37	40
Cohort 2	n=15: Mean=2.87, Median=3, Mode=3, Std. deviation=.915	2006	7	27	40	27
	n=8: Mean=4.75, Median=5, Mode=3, Std. deviation=1.669	2007	--	38	38	25
Cohort 3	n=16: Mean=3.38, Median=4, Mode=4, Std. deviation=.957	Spr. 2007	6	13	19	63
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
h. Using feedback to improve mid-term or final exams						
Cohort 1	n=60: Mean=3.15, Median=3, Mode=3, Std. deviation=.820	2005	3	7	42	38
	n=48: Mean=2.90, Median=3, Mode=3, Std. deviation=1.02	2006	13	19	35	33
	n=38: Mean=4.53, Median=5, Mode=5, Std. deviation=2.102	2007	16	21	34	29
Cohort 2	n=15: Mean=3.00, Median=3, Mode=4, Std. deviation=1.07	2006	13	13	33	40
	n=8: Mean=4.50, Median=5, Mode=5, Std. deviation=1.414	2007	--	38	50	13
Cohort 3	n=16: Mean=3.19, Median=3.5, Mode=4, Std. deviation=1.047	Spr. 2007	13	6	31	50
	n=11: Mean=3.91, Median=3, Mode=1, Std. deviation=2.427	Fall 2007	27	27	18	27

7. How important have the following been for improving student learning? (Continued)		Year	% of Respondents			
			None	Little	Somewhat	Very
i. Using student feedback to evaluate the overall course						
Cohort 1	n=63: Mean=3.29, Median=4, Mode=4, Std. deviation=1.04	2005	5	3	25	67
	n=48: Mean=3.58, Median=4, Mode=4, Std. deviation=.647	2006	2	2	31	65
	n=38: Mean=5.63, Median=5, Mode=5, Std. deviation=1.478	2007	3	8	45	45
Cohort 2	n=15: Mean=3.53, Median=4, Mode=4, Std. deviation=.640	2006	0	7	33	60
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.669	2007	--	25	38	38
Cohort 3	n=16: Mean=3.63, Median=4, Mode=4, Std. deviation=.806	Spr. 2007	6	19	75	--
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64

8. How often have you used the following forms of assessment?		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
a. Interactive techniques (e.g., voting, debates, small group problem-solving						
Cohort 1	n=63: Mean=2.57, Median=2, Mode=2, Std. deviation=.962	2005	10	48	19	24
	n=46: Mean=2.74, Median=3, Mode=2, Std. deviation=1.021	2006	11	35	24	30
	n=38: Mean=5, Median=5, Mode=7, Std. deviation=1.973	2007	8	24	29	40
Cohort 2	n=15: Mean=2.80, Median=3, Mode=3, Std. deviation=1.082	2006	20	7	47	27
	n=8: Mean=4.75, Median=5, Mode=5, Std. deviation=1.982	2007	13	13	50	25
Cohort 3	n=16: Mean=3.38, Median=3.5, Mode=4, Std. deviation=.719	Spr. 2007	--	13	38	50
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	27	64
b. Qualitative methods (e.g., journals, reflection papers, essays, short answer)						
Cohort 1	n=63: Mean=2.57, Median=3, Mode=3, Std. deviation=1.043	2005	19	27	32	22
	n=47: Mean=2.40, Median=2, Mode=2, Std. deviation=.970	2006	19	36	30	15
	n=38: Mean=4.26, Median=5, Mode=3, Std. deviation=2.101	2007	16	32	26	26
Cohort 2	n=15: Mean=2.33, Median=2, Mode=2, Std. deviation=.900	2006	13	53	20	13
	n=8: Mean=3.50, Median=3, Mode=3, Std. deviation=1.773	2007	13	63	13	13
Cohort 3	n=16: Mean=2.75, Median=3, Mode=2, Std. deviation=1.065	Spr. 2007	13	31	25	31
	n=11: Mean=4.64, Median=5, Mode=5, Std. deviation=1.963	Fall 2007	9	27	36	27

8. How often have you used the following forms of assessment? (Continued)		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
c. Quantitative methods (e.g. quizzes or tests, surveys)						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.853	2005	6	5	32	57
	n=47: Mean=3.32, Median=3, Mode=4, Std. deviation=.783	2006	2	13	36	49
	n=38: Mean=5.47, Median=5, Mode=7, Std. deviation=1.704	2007	3	18	32	47
Cohort 2	n=15: Mean=3.47, Median=4, Mode=4, Std. deviation=.743	2006	--	13	27	60
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.669	2007	--	25	38	38
Cohort 3	n=16: Mean=3.06 Median=3, Mode=4, Std. deviation=.998	Spr. 2007	6	25	25	44
	n=11: Mean=4.64, Median=5, Mode=7, Std. deviation=2.501	Fall 2007	18	27	9	46
d. Anonymous student response techniques						
Cohort 1	n=62: Mean=2.24, Median=2, Mode=2, Std. deviation=.803	2005	15	55	23	8
	n=47: Mean=2.21, Median=2, Mode=2, Std. deviation=.954	2006	21	51	13	15
	n=38: Mean=2.84, Median=3, Mode=3, Std. deviation=1.763	2007	25	38	25	13
Cohort 2	n=15: Mean=2.07, Median=2, Mode=2, Std. deviation=.884	2006	27	47	20	7
	n=8: Mean=3.5, Median=3, Mode=3, Std. deviation=2.070	2007	25	38	25	13
Cohort 3	n=16: Mean=2.25, Median=2, Mode=3, Std. deviation=.931	Spr. 2007	25	31	38	6
	n=11: Mean=2.64, Median=3, Mode=1, Std. deviation=1.748	Fall 2007	46	27	27	--
e. Identified student response techniques						
Cohort 1	n=60: Mean=1.95, Median=2, Mode=2, Std. deviation=.852	2005	35	38	23	3
	n=46: Mean=2.20, Median=2, Mode=2, Std. deviation=.980	2006	26	41	20	13
	n=37: Mean=3.7, Median=3, Mode=3, Std. deviation=2.066	2007	24	32	27	16
Cohort 2	n=15: Mean=2.00, Median=2, Mode=1, Std. deviation=1.069	2006	40	33	13	13
	n=8: Mean=3.25, Median=3, Mode=3, Std. deviation=1.669	2007	25	38	38	--
Cohort 3	n=16: Mean=2.31, Median=2, Mode=2, Std. deviation=.946	Spr. 2007	25	38	19	19
	n=11: Mean=2.64, Median=3, Mode=1, Std. deviation=1.963	Fall 2007	46	36	9	9

8. How often have you used the following forms of assessment? (Continued)		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
f. Un-graded performance measures						
Cohort 1	n=62: Mean=2.27, Median=2, Mode=2, Std. deviation=.908	2005	19	45	24	11
	n=47: Mean=2.30, Median=2, Mode=2, Std. deviation=.976	2006	21	43	21	15
	n=38: Mean=3.37, Median=3, Mode=3, Std. deviation=1.852	2007	26	37	29	8
Cohort 2	n=15: Mean=2.20, Median=2, Mode=2, Std. deviation=1.014	2006	27	40	20	13
	n=8: Mean=4.5, Median=4, Mode=3, Std. deviation=2.33	2007	13	38	13	38
Cohort 3	n=16: Mean=2.31, Median=2, Mode=2, Std. deviation=.946	Spr. 2007	19	44	25	13
	n=11: Mean=3, Median=3, Mode=1, Std. deviation=2.00	Fall 2007	36	36	18	9
g. Graded performance measures						
Cohort 1	n=63: Mean=3.57, Median=4, Mode=4, Std. deviation=.615	2005	--	6	30	64
	n=46: Mean=3.37, Median=3, Mode=4, Std. deviation=.679	2006	--	11	41	48
	n=38: Mean=5.84, Median=7, Mode=7, Std. deviation=1.443	2007	3	5	40	53
Cohort 2	n=15: Mean=3.00, Median=3, Mode=3, Std. deviation=.926	2006	7	20	40	33
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.282	2007	--	13	63	25
Cohort 3	n=16: Mean=3.19, Median=3, Mode=4, Std. deviation=.911	Spr. 2007	6	13	38	44
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.044	Fall 2007	--	--	46	55
h. Voluntary measures of performance						
Cohort 1	n=60: Mean=1.85, Median=2, Mode=1, Std. deviation=.880	2005	43	32	22	3
	n=46: Mean=1.96, Median=2, Mode=1, Std. deviation=.918	2006	37	37	20	7
	n=36: Mean=2.83, Median=3, Mode=1, Std. deviation=1.748	2007	39	33	25	3
Cohort 2	n=15: Mean=1.73, Median=2, Mode=1, Std. deviation=.799	2006	47	33	20	--
	n=8: Mean=2.75, Median=3, Mode=3, Std. deviation=1.982	2007	38	50	--	13
Cohort 3	n=16: Mean=1.5, Median=1, Mode=1, Std. deviation=.894	Spr. 2007	69	19	6	6
	n=11: Mean=2.09, Median=1, Mode=1, Std. deviation=1.640	Fall 2007	64	18	18	--

8. How often have you used the following forms of assessment? (Continued)		Year	% of Respondents			
			Never	Sometimes	Often	Very Often
i. Required measures of performance						
Cohort 1	n=60: Mean=3.13, Median=3, Mode=3, Std. deviation=.911	2005	8	10	42	40
	n=46: Mean=3.17, Median=3.5, Mode=4, Std. deviation=.973	2006	7	20	24	50
	n=36: Mean=5.22, Median=5, Mode=7, Std. deviation=	2007	11	11	33	44
Cohort 2	n=15: Mean=3.00, Median=3, Mode=3, Std. deviation=.926	2006	7	50	40	33
	n=8: Mean=4.25, Median=5, Mode=5, Std. deviation=2.375	2007	25	13	38	25
Cohort 3	n=16: Mean=3.00, Median=3, Mode=4, Std. deviation=1.155	Spr. 2007	19	6	31	44
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
j. Individual student performance						
Cohort 1	n=63: Mean=3.35, Median=4, Mode=4, Std. deviation=.883	2005	8	3	35	54
	n=46: Mean=3.24, Median=3.5, Mode=4, Std. deviation=.947	2006	9	9	33	50
	n=36: Mean=5.67, Median=5, Mode=7, Std. deviation=1.512	2007	3	8	42	47
Cohort 2	n=15: Mean=3.13, Median=3, Mode=3, Std. deviation=.743	2006	--	20	47	33
	n=8: Mean=4.75, Median=5, Mode=5, Std. deviation=1.982	2007	13	13	50	25
Cohort 3	n=16: Mean=3.19, Median=4, Mode=4, Std. deviation=1.109	Spr. 2007	13	13	19	56
	n=11: Mean=5.73, Median=7, Mode=7, Std. deviation=1.618	Fall 2007	--	18	27	55
k. Group performance						
Cohort 1	n=62: Mean=2.42, Median=2, Mode=2, Std. deviation=1.017	2005	19	39	23	19
	n=45: Mean=2.27, Median=2, Mode=2, Std. deviation=.939	2006	22	40	27	11
	n=36: Mean=3.89, Median=3, Mode=3, Std. deviation=2.053	2007	19	36	25	19
Cohort 2	n=15: Mean=2.07, Median=2, Mode=1, Std. deviation=1.100	2006	40	27	20	13
	n=8: Mean=2.50, Median=2, Mode=1, Std. deviation=1.773	2007	50	25	25	--
Cohort 3	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=1.047	Spr. 2007	13	25	31	31
	n=11: Mean=3.91, Median=5, Mode=5, Std. deviation=2.256	Fall 2007	27	18	36	18

9. To what degree has each of the following factors motivated you to change your course?		Year	% of Respondents			
			None	Low	Moderate	High
a. Desire to address varied learning styles and needs						
Cohort 1	n=63: Mean=3.16, Median=3, Mode=4, Std. deviation=.846	2005	3	19	37	41
	n=47: Mean=3.19, Median=3, Mode=3, Std. deviation=.798	2006	2	17	40	40
	n=38: Mean=5.74, Median=7, Mode=7, Std. deviation=1.766	2007	5	11	26	58
Cohort 2	n=15: Mean=3.27, Median=3, Mode=3, Std. deviation=.799	2006	7	--	53	40
	n=8: Mean=4.25, Median=4, Mode=3, Std. deviation=1.488	2007	--	50	38	13
Cohort 3	n=16: Mean=3.50, Median=3.5, Mode=3, Std. deviation=.516	Spr. 2007	--	--	50	50
	n=11: Mean=5, Median=5, Mode=5, Std. deviation=1.789	Fall 2007	9	9	55	27
b. Desire to encourage students to spend more time on learning tasks						
Cohort 1	n=63: Mean=3.62, Median=4, Mode=4, Std. deviation=.580	2005	--	5	29	67
	n=47: Mean=3.53, Median=4, Mode=4, Std. deviation=.620	2006	--	6	34	60
	n=38: Mean=5.95, Median=7, Mode=7, Std. deviation=1.207	2007	--	5	42	53
Cohort 2	n=15: Mean=3.27, Median=3, Mode=3, Std. deviation=.704	2006	--	13	47	40
	n=8: Mean=5.75, Median=6, Mode=7, Std. deviation=1.488	2007	--	13	38	50
Cohort 3	n=16: Mean=3.56, Median=4, Mode=4, Std. deviation=..512	Spr. 2007	--	--	44	56
	n=11: Mean=5.55, Median=5, Mode=5, Std. deviation=1.293	Fall 2007	--	9	55	36
c. Desire to facilitate communication between students and instructors						
Cohort 1	n=63: Mean=3.40, Median=4, Mode=4, Std. deviation=.708	2005	--	13	35	52
	n=47: Mean=3.23, Median=3, Mode=3, Std. deviation=.729	2006	--	17	43	40
	n=38: Mean=5.79, Median=7, Mode=7, Std. deviation=1.580	2007	3	11	32	55
Cohort 2	n=15: Mean=3.40, Median=3, Mode=3, Std. deviation=.632	2006	--	7	47	47
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.632	Spr. 2007	--	6	38	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	36	55

9. To what degree has each of the following factors motivated you to change your course? (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
d. Desire to help students work more collaboratively						
Cohort 1	n=63: Mean=2.98, Median=3, Mode=3, Std. deviation=.871	2005	5	24	40	32
	n=47: Mean=3.23, Median=3, Mode=3, Std. deviation=.729	2006	4	26	30	40
	n=38: Mean=5.63, Median=7, Mode=7, Std. deviation=1.683	2007	3	16	29	53
Cohort 2	n=15: Mean=3.40, Median=3, Mode=3, Std. deviation=.632	2006	--	40	53	7
	n=8: Mean=4.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	38	50	13
Cohort 3	n=16: Mean=3.25, Median=3.5, Mode=4, Std. deviation=.931	Spr. 2007	6	13	31	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.335	Fall 2007	18	--	27	55
e. Desire to build on students' familiarity with technology						
Cohort 1	n=63: Mean=2.89, Median=3, Mode=2, Std. 4deviation=.882	2005	3	35	32	30
	n=47: Mean=2.57, Median=3, Mode=3, Std. deviation=1.037	2006	19	26	34	21
	n=38: Mean=4.58, Median=5, Mode=5, Std. deviation=2.088	2007	16	18	37	29
Cohort 2	n=15: Mean=2.73, Median=3, Mode=2, Std. deviation=.799	2006	--	47	33	20
	n=8: Mean=4.75, Median=5, Mode=3, Std. deviation=1.669	2007	--	38	38	25
Cohort 3	n=16: Mean=3.19, Median=3.5, Mode=4, Std. deviation=.911	Spr. 2007	--	31	19	50
	n=38: Mean=4.58, Median=5, Mode=5, Std. deviation=1.401	Fall 2007	--	27	55	18
f. Desire to increase students' access to course materials						
Cohort 1	n=63: Mean=3.10, Median=3, Mode=3, Std. deviation=.856	2005	5	24	40	32
	n=47: Mean=3.09, Median=3, Mode=3, Std. deviation=.830	2006	4	17	45	34
	n=38: Mean=5.21, Median=5, Mode=7, Std. deviation=2.016	2007	11	13	32	45
Cohort 2	n=15: Mean=3.27, Median=4, Mode=4, Std. deviation=.884	2006	--	27	20	53
	n=8: Mean=5.25, Median=6, Mode=7, Std. deviation=1.982	2007	--	37	13	50
Cohort 3	n=16: Mean=3.56, Median=4, Mode=4, Std. deviation=.629	Spr. 2007	--	6	31	63
	n=11: Mean=4.64, Median=5, Mode=7, Std. deviation=2.501	Fall 2007	18	27	9	46

9. To what degree has each of the following factors motivated you to change your course? (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
g. Desire to use technology simulations to teach topics that may have been too dangerous or expensive previously						
Cohort 1	n=63: Mean=2.42, Median=2, Mode=3, Std. deviation=1.073	2005	25	25	30	19
	n=47: Mean=2.21, Median=2, Mode=1, Std. deviation=1.041	2006	34	21	34	11
	n=36: Mean=2.67, Median=1, Mode=1, Std. deviation=2.268	2007	58	14	14	14
Cohort 2	n=15: Mean=1.47, Median=1, Mode=1, Std. deviation=.516	2006	53	47	--	--
	n=8: Mean=1.5, Median=1, Mode=1, Std. deviation=.926	2007	75	25	--	--
Cohort 3	n=16: Mean=1.94, Median=1.5, Mode=1, Std. deviation=1.124	Spr. 2007	50	19	19	13
	n=11: Mean=2.27, Median=1, Mode=1, Std. deviation=2.24	Fall 2007	73	--	18	9
h. Desire to teach my course more efficiently						
Cohort 1	n=61: Mean=3.64, Median=4, Mode=4, Std. deviation=.606	2005	--	7	23	71
	n=47: Mean=3.55, Median=4, Mode=4, Std. deviation=.619	2006	--	6	32	62
	n=38: Mean=6.16, Median=7, Mode=7, Std. deviation=1.366	2007	3	3	29	66
Cohort 2	n=15: Mean=3.53, Median=4, Mode=4, Std. deviation=.640	2006	--	7	33	60
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.669	2007	--	25	38	38
Cohort 3	n=16: Mean=3.50, Median=3.5, Mode=3, Std. deviation=.516	Spr. 2007	--	--	50	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.335	Fall 2007	18	--	27	55
i. Desire to expect higher quality work from my students						
Cohort 1	n=63: Mean=3.79, Median=4, Mode=4, Std. deviation=.481	2005	--	3	14	83
	n=47: Mean=3.64, Median=4, Mode=4, Std. deviation=.529	2006	--	2	32	66
	n=38: Mean=6.42, Median=7, Mode=7, Std. deviation=1.030	2007	--	3	24	74
Cohort 2	n=15: Mean=3.67, Median=4, Mode=4, Std. deviation=.488	2006	--	--	33	67
	n=8: Mean=6.50, Median=7, Mode=7, Std. deviation=.926	2007	--	--	25	75
Cohort 3	n=16: Mean=3.81, Median=4, Mode=4, Std. deviation=.403	Spr. 2007	--	--	19	81
	n=11: Mean=6.6, Median=7, Mode=7, Std. deviation=.843	Fall 2007	--	--	20	80

10. Which items below describe the work you have done as part of the Bush grant?		Years	% of Respondents	
			Yes	No
a. New course syllabus, readings, or materials	**Cohort 1**	2005 (n=62)	65	36
		2006 (n=48)	71	29
		2007 (n=38)	66	35
	Cohort 2	2006 (n=16)	56	44
		2007 (n=8)	38	63
	Cohort 3	Spr 2007 (n=16)	63	38
		Fall 2007 (n=11)	46	56
b. New website	**Cohort 1**	2005 (n=62)	71	29
		2006 (n=48)	71	29
		2007 (n=38)	76	24
	Cohort 2	2006 (n=16)	75	25
		2007 (n=8)	75	25
	Cohort 3	Spr 2007 (n=16)	50	50
		Fall 2007 (n=11)	73	27
c. New presentation tools	**Cohort 1**	2005 (n=61)	54	46
		2006 (n=48)	44	56
		2007 (n=38)	58	42
	Cohort 2	2006 (n=16)	56	44
		2007 (n=8)	50	50
	Cohort 3	Spr 2007 (n=15)	47	53
		Fall 2007 (n=11)	36	64

10. Which items below describe the work you have done as part of the Bush grant? (Continued)		Years	% of Respondents	
d. New communication tools	**Cohort 1**	2005 (n=62)	61	39
		2006 (n=48)	60	40
		2007 (n=38)	58	42
	Cohort 2	2006 (n=16)	75	39
		2007 (n=8)	88	13
	Cohort 3	Spr 2007 (n=15)	80	20
		Fall 2007 (n=11)	73	27
e. New student assignments	**Cohort 1**	2005 (n=62)	61	39
		2006 (n=48)	67	33
		2007 (n=38)	71	29
	Cohort 2	2006 (n=16)	81	19
		2007 (n=8)	38	63
	Cohort 3	Spr 2007 (n=15)	80	20
		Fall 2007 (n=11)	82	18
f. New instructional strategies	**Cohort 1**	2005 (n=62)	86	15
		2006 (n=48)	89	11
		2007 (n=38)	90	11
	Cohort 2	2006 (n=16)	94	6
		2007 (n=8)	63	38
	Cohort 3	Spr 2007 (n=16)	75	25
		Fall 2007 (n=11)	55	46

10. Which items below describe the work you have done as part of the Bush grant? (Continued)		Years	% of Respondents	
g. New technology-enhanced learning strategies	**Cohort 1**	2005 (n=61)	95	5
		2006 (n=48)	94	6
		2007 (n=38)	90	11
	Cohort 2	2006 (n=16)	100	--
		2007 (n=8)	100	--
	Cohort 3	Spr 2007 (n=16)	81	19
		Fall 2007 (n=11)	91	9
h. New reflection strategies	**Cohort 1**	2005 (n=61)	72	28
		2006 (n=48)	65	35
		2007 (n=38)	84	16
	Cohort 2	2006 (n=16)	81	19
		2007 (n=8)	75	25
	Cohort 3	Spr 2007 (n=16)	75	25
		Fall 2007 (n=11)	91	9
i. New collaborative strategies	**Cohort 1**	2005 (n=62)	76	24
		2006 (n=47)	64	36
		2007 (n=38)	63	37
	Cohort 2	2006 (n=16)	69	31
		2007 (n=8)	50	50
	Cohort 3	Spr 2007 (n=16)	94	6
		Fall 2007 (n=11)	73	27

10. Which items below describe the work you have done as part of the Bush grant? (Continued)		Years	% of Respondents	
j. New ways to address student learning styles	**Cohort 1**	2005 (n=61)	72	28
		2006 (n=47)	70	30
		2007 (n=38)	79	21
	Cohort 2	2006 (n=16)	75	25
		2007 (n=8)	50	50
	Cohort 3	Spr 2007 (n=16)	63	37
		Fall 2007 (n=11)	64	36
k. New classroom assessment methods or instruments	**Cohort 1**	2005 (n=62)	71	29
		2006 (n=48)	58	42
		2007 (n=38)	74	26
	Cohort 2	2006 (n=16)	75	25
		2007 (n=8)	50	50
	Cohort 3	Spr 2007 (n=16)	63	37
		Fall 2007 (n=11)	55	46
l. New grading techniques	**Cohort 1**	2005 (n=62)	86	15
		2006 (n=48)	81	19
		2007 (n=38)	87	13
	Cohort 2	2006 (n=16)	81	19
		2007 (n=8)	75	25
	Cohort 3	Spr 2007 (n=16)	63	37
		Fall 2007 (n=11)	64	36

10. Which items below describe the work have done as part of the Bush grant? (Continued)		Years	% of Respondents	
m. New software or tailored application	**Cohort 1**	2005 (n=62)	42	58
		2006 (n=47)	47	53
		2007 (n=38)	53	47
	Cohort 2	2006 (n=16)	63	37
		2007 (n=8)	25	75
	Cohort 3	Spr 2007 (n=16)	44	56
		Fall 2007 (n=11)	46	55

SECTION C: SCHOLARSHIP AND COLLABORATION

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching.		Year	% of Respondents			
			None	Low	Moderate	High
11. Using active learning techniques such as small group discussions and team projects.						
Cohort 1	n=63: Mean=3.19, Median=3, Mode=4, Std. deviation=.895	2005	3	22	27	48
	n=47: Mean=3.21, Median=3, Mode=3, Std. deviation=.750	2006	4	6	53	36
	n=38: Mean=5.53, Median=5, Mode=7, Std. deviation=1.656	2007	3	16	34	47
Cohort 2	n=16: Mean=2.88, Median=2.5, Mode=2, Std. deviation=1.088	2006	6	44	6	44
	n=8: Mean=4.75, Median=5, Mode=5, Std. deviation=1.282	2007	--	25	63	13
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.966	Spr. 2007	6	13	6	75
	n=11: Mean=6.09, Median=7, Mode=7, Std. deviation=1.686	Fall 2007	9	--	18	73
12. Using information in your course(s) from recent articles, books, or topics						
Cohort 1	n=63: Mean=3.35, Median=4, Mode=4, Std. deviation=.845	2005	2	19	22	57
	(n=47: Mean=3.15, Median=3, Mode=3, Std. deviation=.691	2006	2	11	57	30
	n=38: Mean=5.42, Median=5, Mode=5, Std. deviation=1.553	2007	3	13	45	40
Cohort 2	n=16: Mean=3.44, Median=3.5, Mode=4, Std. deviation=.629	2006	--	6	44	50
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=16: Mean=3.38, Median=4, Mode=4, Std. deviation=.806	Spr. 2007	--	19	25	56
	n=11: Mean=5.55, Median=5, Mode=5, Std. deviation=1.809	Fall 2007	9	--	46	46

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
13. Using technology in your teaching.						
Cohort 1	n=62: Mean=3.37, Median=4, Mode=4, Std. deviation=.773	2005	2	13	32	53
	n=47: Mean=3.19, Median=3, Mode=3, Std. deviation=.825	2006	4	13	43	40
	n=38: Mean=5.58, Median=6, Mode=7, Std. deviation=1.671	2007	3	16	32	50
Cohort 2	n=16: Mean=3.56, Median=4, Mode=4, Std. deviation=.512	2006	--	--	44	56
	n=8: Mean=6.25, Median=7, Mode=7, Std. deviation=1.035	2007	--	--	38	63
Cohort 3	n=16: Mean=3.56, Median=4, Mode=4, Std. deviation=.512	Spr. 2007	--	--	44	56
	n=11: Mean=6.27, Median=7, Mode=7, Std. deviation=1.009	Fall 2007	--	--	36	64
14. Overseeing student independent research or creative work.						
Cohort 1	n=63: Mean=2.60, Median=3, Mode=3, Std. deviation=1.040	2005	18	29	30	24
	n=47: Mean=2.11, Median=2, Mode=1, Std. deviation=1.026	2006	34	34	19	13
	n=38: Mean=3.21, Median=3, Mode=3, Std. deviation=2.171	2007	37	32	16	16
Cohort 2	n=16: Mean=2.69, Median=2.5, Mode=2, Std. deviation=1.078	2006	13	38	19	31
	n=8: Mean=4.5, Median=5, Mode=5, Std. deviation=.926	2007	--	25	75	--
Cohort 3	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=1.047	Spr. 2007	13	25	31	31
	n=11: Mean=3.73, Median=3, Mode=1, Std. deviation=2.573	Fall 2007	36	18	18	27
15. Informally studying the effects of your teaching on student learning.						
Cohort 1	n=62: Mean=3.11, Median=3, Mode=3, Std. deviation=.812	2005	3	18	44	36
	n=47: Mean=2.96, Median=3, Mode=3, Std. deviation=.806	2006	4	21	49	26
	n=38: Mean=5.16, Median=5, Mode=5, Std. deviation=1.882	2007	11	8	45	37
Cohort 2	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=.750	2006	--	38	44	19
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=15: Mean=2.60, Median=3, Mode=2, Std. deviation=.986	Spr. 2007	13	33	33	20
	n=11: Mean=5.73, Median=7, Mode=7, Std. deviation=2.054	Fall 2007	9	9	18	64

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
16. Taking into account differences among students in how they learn.						
Cohort 1	n=63: Mean=3.06, Median=3, Mode=3, Std. deviation=.859	2005	5	19	41	35
	n=47: Mean=3.02, Median=3, Mode=3, Std. deviation=.794	2006	4	17	51	28
	n=38: Mean=5.26, Median=5, Mode=5, Std. deviation=1.750	2007	5	16	40	40
Cohort 2	n=16: Mean=2.75, Median=3, Mode=2, Std. deviation=.931	2006	6	38	31	25
	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.069	2007	--	13	75	13
Cohort 3	n=16: Mean=2.94, Median=3, Mode=3, Std. deviation=.854	Spr. 2007	6	19	50	25
	n=11: Mean=5, Median=5, Mode=5, Std. deviation=1.265	Fall 2007	--	18	64	18
17. Using interdisciplinary knowledge to inform your course design.						
Cohort 1	n=63: Mean=2.89, Median=3, Mode=3, Std. deviation=.918	2005	8	24	40	29
	n=47: Mean=2.66, Median=3, Mode=3, Std. deviation=.915	2006	13	26	45	17
	n=37: Mean=4.62, Median=5, Mode=5, Std. deviation=1.816	2007	8	27	41	24
Cohort 2	n=16: Mean=2.69, Median=3, Mode=2, Std. deviation=1.014	2006	13	31	31	25
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.982	2007	13	--	50	38
Cohort 3	n=15: Mean=2.33, Median=2, Mode=2, Std. deviation=.816	Spr. 2007	13	47	33	7
	n=11: Mean=4.45, Median=5, Mode=5, Std. deviation=2.382	Fall 2007	27	--	46	27
18. Implementing team teaching or other collaborative approaches in courses.						
Cohort 1	n=63: Mean=2.14, Median=2, Mode=2, Std. deviation=.965	2005	30	35	25	10
	n=46: Mean=2.02, Median=2, Mode=1, Std. deviation=.954	2006	37	31	26	7
	n=38: Mean=3.32, Median=3, Mode=1, Std. deviation=2.107	2007	34	29	24	13
Cohort 2	n=16: Mean=1.94, Median=1.5, Mode=1, Std. deviation=1.124	2006	50	19	19	13
	n=8: Mean=3, Median=3, Mode=1, Std. deviation=1.852	2007	38	25	38	--
Cohort 3	n=16: Mean=2.00, Median=2, Mode=2, Std. deviation=.894	Spr. 2007	31	44	19	6
	n=11: Mean=3.18, Median=1, Mode=1, Std. deviation=2.601	Fall 2007	55	--	27	18

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
19. Updating your knowledge of your discipline.						
Cohort 1	n=62: Mean=3.37, Median=4, Mode=4, Std. deviation=1.044	2005	10	13	8	69
	n=47: Mean=3.28, Median=4, Mode=4, Std. deviation=.852	2006	2	19	28	51
	n=38: Mean=5.05, Median=5, Mode=5, Std. deviation=1.770	2007	8	13	47	32
Cohort 2	n=16: Mean=3.31, Median=3, Mode=3, Std. deviation=.704	2006	--	13	44	44
	n=8: Mean=5.25, Median=5, Mode=5, Std. deviation=1.282	2007	--	13	63	25
Cohort 3	n=16: Mean=3.44, Median=4, Mode=4, Std. deviation=.964	Spr. 2007	6	13	13	69
	n=11: Mean=5.18, Median=7, Mode=7, Std. deviation=2.442	Fall 2007	18	9	18	56
20. Including multicultural perspectives in appropriate courses.						
Cohort 1	n=63: Mean=2.68, Median=3, Mode=2, Std. deviation=1.029	2005	13	35	24	29
	n=47: Mean=2.55, Median=3, Mode=4, Std. deviation=1.157	2006	26	21	26	28
	n=37: Mean=4.03, Median=5, Mode=5, Std. deviation=2.088	2007	22	24	35	19
Cohort 2	n=16: Mean=2.47, Median=3, Mode=1, Std. deviation=1.246	2006	33	13	27	27
	n=8: Mean=3.5, Median=3, Mode=3, Std. deviation=2.070	2007	25	38	25	13
Cohort 3	n=16: Mean=2.69, Median=3, Mode=3, Std. deviation=1.078	Spr. 2007	19	19	38	25
	n=11: Mean=3, Median=3, Mode=1, Std. deviation=2.919	Fall 2007	46	18	27	9
21. Using comments from students to alter teaching practices or materials.						
Cohort 1	n=63: Mean=3.27, Median=3, Mode=4, Std. deviation=.787	2005	3	11	41	44
	n=47: Mean=3.34, Median=3, Mode=4, Std. deviation=.700	2006	--	13	40	47
	n=38: Mean=5.68, Median=6, Mode=7, Std. deviation=1.561	2007	3	11	37	50
Cohort 2	n=16: Mean=2.94, Median=3, Mode=3, Std. deviation=.772	2006	--	31	44	25
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.632	Spr. 2007	--	6	38	56
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.375	Fall 2007	--	9	36	55

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
22. Helping students make connections between their prior learning and new knowledge.						
Cohort 1	n=63: Mean=3.51, Median=4, Mode=4, Std. deviation=.669	2005	--	10	30	60
	n=46: Mean=3.35, Median=3, Mode=4, Std. deviation=.674	2006	--	11	44	46
	n=38: Mean=5.68, Median=6, Mode=7, Std. deviation=1.561	2007	3	11	37	50
Cohort 2	n=16: Mean=3.25, Median=3.5, Mode=4, Std. deviation=.856	2006	--	25	25	50
	n=8: Mean=6.50, Median=7, Mode=7, Std. deviation=.926	2007	--	--	25	75
Cohort 3	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.730	Spr. 2007	--	13	25	63
	n=11: Mean=5.55, Median=7, Mode=7, Std. deviation=2.207	Fall 2007	9	18	9	64
23. Using a variety of techniques in assessing student learning in your courses.						
Cohort 1	n=63: Mean=3.37, Median=4, Mode=4, Std. deviation=.809	2005	3	11	32	54
	n=47: Mean=3.36, Median=3, Mode=4, Std. deviation=.673	2006	--	11	43	47
	n=38: Mean=5.84, Median=7, Mode=7, Std. deviation=1.366	2007	--	11	37	53
Cohort 2	n=16: Mean=3.00, Median=3, Mode=3, Std. deviation=.894	2006	--	38	25	38
	n=8: Mean=5.5, Median=7, Mode=7, Std. deviation=2.070	2007	--	38	--	63
Cohort 3	n=16: Mean=3.19, Median=3, Mode=3, Std. deviation=.655	Spr. 2007	--	13	56	31
	n=11: Mean=5.73, Median=7, Mode=7, Std. deviation=1.842	Fall 2007	9	--	36	55
24. Relating concepts in your courses to real life, such as through problem-based or service learning.						
Cohort 1	n=62: Mean=3.45, Median=4, Mode=4, Std. deviation=.761	2005	2	11	27	60
	n=47: Mean=3.30, Median=4, Mode=4, Std. deviation=.907	2006	4	17	23	55
	n=38: Mean=5.26, Median=5, Mode=7, Std. deviation=1.870	2007	8	13	37	42
Cohort 2	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=.834	2006	6	25	50	19
	n=8: Mean=4.5, Median=5, Mode=5, Std. deviation=2.070	2007	13	25	38	25
Cohort 3	n=16: Mean=3.19, Median=3.5, Mode=4, Std. deviation=.981	Spr. 2007	6	19	25	50
	n=11: Mean=5.36, Median=7, Mode=7, Std. deviation=2.335	Fall 2007	9	27	--	64

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
25. Making connections to other disciplines for students.						
Cohort 1	n=63: Mean=2.95, Median=3, Mode=3, Std. deviation=.906	2005	8	19	43	30
	n=46: Mean=2.85, Median=3, Mode=3, Std. deviation=.942	2006	9	26	37	28
	n=38: Mean=4.37, Median=5, Mode=5, Std. deviation=1.746	2007	8	34	40	18
Cohort 2	n=16: Mean=2.81, Median=3, Mode=3, Std. deviation=.981	2006	13	19	44	25
	n=8: Mean=4.75, Median=5, Mode=7, Std. deviation=2.252	2007	13	25	25	38
Cohort 3	n=16: Mean=2.75, Median=3, Mode=3, Std. deviation=.856	Spr. 2007	6	31	44	19
	n=11: Mean=4.64, Median=5, Mode=5, Std. deviation=1.502	Fall 2007	--	36	46	18
26. Meeting informally with students outside of class, labs, or studios.						
Cohort 1	n=62: Mean=2.69, Median=3, Mode=3, Std. deviation=1.065	2005	18	23	32	27
	n=46: Mean=2.65, Median=3, Mode=3, Std. deviation=.924	2006	11	33	37	20
	n=38: Mean=4, Median=4, Mode=3, Std. deviation=2.013	2007	18	32	32	18
Cohort 2	n=16: Mean=2.88, Median=3, Mode=4, Std. deviation=1.088	2006	13	25	25	38
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	2007	25	25	38	13
Cohort 3	n=16: Mean=2.69, Median=3, Mode=3, Std. deviation=1.078	Spr. 2007	19	19	38	25
	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	Fall 2007	18	18	18	46
27. Providing written comments to students on their assignments and exams.						
Cohort 1	n=62: Mean=3.10, Median=3, Mode=4, Std. deviation=.900	2005	5	21	34	40
	n=46: Mean=2.89, Median=3, Mode=4, Std. deviation=1.038	2006	11	26	26	37
	n=38: Mean=4.84, Median=5, Mode=5, Std. deviation=1.939	2007	11	18	40	32
Cohort 2	n=16: Mean=2.88, Median=3, Mode=3, Std. deviation=.885	2006	6	25	44	25
	n=8: Mean=5.5, Median=5, Mode=5, Std. deviation=1.414	2007	--	13	50	38
Cohort 3	n=15: Mean=3.20, Median=4, Mode=4, Std. deviation=1.082	Spr. 2007	13	7	27	53
	n=11: Mean=5, Median=5, Mode=7, Std. deviation=2.366	Fall 2007	18	9	27	46

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
28. Providing prompt feedback to students about their exam results and assignments.						
Cohort 1	n=62: Mean=3.58, Median=4, Mode=4, Std. deviation=.737	2005	3	5	23	69
	n=47: Mean=3.49, Median=4, Mode=4, Std. deviation=.718	2006	--	13	26	62
	N=38: Mean=5.68, Median=6, Mode=7, Std. deviation=1.629	2007	5	5	40	50
Cohort 2	n=16: Mean=3.50, Median=4, Mode=4, Std. deviation=.816	2006	6	--	31	63
	n=8: Mean=6.25, Median=7, Mode=7, Std. deviation=1.488	2007	--	13	13	75
Cohort 3	n=16: Mean=3.50, Median=3.5, Mode=3, Std. deviation=.516	Spr. 2007	--	--	50	50
	n=11: Mean=5.91, Median=7, Mode=7, Std. deviation=1.868	Fall 2007	9	--	27	64
29. Using examples or illustrations to clarify course material.						
Cohort 1	n=63: Mean=3.78, Median=4, Mode=4, Std. deviation=.552	2005	2	2	14	83
	n=47: Mean=3.55, Median=4, Mode=4, Std. deviation=.619	2006	--	6	32	62
	n=38: Mean=6.47, Median=7, Mode=7, Std. deviation=1.006	2007	--	3	21	76
Cohort 2	n=16: Mean=3.63, Median=4, Mode=4, Std. deviation=.719	2006	--	13	13	75
	n=8: Mean=6.5, Median=7, Mode=7, Std. deviation=.926	2007	--	--	25	75
Cohort 3	n=16: Mean=3.81, Median=4, Mode=4, Std. deviation=.403	Spr. 2007	--	--	19	81
	n=11: Mean=6.45, Median=7, Mode=7, Std. deviation=.934	Fall 2007	--	--	27	73
30. Setting high expectations for all students.						
Cohort 1	n=61: Mean=3.80, Median=4, Mode=4, Std. deviation=.542	2005	2	2	12	85
	n=47: Mean=3.53, Median=4, Mode=4, Std. deviation=.654	2006	--	9	30	62
	n=38: Mean=6.37, Median=7, Mode=7, Std. deviation=1.239	2007	3	--	24	74
Cohort 2	n=16: Mean=3.38, Median=3, Mode=3, Std. deviation=.619	2006	--	6	50	44
	n=8: Mean=6.5, Median=7, Mode=7, Std. deviation=.926	2007	--	--	25	75
Cohort 3	n=15: Mean=3.67, Median=4, Mode=4, Std. deviation=.488	Spr. 2007	--	--	33	67
	n=11: Mean=6.64, Median=7, Mode=7, Std. deviation=.809	Fall 2007	--	--	18	82

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
31. Providing syllabi with course objectives, assignments, and grading procedures.						
Cohort 1	n=62: Mean=3.77, Median=4, Mode=4, Std. deviation=.663	2005	3	14	41	43
	n=47: Mean=3.81, Median=4, Mode=4, Std. deviation=.495	2006	--	15	45	40
	n=38: Mean=6.42, Median=7, Mode=7, Std. deviation=1.388	2007	3	5	11	82
Cohort 2	n=16: Mean=3.44, Median=3.5, Mode=4, Std. deviation=.629	2006	--	25	44	19
	n=8: Mean=6, Median=6, Mode=5, Std. deviation=1.069	2007	--	--	50	50
Cohort 3	n=16: Mean=3.75, Median=4, Mode=4, Std. deviation=.577	Spr. 2007	--	6	13	81
	n=11: Mean=6.27, Median=7, Mode=7, Std. deviation=1.849	Fall 2007	9	--	9	82
32. Discussing with colleagues your course content, materials, assessment techniques, and the like.						
Cohort 1	n=63: Mean=3.25, Median=3, Mode=4, Std. deviation=.761	2005	2	14	41	43
	n=47: Mean=3.26, Median=3, Mode=3, Std. deviation=.706	2006	--	15	45	40
	n=38: Mean=5.37, Median=5, Mode=5, Std. deviation=1.460	2007	--	18	45	37
Cohort 2	n=16: Mean=2.69, Median=3, Mode=3, Std. deviation=.946	2006	13	25	44	19
	n=8: Mean=5, Median=5, Mode=5, Std. deviation=1.512	2007	--	25	50	25
Cohort 3	n=16: Mean=3.00, Median=3, Mode=4, Std. deviation=1.033	Spr. 2007	6	31	19	44
	n=11: Mean=5.36, Median=5, Mode=5, Std. deviation=1.502	Fall 2007	--	18	46	36
33. Participating in conferences, seminars, or workshops on teaching or student learning.						
Cohort 1	n=63: Mean=3.19, Median=3, Mode=3, Std. deviation=.780	2005	2	18	41	40
	n=47: Mean=5, Median=5, Mode=5, Std. deviation=1.633	2006	3	24	43	30
	n=37: Mean=2.96, Median=3, Mode=3, Std. deviation=.806	2007	3	24	43	30
Cohort 2	n=16: Mean=2.88, Median=3, Mode=3, Std. deviation=1.025	2006	13	19	38	31
	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	2007	13	38	38	13
Cohort 3	n=16: Mean=3.06, Median=3, Mode=3, Std. deviation=.929	Spr. 2007	6	18	38	38
	n=11: Mean=5, Median=5, Mode=3, Std. deviation=1.789	Fall 2007	--	36	27	36

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
34. Presenting on your discipline in a colleague's class.						
Cohort 1	n=62: Mean=2.31, Median=2, Mode=2, Std. deviation=.879	2005	19	36	34	8
	n=47: Mean=1.87, Median=2, Mode=1, Std. deviation=.992	2006	45	34	11	11
	n=38: Mean=2.84, Median=3, Mode=1, Std. deviation=1.824	2007	42	26	29	3
Cohort 2	n=16: Mean=1.81, Median=1.5, Mode=1, Std. deviation=1.047	2006	50	31	6	13
	n=8: Mean=2.75, Median=3, Mode=3, Std. deviation=1.282	2007	25	63	13	--
Cohort 3	n=16: Mean=1.56, Median=1, Mode=1, Std. deviation=.727	Spr. 2007	56	31	13	--
	n=11: Mean=2.64, Median=1, Mode=1, Std. deviation=2.157	Fall 2007	55	18	18	9
35. Inviting colleagues to review your syllabi or teaching materials.						
Cohort 1	n=62: Mean=2.69, Median=3, Mode=3, Std. deviation=.985	2005	16	19	44	21
	n=46: Mean=2.39, Median=2.5, Mode=3, Std. deviation=.954	2006	22	28	39	11
	n=38: Mean=3.95, Median=3, Mode=3, Std. deviation=1.659	2007	11	42	37	11
Cohort 2	n=16: Mean=2.19, Median=2, Mode=1, Std. deviation=1.047	2006	31	31	25	13
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=1.488	2007	13	38	50	--
Cohort 3	n=16: Mean=2.44, Median=2.5, Mode=3, Std. deviation=1.094	Spr. 2007	25	25	31	19
	n=11: Mean=3.18, Median=3, Mode=1, Std. deviation=2.442	Fall 2007	46	18	18	18
36. Making your course syllabi available to anyone on the Internet or other public sources.						
Cohort 1	n=62: Mean=2.85, Median=3, Mode=4, Std. deviation=1.053	2005	15	19	32	34
	n=47: Mean=2.85, Median=3, Mode=4, Std. deviation=1.083	2006	15	21	28	36
	n=38: Mean=4.74, Median=5, Mode=7, Std. deviation=2.333	2007	21	11	29	40
Cohort 2	n=16: Mean=3.06, Median=3.5, Mode=4, Std. deviation=1.063	2006	6	31	13	50
	n=8: Mean=4.25, Median=5, Mode=5, Std. deviation=2.375	2007	25	13	38	25
Cohort 3	n=16: Mean=3.06, Median=3.5, Mode=4, Std. deviation=1.181	Spr. 2007	19	6	25	50
	n=11: Mean=4.82, Median=5, Mode=7, Std. deviation=2.442	Fall 2007	18	18	18	46

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
37. Preparing a portfolio or dossier to support your teaching performance.						
Cohort 1	n=62: Mean=2.55, Median=3, Mode=2, Std. deviation=1.051	2005	19	29	29	23
	n=47: Mean=2.21, Median=2, Mode=1, Std. deviation=1.062	2006	32	30	23	15
	n=38: Mean=3.11, Median=3, Mode=1, Std. deviation=2.024	2007	40	24	29	8
Cohort 2	n=16: Mean=2.25, Median=2, Mode=2, Std. deviation=1.183	2006	31	38	6	25
	n=8: Mean=3.75, Median=4, Mode=5, Std. deviation=2.121	2007	25	25	38	13
Cohort 3	n=16: Mean=2.06, Median=2, Mode=1, Std. deviation=1.063	Spr. 2007	44	13	38	6
	n=11: Mean=3.55, Median=1, Mode=1, Std. deviation=2.979	Fall 2007	55	--	9	36
38. Working with an undergraduate to further inform your course design.						
Cohort 1	n=61: Mean=2.52, Median=3, Mode=3, Std. deviation=1.134	2005	27	20	30	25
	n=47: Mean=2.30, Median=2, Mode=1, Std. deviation=1.178	2006	36	19	23	21
	n=38: Mean=3.84, Median=3, Mode=3, Std. deviation=2.260	2007	26	29	21	24
Cohort 2	n=16: Mean=1.75, Median=1, Mode=1, Std. deviation=1.000	2006	56	19	19	6
	n=8: Mean=2.5, Median=1, Mode=1, Std. deviation=2.070	2007	63	--	38	--
Cohort 3	n=16: Mean=1.94, Median=1.5, Mode=1, Std. deviation=1.063	Spr. 2007	50	13	31	6
	n=11: Mean=3.91, Median=3, Mode=1, Std. deviation=2.737	Fall 2007	36	18	9	36
39. Working with a Teaching Assistant to further inform your course design.						
Cohort 1	n=61: Mean=2.13, Median=2, Mode=1, Std. deviation=1.132	2005	41	21	21	16
	n=47: Mean=1.96, Median=1, Mode=1, Std. deviation=1.197	2006	55	11	17	17
	n=38: Mean=3.53, Median=3, Mode=1, Std. deviation=2.357	2007	37	21	21	21
Cohort 2	n=16: Mean=1.88, Median=1, Mode=1, Std. deviation=1.088	2006	56	6	31	6
	n=8: Mean=2.75, Median=3, Mode=1, Std. deviation=1.669	2007	38	38	25	--
Cohort 3	n=16: Mean=2.13, Median=2, Mode=2, Std. deviation=.885	Spr. 2007	25	44	25	6
	n=11: Mean=3.73, Median=3, Mode=3, Std. deviation=2.412	Fall 2007	27	36	9	27

Please indicate the priority you have given to the following policies and/or practices as they relate to your teaching. (Continued)		Year	% of Respondents			
			None	Low	Moderate	High
40. Working with other faculty to further inform your course design.						
Cohort 1	n=61: Mean=2.90, Median=3, Mode=3, Std. deviation=.978	2005	10	23	34	33
	n=46: Mean=2.48, Median=2.5, Mode=3, Std. deviation=.960	2006	17	33	35	15
	n=38: Mean=4.42, Median=5, Mode=5, Std. deviation=1.968	2007	13	26	37	24
Cohort 2	n=16: Mean=2.25, Median=2, Mode=2, Std. deviation=.856	2006	19	44	31	6
	n=8: Mean=4, Median=4, Mode=3, Std. deviation=1.852	2007	13	38	38	13
Cohort 3	n=16: Mean=2.63, Median=3, Mode=3, Std. deviation=.957	Spr. 2007	13	31	38	19
	n=11: Mean=3.36, Median=3, Mode=3, Std. deviation=1.963	Fall 2007	27	36	27	9
41. Working with consultants to further inform your course design.						
Cohort 1	n=61: Mean=2.20, Median=2, Mode=1, Std. deviation=1.093	2005	34	28	21	16
	n=47: Mean=2.26, Median=2, Mode=1, Std. deviation=1.188	2006	38	19	21	21
	n=38: Mean=3.47, Median=3, Mode=1, Std. deviation=2.298	2007	37	21	24	18
Cohort 2	n=16: Mean=1.75, Median=1.5, Mode=1, Std. deviation=.931	2006	50	31	13	6
	n=8: Mean=2, Median=1, Mode=1, Std. deviation=1.512	2007	63	25	13	--
Cohort 3	n=16: Mean=2.13, Median=2, Mode=1, Std. deviation=1.204	Spr. 2007	44	19	19	19
	n=9: Mean=1.91, Median=1, Mode=1, Std. deviation=1.375	Fall 2007	64	27	9	--

42. What criteria have you use to determine whether your participation in the grant was worthwhile?
Based on the qualitative analysis of open-ended responses, the two main criteria were identified that determined whether participation in the grant was worthwhile at grant completion: 1.) improved student performance (including an improvement in engagement, satisfaction, and attendance; and 2.) improvement of faculty ratings through student evaluation. Participants expect to see a greater understanding of the material by students and improved performance on exams and project work. Participants will have also implemented new teaching and assessment strategies and see a higher percentage of student success.

APPENDIX D:

Course Profiles

APPENDIX D
COURSE PROFILES

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Crookston

Faculty Member(s)/Instructor: Brian Dingmann

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 6 instructors in research team

Course Impacted by Research:

Spring 2007 General Zoology Biol 2012

Fall 2007 General Biology Biol 1009

Course Description: *(Please provide the course overview that appears in course bulletins)*

Fall 2007, Biol 1009
Major concepts of modern biology. Molecular structure of living things, energy recruitment/utilization, flow of genetic information through organisms/populations. Principles of inheritance, ecology, and evolution. Includes lab.

Spring 2007, Biol 2012, BIOL 1009
Major animal groups (phyla). Applications of morphological, physiological, and developmental characteristics to define evolutionary relationships. Parasitic forms affecting human welfare. Lab requires dissection, including mammals.

Student Learning/Teaching Issue/Research Question:

What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

1) **Pre-Instructional Decisions** included the following with research members using a common planning template:

a) **specifying the academic objective(s) and the collaboration skill objective** *(Interpersonal skills such as listening, eye contact, trust-building; Communication or Inquiry skills such as peer questioning for deeper-level thinking, peer teaching, use of questions stems; Group Management skills such as keeping members on task, organizing, teamwork; Conflict prevention, mediation, and resolution; Presentation skills including oral and written communication, summarizing, synthesizing information)*
b) **determining the size of group**;
c) **assigning students to heterogeneous groups using a random procedure**;
d) **determining which assignments or work will be completed with Formal Cooperative Learning Groups**

2) **Structuring Task and Cooperative Structure** included that was explained to the students prior to providing the assignment:

a) **explaining the academic task or assignment**; define tasks, provide clear instructions
b) **explaining the criteria for evaluating students' work**;
c) **structuring positive interdependence by establishing common goals** - *students are responsible for the learning and understanding of each group member;*
d) **structure individual and group accountability** *(eg. "ticket to ride" – assign worksheets at beginning of class and prior to in-class work with FCG)*
e**) assigning roles to students to ensure interdependence** *(eg. recorder or writer, encourager, leader, reporter or summarizer or presenter)*

3) **Monitoring and Intervening** included:

a) **monitoring students' behavior** *(observing the students while they are working, giving feedback and reinforcement);*
b) **intervening when necessary to improve a group's task work and teamwork** *(clarify, re- teach etc);*
c) **electronically submit assessment surveys to ascertain students perceptions** at regular intervals *(use of Flashlight Online with validated questions and for creation of custom questions; minimum of 4 survey periods)*

4) **Assessing Student Learning and Group Functioning** included:

a) **providing feedback to students** in terms of the quality and quantity of their work;
b) **involving students in the assessment process** *(their individual work and effort and the work and effort of their peers)*
c) **collecting written feedback** on the efforts, contributions, and tasks accomplished by each member of the Formal Cooperative Learning Group. *(Group-Work Evaluation forms)*

Evaluation Plan:

We used the following survey system to evaluate the students' perceptions of their learning in formal learning groups:

a) Flashlight Online licensed software for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning.

b) Flashlight Online license for creation of custom questions for Group-Work Evaluation

We plan to use histograms, cross-case analysis and themes with supporting quotes to analyze and combine the research team's data.

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Spring 2007
The data has not been analyzed to the extent that any real conclusions can be stated.
Fall 2007
The data has not been analyzed to the extent that any real conclusions can be stated other than some interesting student's perceptions of formal learning groups seems to be very positive and improve the learning environment.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Spring 2007
I have been planning out the various group activities that I will be conducting later in the semester. I have planned and conducted three 20-25 minutes in-class assignments and one large multiple class period project that used formal learning groups. I met with my faculty classroom research group to finalize formative and summative surveys. We met as a research group 6 times since January (beginning of the semester) including the following dates: January 10th, 18th; February 9th, 16th, 23rd; March 23rd. We met and decided on 20 questions as a group to ask for the formative surveys. The summative questions were very similar but it was decided to be used only at the end of the semester. The summative questions also included three open-ended questions to ask for reflective perspectives from the students on their experience of the formal learning groups.
Fall 2007
I have planned out the various group activities that I will be conducting later in the semester. I have planned and conducted two 20-25 minutes in-class assignments (it was actually was a two-part assignment). The assignment involved conducting a disruptive discussion case study on Cormorant control on Leech Lake, Minnesota. The students were asked to work together to answer several questions and share their results with the whole class using formal learning techniques. I have also planned and conducted one large multiple class period project that used formal learning groups. The formal groups choose one biology related topic to present an oral presentation or a written case study that was based on their research topic.

I have met several times with my faculty classroom research group our continuation of our research from last semester. I or at least the research group met 8 times since October (beginning of the semester) including the following dates:

August 28th-We discussed the upcoming semester activities including lessons plans and consent letters.
October 3rd-We discussed and confirmed the use of the summative survey we used in the spring of 2007 for our research in the fall of 2007.
October 18th – I missed this meeting in which the team discussed the dates to submit the Research Course Profiles and the date to administer the Summative Evaluation to students.
October 25th – We had general discussions of the research project.
November 1st – We had general discussions of the research project.
November 8th- We discussed the Bush Foundation Poster Celebration on December 6th, 2007.
November 15th-We discussed initial poster development and discussed the upcoming Bush Foundation Poster Celebration.
November 29th- We continued the poster development, and question selection/analysis for the poster presentation.

We decided that the summative questions that were used the prior semester was a good survey and should be used again for the fall 2007 semester at the end of the semester. The summative questions also included three open-ended questions to ask for reflective perspectives from the students on their experience of the formal learning groups.

What successes have you experienced with your work/project?

Spring 2007
One of the successes of this project has been the collaboration within our research team. I have learned a great deal about teaching and assessment of student learning. With regard to the specific classroom research, I think the greatest success was the student's perceptions toward formal learning groups. The open-ended questions explored the students' overall perceptions and revealed an interesting overall student preference for assigned groups and roles over self-assigned groups.
Fall 2007
One of the successes of this project has been the collaboration within our research team. I have learned a great deal about teaching and assessment of student learning. With regard to the specific classroom research, I think the greatest success was the student's perceptions toward formal learning groups. The open-ended questions explored the students' overall perceptions and revealed an interesting overall student preference for assigned groups and roles over self-assigned groups.

Another success is that I have become much more deliberate and strategic in my planning of assignments. I really have focused on the learning outcomes of each and every small and large activity for my students. I know that this experience will aid me and my students during my teaching career. I know that the student have benefited from my own reflection of each assignment and assessment activity that I plan for my students. It is very exciting to plan/adjust my teaching style to incorporate my new found focus on assessment activities. These skills have really developed during my participation in the Bush Foundation grant and I look forward to the upcoming years of teaching to refine my teaching techniques.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Deciding on the appropriate group activities has been challenging. However, I think the most challenging aspect has been the planning of the research question and the assessment instrument questions. I tried to maintain the same formal learning groups to develop better interdependence and accountability. The challenge of this plan was that at the end of the semester I had several students drop the course. This attrition affected not only group dynamics but overall group numbers. This was a significant challenge I had to deal with at the end of the classroom research project

This same challenge seemed to occur in my attempt of this research last semester and I am struggling to control this type of student attrition.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

This current semester analysis has not been completed but some assignment adjustments will be made for future semesters. We have begun the spring semester data analysis with one presentation being conducted at the Bush Foundation Celebration Forum that occurred on December 6th, 2007. We have noticed some interesting survey outcomes from student's perceptions. Students seem to prefer the formal learning collaborative groups during the semester.

How are you using collaboration within your project?

I have the students assigned to various groups and will had the students identify roles and accomplish a task as a group. The students work within formal learning groups to accomplish the assigned task with clearly defined roles and assignment rubrics. I am personally using my faculty research group to collaborate and assist me in my classroom research.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Some reading of articles to provide background information has occurred and will probably intensify for data analysis. Specifically, I have used resources of cooperative learning from Karl Smith and planning sheets from Johnson et. al. of *Circles of Learning.* I also have used resources found in Cross's *Classroom Research* and Angelo and Cross's *Classroom Assessment Techniques* for various ideas and templates. I also have used some documents that I received when I attended some of the campus Bush Foundation teaching and learning workshops (e.g., Karl Smith workshop). In addition, I have used many collaborative learning techniques that I was exposed to during a "Case Studies for the Sciences" workshop facilitated by Kip Herreid from the University of Buffalo.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

I think the process of various teaching learning workshop opportunities has been critical for my development as a junior faculty member. I look forward to the analysis of the classroom research data. I hope that I will find a continuation of the very helpful research collaboration that exists among my classroom research team. Face-to-face collaboration has really been critical for project development and follow through.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Crookston

Faculty Member(s)/Instructor: Marilyn Grave

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171):

Spring 2007 ECE 4702 Developmentally Appropriate Preprimary Education II

Fall 2007 ECE 4720 Understanding and Supporting Parenting and

ECE 4880 Administration of Early Childhood Programs

Course Description: *(Please provide the course overview that appears in course bulletins)*

Spring 2007
ECE 4702 Developmentally Appropriate Preprimary Education II
Students integrate theory and practice related to preprimary (preschool and kindergarten) education. Development related to learning environment, curriculum, and teaching methods. Developmentally appropriate approaches to subject matter in mathematics and the physical and social sciences. Lab placement in Early Childhood Development Center.

Fall 2007
ECE 4730 Understanding and Supporting Parenting
Parent-child relationships including adult development, family systems theory, parental authority, child compliance and developmental interaction during child rearing years. Parenting in diverse family configurations, diverse cultures and lifestyles, and parenting in high-risk families. Emphasis on knowledge of research for application and collaboration to promote child's learning.

ECE 4880 Administration of Early Childhood Programs
Application of developmental theory, human ecological systems framework, and management theory. Survey of management processes, principles, and tasks. Emphasis on government regulations, community relations, staff development, advocacy and financial resource management.

Student Learning/Teaching Issue/Research Question:

Project Goals:
To gather information about the impact of Formal Cooperative Learning on the student learning experience**.**

Major Objectives:
Use Formal Cooperative Learning Groups to ensure that students are actively involved in the intellectual work of organizing material, explaining it, summarizing it, and integrating it into their current conceptual understandings.

Student practices that affect the engagement of students in collaborative learning experiences as they learn academic subject matter and collaboration skills.

Project Title:
Students' Perceptions of their Learning in Formal Cooperative Learning Groups

Research Question:
What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Research methods for this Classroom Research Partnership Grant included the following:

1**)** **Pre-Instructional Decisions** included:

a) **specifying the academic objective(s) and the collaboration skill objective** *(Interpersonal skills such as listening, eye contact, trust-building; Inquiry skills such as peer questioning for deeper-level thinking, peer teaching, use of questions stems; Group Management skills such as keeping members on task, organizing, teamwork; Conflict prevention, mediation, and resolution; Communication skills including oral and written communication, summarizing, synthesizing information)*

b) **determining the size of group**;

c) **assigning students to heterogeneous groups using a random procedure**;

d) **determining which assignments or work will be completed with Formal Cooperative Learning Groups**

2) **Structuring Task and Cooperative Structure** included:

a) **explaining the academic task or assignment**; define tasks, provide clear instructions

b) **explaining the criteria for evaluating students' work**;

c) **structuring positive interdependence by establishing common goals** - *students are responsible for the learning and understanding of each group member;*

d) **structure individual and group accountability** *(eg. "ticket to ride" – assign worksheets at beginning of class and prior to in-class work with FCG)*

e) **assigning roles to students to ensure interdependence** *(eg. recorder or writer, encourager, leader, reporter or summarizer or presenter)*

3. **Monitoring and Intervening** included:
   a) **monitoring students' behavior** *(observing the students while they are working, giving feedback and reinforcement);*
   b) **intervening when necessary to improve a group's task work and teamwork** *(clarify, re-teach etc);*
   c) **electronically submit assessment surveys to ascertain students perceptions** at regular intervals *(use of Flashlight Online with validated questions and for creation of custom questions)*

4. **Assessing Student Learning and Group Functioning** included:
   a) **providing feedback to students** in terms of the quality and quantity of their work;
   b) **involving students in the assessment process** *(their individual work and effort and the work and effort of their peers)*
   c) **collecting written feedback** on the efforts, contributions, and tasks accomplished by each member of the Formal Cooperative Learning Group with a Group-Work Evaluation form.

Evaluation Plan:

DATA COLLECTION METHODS USED:

a) Flashlight Online licensed software for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning.

b) Flashlight Online licensed software was used for creation of custom questions for Group-Work Evaluation and other open-ended questions to students.

c) I also created Group Work Evaluation forms to assist in the assessment of individual student contributions, which was a factor contributing to assignment values earned (grade). In the Fall I had students individually submit answers to me regarding their work and the process of completing work with partner (how, when, where, what)

DATA ANALYSIS METHODS:

Histogram - completed

Cross-Case Analysis – analysis will occur after Fall 2007 data collection; will compare and combine (Spring and Fall '07 data)

Themes with Supporting Quotes – analysis will occur after Fall 2007 data collection

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Spring 2007

This semester ended last week and we have not completed analysis individually or collectively. I have reviewed student survey data for my course. Results are clear, however, with my small class size, individual course data has less significance in terms of research results. Thankfully, the collective results with my 5 other research partners, will increased significance. Currently, we each have the numerical responses and a histogram indicating individual student responses for each question on formative and summative surveys. Cross-case analysis and themes with supporting quotes will be used as we continue this research project Fall semester 2007.

Fall 2007

Because of the positive results from data collected from students last spring, I decided to use formal cooperative learning groups in two classes this fall. The

ECE 4730 and 4880 – brief summary of student survey responses

Student Responses of Agreement ***(strongly agree and agree)***	**4730**	**4880**
I am learning how to work in a team/group by completing a group project. 75%	100%	
I am gaining more confidence in my ability to learn subject matter. 75%	86%	
I am gaining more confidence in my ability to learn subject matter. 87.5%	86%	
I spend more "time on task" (focused effort). 75%	86%	
I am learning to respect others who are different from me. 87.5%	86%	
I am acquiring skills that will be useful in my chosen profession. 87.5%	86%	
Working in groups has helped me to understand the ideas and concepts being taught in this class. 87.5%	100%	
Working in groups has helped me learn how to work in future job or career situations.	75%	100%

Rank Order of Students' Perceptions of Factors of Importance

4730

17. Respecting others that are different from you
19. Verbal communication
16. Recognizing the importance of others ideas
13. Non-verbal communication (body language)
12. Delegating tasks
11. Coordinating group efforts
18. Speaking up and sharing my ideas
9. Assuming the responsibilities of my role
10. Building group consensus
20. Written communication
15. Problem-Solving
13. Objectively evaluating the work of my peers

4880
19. Verbal communication
18. Speaking up and sharing my ideas
16. Recognizing the importance of others ideas
9. Assuming the responsibilities of my role
17. Respecting others that are different from you
20. Written communication
12. Delegating tasks
11. Coordinating group efforts
10. Building group consensus
15. Problem-Solving
14. Objectively evaluating the work of my peers
13. Non-verbal communication (body language)

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

COLLABORATION ACTIVITIES
Spring 2007
As the classroom research project author, I established 12 Meeting Agendas (as follows) and participated in dialogue during our decision-making process.

January 10, 2007 (10:30 – 12 noon)
1. Discuss any necessary edits that are "essential" to the major intent of the proposal.
2. Make final decision if you are going to be an active engaged in this classroom research project
3. If yes:
   a) type name, discipline, department in #4 Faculty on application
   b) type in term, name and course you will conducting the classroom research
   c) reminder of responsibilities listed on Call for Proposal – expectations on pg 3
   d) letter from dept head is waived
4. Turn in to Grave your spring schedule of classes and regular commitments so that a regular meeting day and time can be set up. Turn in schedule (email) in next 24 hours.
5. Grave will set up meeting for Friday this week or early next week (day determined by your schedule. Probably weekly meetings or 3 mtgs this month as we start project. Mtgs no longer than 50-60 minutes.

January 19, 2007 (10:30 -12:00)
1. Discussion of Methodology
2. Select format for Cooperative Learning Plans

January 22, 2007
1. Continue work on Cooperative Learning Plan form

January 25, 2007
1. Approval of Cooperative Learning Plan form
2. Announce UM Teaching and Learning Conference April23
3. Select Questions from Flashlight for survey
4. Share IRB Consent Letter

February 2nd, 9th, and 23rd, 2007 (10:30 – 12 noon each meeting)

1. Flashlight Survey Questions discussion
    a. review handout provided earlier
    b. use Flashlight index and codes;
    c. A = active learning, C= collaborative learning, G= engagement in learning and X=application to "real world" problems/preparation for work
2. Create open-ended questions for summative survey
3. Project idea generation
4. Flashlight training manual

March 2 and 23, 2007 (10:30-12 noon each meeting)

1. Finalized formative and summative surveys.
2. Reviewed consent letters, and classroom research lesson plans
3. Set up individual Flashlight training – for each faculty member
4. Review UMC Classroom Research Partners lesson plans
5. Faculty Logs
6. Arrangements for April 22-23 UM Bush event and UM Academy of Distinguished Teachers
7. UM Bush Course Profiles
8. Update of progress
9. Other:

May 10, 2007 (9:00 – 11:00)

1. Faculty Reflection Logs
2. Discuss Writing Course Profiles – due 15th

May 14, 2007 (11:30 – 1:00)

1. Q and A on Course Profiles = due 15th
2. Discuss general data from formative and summative surveys
3. Discuss timing (now, summer, beginning of fall, etc.) of our data analysis for completing cross-case analysis and themes with supporting quotes
4. Fall 2007 Classroom Research Work Continuation
    a. consider, confirm
    b. thoughts on changing methodology

May 15, 2007 (12:30 – 2:00)

1. Discuss potential changes to formative surveys
    a. purpose – collective vs. individual
    b. frequency
    c. usefulness to individual faculty
    d. usefulness to research project

Fall 2007

Classroom Research Partners Meetings

August 28, 2007

1. Reminders;
    a. consent letters
    b. UMC Classroom Research Partners lesson plans
    c. send me email with course prefix, number, title, credits, numbers of students
2. Types of Formal Learning Group projects – (influences formative survey)
3. Formative surveys
4. Summative surveys
5. Scheduling future meetings - Outlook

October 3, 2007

1. Confirm courses we are conducting our classroom research
   Send Marilyn: prefix, #, title, and enrollment
2. Confirm use of summative survey
3. Regular meeting schedule
4. External Evaluation site visit Oct. 16 (Tuesday)
   Purpose
   Format
   Scheduling – availability
   Research Study – content of questions
5. UM updates

October 18, 2007

1. Omit Faculty Bimonthly Logs
2. Confirm deadline for Research Course Profiles
   Due Thursday, December 13th
   Send to Marilyn, she submits group for campus to MGT (external evaluators) on Friday, December 14th
3. Confirm week for administering the Summative Evaluation to students
   Monday, December 3rd is the last day to administer Summative Evaluation
4. UM System-wide Faculty Survey (electronic)
   Will be sent from Carriers office; to be completed November 26 – December

Handout(s): Research Course Profiles, Year 3 (Fall 2007)

October 25, 2007

1. THANK YOU for time and contributions to UM External Evaluation interviews!
2. Outlook updated for Fall 2007 meetings – Thursday, noon – 12:50
3. Resource Books
4. Partners discussion and sharing – topic of your choice!

November 1, 2007

1. October 31st response to our UMC No-Cost Extension proposal (October 11)
2. 50% of base stipend- I'll authorize this week end
3. Share!
4. Other:

November 8, 2007

1. Bush Celebration Event, December 6th (chgd to system-wide)
2. Scholarly work – dissemination - Poster sessions
3. Individual participation in creating poster
4. Individual participation in traveling December 6th to TC and return schedules

November 15th

1. Continue discussion for creating posters and traveling to event on Dec. 6th
2. Establish poster planning session

November 29, '07

1. Confirm deadlines

Administering Summative Evaluation -	Monday, December 3rd
System-wide Electronic Faculty Survey	Friday, December 7th
Course Profiles -	Thursday, December 13th
Publications and Presentations -	January 4th

2. Poster
   Selection of questions and student responses
3. Bush Celebration Thursday, December 6th – travel arrangements

4. Course Profiles – Questions?
5. Weekly mtg is cancelled for next week (Dec. 6) due to Bush Celebration
6. UMC Bush event- December 20 or 21 or January?

December 6, 07

UM Poster Session at UM, Twin Cities campus

December 13, 2007

1. Reminder of Course Profile
2. Discuss possible publications – journals
3. Establish date for analysis of merged data

COURSE ACTIVITY TIMELINES

ECE 4880

Course taught over 6 week period; 9 class hours per week

Formal Cooperative Groups are established on session 2; students placed in 3 groups for entire course term; select title of "new center", write philosophy, mission etc.; team projects throughout the semester include major assignments with more complexity such as the child care plan for DHS and fiscal management budget's.

ECE 4730

Course taught over full 16 week term; students paired, rather than placed in small groups; pairs work together for one month periods; rather than major projects, students are given multiple short term projects starting with partner quizzes in class, moving to pairs working on chapter summative responses and applications, "game" work in class, parent interview questions, mini presentations on their "top ten facts, why important, and what parents can do" etc.

What successes have you experienced with your work/project?

The value of lengthy discussion between six (6) faculty research partners was significant. It provided insight as to the value of context in this collaborative research project. Variety of diverse and shared faculty experiences, varied student responses to directions for collaborative work, nature of course content, perspectives on requiring teamwork in and outside of the classroom, faculty expectations etc.

We spent significant amount of time discussing our methodology and finding consensus. The use of the following four (4) major areas of responsibilities and tasks was mutually agreed to – 1) Make Pre-Instructional Decisions, 2) Explaining Task and Cooperative Group Structure, 3) Monitor and Intervene, and 4) Evaluate and Process. Also made decisions on modifications of Smith and Johnson's textbook sample lesson plan form for Formal Cooperative Learning Groups. Creating survey questions (formative and summative) and gaining collective consensus was time consuming but essential.

Comparing the use of major and complex projects for groups to the use of smaller and simpler assignments to students in two separate courses during the same semester has been interesting. Students noticed value to working with partners in both courses, as evidenced by the Summative Surveys. However, I think the use of more complex projects increases student problem solving, organizational skills, and collaboration skills.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Spring 2007

Planning Formal Cooperative Group activities and then having students missing class sessions was extremely challenging. My class size originally was 10, at week five class size was 9, and during the last 6 weeks of class (when I implemented 3 Formal Learning Activities), 2 students were absent 80% of the class sessions. Since the students in this curriculum course had a lab partner (based on day of week and time period), I planned for students to work with their lab partner designing learning environments, creating unit plans etc. during class sessions. Since approximately 20% of students missed most of their weekly class sessions during the implementation period, my lesson plans were always significantly adjusted.

Students were asked to complete the formative and summative surveys outside of the class sessions. This meant a lower response rate, which coupled with small class size, led to minimal responses.

It took the six of us about 9 weeks to reach consensus on methodology and evaluation instructions. This was valuable and essential for a collaborative research project. In many ways, this experience was modeling the benefits and challenges of collaborative group work! Finding a consistent meeting time for six faculty from 5 disciplines and 4 departments on campus was the first task challenge!

Fall 2007

Major challenge in both ECE 4730 and 4880 was the limited enrollment, which favors the use of partners, rather than small group. Creating two separate approaches to the nature of the assignments was manageable. Using or assigning roles is more challenging when the assignments are short term, smaller in nature, and simpler in context. It is always a challenge to increase interdependence. It works better if preparation work for the group is done independently and using some of the class time for collaboration between partners or members of the same group.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Spring 2007

The first Formal Cooperative Learning group activity was short-term, 20 minutes in class. This project was the creation of a Math Long Path Game based on a children's book. My second project was creating a unit plan on Health Science – Nutrition and each group had responsibility for one of two components - daily small and large groups and active play OR learning centers for one week in a preschool program. Students had approximately one hour in class to work on this. The 3rd project students were required to research on the web and bring samples of appropriate subject matter on endangered animals. This subject matter was to be used in the development of a complete weekly unit plan with the theme of "How can we protect animals?" Unfortunately, only half of the students brought the required work resulting in some partners not having the essential work necessary to complete the assignment as it was initially designed. Since these projects all occurred during the last 6 weeks of the semester, class sessions were scheduled only once a week, and student absenteeism increased at the end of the semester, adjustments to group work assignments had to be made at the class session

which was a challenge I do not want students or myself to experience in the future. Next semester, Fall 2007, I will implement this classroom research project in two courses, will increase group size, and will be able to begin Formal Cooperative Learning Groups at the beginning of the semester. I've decided that this was definitely a "pilot" project for me this semester!

Fall 2007
Project adjustments included the use of partners, rather than small groups due to the 10 person class size. Creating two separate approaches to the nature of the assignments with 2 independent courses (4730 and 4880) was an adjustment for myself and the students. In addition, it is always a challenge to increase interdependence. It works better if preparation work for the group is done independently and using some of the class time for collaboration between partners or members of the same group.

I plan on continuing this study Spring 2008. I am adding Formal Cooperating Groups in all my courses.

How are you using collaboration within your project?

Spring 2007
Twelve (12) meetings were held during Spring 2007 for all Classroom Research Partners. Meetings were either 90 minutes or 2 hours in length.

January 10, 19, 22, and 25, 2007
February 2nd, 9th, and 23rd, 2007
March 2 and 23, 2007
May 10, 14, and 15, 2007

Dialogue between the six (6) faculty members engaged in this Classroom Research Partnership was extensive, divergent, invigorating, and respectful at all times.

Fall 2007

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

My literature review started with reading "Active Learning: Cooperation in the College Classroom", by David W. Johnson, Roger T. Johnson, and Karl A. Smith. In addition, I read several handouts that Karl Smith had distributed to us at faculty retreats funded with Bush grant funds during the original grant period (01-05), such as "Cooperative Learning: Advice for Starting Out". I also have read the majority of the textbook entitled, "Classroom Research: Implementing the Scholarship of Teaching" by K. Patricia Cross and Mimi Harris Steadman. I also relied on specific handouts from Mimi Steadman's workshops on our campus is 2002 and 2004 (original grant), "Enhancing Learning and Teaching Through Classroom Assessment Techniques", Classroom Research: Scholarly Investigations to Improve Student Learning," "Research Tip Sheet #3 Qualitative Studies", and "Investigating Collaborative Learning with Classroom Research".

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

No comment – conflict of interest since I'm also the campus coordinator!

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus:

Faculty Member(s)/Instructor: Harouna A Maiga

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 6

Course Impacted by Research (e.g., Theatre History TH 3171): ANSC 2104 Feeds & Feeding

Course Description: *(Please provide the course overview that appears in course bulletins)*

Identification and use of feeds grains, forages, supplemental feeds, and additives. Bushel weights, price, and cost per unit calculations. Moisture and dry matter contents calculations. Factors influencing feed quality, feed value, price, and storage. Nutrient requirements of farm animals. Digestion, rations formulation, and feed processing methods.

DESIRED LEARNER OUTCOMES

Upon successful completion of this course the student should be able to:

- Identify the common feedstuffs of the north central states, along with harvest and storage methods
- Understand the role of various nutrients supplied by feedstuffs
- Define the nutrients needs of farm animal species
- Identify parts and functions of animal digestive systems
- Compare differences and similarities of the digestive systems
- Identify quality factors and their influence on value and nutritional quality
- Use feeding tables for various farm animal species
- Formulate simple rations from NRC animal requirements.
- Calculate cost comparison and cost of rations
- Identify the role of supplementation, which feed additives and implants are used for particular purposes.

Student Learning/Teaching Issue/Research Question:

PROJECT TITLE: Students' Perceptions of their Learning in Formal Cooperative Learning Groups

RESEARCH QUESTION: What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

The goal of this cooperative learning project is to enhance student learning through activities conducted by small groups of students. Each activity was designed in the same format as follow:

1. **Academic Objective**: Learn physical characteristics and class categories of livestock concentrates feeds
2. **Collaboration Skills**: have equine, dairy, and meet animal students
3. **Group size**: 3 students
4. **Student Roles**: Elect recorder, reporter, and timekeeper
5. **Activities: i.e. Activity I (20 - 30 minutes)**
    a. Identify the first 24-35 feeds on Feed list 1
    b. Select few feeds at a time
    c. Learn physical characteristics of each feed (shape, size, color, odor, texture, etc.)
    d. Put each feed in its appropriate feed category (dry forages, pasture, haylages & silages, grains, protein supplements, vitamins, minerals, additives)
    e. Record nutrients content on dry matter basis: CP%, EE%, CF%, ADF%, NDF%, TDN% of the first 5 feeds of list.
    f. Discuss finding together
    g. Answer questions to class

Activity II. (20-30 minutes in class then finished up problems at own time)

a. Using information in Activity I, formulate a diet for a given animal species (dairy, beef, horse, pig, and sheet)
b. Discuss finding together
c. Answer questions to class

Throughout the semester students performed eight (8) different activities.

Evaluation Plan:

An anonymous summative survey containing 23 questions was generated from flashlight online software of WSU and used to evaluate students' perception about their learning in this course

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Twenty two students out of 27 in the class completed the survey. The majority of students agreed that because of this project used Formal Cooperative Learning groups they:

1) Learned how to work in a team/group
2) Gained more confidence in their ability to learn the subject matter
3) Learned how to take responsibility for their learning
4) Understood ideas and concepts
5) Acquired more problem-solving ability

A small percent of students expressed the difficulty of working in groups.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

This is my first Bush grant project. During the course of this project I attended weekly meetings in which we discussed topics related to our projects and classroom learning assessment techniques.

What successes have you experienced with your work/project?

This cooperative small group's project worked so well that I extended the concept to my dairy production class. In this second class students were put in a group of three students to search a topic related to dairy production and then present it in class as a group project.

Some students comments were: 1) "I think that it really helps, because when you forget one little thing some one else remembers it and the process goes much faster". 2) "It made me focus on my work and learn the concepts of the problems better".

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Challenges were mostly group dynamic and differences in student's knowledge and background. Once students understood they can learn from each other and that everyone bring his/her strengths and weaknesses they build new learning environment and confidence. I found it was very helpful to have groups made of students with different animal species knowledge and background to solve complex and multi-species feeds and feeding problems.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Data analysis is not complete yet, but from preliminary information, I will make all classroom activities completed in the class. With this project, I let students work on some activities (not always) outside the classroom and in some instances; groups were not very functional because members could not coordinate their time to work on the activity.

How are you using collaboration within your project?

I discuss the success of this project with other faculty and encourage them to try it. This project helped me to engage in more cooperative teaching (used in the Area High school Biotechnology training). I planned to use it in all my courses whenever possible.
This project also helps me focus more in reading collaborative teaching and learning literature.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

The team of six faculty engaged in this project plan to summarize the data and present the information to local and regional meetings. The data will also be written for publication.
I used several resource materials: 1) Classroom Assessment Techniques by Thomas A. Angelo and K. Patricia Cross; 2) Classroom Research by K. Patricia Cross and Mimi Harris Steadman; 3) The NEA Higher Education Journal; 4) NACTA Journal.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

This grant and project allowed me to introduce different ways to teach my Feeds & Feeding class. Using small group approach in a cooperative learning environment helped enhanced students learning (reflected in their grades). This grant also allowed me to work with other faculty in a multi-disciplinary setting which helped my comprehension of how students learn. Marilyn Grave, our local grant manager did an excellent job in organizing meetings, providing information and resources to complete this project. An excellent experience and I hope such opportunity will be available to faculty.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: University of Minnesota Crookston

Faculty Member(s)/Instructor: Ken Myers

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 5

Course Impacted by Research (e.g., Theatre History TH 3171):
Spring 2007
HRI 4451 Cases and Trends in Hospitality Management

Fall 2007
HRI 1111 Introduction to Food Preparation
HRI 2231 Menu Design and Analysis

Course Description: *(Please provide the course overview that appears in course bulletins)*

Spring 2007
HRI 4451 **Cases & Trends in Hospitality Management**
Hospitality topics explored using a critical incident approach, which encourages thorough analysis of a prominent issue rather than superficial analysis of a complicated case. UPS show attendance required.

Fall 2007
HRI 1111 **- Introduction to Food Preparation**
Fundamentals of food preparation and equipment use. Culinary vocabulary, cooking methods, and recipe development. Stocks, soups, sauces, seafood, poultry, meats, vegetables, salads, baking, and desserts.

HRI 2231 **- Menu Design and Analysis**
Principles of menu design, pricing, and analysis. Menus for varied establishments of the hospitality industry.

Student Learning/Teaching Issue/Research Question:

What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

1) **Pre-Instructional Decisions** will include:
   a) **specifying the academic objective(s) and the collaboration skill objective** *(Interpersonal skills such as listening, eye contact, trust-building; Communication or Inquiry skills such as peer questioning for deeper-level thinking, peer teaching, use of questions stems; Group Management skills such as keeping members on task, organizing, teamwork; Conflict prevention, mediation, and resolution; Presentation skills including oral and written communication, summarizing, synthesizing information)*
   b) **determining the size of group**;
   c) **assigning students to groups**;
   d) **determining which assignments or tasks will be completed with Formal Cooperative Learning Groups**;

2) **Structuring Task and Cooperative Structure** will include:
   a) **explaining the academic task or assignment**; define tasks, provide clear instructions
   b) **explaining the criteria for evaluating students' work**;
   c) **structuring positive interdependence by establishing common goals** - students are responsible for the learning and understanding of each group member;
   d) **structure individual and group accountability** *(eg. "ticket to ride" – assign worksheets at beginning of class and prior to in-class work with FCG)*
   e**) assigning roles to students to ensure interdependence** *(eg. recorder or writer, encourager, leader, reporter or summarizer or presenter)*

5) **Monitoring and Intervening** will include:
   a) **monitoring students' behavior** *(observing the students while they are working, giving feedback and reinforcement);*
   b) **intervening when necessary to improve a group's task work and teamwork** *(clarify, reteach etc);*
   c) **electronically submit assessment surveys to ascertain students perceptions** at regular intervals *(use of Flashlight Online with validated questions and for creation of custom questions; minimum of 4 survey periods)*

6) Assessing Student Learning and Group Functioning will include:
   a) **providing feedback to students** in terms of the quality and quantity of their work;
   b) **involving students in the assessment process** *(their individual work and effort and the work and effort of their peers)*
   c) collecting written feedback on the efforts, contributions, and tasks accomplished by each member of the Formal Cooperative Learning Group. *(Group-Work Evaluation forms)*

Evaluation Plan:

Both a formative and summative survey was used in Spring 2007 and a summative survey was used in Fall 2007. The Flashlight system has been used to collect the data. The results will be compared to the other members in the group to look for similarities and differences. Flashlight produces a histogram for a quick visual.

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Flashlight software will be used at the conclusion of the semester.

d) Flashlight Online license for use of validated questions with sub-scale codes for active learning, collaborative learning and engagement in learning
e) Flashlight Online license for creation of custom questions for Group-Work Evaluation.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Spring 2007

January / February-

- Several meetings have taken place in the planning and development of the materials with the other faculty. We scheduled meetings for Jan 19, Feb 2, 9, 23, March 2, and had very full agendas and active discussions.

- We shared background / support resource information such as Book (Active Learning by Johnson & Smith; New Paradigms for College Teaching by Campbell & Smith; How to Model It by Starfield, Smith & Bleoch; Building Models For Conservative & Wildlife Management by Starfield & Bleloch.

- We reviewed many handouts that covered topics such as Formal Cooperative Learning Groups, The Instructor's Role, Pre-instructional Decision Making, Deciding on the Size of the Group, Assigning Students to Groups; Positive interdependence, Individual accountability, etc.

March / April-

- Duplicated the formative survey, creating one for each of the "collaborative learning opportunities" (CLO) that I had planned for class.
- Duplicated the summative survey in preparation for the end of the term.
- Put together a MS Word document (cheat sheet) with all of the links to each of the needed surveys and reminders of what I needed to explain to the students prior to the CLO's.

Fall 2007

September / October / November-

A) confirm courses we are conducting our classroom research
B) confirm summative survey and update as needed
C) regular meeting schedule
D) External Evaluation site visit Oct 15
E) UM updates

F) Created summative survey for fall classes based on form used last spring.
G) Reviewing data from prior semester (from all faculty classes) and comparing data gathered from all faculty participants.
H) Preparation of poster boards for presentation of data at the Bush Conference in Minneapolis.

What successes have you experienced with your work/project?

Spring 2007
January / February-

- Major accomplishments have taken place after a great deal of discussion. Those successes include:

- The development of a Cooperative Lesson Planning Form to help each of us as we focus on each of the multiple activities we plan. It includes the academic objective for the lesson, the collaborative skill(s) you will be working on, the group size, the method, role, and rational for assigning students, etc.

- We drafted the Formative Survey.

- We drafted the Summative Survey.

We decided to utilize Flashlight for implementing the survey. Marilyn had the greatest experience with it so she took the lead in entering the key questions into a template. We then duplicated the templates and made any needed adjustments for the specific collaborative activity we planned.

March / April-
All of the CLO's would be called a success in my view. One had a brief deviation from the original plan, but it was still a success. Students completed the surveys.

Fall 2007
September / October / November -

- Major successes have been the continuation of the work started last semester, and the review of summative data from last semester with the creation of poster boards for the Bush Conference.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Spring 2007

January / February-

- The only challenge would possibly be collaboration. Yet that is also the joy as your final product (tools used, etc.) as a research group is more fully developed. We did need to discuss / share on several occasions the specifics of how each of us were looking at utilizing cooperative learning in our classes. Those discussions provided me an opportunity to ask specific questions of others that allowed me to look at ways I might better implement the concepts in my class. It also provided opportunity to deviate at times from the main focus of our project to related topics in the class (syllabus, grading, etc.). These deviations may not have always been the focus of this project, but were related to it and important.

March / April –

- - Each student (person) is interesting and we all have times that we are more talkative or less talkative. Attempting to judge or project how much conversation there may be to a particular topic is very difficult. Sometimes they can surprise you and other times you wait for them to take the lead. For example, one student that is typically very active verbally, was phasing in and out and even when they did participate, it was a fraction of what I typically see. Even others noticed it. As it turns out, that student had some personal items taking place that were very heavy on their mind, and they simply had a hard time focusing. The interesting thing was that there was a concern by others in the group on if she was ok. This did interrupt the CLO temporarily. They did complete the activity, and possibly shared a very special moment understanding collaborative support for a friend. It was not the goal of the CLO activity the one day, but rather a bonus.
- We had some students having difficulty connecting to the web as the wireless is at a distance. I have been asking students to do the survey after class and I simply sent them the link.

Fall 2007

September / October / November-

- There were no real challenges while working on the grant this fall. Some students had verbally expressed some moments of frustration when working in a group as portions of the activities needed to be completed outside of class and there were times some had a hard time meeting.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

- This fall I have been doing the Formal Cooperative Learning Groups in different classes. The adjustments have been listening to student comments and making minor adjustments in the learning groups. There had been a couple students that had dropped a class and both just happened to be in the same learning group. That caused a major imbalance and those couple students that were left in that group needed to be merged in two other groups. Students seemed to adjust well to this.

How are you using collaboration within your project?

Spring 2007

January / February –

- I am providing several collaborative learning opportunities for the class.
- Examples of what I am planning are what I am calling / developing):
  - "Strategic Supervision Choices"
  - "OPM Visions" (Customers Wants, Needs, and Likes)
  - "Where Do We Put Him" or "What is the Real Problem"
  - "Let me help you plan your project"

Each of these activities is very different and should provide excellent opportunities (I hope) for then to share and learn in collaborative groups.

March / April –

- I am providing several collaborative learning opportunities for the class. An example is what I call the "strategic supervision" experience. Students are placed in groups. Each group as a coordinator and a time keeper. They are then given a brief situation and choices to deal with the situation. As an individual they must make a choice and as a group they must then discuss the strengths and weaknesses of the possible choices and select a group answer (they have a set amount of time to complete the discussions). As a class we review why certain choices may be better. They are then awarded points based on the individual and group choice. Students found that group choices are most often the better choices. They also found that the discussion between themselves to be very stimulating.

Fall 2007

September / October / November –

- I am providing several collaborative learning opportunities for the class.
- Examples of what I have been providing as collaborative learning:
  - "Lab application groups"
  - "Customer Restaurant Wants"
  - "Vocabulary Builder"
  - "Can you ID that Substance"
  - "Group Jeopardy"

Each of these activities is very different and should provide excellent opportunities for then to share and learn in collaborative groups.

An example of the above activities is the "Vocabulary Builder". Instead of having students study only on their own, the students are grouped together and compete with other groups (game activity). They said that they enjoyed the friendly competition and that it helped them learn the terms in a fun way.

Another example in preparing for tests, was Group Jeopardy. It took a great deal of time to prepare the activity but the students were broken into groups and had some friendly competition. They enjoyed it and indicated that it was a fun way to study.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Spring 2007

January / February –

- At the moment I am looking for related articles. At a future time I will look at possible presentations to faculty on campus and/or off campus groups.

March / April –

- As a faculty group in the development of the surveys, etc. we are reading and discussing related articles.

May -

I hope to continue this research next fall and if all goes well, I may have sufficient data to possibly make a presentation at the 2008 CHRIE / MAHE conference.

Fall 2007

September / October / November

- Two posters were prepared with data and charts for presentation at the December Bush Conference.

- We are collecting data and preparing to meet to compare data and prepare an article for publication.

- I hope to represent the group at a February 2008 Midwest Association of Hospitality Educators for a poster session.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

There is no question in my mind that this grant has provided me an opportunity to work collaboratively with other faculty that most likely would not have happened otherwise. It has allowed me to look closely at student collaborative learning and look for new ways to embed opportunity into classes. Perhaps when this grant is finished, it will have planted a seed that will continue to grow as other faculty see the outcomes.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: University of Minnesota, Crookston

Faculty Member(s)/Instructor: Kevin D. Thompson, Ph.D.

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Six Faculty Members on the Research Team

Course Impacted by Research (e.g., Theatre History TH 3171):

Spring 2007 Public Speaking (SPCH 1101 Section 4)

Fall 2007 Business and Professional Speaking (COMM 3704 – Section 1)

Course Description: *(Please provide the course overview that appears in course bulletins)*

Spring 2007 – SPCH 1101 Section 4

The Public Speaking course combines communication concepts and skills with the dual goals of helping you to understand basic communication principles and to improve your own communication skills (focusing on presentation skills). Special emphasis is placed on preparing, selecting, organizing, and delivering oral messages as well as on analyzing and evaluating the speaking-listening process. The primary objective of this course is to provide you information and an environment in which to gain an understanding of the communication process at it relates to the speaker and the audience. Specifically, by the end of this course, you will be able to (learner outcomes):

1. Select the speech purpose and limit the subject area
2. Analyze the speech occasion and the audience
3. Use a variety of sources to effectively research a speech
4. Demonstrate the use of evidence and different forms of support material
5. Organize the speech body and develop an effective speech outline
6. Deliver a thoughtful and well-organized speech
7. Evaluate audience, critique and develop self-assessment of speech success

Fall 2007 – COMM 3704

Businesses and organizations demand a high level of proficiency in communication and presentation skills. Having this skill set will help you in securing a position as well as thriving in your career. Emphasis is placed on preparing, selecting, organizing, designing and delivering oral messages in a variety of business situations. The intent of this course is to build and enhance your understanding of the basic skills, principles and contexts of communication in business and professional settings and put that understanding into action through a variety of activities.

The primary objective of this course is to provide you information, experience and an environment in which to gain an understanding of the communication process at it relates to the business and professional context. Specifically, by the end of this course, you will be able to (learner outcomes):

8. Describe the relationship between the content, relational and image components of communication and how these elements affect a person's success within business;
9. Demonstrate conceptual understanding of communication skills associated with business and professional contexts;
10. Deliver speeches and respond to audience questions/feedback using effective oral and visual delivery methods;
11. Write effective cover letters and resumes;
12. Apply effective interviewer and interviewee techniques; and,
13. Design and implement communication tools to facilitate meetings;

Student Learning/Teaching Issue/Research Question:

What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Major Objectives:

Use Formal Cooperative Learning Groups to ensure that students are actively involved in the intellectual work of organizing material, explaining it, summarizing it, and integrating it into their current conceptual understandings. Study practices that affect the engagement of students in collaborative learning experiences as they learn academic subject matter and collaboration skills.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Spring 2007

The purpose of my research study was to incorporate cooperative learning groups into the speech development and post-speech reflection elements of the persuasive speech project during a Public Speaking course section. The classroom collaborative group activities included formalized group member roles, assignment tasks. The activities were implemented in March to encourage peer interaction, discussion, feedback and assistance in preparation for their individual persuasive speech projects. The students delivered their persuasive speeches in April. After students deliver their speeches, they will resume group collaborative activities to review and reflect on their (and the peer's) speech delivery efforts (e.g., content and delivery effectiveness, persuasiveness, credibility, etc.). The classroom cooperative group activities were implemented in March to encourage peer interaction, feedback and assistance in preparation for their individual persuasive speech projects. The groups use formal roles such as leader, recorder and presenter. I assigned groups specific tasks to complete such as discussing and providing feedback regarding their speech topics, persuasive argument structure based on their topics (arrangement of main points), strategies for increasing their effectiveness in creating and delivering their speeches, and integrating credibility into their speeches (ethos, logos, pathos). After they deliver their speeches, the groups will reconvene and discuss each member's speech (reflection on what worked well and areas for improvement).

Fall 2007
The purpose of my research study was to incorporate cooperative learning groups into the presentation development and post-presentation evaluation and reflection elements of the "Informative Presentation" project during the Business and Professional Speaking course. The classroom collaborative group activities included formalized group member roles, evaluation form creation, assignments, self-reflection and peer evaluation tasks. The activities were implemented in October to encourage peer interaction, discussion, integration of presentation techniques and practices discussed in class (as well as in the individual research they conducted), assistance in presentation preparation, creating a "group-designed" evaluation tool (using information discussed in class), reviewing video tape of their individual presentations (of their group members) (on CD), and providing feedback regarding their individual Informative Presentation project.

Sequence of Events
Prior to delivering their presentations, the students worked with their groups on the developing the presentation (ideas, suggestions, incorporating project requirements, incorporating presentation strategies and techniques, etc.). Each group consisted of three individuals. To assist their group efforts, the groups used formal roles such as leader, forms developer, recorder/presenter. The students delivered their Informative Presentation in October. After students delivered their presentations, each member completed a "self-analysis" paper reflecting on their presentation effectiveness (after watching the CD of their presentation). They resumed group collaborative activities to review and reflect on their (and the peer's) presentation delivery efforts (e.g., content and delivery effectiveness, credibility, professionalism of their PowerPoint presentations, etc.). Each group member reviewed each member's presentation from the CD and used the evaluation tool the group created to provide feedback to those members. The group met again outside of class to discuss their feedback.

Additional group activities were arranged in class in preparation for their final individual presentation, Persuasive Presentation (December).

Evaluation Plan:

To determine student perceptions of their learning in formal cooperative learning groups within the Public Speaking course (Spring 2007), I used two primary methods of evaluation, formative and summative evaluation. These online surveys were designed using Flashlight software. To determine student perceptions of their learning in formal cooperative learning groups within the Business and Professional Speaking course (Fall 2007), I used the summative evaluation that the Research Partners created. This evaluation was conducted using an online survey designed using the Flashlight application. I also conducted a "Supplemental Evaluation" at the end of the course to obtain additional data. I also conducted informal discussions with the class to gage progress, status, and overall attitudes.

Summary of Outcomes:

Spring 2007

Fifteen students completed the summative evaluation at the end of the project. The results of the summative evaluation showed that the majority of respondents believed that the formal cooperative learning groups helped them learn the course material pertaining to the project. While the survey results were positive toward these activities, they also showed that it was challenging for some students to engage in cooperative learning groups. A small percentage of students expressed concerns or difficulties regarding communicating with international students in their group or group members who were not prepared with their assignment ahead of time (which reduced the effectiveness of their group work and discussions).

Fall 2007

Out of the seventeen students in class, thirteen students completed the summative evaluation at the end of the project (three students were not in class during the evaluation and did not complete the survey). The results of the summative evaluation showed that the majority of respondents believed that the formal cooperative learning groups helped them learn the course material pertaining to the presentation projects. While the survey results were positive toward these activities, they also showed that it was challenging for some students to engage in cooperative learning groups. A small percentage of students expressed concerns or difficulties regarding group members who were not prepared with their assignments/activities ahead of time and members that took a less active roll in the group (making other members having more responsibility and work).

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

During the spring semester 2007, I worked with others on this Bush Grant classroom research project. I attended weekly meetings in which we discussed a number of topics associated with the research project, including: designing a formative and summative online survey using “Flashlight,” discussing approaches to our individual research projects, offering possible solutions and suggestions to issues/problems related to our individual research, etc.

Outside of the meetings, I also spent time on the following tasks:

- I spent time working with “Flashlight” to understand its functionality. Based on my participation in this research, I used “Flashlight” to develop a survey to gather feedback from our communication students regarding the communication program to assist with our 3-Year Program Review. These activities helped me to build an understanding and comfort-level with the program that helped me with this classroom research project.

- I created a strategy for the classroom research.

- The cooperative group activities were implemented in March to encourage peer interaction and feedback and assistance in preparation for their individual

persuasive speech projects. After students delivered their speeches in April, they resumed group collaborative activities to review and reflect on their (and the peer's) speech delivery efforts (e.g., content and delivery effectiveness, persuasiveness, credibility, etc.).

- Students completed formative and summative online surveys. These methods were used to gather data on their perceptions regarding the learning they experienced within their formal cooperative learning groups.

- After the surveys were completed and through reflecting on the project, I began brainstorming on how to increase the effectiveness of implementing this research in the fall.

During the fall semester 2007, I worked with others on this Bush Grant classroom research project (continuation of our research started in the spring semester 2007). I attended weekly meetings in which we discussed a number of topics associated with the research project, including: discussing approaches to our individual research projects, offering possible solutions and suggestions to issues/problems related to our individual research, etc.

Outside of the meetings, I also spent time on the following tasks:

- I created a strategy for the classroom research.

- The cooperative group activities were implemented in October to encourage peer interaction, assistance and feedback in preparation and evaluation for their individual Informative Presentation project (as well as their individual Persuasive Presentation project). Prior to delivering their presentations, the groups worked to assist each other with their presentations (structure, content, delivery techniques, professional PowerPoint techniques, etc.). After students delivered their presentations in October, they resumed group collaborative activities to review and reflect on their (and their group members') presentation delivery efforts (e.g., content and delivery effectiveness, structure, PowerPoint usage, etc.).

- Students completed a summative online survey. This method was used to gather data on their perceptions regarding the learning they experienced within their formal cooperative learning groups. I also asked students to complete a "supplemental" evaluation at the end of the course to assess their project in the overall design of the course (was it a good fit, helpful for learning course material, etc.).

- After the surveys were completed and through reflecting on the project, I began brainstorming on how to increase the effectiveness of implementing this research in the spring with other communication courses that I teach.

What successes have you experienced with your work/project?

Spring 2007

Although I believe that peer cooperative group learning is a valuable method in helping students prepare and reflect upon their speech project (to complement their individual preparation efforts), I have not implemented these groups in previous course offerings. Based on my observations and survey results, I believe that students are accomplishing the objectives of the group cooperative activities (asking questions, exchanging information, comparing approaches, and providing feedback). The group format allows for these activities to occur as compared to individual work that has been the pedagogical approach used for the first speech project (Informative Speech) earlier in the semester. Comments on the completed surveys showed that some student appreciated the opportunity to discuss course content with other classmates and use that content in activities related to the speech project. While I believe that students had a richer learning experience and used this learning to increase the effectiveness of their persuasive speech, it is difficult to quantify the impact of these activities on their speech delivery.

In addition, the class of 24 students was very diverse, with six Korean students, one French student, and one Russian student. The cooperative group activities ensured that students were interacting and involved. The formal group roles also ensured that each group member actively participated in the activities.

Fall 2007

I learned a great deal from the classroom research that I conducted in the spring semester 2007 with a Public Speaking section. I saw the value of formal collaborative group activities in presentation preparation and assessment. Based on my observations and survey results, I believe that students accomplished the objectives of the group cooperative activities (asking questions, exchanging information, comparing approaches, developing an evaluation tool by incorporating what the discussed in class, using to tool to evaluate group member presentations by viewing them on a CD, and providing feedback during group meetings). The group format allowed for these activities to occur as compared to individual work that had been the pedagogical approach used for the first offering of this course in Spring 2006. While it's helpful to receive my feedback and to reflect on their own efforts, by collectively creating an evaluation tool and critiquing another presenter's presentations using that tool (and being able to closely review these presentations using a CD), I believed the students increased their awareness of their overall effectiveness. Comments on the completed surveys showed that student appreciated the opportunity to discuss course content with other classmates, use that content in activities related to the presentation project, and evaluate each other based on the criteria they created (evaluation tool). The cooperative group activities ensured that students were interacting and involved. The formal group roles also ensured that each group member actively participated in the activities.

While I believe that students had a richer learning experience because of the collaborative group structure and used this learning to increase the effectiveness of their Informative Presentation, it is difficult to quantify the impact of these activities on their overall presentation delivery or continued delivery upon class completion. With this said, a very positive indicator of their knowledge development was the feedback from students that their group members provided very consistent feedback to one another (so two members had similar feedback on the third member's presentation). This consistence in feedback showed that students found similar strengths and weaknesses.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Spring 2007

The biggest challenge in this research project is the class itself. Out of the many Public Speaking classes that I've taught over the last two years at the UMC (and other similar classes taught at two other institutions), this class was the most disappointing. A third of the students regularly missed class which presented a significant problem in ensuring group consistency, understanding of the group work, member relationships, group and member expectations, and participation. The level of overall participation was also low so the level of full participation in several groups was also very low (they complete the minimum requirement). Because of this, the research data may be suspect because some respondents participated in their group regularly and fully while others missed some of the group activities and/or offered little participation. I believe that this research project would have been easier to implement and measure and also generally more successful if it were used in any of my previous Public Speaking classes.

Fall 2007

Compared to the first time I implemented this classroom research during the spring semester 2007, this project went extremely well. During that previous semester, the biggest challenge of the research project was the class itself. Implementing the research this semester went very smoothly, primarily because the class was really active in the group activities (it was a 3-hour night course and the class consisted of upper level students).

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Spring 2007

I plan to implement this study again during the fall semester for two Public Speaking sections. I plan to make the following changes:

- Implement this project earlier in the semester (for the first speech project)
- Implement some "group ice breaker" activities immediately when the groups are formed
- Discuss expectations of group members and hold them more accountable (have required work completed before the class session so groups members can fully discuss the item and have the group record who did/did not complete the work in that timeframe)
- Implement several "micro" formative evaluations to determine student attitudes and movement during the cooperative group project timeframe

Determine how to assess the impact of the cooperative group learning activities on the students' speech delivery

Fall 2007

I plan to implement this study again during the spring semester in other courses (potentially in Public Speaking, Organizational Communication and Topics in Communication: Corporate Training). I plan to make the following changes:

- Implement this project earlier in the semester (for the first speech project in Public Speaking)
- Implement some "group ice breaker" activities immediately when the groups are formed

- Discuss expectations of group members and hold them more accountable (have required work completed before the class session so groups members can fully discuss the item and have the group record who did/did not complete the work in that timeframe)
- Implement several "micro" formative evaluations to determine student attitudes and movement during the cooperative group project timeframe (and to ensure that all group members are actively participating and accountable)
- Determine how to assess the impact of the cooperative group learning activities on the students' speech delivery and other projects

How are you using collaboration within your project?

During the fall semester 2007, I worked with the six members of this Bush Grant classroom research project. I attended weekly meetings with the Research Partners in which we discussed a number of topics associated with the research project, including: discussing approaches to our individual research projects, offering possible solutions and suggestions to issues/problems related to our individual research, etc. After completion of the project, the team met to create a Poster Session for the Bush Foundation event on UM-Twin Cities campus. We will continue to meet to discuss the analysis of this semester's projects and determine strategies to continue this research in the spring semester 2008.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Resources were shared during the project team meetings. Two classroom research books were often used (Classroom Research: Implementing the Scholarship of Teaching by K. Patricia Cross and Mimi Harris Steadman and Classroom Assessment Techniques: A Handbook for College Teachers by Thomas A. Angelo and K. Patricia Cross). I also consulted teaching and group activities research in the context of teaching and in presentation preparation, delivery and assessment.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The grant administrator did an excellent job coordinating the six project team members, providing valuable resources and support, and moving the project along.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Crookston

Faculty Member(s)/Instructor: Soo-Yin Lim-Thompson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 6

Course Impacted by Research:

Spring 2007
ECE 3410 Learning Environments for Infants and Toddlers; ECE 4750 Family, School and Community Relations

Fall 2007
ECE 4700 Developmentally Appropriate Preprimary Education I

Course Description: *(Please provide the course overview that appears in course bulletins)*

Spring 2007

ECE 3410 Learning Environments for Infants and Toddlers

COURSE DESCRIPTION:

Design, organize, and maintain a developmentally appropriate healthy learning environment through the arrangement of the physical setting, provision of materials, construction of curriculum and implementation of learning experiences. Assessment of child's learning and the teaching and learning environment. Field experiences require team teaching in a university-approved lab setting.

ECE 4750 Family, School and Community Relations

COURSE DESCRIPTION:

Students focus on family involvement as essential in the successful education of the young learner. Emphasis is given to analysis of patterns in family-school relations, including trends in relations, problems that inhibit parent involvement, and strategies for productive family involvement. Community and cultural considerations in family-school-community relations are examined. Field experiences required.

Fall 2007

ECE 4700 Developmentally Appropriate Preprimary Education I

COURSE DESCRIPTION:

Students integrate theory and practice related to preprimary (preschool and kindergarten) education. Development related to learning environment, curriculum, and teaching methods. Developmentally appropriate approaches to subject matter in the language arts, literacy, and expressive arts. Field experiences.

Student Learning/Teaching Issue/Research Question:

Project title: Students' Perceptions of their Learning in Formal Cooperative Learning Groups

Research question: What are the students' perceptions of their learning in Formal Cooperative Learning Groups?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Spring 2007

Literature Review

1. A literature review will be completed throughout the course of this research.

Subjects

2. Subjects for this research study were students from the following two classes during the semester of Spring 2007: ECE 3410 and ECE 4750.

   A total of 44 students participated in this project. There were 20 of the 26 students enrolled in ECE 3410 course that participated (77%), and 24 of the 27 students enrolled in ECE 4750 (89%).

3. In order to form a heterogeneous group, the size of each group which ranges from 3 or 4 students were randomly selected.

4. Each class was assigned to complete at least one formal cooperative learning group project that took the students 4 – 5 weeks to complete the project.

Formal Cooperative Learning Group

5. Students were provided with instructions prior to each group work. The instructions included: objective and task of the assignment; role assignment; completion of "Formal Learning Group" minutes **.

   **ECE 4750 course required each group to complete a "Formal Learning Group" form which entails the minutes of each meeting (see enclosed example).

6. During students' group work, the course instructor monitored students' behaviors and work; provided feedback, monitored progress, and intervene when necessary.

Data Collection

7. A total of three formative surveys were sent and completed by the students. A total of 68 students were asked to respond to the formative surveys and 59 students (87%) responded to the formative survey.

8. Summative surveys were sent to 44 students and 42 students (95%) completed the survey.

Fall 2007

Subjects

1. Subjects for this research study are students enrolled in ECE 4700 Developmentally Appropriate Education I in Fall 2007.

   There are a total of 16 students enrolled in this course and 100% of the students agreed and participated in this research project throughout the semester.

2. In order to form a heterogeneous group, each group are randomly selected with a size of 4 students per group.

Formal Cooperative Learning Group

1. Each cooperative learning group was assigned to complete a 7-week project.

2. Students were provided with instructions prior to each group work. The instructions included: objective and task of the assignment; role assignment; completion of "Formal Learning Group" minutes **.

3. During students' group work, the course instructor monitored students' behaviors and work; provided feedback, monitored progress, and intervene when necessary.

Data Collection

1. One summative survey was sent to 16 students and a total of 16 students (100%) completed the survey.

Evaluation Plan:

The use of Flashlight Online program was used as a way of collecting data for the summative survey. Students were provided in-class time to complete their survey.

The method of data analysis is transforming raw data into histogram and cross-case analyses. The open-ended questions will be analyzed by using themes with supporting quotes from the subjects.

Summary of Outcomes:

The data collected in this research project will be combined with the data that was collected in Spring 2007 (courses ECE 3410 and ECE 4750).

Because of the nature of this research that involves other disciplines, the data collected will also be combined with other discipline involved in this research project.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Meetings: January 2007:

January 10:

- Discussed, reviewed and refined proposal – research question; project title
- Discussed potential faculty to conduct the research (across-disciplinary areas)
- Submitted application

January 19:

- Discussed methodology
- Worked on the format to report "Cooperative Learning Planning" form
- Discussed Flashlight survey questions

January 23:

- Continued working on the "Cooperative Learning Planning' form

January 25:

- Finalized "Cooperative Learning Planning" form
- Discussed and selected questions from the Flashlight survey

Meetings: February 2 – 23, 2007:
- Attended three meetings to work on survey questions.
- Reviewed questions from the flashlight inventory in the areas of "active learning" and "collaborative learning".
- Completed January log.

Meetings: March 2 and 23, 2007:
- Finalized formative and summative surveys.
- Reviewed consent letters, and classroom research lesson plans
- Reviewed consent letters with students and collected consent letters from students.
- Flashlight training on setting up my formative surveys.
- Completed February log.
- Working on March log.
- Students were provided with two formative surveys to complete on March 20 and 28.

Created a "Formal Learning Group" form for students to complete after each group work.

Month of April 2007:
- Completed March log.

- Provided feedback on "Formal Learning Group" (i.e. minutes) completed by students in ECE 4750.

- Formative survey was conducted for ECE 4750 on April 4.
- Summative survey was conducted for ECE 3410 on April 22.
- Summative survey was conducted for ECE 4750 on April 22.

Meetings: August 2007:
- Total of one meeting attended: August 27
- Reviewed last year's summative survey to decide if this instrument will be used with student.

Meetings: October, 2007:
- Total of three meetings attended: Oct 3, 18, and 25

- Our group shared and discussed our course project using formal learning group. Challenges and successes were also shared.

Research project:
- Class project was introduced to the students in mid-October
- Students were provided with instructions on how to carry out a "formal learning group" - define objective(s) and task of the assignment for each week; role assignment during group meetings; complete "Formal Learning Group" minutes ** after each meeting.

Month of November 2007:
- Total of four meetings: Nov 1, 8, 15, and 28
- Majority of the meetings were set to discuss what to include in our poster presentation

Research project:

- Students are well into their group project, and sending their minutes to course instructor.

Month of December 2007:

- December 6: BUSH Poster Presentation at U of M, Twin Cities campus
- Research Course Profile due December 14.
- Conducted a summative survey (December 12)

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What successes have you experienced with your work/project?

January 2007:

- Interesting discussion on faculty's experiences and thoughts regarding teamwork in and outside classroom: types of teamwork assignments; teamwork expectations; grading.
- Fruitful discussion on the handouts on the "essentials" to conduct formal cooperative learning group (Karl Smith; Johnson, Johnson, & Smith), which eventually provides base foundation to our research methodology: instructor's role in cooperative learning; basic elements of cooperative teams, cooperative learning.
- After much discussion, we all agreed on the research question and project title.
- Continued to read information on cooperative learning which provided ideas on how to conduct cooperative learning in the classroom and at the same time collect data for this research project ("Cooperative Learning: Advice for Starting Out" by Karl Smith; "Investigating Collaborative Learning with Classroom Research" by Mimi H. Steadman)
- The methodology was discussed and finalized with room for flexibility in order to meet the diversity of faculty's cooperative learning activities: number of students in a formal learning group; length of formal learning group; number of surveys implemented to collect data
- Finalized the "cooperative learning planning' form.

February 2007:

- As a group, we decided that our research needs two types of surveys: formative and summative. Discussion topics were: Should we have the same questions for formative and summative? How many questions should we have? When should we conduct our formative survey? How often should we conduct our formative survey? Should we use all the formative survey?
- We made the decision that there is a need to create our own survey questions that are relevant to our research question. I was surprised how easy we all agreed upon this!
- The process of creating the survey questions is/was time consuming but each meeting we did make progress along with rich discussion on our perspective regarding cooperative learning groups. Our group is very diverse from different discipline, but I felt our ideas shared were respected.

March 2007:

- The formative and summative surveys were completed and ready for implementation.
- Training on using the Flashlight program to create our survey was easier than I

initially thought.

- Overall, the students were positive with the classroom research project after I reviewed and discussed the consent letter and purpose of the project. The numbers of consent letters received:
    - ECE 3410 Learning Environment for Infants and Toddlers:
      UMC - 9/9 students; BSU – 11/17 students. Total: 20 students
    - ECE 4750 Family, School and Community Relations:
      UMC – 11/11 students; BSU – 13/16 students. Total: 24 students

- Instructions were provided to students prior to each group work.
- Students in ECE 4750 were instructed how to complete the "Formal Learning Group" form (i.e. minutes of each meeting). All students turned in their forms after each group meeting.
- March 20 and 28 formative survey: received total of 39/44 surveys sent (89%)

April 2007:

- The "formal learning group" form completed by the students act as reminders of the next meeting agenda and accountability for their "homework" to be completed prior to group meeting.

A high percentage of students completed their surveys:

- Number of students returned the April 4 formative survey (ECE 4750): 20/24 (83%)
- Number of students returned the April 22 summative survey (ECE 4750): 22/24 (92%)

Number of students returned the April 22 summative survey (ECE 3410): 20/20 (100%)

- It went a lot smoother compared to Spring 2007 – groundwork were established. We learned about the challenges last year (spring 2007) and Fall 2007 allows each of us to refine and conduct the research.
- Took a more active role in listening or guiding students during their formal learning group project.
- The Formal Learning Group Form minutes were useful to track performance.
- Students in ECE 4750 were instructed on how to complete the "Formal Learning Group" form (i.e. minutes of each meeting). All students turned in their forms after each group meeting.
- The "formal learning group" form completed by the students act as reminders of the next meeting agenda and accountability for their "homework" to be completed prior to group meeting.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

January 2007:

- I was having a hard time finding flashlight questions to fit our research project or questions that will answer our research question. I also wondered how much editing we should do on the flashlight questions due to validity and reliability.

February 2007:

- I did not find the flashlight inventory survey questions fit or match our current research questions.

- Finding the "right' wording for some of the survey questions were challenging and time consuming. I also realized this process is needed in order for the survey to be inclusive for all faculty conducting this research.

March 2007:

- ITV instruction added a different dimension of challenges to cooperative learning. I decided to travel and meet with BSU students once a week and provide assistance during their cooperative learning projects.
- Trying to keep the survey code straight was a challenge for me – I accidentally sent the same survey code to both classes.
- During formal cooperative learning group project: getting the students to perform their roles can be challenging – especially the role of "leader".

April 2007:

- Finding the time to read and provide email feedback in a timely manner (prior to their next group meeting).
- A total of three formative surveys were completed. I was hoping for more surveys to be completed, but the students stated that the surveys are redundant to their answers provided.
- Lack of time to review current literature that I hope to do more.
- The classroom research went very well (100% response rate) therefore changes are not needed.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

There were no adjustments needed to be made for our data analysis.

How are you using collaboration within your project?

January 2007:

Our group met four times in January and engaged in the discussion of a classroom research project (research question) that will/can be inclusive across discipline areas. The topics discussed were:

- Formal cooperative learning group as pedagogy – what entails in this kind of pedagogy?
- Student learning – what are students' learning through this kind of pedagogy?
- What assignments that lends itself to this kind of pedagogy?
- How are data collected?

February 2007:

During our February meetings (Fridays at 10:30 a.m. to noon) we as a group worked on survey questions for formative and summative surveys. During our group work, we discussed and shared our experiences regarding teamwork (cooperative learning groups) in the classroom:

- Students' and instructors' challenges on teamwork
- Assignments that are informal or formal cooperative learning groups
- Group size that are conducive for students learning and their challenges

- Skills needed for students and our expectations from students during their group work.
- Monitoring students' group work – instructor's role

March 2007:
March 2: As a group we finalized our formative and summative surveys.
March 22: Each faculty discussed their potential formal cooperative learning group projects and potential challenges and successes. The discussion provided insights to our own project(s) and ways to improve that are more conducive to student learning.

Weekly meetings (Thursday noon) were set for October and November to discuss:

- the progress of our research
- any challenges or successes during the process of formal learning groups, content for the poster presentation (December 6)

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Spring 2007
The following articles provided basic guide to generating a research question and the process of conducting a classroom research, and designing survey questions:

- "Investigating Collaborative Learning with Classroom Research" by Mimi H. Steadman) – the powerpoint notes provides some basic guide in generating a doable research question; process of conducting a classroom research
- "Classroom Research tip Sheet #1: Designing surveys for classroom assessment by Mimi Steadman – ways to construct survey questions.
- "Flashlight Inventory" - provides sample questions and also provides ideas of the different ways survey questions are set up.

The following articles provided our group some consensus on how we would conduct our formal cooperative learning groups:

- "Cooperative Learning: Advice for Starting Out" by Karl Smith provides some basic information on how to form cooperative learning group (group size; choosing a group; group behaviors; length of group work; monitoring the group; meetings with colleagues)

- "Formal Cooperative Learning Groups" by Johnson, Johnson & Smith provides instructors roles during the following processes: Preinstructional decisions; explain the instructional tasks to students; monitor and intervene; and evaluate.

This article assisted me in designing assignments (projects) that are conducive for formal cooperative learning groups:

"Classroom Assessment Techniques: A handbook for college teachers" by Thomas Angelo and Patricia Cross. Chapter 4: Planning and Implementing Classroom Assessment Project (page 33 – 35). I use the "project cycle" as a framework to complete the 4 –week project. The "project cycle" which I somewhat modify to fit the needs of my students, provided my students structure and organization in completing their project.

Fall 2007
Most of the readings were done last semester. This semester we are focusing more on data analysis and disseminating our findings:

We are in the process of analyzing our data (quantitative and qualitative) and will share our results within the UMC community.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Disseminating our findings through a variety of ways: in conferences, article publication, UMC community.

Use our findings as a base foundation to discuss instructional strategies that impacts student learning.

Explore other teaching strategies that impacts student learning and conduct a classroom research (if funds are available)

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Crookston

Faculty Member(s)/Instructor: Behrooz Sedaie

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): one

Course Impacted by Research: Econ 2101 Microeconomics

Course Description: *(Please provide the course overview that appears in course bulletins)*

Basic economic principles of resource allocation, demand and supply, market equilibrium and pricing. Theory of production and costs. Perfect competition and monopoly. Factor markets and factor pricing. Public goods and externalities.

Student Learning/Teaching Issue/Research Question:

Is collaborative learning teaching method more effective than traditional lecture method on students' achievement in learning economics?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

The research involves a controlled experiment in which students enrolled in the course in the Fall 2006 semester were treated as the experimental group and were taught with a collaborative learning teaching method. Students enrolled in the course in the Spring 2007 semester were treated as the control group and were taught using the traditional lecture method. In both semesters a web-based polling system was used to ask questions from students during class time to which students responded in real time using their own computers. In the control group students answered the questions individually, but in the experimental group students were required to discuss the questions in small groups before registering their answers. Students' achievement in learning microeconomics was measured using the standardized Test of Understanding in College Economics (TUCE). An educational production function was specified and was estimated using regression analysis.

Evaluation Plan:

Estimation of the educational production function using regression analysis will show whether collaborative learning teaching method is more effective than the traditional lecture method. Regression analysis allows to controls for the effect of other variables that have been shown in the research literature to affect student learning (such as student gender and minority status, ability, effort, prior economic and algebraic knowledge, etc.) and detects any effect on student learning that is due to collaborative learning.

Summary of Outcomes:

Example: Student survey data revealed . . .

Preliminary results from estimations indicate that collaborative learning teaching method positively and significantly affects students' stock of knowledge at the end of the semester as compared to a traditional lecture method. Collaborative teaching method also seems to have positive influence on the flow of student learning from the beginning to the end of the semester.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Fall 2006 semester classes started on August 30th and I administered both The Test of Understanding in College Economics (TUCE) as a pretest and my pre-survey questionnaire to my students on September 1st. The purpose of the pre-survey questionnaire was to collect from students some of the data that would be used in the research analysis.

During the months of September, October, November, and December I continued the practice of collaborative learning in my microeconomics classes which formed the experimental group in my research project. During each class I asked students several questions using the Web-based polling system, and they answered the questions after having discussions in groups of two to four students.

In December, which is the month of final examinations, I administered the Test of Understanding in College Economics to my students as a post test as well as a post survey questionnaire in order to collect additional data from students that would be used in the statistical analysis of the project. I also attended a faculty learning community meeting at UMC and presented the results of my analysis of data that I had collected during the 2005/06 academic year.

The Spring 2007 Semester was the fourth and last semester of my project and experiment. Because my Fall 2006 students were my experimental group during

2006/07 academic year, in the Spring 2007 semester I treated my microeconomics students as the control group. In early January at the start of the semester I administered the Test of Understanding in College Economics (TUCE) as pretest to my students. I also administered the pre-survey questionnaire that I had used in previous semesters, to collect personal information from students that are needed in the statistical analysis.

During January and February, as in previous semesters, I used the polling system during class meetings to ask questions from my students. Because these students were my control group they answered my questions individually and without collaboration with each other.

In January I started to write a paper based on the results of the analysis of the data that I had collected from my students during the 2005/06 academic year. I completed the paper by mid March and presented it at the 2007 annual meeting of the Midwest Economic Association on March 24 in Minneapolis.

I continued to use the polling system in my microeconomics classes during the months of March and April using a traditional lecture method with no collaboration among students. In early May during final examinations I administered the Test of Understanding in College Economics to my students as a post test, and also I administered the post-survey questionnaire (the same as in the previous semesters) in order to collect additional student data that are needed for statistical analysis.

What successes have you experienced with your work/project?

Collaborative learning teaching method was used successfully in my microeconomics courses and students seemed to enjoy it. Administration of pre- and post-TUCE, pre and post survey questionnaire, and collection of data from students have been completed according to the plans. Presentation of my paper at the annual meeting of the Midwest Economic Association in March 2007 went well and the paper was rather well received.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

There were a few students who seemed not to like the idea of collaboration in a group and would rather answer my questions individually. I had to encourage them repeatedly to discuss the questions with other students. There were also a few students who occasionally did not bring their computers to classroom. In such cases I still asked them to be part of a group and participate in group discussions even though they were not able to record their answers in the polling system using their computers.

Some students withdrew from the course and therefore did not complete the post-survey questionnaire and did not take the post-TUCE. These students can not be included in the analysis of the data because of incomplete information. This reduces the number of students who could be included in the analysis.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

The regression analysis using the data that I had collected during 2005/06 academic year showed that the effect of collaborative learning method on the flow of learning (the percentage of the gap between the maximum possible TUCE score and the pre-TUCE score that is closed by the end of the semester) was rather large but lacked statistical significance. I believe that this lack of statistical significance was most probably due to the small sample of 89 observations that I had available for preliminary analysis from 2005/06 academic year. To make sure that my final analysis and results do not suffer from limitations of a small sample I decided to continue with my project and collect data from students who took my courses during the 2006/07 academic year in order to make my sample larger and therefore give my results more statistical validity.

How are you using collaboration within your project?

I use collaborative learning in my experimental classes. In these classes students are divided into small groups. When I ask questions during the class time using the polling system, students in each group are required to discuss the questions with each other before they register their answers in the system.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I made a literature review of collaborative learning in economics education before I started implementation of my project. I also have used economics education literature to identify other factors than teaching method (such as personal characteristics, ability, effort, prior algebraic and economic knowledge, working on a job, etc.) that affect students' achievement in learning economics. This information is needed for specification of an educational production function and detection of the effect of collaborative learning. Most of the articles I have used are published in the *Journal of Economic Education.* These include papers by authors such as Becker and Salemi (1977), Beron (1990), Brasfield et al (1993), D' Amico (1984), Heath (1989), Johnson et al (2000), Lillydahl (1990), Lopus (1997), Manahan (1983), Moore (1998), Paul (1982), Polacheck et al (1978), Price et al (1981), and Walstad and Robson (1997).

I myself presented my research and its preliminary results to a group of UMC faculty in a faculty learning community meeting in December 2006. In March 2007 I presented the paper that I wrote on the basis of my preliminary results at the 2007 annual meeting of the Midwest Economic Association which took place in Minneapolis, Minnesota.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Longer grant periods will help because at small institutions such as UMC often it is not possible to have a large enough sample of students during one semester or even one academic year. To have a large sample one may need to collect data during a two or three year period.

Also, availability of an experienced research consultant, who can answer questions about appropriate research methodology and statistical analysis and regression models, would be of great help.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: UMD

Faculty Member(s)/Instructor: James Allert

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 8

Course Impacted by Research (e.g., Theatre History TH 3171):

Computer Science I (CS-1511) and Intro to Programming in Visual Basic (CS-1121)

Course Description: *(Please provide the course overview that appears in course bulletins)*

CS-1511 Introduction to the discipline of computer science and its theoretical foundations. Introduction to structured programming, problem analysis and solution design, data abstraction, and ethical and social issues. Students will learn a high-level programming language. Requires design and implementation of computational solutions to sample problems.

CS-1121 Introduction to programming in Visual Basic.NET, including event-driven Windows programming, data types, operators, objects and properties, menus, procedures, control structures, and database file processing. For students with no prior programming experience.

Student Learning/Teaching Issue/Research Question:

This project seeks to improve the learning environment in several large lecture classes by introducing a series of reflective opportunities that students can use to 1) come to understand themselves as learners, 2) state their initial goals and strategies for the course, 3) determine whether their strategy was effective after each exam and allow them to reformulate a new one based on dropping unproductive methods, 4) reflect back on the course as a whole and their growth as learners.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

The four areas listed above are served by four measurement tools:
1) An online learning styles survey (Soloman-Felder ILS)
2) A first week statement of goals and strategies
3) Post-exam reflection (online survey, done after each exam)
4) Web logs tracking student use of online materials

Evaluation Plan:

Data is currently being assembled in a master database from which comparative analyses can be run. At present there are over 1,900 cases with up to 90 variables per case.

Preliminary profiles of learners have been made and correlations are beginning to emerge as I have time to get at the data.

Summary of Outcomes:

Preliminary data analysis results:

Learning style profiles reveal strong visual learning preferences and tendencies toward sequential, sensory approaches to learning.

Sequential and Sensory learning appear to be moderately correlated. All other learning styles are independent of one another. Unlike 4 years ago, neither the active/reflective scale nor the visual-verbal scale are correlated with outcomes (which is very good news).

However I believe that I have come to an important realization about visual learners. I believe that their correlation with outcomes is a statement about the verbal learner advantage more than visual learner disadvantage. The size of the visual learner n probably means that other factors characterize those populations. Specifically, I am now looking into the relationship between visual and active learning.

Conferences and papers planned:

I have had a presentation/paper accepted at the TechEd 2008, April 13-16 in Ontario, CA. The title of the presentation is: “The Visual Transformation of Introductory Computer Programming Courses”.

I have ten possible papers planned for the next 18 – 24 months. Each address a different aspect of teaching and/or learning and I have sufficient, although as of yet unanalyzed, data for each topic.

Paper: A Strategy for Developing Reflection and Self-Regulated Learning in Computer Science I.

Paper: Does Learning Style Matter? (targeted to CS and Engineering disciplines)

Paper: Using the Soloman-Felder ILS with Computer Science and Computer Engineering Students: Strengths and Weaknesses

Paper: Pre-test/Post-test Reliability of the Soloman-Felder ILS

Paper: Factor analysis of Soloman-Felder ILS scale components with suggestions for improving the ILS scales

Paper: WebCT vs. nonWebCT Content Delivery: Patterns of Differential Access to Course Materials

Paper: Web log monitoring for evidence of study strategies

Paper: The Role of Post-Exam Reflection in CS1

Paper: When is a Visual Learner not a Visual Learner?

Paper: Flash-animation libraries as a resource in computer science education

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Construction of a master database is now complete. Synthesis of the total results is underway and learning style information has been compiled and can be reported for over 1,900 students over the past 4 years.

What successes have you experienced with your work/project?

I have completely changed the way that Computer Science I is taught at UMD and the approach shows promise for dissemination to departments at other universities. Last Spring I signed a textbook contract with Cengage Course Technology Publishing for an introductory CS textbook. I have been working on it since then and it is currently in the page proof stage. The publication date is March 2008. The book is based on an approach to teaching Cs1 that is highly visually and sequentially oriented to appeal to the most pronounced learner types I am seeing in my classes and that others have found elsewhere.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

The single biggest challenge still remains having time for data analysis. I look forward to being able to analyze the data in the spring of 2008 and write two or more papers over the summer.

The one component I lack at present is good statistical analysis software on my computer.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

A component was added this semester in the form of a web-based visual learning aid. I am in the process of assessing its value. This was an idea that came out of discussions with students in the spring of 2007.

A library of flash animations showing how to create each project and also how to perform basic tasks from program creation to debugging has been created for my Cs-1121 and Cs-1511 students on a website called 'cshelper'. In the first few weeks of this semester this resource had thousands of hits. It looks like a real winner.

How are you using collaboration within your project?

My most important collaborative experiences are with my students. The project has opened up more faculty/student interaction than in the past that the courses are benefiting from that in a huge way.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I presented the result of a portion of the Cs1 course redesign effort – construction of a website of flash animation demonstrations – at a UMD Visual and Digital Imaging Lab colloquium on Oct 2, 2007.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The next phase should be dissemination or research findings, peer review and course redesign. I believe the most pressing need at this point is to fund research completion and dissemination. If the grant were to continue then it should center on course redesign and the assessment of that success.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: University of Minnesota Duluth

Faculty Member(s)/Instructor: Jane A.K. Carlson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): one

Course Impacted by Research (e.g., Theatre History TH 3171): Elementary Physical Education Methods PEP 3720 & Secondary Physical Education Methods PEP 3730

Course Description: *(Please provide the course overview that appears in course bulletins)*

PEP 3720 - Methods, instructional techniques and strategies, classroom management, lesson planning, developmental levels, elementary curriculum and standards.

PEP 3730 - Methods, instructional techniques and strategies, classroom management, lesson planning, developmental levels, secondary curriculum and standards.

Student Learning/Teaching Issue/Research Question:

The purpose of this research is to describe the focus and level of the preservice physical education teachers' self reflection in a field experience, and correlate their reflection to the university supervisor and cooperating teacher evaluation of the teachings. The specific research questions that guide this study are:

Research Question #1: What is the focus (Technical, Situational, Sensitizing) and level (Description, Justification, Critique, Justification & Critique) of the preservice physical education teachers self reflection in a field experience?

Research Question #2: How often do preservice physical education teachers, university supervisor and cooperating teacher "significant event" response correlate per field experience teaching? When correlated, what was the "significant event" and rating of the teaching on a 1 to 15 scale?

Research Question #3: How often do preservice physical education teachers, university supervisor and cooperating teacher "teaching effectiveness" (strength of the lesson) response correlate per field experience teaching?

When correlated, what at was the "teaching effectiveness" and rating of the teaching on a 1 to 15 scale?

Research Question #4: How often do preservice physical education teachers, university supervisor, cooperating teacher "rating of the teachings" correlate per field experience teaching? When correlated, what was the rating of the teaching on a 1 to 15 scale?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

To answer these research questions the study will ask participants to do the following: The University of Minnesota Duluth preservice physical education teachers after each of their twelve teachings will voluntarily write a reflection log, rate the focus and level, identifying one significant event, an area of teaching effectiveness, a quality of the field experience, rate the teaching performance, view a video and complete a video analysis about the most important thing they learned.

In addition, to keep track of the major area on their reflection log and video analysis a reflection tracking sheet will be used by the preservice physical education teachers. A reflection tracking sheet will also be used by the UMD university supervisor and the cooperating teacher after each of the preservice teacher's twelve teachings. The reflective tracking sheet will be in regards to the teaching: a) identify one significant event; b) identify teaching effectiveness; c) identify a field experience factors; d) rate the teaching performance; e) describe what you learned the most from viewing the video (preservice teachers only). This study will take place for two semesters. One semester the study will be conducted at an elementary school site and another semester it will be at a middle school site. Below are the specifications of the design of the study.

1st Semester
Context:
-Study conducted at Stowe Elementary School, Duluth, MN (collaborative field experience setting)

Sample:
1 University of Minnesota Duluth University Supervisor
1 Stowe Elementary School Cooperating Teacher
9 University of Minnesota Duluth Physical Education Preservice Teachers (enrolled in PEP 3720 Elementary Physical Education Methods)

2nd Semester
Context:
-Study conducted at Morgan Park Middle School, Duluth, MN (collaborative field experience setting)

Sample:
1 University of Minnesota Duluth University Supervisor
1 Morgan Park Middle School Cooperating Teacher
9 University of Minnesota Duluth Physical Education Preservice Teachers (enrolled in PEP 3730 Secondary Physical Education Methods)
Both Semesters

Training:
Before teaching in the field, UMD physical education preservice teachers will be trained on how to use the Reflective Framework for Teaching in Physical Education (RFTPE). Preservice teachers will be given specific instructions on the format to use when writing about the meaningful events that occur during their teachings, video analysis, and tracking reflective information.

Instruments:
After each preservice teachers' teaching at Stowe Elementary School (12 total teachings) and Morgan Park Middle School (11 total teachings) the following will occur:
-The preservice teachers will use the Reflective Framework for Teaching in Physical Education (RFTPE) to guide their reflective analysis of teaching as they write the focus and level in their reflective log, complete their video analysis and reflective tracking sheet.

-A reflection tracking sheet will be given to the preservice physical education teachers, the university supervisor and the cooperating teacher to complete after each teaching.

-Before the first teaching of the semester each preservice teacher will receive a reflection folder identified only by a number (no name will be written on it). Each folder will contain all of the preservice teacher's reflective logs, video analysis forms, and questionnaires for the semester. All forms in the folder will be coded using the preservice teacher's assigned number. The forms are organized by teaching (1st teaching, 2nd teaching, etc.).

In addition each university supervisor and cooperation teacher will also receive their own reflection folder before the first teaching of the semester. Each folder will contain all the reflection tracking sheets for each preservice teacher for the entire semester, the forms will state at the top if it is from the cooperating teacher or university supervisor. The reflection tracking sheet in both folders will be coded using the preservice teacher's assigned number (no names will be written directly on the questionnaire). However, tabs in the folders will have the preservice teachers' first name on them. Names were only used on the tabs to mark the corresponding set of reflection tracking sheets were the coded sheets of the identified preservice teacher. The tabs will be removed at the end of the semester. The reflection tracking sheets in each tab are organized by preservice teachers assigned numbers and teaching number.

Data Collection:
12 times (first semester at Stowe Elementary School)
11 times (second semester at Morgan Park Middle School)
A total of 23 times

Significance of the Study:

No past reflection research on preservice physical education teachers has taken place in a school setting for four semesters, or correlated the preservice teachers' reflections to the university supervisor and cooperating teacher evaluations. From this investigation physical education teacher educators may acquire greater understanding of the nature of preservice teachers' reflection in a field experience, and its alignment with university supervisors' and cooperating teachers' evaluations. If the reflection aligns, how often does it happen, what was the topic of the reflection, and did it happen with lower rated teachings or higher rated teachings? The outcomes of this study will have important implications for the role and function of reflection in physical education teacher preparation.

Evaluation Plan:

Data Analysis:

The data will be analyzed both quantitatively and qualitatively to answer the research questions.

Research Question #1 will be answered quanitatively. The preservice teacher will select the focus and level of their refection after each teaching. An assigned number will code each of their responses.

Focus: 1 Technical, 2 Situational, 3 Sensitizing

Level : 4 Description, 5 Justification, 6 Critique, 7 Justification & Critique

The data collected will be qualitatively analyzed to determine the focus and level of preservice teachers' reflections in a field experience.

Research Question #2 and #3 will use the qualitative data from open-ended questions. The preservice teacher, university supervisor and cooperating teacher response to the open-ended questions "state one significant event", and "one teaching effectiveness" in each field experience teaching will be documented and then coded. After all preservice teachers, university supervisor and cooperating teacher responses are coded they will be quantitatively analyzed to determine any correlation between them per teaching. If the significant event or teaching effectiveness correlates, further analysis will be used to determine: how

often, what were the significant event or teaching effectiveness, and the rating of the teaching on a 1 to15 scale. See the enclosed *Coding Scheme* to describe responses.

Research Question #4 will be answered quanitatively. The preservice teacher, university supervisor and cooperating teacher will rate each field experience teaching on a 1 to 15 scale (15 being the best). Their responses will be quantitatively analyzed to determine any correlation between them per teaching. If the "rating of the teaching" correlates, further analysis will be used to determine: how often and what was the rating of the teaching on a 1 to15 scale.

I need to find someone who can effectively analyze part or all of the data I have obtained from last year's studies.

Summary of Outcomes:

The data collected for one semester has been entered into an Excel format. Currently, It has not been analyzed to reveal outcomes. Enclosed with this report is the data in the Excel format.

Informally, several cooperating teachers not involved in the study stated that students who were involved in the study could effectively self reflect their own teachings.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

1. Entered the data for one semester into an Excel format.
2. Started the study with another group of students
3. Had an article published in relationship to this study "University/Schools Partnerships in Teacher Education Programs" in the international journal Physical and Health Education Journal (summer, 2007).

What successes have you experienced with your work/project?

Currently, the study is successfully being conducted with a second group. I conducted this study last year, but have not been able to analyze the data.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

I need to find someone who can effectively analyze part or all of the data I have obtained from last year and this years study.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

After running a test pilot and receiving responses from a feedback survey from all participants, the format was adjusted. The University supervisor and cooperating teacher originally completed both a questionnaire and reflection tracking sheet after each preservice teaching. Completing both forms was too time consuming, so currently only the reflection tracking sheet is currently used by the University supervisor and cooperating teacher.

Space was added on the all reflections tracking sheets to code answers. Also codes were developed to classify answers on all reflection tracking sheets.

How are you using collaboration within your project?

The study is conducted at two Duluth Public Schools and two Duluth Public School teachers are involved in the study. This collaboration has provided an authentic field experience in which to conduct this study on physical education preservice teachers' self reflection and its effect on teaching effectiveness during a collaborative field experience (university and school).

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Publication: (International Journal)
Carlson, J., Kimpton, A, Oswald, L. & Puglisi, L. (2007). University/School Partnerships in Teacher Education Programs. *Journal of Physical & Health Education*, Summer 2007.

I gave two presentations at national conferences on my project:

1. Title of presentation "Partnership in the Schools---the Missing Link" given at the National Physical Education Teacher Education (PETE) Conference in Long Beach, California October 11 – 15, 2006 sponsored by the National Association for Sports and Physical Education (NASPE).

2. Title of poster presentation "Partnership in the Schools---Transitioning Away from the Traditional" given at the American Alliance of Health, Physical Education, Recreation and Dance National Convention in Baltimore, Maryland March 14 to 17, 2007.

I gave two presentation at a state conferences on my project:

1. Title of poster presentation "Partnership in the Schools---Transitioning Away from the Traditional" to be given at the Teaching and Learning Conference in Minneapolis, Minnesota on April 23, 2007.

2. Title of presentation "Partnership in the Schools---the Missing Link" given at the Minnesota Association of Health, Physical Education, Recreation and Dance State Conference in Alexandria, Minnesota on October 29, 2007.

Grant:
In December 2007 I was notified that I will receive a Grant-In-Aid starting in January 2008 to support my current Bush Grant research. With the Grant-In-Aid funding source the following will take place:

- An increase in the amount of time this research study will be conducted, an additional four semesters.
- An increase in the number of subjects enrolled in the study since it will be conducted for additional four semesters.
- The elementary and secondary cooperating teachers will now receive compensation for participating in this study at a rate of $10.00 an hour. Each cooperating teacher involved in this research will spend 48 hours each semester for a total of 96 hours as a participant in this study. They will be compensated a total of $960.00 for their participation in this study. The reason the cooperating teachers will receive compensation is the large time commitment for their participation in this research study.
- An undergraduate research assistant will be hired to analyze the data received from this research study.

Single Semester Leave
In December 2007 I was notified that I will receive a single semester leave starting in Fall 2008 or Spring 2009 semester to support my current Bush Grant research. During this leave I plan on writing a research article with the data that has been collected by that time.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Angela K. George

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 2

Course Impacted by Research (e.g., Theatre History TH 3171): Pharmacy Skills 1 and 3: Phar 6171/ Phar 6173

Course Description: *(Please provide the course overview that appears in course bulletins)*

PHAR 6171 - Pharmaceutical Care Skills
(2.0 cr; Prereq-Concurrent registration is required (or allowed) in 6151, 6111, 6161; A-F only, fall, every year)
Integrating basic and clinical science curriculum in a lab setting.

PHAR 6173 - Pharmaceutical Care Skills
(2.0 cr; Prereq-Concurrent registration is required (or allowed) in 6121, 6132; A-F only, fall, every year)
Integrating basic/clinical science curriculum in a lab setting.

Student Learning/Teaching Issue/Research Question:

Does self-reflection about patient care skills and IV technique improve student learning and contribute to self-learning processes?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Inclusion of prompted self-reflection in the electronic post lab activity evaluation for aseptic compounding and direct patient care lab activities.

Evaluation Plan:

I plan to look for learning themes within student reflection and see what develops. I may also look for changes in activity ratings on student assessments in the future.

Summary of Outcomes:

Example: Student survey data revealed . . .

Pending.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Student releases have been completed. Questions have been formulated. Students have been responding to reflection prompts as part of the post assignment evaluation. Some responses have been very brief; others have been long and introspective. Students who relate their educational activities to patient care situations in their futures tend to have longer reflection responses, but further analysis of the data is required before any conclusions can be made.

What successes have you experienced with your work/project?

Pending. I have expanded my circle of contacts in order to find mentors who have experience with qualitative data.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Lack of experience with subjective research. Time available to contribute to research.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

I have been more specific with reflection prompts. I have adjusted questions to account for first experiences in 6171.

How are you using collaboration within your project?

I have been seeking out faculty members with subjective research histories and asking many questions. I am using students in 6171 and consulted with the course director. I plan to share the responses and findings with her.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Pending. I have been asked about reflection and learning by other faculty members in regards to their own projects. I hope to create a poster presentation for the American Association of Colleges of Pharmacy meeting in July of 2008 and perhaps an article in the future.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: UMD

Faculty Member(s)/Instructor: Dan Glisczinski

Number of people involved in course redesign/research team: 5.

Course Impacted by Research: EdSe 4501

Course Description

EdSe 4501 studies psychology as applied to the field of education. The readings examine learners, learning, and teaching. A particular emphasis is placed on studying the physical, cognitive, social, personal and moral development of students from 5th to 12th grade. The course content contributes to a better understanding of both learning and developmental theories and provides insight in how to integrate those theories into practice to make good decisions in the classroom.

Student Learning/Teaching Issue/Research Question:

EdSe 4501 provides students with opportunities to learn what professional educators understand about how students learn and how this informs best teaching practices.

Transformative learning theory suggests that scaffolded disorienting dilemmas—when followed by critical reflection, dialogue, and opportunities for committed action—can foster perspective transformation in learners.

1. Which scaffolded disorienting dilemmas were most effective in helping teacher candidates understand how to effectively use learning theory in support of student learning?

2. Which scaffolded disorienting dilemmas were least effective in helping teacher candidates understand how to effectively use learning theory in support of student learning?

3. What action that anyone (teacher or student) took in class did you find most affirming and helpful?

4. What action that anyone (teacher or student) took in class did you find most puzzling or confusing?

5. What about the class surprised you the most? (This could be something about your own reactions to what went on, or something that someone did, or anything else that occurs to you.)

Description of Research Project/Interventions/Methodology: (Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)

Critical Incident Questionnaire (CIQ) be collected from Educ 4501 participants via anonymous Wiki Technology (UMD Moodle Wiki)

1. Which scaffolded disorienting dilemmas were most effective in helping teacher candidates understand how to effectively use learning theory in support of student learning?
2. Which scaffolded disorienting dilemmas were least effective in helping teacher candidates understand how to effectively use learning theory in support of student learning?
3. What action that anyone (teacher or student) took in class did you find most affirming and helpful?
4. What action that anyone (teacher or student) took in class did you find most puzzling or confusing?
5. What about the class surprised you the most? (This could be something about your own reactions to what went on, or something that someone did, or anything else that occurs to you.)

CIQ: Brookfield (1995)

Evaluation Plan:

I read the wiki postings, conducted qualitative thematic analysis in order to better understand the essence of perspective transformations fostered in this college curriculum.

Summary of Outcomes:

Student Critical Incident Questionnaire data revealed:

1. Students reported feeling most engaged when:
being challenged to reflect on professional decisions with advanced notice in a community of peer support and gentle scrutiny

2. Students reported feeling most distanced when:
being challenged to reflect on professional decisions while their sense of confidence and efficacy were low

3. Students found most affirming and helpful:
receiving feedback on how they're doing as learners

4. Students found most puzzling or confusing:
feeling that insufficient empathy is shown for their struggles as new professionals

5. Students found most surprising:
feeling strangely engaged by the uninvited burden of professional decision making

Describe the activities/work you have completed since the last time you reported.

Since last report, I've read articles about successfully conducting Critical Incident Questionnaires (C.I.Q.s), read Understanding and Promoting Transformative Learning (Cranton, 2006), conducted a wiki-based C.I.Q, analyzed findings for thematic elements, constructed an Intense Incident Questionnaire based on C.I.Q. findings, presented this work to peers across the college, been accepted to present findings of Critical Incidents, Collaboration, and Cyber-Reflection at the International Technology, Education, and Development Conference, March 2008 in Valencia, Spain, shared results with colleagues from coordinate campuses through a Bush grant poster session, and began composing a research article on fostering cyber reflection on critical events in college curriculum.

What successes have you experienced with your work/project?

I've learned a collaborative, online method for fostering student reflection on learning.

I've learned that:

1. Students reported feeling most engaged when:
being challenged to reflect on professional decisions with advanced notice in a community of peer support and gentle scrutiny

2. Students reported feeling most distanced when:
being challenged to reflect on professional decisions while their sense of confidence and efficacy were low

3. Students found most affirming and helpful:
receiving feedback on how they're doing as learners

4. Students found most puzzling or confusing:
feeling that insufficient empathy is shown for their struggles as new professionals

5. Students found most surprising:
feeling strangely engaged by the uninvited burden of professional decision making

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

I've learned that I want to ask different questions, in order to more intentionally inquire into four quadrants characteristic of perspective transformation:

I. Cognitive dissonance of disorienting experiences
II. Critical reflection on assumptions that contribute to dissonance
III. Rational dialogue on alternative perspectives
IV. Directed action consonant with new understandings

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

I've learned that I want to ask the following questions via Wiki at midterm and the end of the semester:

1. What event(s) associated with this course have troubled your thinking or caused you cognitive distress?

2. What assumptions, beliefs, or perspectives about learning have you or others held that have contributed to this distress?

3. What other assumptions, beliefs, or perspectives about learning may suggest value in proceeding otherwise?

4. In what ways does what you think know affect and inform your choices and behavior?

(Glisczinski, 2007)

How are you using collaboration within your project?

In my project, I scaffold collaborative online reflective interaction between classmates via wiki software.

Additionally, I've consulted, read, and presented to peers regarding C.I.Q. content and wiki method.

How are you utilizing a scholarly approach to teaching within your project? (i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)

This project is informed by Transformative Learning Theory and the literature of critically reflective pedagogy including:

- Mezirow (2000)
- Parks-Daloz (1990)
- Kegan (2000)
- Brookfield (2000)
- Cranton (1994)

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: UMD

Faculty Member(s)/Instructor: Marshall Hampton

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research (e.g., Theatre History TH 3171): Primarily Math 3280 (Differential Equations and Linear Algebra); some impact on Math 3298, Math 5327, and Math 5233.

Course Description: *(Please provide the course overview that appears in course bulletins)*

MATH 3280 **- Differential Equations with Linear Algebra**
(4.0 cr; Prereq-A grade of at least C- in 1297 or 1597; A-F or Aud, fall, spring, summer, every year)

First, second, and higher order equations; series methods; Laplace transforms; systems; software; modeling applications; introduction to vectors; matrix algebra, eigenvalues.

Student Learning/Teaching Issue/Research Question:

Can projects and assignments which encourage self-reflection improve the understanding of mathematics? More specifically, can reflection upon the process of learning affect the depth of understanding of students in calculus and differential equations classes? And can group work during class increase reflection and understanding?
Another broad question I have: how we can increase reflection in a course without sacrificing content?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

The broad goal of my research is to improve the level of understanding of mathematics and its connection to applications in the courses I teach, with an emphasis on the courses Math 3298 (Calculus III) and Math 3280 (Differential Equations and Linear Algebra). My specific research question right now is: Can in-class group work which encourages self-reflection improve the understanding of mathematics?

Evaluation Plan:

Survey questions and reflective assignments will be my main evaluation methods. I will also use test questions and assignments that I have used before to help measure whether or not students are attaining a deeper understanding.

Summary of Outcomes:

The response of three classes of Math 3280 to my group assignments has been extremely positive, so I have increased my use of these. I have adjusted my assignments so that I am not sacrificing any content, although I am also doing less reflective assignments than initially. Overall I think my changes have been very successful.

In my latest iteration of this project, I succeeded in covering more content than I have ever been able to before. Until I grade the final exams I cannot be sure, but my impression is that my changes to the course have also resulted in better understanding of the material by the students.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

I have completed teaching Math 3280 using group worksheets in every meeting. I have also revised my computer labs somewhat to encourage more introspection. I revised and created many worksheets based on my previous experiences and from input from the other Bush grant faculty.

What successes have you experienced with your work/project?

My students had very positive responses to my in-class assignments, and I think it helped them learn the material. Class attendance is close to 100%. I have done enough revisions so that I can use about 1/3 of the class time on group worksheets without sacrificing any content – in fact I think when used well they let me increase the content. The students from several classes have indicated overwhelmingly that the use of worksheets is extremely helpful to them.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

I still need to work on getting small groups to function well. The Karl Smith visit helped with that but I still have some problems.
I have given up on some of my more reflective questions. They seemed to distract the students from the content. I think with more experience I can work in more reflection, but it needs to be closely tied to the content.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Because of their popularity, I started using my worksheets every day. I modify them heavily every semester based on student feedback.

How are you using collaboration within your project?

I am not directly collaborating with anyone, but I benefit a great deal from hearing about the experiences and ideas of other Bush faculty.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I have read several related texts to begin to learn how to better assess the outcomes of my project, and to get more ideas on improving my teaching for the course. Since I am in the early stages of this project, I have no immediate plans on publishing on article or presenting my work, but I expect to at least make a presentation on my project eventually.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3
Due: December 14, 2007

Campus: University of Minnesota Duluth

Faculty Member(s)/Instructor: Charlene Harkins

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 2; I had the assistance of a student to enter data

Course Impacted by Research (e.g., Theatre History TH 3171):

Course Description: *(Please provide the course overview that appears in course bulletins)*

Course Description:(3 credits; 3 hr lecture) A study of human nutrition with emphasis on the science of nutrition, the nature of nutrients, processing of nutrients in the body, and nutritional aspects of human physiology.

Liberal Education Requirements: This course meets Category 5: Physical & Biological Sciences without a lab

Student Learning/Teaching Issue/Research Question:

Does the use of a personal response system in a large lecture class increase student learning outcomes? Can the use of personal response systems accommodate different learning styles? Does the use of a personal response system increase instructor effectiveness?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Current study: to determine what particular tools help students in large lecture classes to learn the course material and be able to apply what they have learned. Does the use of a personal response system (clicker), online interactive practice questions, or TA study sessions help students? Which of these makes the biggest difference as evidenced by performance on exams?

Evaluation Plan:

Plant key questions/applications in classroom lectures using the PRS system. Plant other key questions/applications in online interactive format. Log students who choose to use TA study sessions. Determine which intervention (PRS, online interaction, or TA assistance) made the most difference in student outcomes as evidenced by scores on specific exam questions and the overall exam score.

Summary of Outcomes:

The data gathering and analysis involves two phases. The first phase has gathered data (for one exam) being entered into EXCEL. This data includes: student attendance at TA study sessions, use of an interactive study guide, participation in the classroom with a prs clicker, and performance on three key exam questions and the exam score. An attempt was made to try to help students perform at a higher level on Bloom's Taxonomy (i.e. analysis or application rather than at a lower level of simply knowledge). This phase of data entry was completed with the assistance of a student (paid through Bush Grant funds). The analysis of the data now needs to be completed.

The second phase was a survey that was administered to two large lecture Human Nutrition classes on Nov 1, the class period after the exam under study. This was reported in the Course Profile for 12/06 and presented to other Bush Grant Participants on March 8, 2007.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

I have attended three Bush Grant meetings of the whole.
Together with the other members of the Clicker group, I worked to present a workshop to UMD faculty on the use of clickers in the classroom: "Click Into Bloom: Realizing the Potential in SRS Systems," September 25, 2007.

What successes have you experienced with your work/project?

The most personally satisfying part of this project has been the opportunity to work with other faculty members across disciplines. It is been satisfying to work with other Bush Grant participants to make the use of clickers in the class room to have a real, measurable student learning outcomes. We worked to get away from the clickers as merely an attendance taking tool and move students into higher levels of thinking/reflection based on Bloom's taxonomy of learning.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

I had hoped that my involvement with the Bush Grant group would be recognized – or at least acknowledged by my department and college. Sadly, that is not the case. It is deemed as "not applicable" to my job or performance.

In one large lecture class of 360 students, the downside of the use of clickers was evident. Many students, who would not have other wise attended class, did because there were points attached to their participation. There was a great deal of disruption and inappropriate classroom behaviors during class lectures. I am hopeful that this experience is an isolated semester experience.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

My course is undergoing continual updating and revision. From the Large Lecture group last semester I gained many insights (and good advice) into classroom management policies and procedures.
Much of the initial student resistance to clickers that we experienced last year has subsided. This technology has become more accepted by the students. More students say that the use of clickers is helpful to learning. Complaints about the technology are much less (perhaps we as instructors have more of the answers to trouble shooting this technology).

How are you using collaboration within your project?

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus:

Faculty Member(s)/Instructor:

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171):

Course Description: *(Please provide the course overview that appears in course bulletins)*

TH 1001 - Introduction to Theatre Arts (Liberal Education Category 9)
(3.0 cr; A-F)

Appreciation of theatre arts. Developing sensitivity and critical sophistication as articulate, discriminating theatre-goers. Play viewing, play reading, critiques, and term projects.

Student Learning/Teaching Issue/Research Question:

What technology is available to help students better critique theatre production?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

This project researched methods of moving a large enrollment liberal education course from a lecture based course to a course where students are more active in their own learning experience.

Evaluation Plan:

Divide the course into four parts – none of which involve a traditional lecture.

1. Invite guests speakers to visit with the class and discuss their specific discipline as it relates to theatre production, including playwrights, directors, producers, actors, and designers.
2. Watch video clips of classic theatre productions as described in the textbook.
3. Create on-line small discussion groups that will discuss topics addressed in the textbook.
4. Create an on-line web log for students to critique plays they have seen.

Summary of Outcomes:

Students have responded well to the hybrid on-line course structure. While not as interactive as I would have liked, the on-line discussion forum seems to have enough structure to hold each student responsible for reading the textbook.

Students responded well to the play review blog. They enjoyed reading each others work and the writing quality steadily improved because they received timely responses from the instructor on how to improve their writing skills.

Students enjoyed the guest speakers.

Students, for the most part, appreciated the in class video clips that were shown.

At the midterm course assessment one student wrote:
"I am so thankful of how you have been running the class! It seems SO much less stressful to write blogs rather than papers or quizzes. Writing blogs proves our knowledge in the subject and allows us to apply it in many ways throughout the course and more often without the stress of trying to come up with one long research paper. I think it benefits both the professor and the students to do it this way! Also, as technology moves ahead it's good to know what you are doing and blogging helps with this as well. Blogging is also extremely convenient with my stressful schedule, as I'm sure all of ours are. I am able to blog easier and write my ideas down without the time crunch and there isn't the stress of having to sit down and type up a long paper."

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Creating the UMD Intro to Theatre Review Blog and integrating it into the course was the major task I undertook since I last reported.
<http://blog.lib.umn.edu/rlitwin/theatrereviews/>

What successes have you experienced with your work/project?

Students like the class even though it's a large enrollment course outside their major. The goal of the course was to develop these students' appreciation of the theatre, and the high level of enthusiasm in the course indicated that was happening.

I put more pressure on the students to post a photo of themselves on Web Crossing, the on-line small discussion group format. I think this made it possible for students to get to know each other a little better. I certainly appreciated seeing a face as I read through each post.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Deadline for blog entries was difficult to determine since students were seeing plays at different times of the semester. Having no deadlines, however, allowed students to procrastinate and blog at the last possible moment, which restricted their learning opportunities.

Students do not reply to other student's discussion posts as much as I would like. I'd like to find a way to motivate them to respond to one another without me having to award points for doing so.

I continue to search for quality up-to-date videos that reflect the same concepts as the textbook.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

I've determined that it will be necessary to develop deadlines for blog entries, perhaps one week after each production closes. Keeping track of these many deadlines will be a challenge, but one I feel I need to attempt.

How are you using collaboration within your project?

I so appreciate the guest speakers, faculty, students, and community professionals, who donate their time to speak to the class. This is by far the students' favorite aspect of the course, so I hope I can continue to rely on their generosity.

The UMD Intro to Theatre Review Blog would not have been possible without the help of UMD Fine Arts Librarian Rory Litwin. I very much appreciate his willingness to listen to the challenges I was facing with this course and propose methods of structuring the blog to best serve the class.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Whether it be written articles or public presentations, I am certainly willing to share my discoveries concerning the use of the UThink web site http://blog.lib.umn.edu/ to improve student writing skills. I'm afraid I've become a bit of an evangelist!

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

I believe there are many ways technology can help instructors teach students better writing skills in such a way to be more rewarding for the student and less time consuming for the instructor. Giving faculty who are exploring these different techniques the opportunity to share their experiences with others looking for technological alternatives to improve writing skills would be well worth supporting through continued research.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: University of Minnesota Duluth

Faculty Member(s)/Instructor: Nik R. Hassan

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research (e.g., Theatre History TH 3171): FMIS 2201 IT in Business

Course Description: *(Please provide the course overview that appears in course bulletins)*

Introduction to information technology (IT) concepts: computer hardware and software; use of personal productivity tools (spreadsheet, database, and presentation software); system development processes; Web technologies; applications of IT in business processes.

Student Learning/Teaching Issue/Research Question:

What qualifies as the perfect set of "IT skills?"
Minimum skills today will likely change tomorrow. How much IT skills should a nurse learn in order to function well in a healthcare environment?
Literate group is often those that are schooled. But many talented programmers and CEO are NOT schooled, or trained in IT skills. How can this be explained?
If IT skills can be so easily trained, why is it that adults (who are capable) have problems learning IT compared to kids (who are less capable)? How do you go about training Congress to better understand IT?
How can we measure such emerging IT literacy?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Emergent IT Literacy is better developed in people as they reconstruct the world through discourse with others in a computer-mediated environment rather than in formal training sessions.
Specific research question: Will the group that interact through discourse with others more in a computer-mediated environment perform better with technology than the group trained in computers but do not interact with others as much?

Teaching intervention: Group students into groups of 2-3 and encourage these groups to learn technology by closely with each other.

Evaluation Plan:

Students are evaluated using individual homework grades, individual test grades and extra credit for undertaking an assignment requiring skills beyond what is taught in class. This evaluation is done to test the ability of the students not only to reproduce what they learned in class but to transfer existing knowledge and skills into unfamiliar technological challenges.

Summary of Outcomes:

The students that interacted in groups performed better than the students that did not interact as much as they learned the technology.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you completed during the Bush Grant.

Presented the research at the Bush group meeting
Discussed with Bush group on how to resolve problems with research methods
Collected and analyzed the data
Wrote up paper about the research and submitted to the SIGED IAIM 2007 (Special Interest Group in Education—International Academy for Information Management) workshop in Montreal Canada, held jointly with the International Conference for Information Systems (ICIS), December 2007.
Paper was accepted

What successes did you experience with your work/project?

Getting the paper accepted for the SIG-ED AIAM workshop/ICIS Conference 2007
The general performance of the students have improved
An assessment performed by the Labovitz School of Business and Economics undergraduate committee, comparing the students in different sections of FMIS 2201 IT in Business course, showed my students performed better than the other sections.

What challenges did you encounter with your research or implementation? (Consider activities or events that did not work as well as you had hoped or expected.)

1. Creating groups raises ethical issues (how do you decide which students receive intervention that is likely to improve their grades). This is partly resolved by offering extra credit for those who want to participate in the experiment. But the spillover effects of the intervention into individual tests could not be controlled.
2. Very difficult to isolate the effects of the intervention from other spurious variables. This was partly resolved by using different measures of interaction and by cross-checking the groups to make sure the students were correctly categorized.

What project adjustments did you have to make based on the data analysis, student reactions, feedback from consultants, etc.?

Many project adjustments:

1. When students knew that they could potentially lose points if they were placed in the control group, I had to assure them that (a) the extra credit is voluntary, (b) that any grade given to homework related to the experiment will only be used as data for the experiment and will not be included as their formal grade.
2. For future projects, I needed to make sure that the categorization is carried out with more rigor.
3. Students liked the idea that they can work on assignments and quizzes together. So in the middle of the class, as they are taking a pop quiz, I asked them to discuss with a student sitting next to them about the quiz. Both of them would discuss and agree on a response. This intervention improved student interaction and learning.

How did you use collaboration within your project?

As students are taking a pop quiz, I asked them to discuss with a student sitting next to them about the quiz. Both of them would discuss and agree on a response. This intervention improved student interaction and learning.

When students take home assignments and problems they are encourage to sit down together and discuss the assignment, but to complete the assignment individually.

How did you utilize a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I will be presenting on the research at a Bush group meeting in October.
Performed an experiment, collected and analyzed the data
Wrote up paper about the research and submitted to the SIGED IAIM 2007 (Special Interest Group in Education—International Academy for Information Management) workshop in Montreal Canada, held jointly with the International Conference for Information Systems (ICIS), December 2007.
Paper was accepted and will be presented at this conference/workshop.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

I would encourage the following:

1. Making available tutorials/training in research methods, specifically qualitative research methods.
2. Making the process more structured to motivate faculty.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3 – December 2007.

Campus: UMD

Faculty Member(s)/Instructor: Helen Mongan-Rallis

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Input received from Lynn Bye and Shelly Smith on EdSe 4100 project.

Course Impacted by Research: SW 8331, EdSe 4100

Course Description: *(Please provide the course overview that appears in course bulletins)*

1. Social Work 8331 – Organization and Community Practice 2 (section 1 & 2) (continuation of last year's project)
2. EdSe 4100 – Human Relations in the Classroom: Examination of cultural differences and the systematic effects they have on education; designing learning environments and planning instruction to accommodate individual differences in race, ethnic, cultural and socioeconomic background, gender, sexual orientation, religion, and physical and mental development; needs of persons with disabilities; humanizing classroom and classroom management procedures.

Student Learning/Teaching Issue/Research Question:

In this course I am having students engage in reflective practice by:

1) having them use online asynchronous discussion forum (in Moodle) to engage in reflective posts and discussions that connect their classroom learning, readings for the course, and practicum experiences.
2) Students will then self-evaluate (a) their own posts to identify the effectiveness of their reflection (using a rubric) (b) the effectiveness of the learning strategies that they are using in the course, identifying what they can do to direct and improve their own learning

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

1) use of pre-survey in which students self-evaluated their beginning competence in course objectives
2) students analyze their written contributions in course web forum discussions (using detailed guidelines).
3) I will analyze both students' forum posts and their self-evaluations (qualitative analysis – seeking themes)
4) Post-survey – students self-evaluation exit competence

Evaluation Plan:

1) Comparison of pre and post surveys
2) From analysis of student online work, identify strategies that students used that enabled them to become more reflective
3) From analysis of student self-evaluation, identify effective and ineffective strategies that students have used in self-monitoring.

Summary of Outcomes:

For Online group:

- Lynn Bye, Shelley Smith and I have completed the article that we have been writing on the results of our study, and are in the process of final editing. Our plan is to submit the article to a journal before the start of the spring 2008 semester.

For my study of my Human Relations classes:

- I have not completed the analysis yet, but I have the data gathered and my initial analysis shows a significant improvement in student self-ratings between the pre-and post-surveys.
- My initial analysis of student reflections in their self-evaluations at the mid-point and the end shows a depth of reflection and quality of self-reflection that I have not seen in previous courses that I have taught. I am very excited about doing further analysis on these data!

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

For Online group:

- Lynn Bye, Shelley Smith and I have completed the article that we have been writing on the results of our study, and are in the process of final editing. Our plan is to submit the article to a journal before the start of the spring 2008 semester.

For my study of my Human Relations classes:

- At the start of the course I had students complete a pre-assessment of their level of competence on our course objectives prior to taking the course. At the end of the semester I had them complete this same assessment, as a post-assessment, to examine the changes in their self-rating. At this time I have not analyzed these data in detail, but my initial reading through of the surveys and students' self-analysis of their improvement this semester seems to indicate a significant improvement.
- At the mid-point of the course I had students complete a very detailed reflective self-analysis in which they (a) reviewed their work (not just written, but also class participation and work at their practicum sites) to date and (b) identified what they needed to develop further and improve during the rest of the semester.
- At the end of the semester students again reviewed their work, looking back at what they had planned to do to improve, and reflecting both on this improvement and on what they had accomplished during the semester. I have just received these evaluations so have not yet analyzed them systematically.

What successes have you experienced with your work/project?

This project has been immensely rewarding and exciting for me, as I feel as if everything I have been learning throughout the Bush Grant really started to come together for me. I was able to take what I had learned from my work in past semesters and from hearing from other Bush participants, and apply key aspects of this in this new course that I taught this semester. I have been more intentional than ever before about pushing my students (and myself) to engage in self-reflection about their work. This influenced my design of the course, my methods of instruction, and my methods of assessment.

Although I do not know if this is directly a result of my new approaches, the students in my two Human Relations classes have surpassed my expectations in the depth and quality of their reflections. It may have been that they already came into the course already being deeply reflective (so I cannot attribute the depth of their reflection necessarily to what I did). However, the methods that I used required them to demonstrate their ability to self-reflect.

Using Moodle as a course management system has been a tremendous success, both in terms of its power as a teaching and learning tool, and because of the Moodle activities summary that provided both the students and myself with a detailed report of every aspect of student work within the course. Every time a student accessed any of the pages, resources, and activities within Moodle, this was recorded and showed in a

summary, providing data on when and how often the student used these. In addition, each student's report included the text of anything that they posted or submitted within Moodle, enabling the student and me to view in one place all of their work. I had the students analyze their own reports as part of completing their reflective self-analysis (at mid-point and at the end of the course).

Another success has been that I have been able to draw on the input from our online research group (Lynn Bye, Shelley Smith, and myself) and use their input and suggestions in guiding my study; additionally we plan to continue my Human Relations project with them working with me to analyze my findings.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

- As I have noted in my earlier course profile log, I have really missed meeting with the whole Bush group, as those meetings have been especially helpful in guiding my thinking (unfortunately I could make the morning meetings this semester because of having to take our daughter to school).
- I experienced typical "teething problems" in learning to use Moodle, but none of these was anything long lasting, and I was able to become proficient in using the system fairly quickly.
- One issue with Moodle that I have yet to resolve is the accuracy of the Moodle activity reports. I have had a few (but not many) students report that they thought that this was not accurate in recording if the accessed a resource (they said they had accessed some online readings but Moodle showed that they had not). I still have to look into this with the Moodle support people.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

As noted in my earlier report, I was engaged in a new project this semester, so much of what I was doing was in applying what I had learned from earlier semesters in different projects, rather than making adjustments to this project. This use of Moodle as a course management system and some of the other methods that I have used in teaching and designing my course have been influenced by past Bush group experiences.

How are you using collaboration within your project?

For the Social Work project, I collaborated with Lynn Bye and Shelley Smith (but no progress on this project yet this semester). I also shared m Human Relation project with them, drawing on their ideas and feedback to guide what I was doing. We also plan to continue the work I have done on the Human Relations project, analyzing my data together with the intention of writing this up for publication. Additionally, we plan to begin a new study either next semester of in the Fall 2008.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

- Lynn Bye, Shelley Smith and I have written an article based on our work in the Online Group.
- I have shared with my colleagues in my department and my Online Teaching and Learning class the work that I have been doing with Human Relations students on engaging in self-reflection as well as in using Moodle.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: University of Minnesota Duluth

Faculty Member(s)/Instructor: Steven J Holtz

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research (e.g., Theatre History TH 3171):

- Solving Problems with Computers : CS 1301

Course Description: *(Please provide the course overview that appears in course bulletins)*

Introduces skills used to solve problems with computers. Students learn fundamental computer programming skills through a variety of possible contemporary applications, including creating dynamic web pages, programming robots, and/or animating 3D computer graphics, and games. For students with no prior programming experience.

Student Learning/Teaching Issue/Research Question:

I will make use of ConcepTests (as developed by Eric Mazur) and clickers in the lecture setting to engage collaborative enhancement of the understanding of conceptual material through peer instruction. I will also present students with the Felder and Soloman *Index of Learning Styles* survey to examine how different approaches in lecture might affect students with different learning style propensities. I am also using a 'pair programming' technique in the lab sections, making them very collaborative.

How do interactive/reflective lecturing techniques affect students with different learning styles?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Felder and Soloman *Index of Learning Styles* survey – presented to students at the beginning of the term.

Clickers (ConcepTest, peer instruction) – Approach: I lecture on a conceptual topic for 10 to 15 minutes. Then a multiple-choice question is posed to students using the TurningPoint extension to Microsoft PowerPoint. Students must respond to this question on the own. After all responses have been collected, students are asked to turn to their immediate neighbors and discuss their answers. After a few minutes of interaction, the exact same question is posed a second time. In this way, peer instruction occurs between the two presentations of the question. And I have data to assess to indicate how effective the interactive portion was in increasing student understanding.

TurningPoint also gives immediate feedback to me on how well students understand the concepts just presented. With this feedback, I can alter (and often have altered) the following lecture material.

Pair Programming (collaborative small-team work during lab).

Evaluation Plan:

Data collected for both Fall and Spring 2007 terms. Have yet to find time to evaluate data from either term. If all goes well, I should have some results generated during the mid-winter break.

I plan to use a spreadsheet to collate all data and generate charts that show important relationships.

Summary of Outcomes:

Student survey data has revealed that the Spring 2007 cohort was relatively well balanced across the Active/Reflective, Sensing/Intuitive, and Sequential/Global scales of the Felder/Soloman *Index of Learning Styles* survey. On the Visual/Verbal scale, they were skewed toward the Visual end of the scale (I feel that this would probably be true with the majority of our cohorts today). The Fall 2007 cohort is very similar.

The use of clickers during lecture (and the extra credit that is available from participating with them) has dramatically increased attendance levels. While this is not directly part of my study, I believe that regularly attending lecture will benefit the majority of students. I will include this in my analysis.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you completed during the Bush Grant.

I have conducted the Felder and Soloman *Index of Learning Styles* survey. I have accumulated results and distributed them to students with a description of what those results mean and how students might alter their study patterns to best support their learning style (thus helping students become more reflective and self-regulated). This has been done both Fall and Spring 2007 terms.

ConcepTests are being refined (and in many cases freshly developed) and delivered via Student Response System clickers during lecture. Data is accumulating. I have 64 pairs of questions from Spring 2007 term ready to analyze. Some rudimentary analysis has been performed, but data from the learning style surveys has not been keyed to ConcepTest data.

I have created pairings of students to collaborate on programming solutions to their assignments. I have presented rules of conduct and positive/negative examples of conduct to students. Students have recently been required to switch to a new programming partner so that they are exposed to the coding and thinking styles of multiple students. During the term, they will have experience working with several programming partners.

What successes did you experience with your work/project?

Initial analysis of the data generated by clickers Spring 2007 term reveals that the ConcepTests have shown an improvement in student understanding of the concepts presented on over 70% of the ConcepTests presented. Whether or not students have improved, the ConcepTest has presented an excellent opportunity to get students to explain their understanding to one another; and to get immediate feedback from students on how well a concept just covered has been understood. This is a powerful technique for obtaining immediate, meaningful feedback from students on a relatively small amount of material. Then engaging students in a collaborative, interactive technique for making immediate corrections in understanding.

The interactive nature of the ConcepTest has resulted in fewer students zoning out during lecture and attendance has remained very high.

Learning Styles inventory indicated that this cohort is visually oriented (on other scales this group falls near the middle of the range). We are working with animation tools, – very visual – so I have been able to take advantage of this.

What challenges did you encounter with your research or implementation? (Consider activities or events that did not work as well as you had hoped or expected.)

My primary challenge remains finding time to implement things as well as I would like to. I have found that low-level classes that have very general content are more difficult to produce good ConcepTests for.

I have still found no time to correlate and integrate the student's learning styles into meaningful information. I hope to find time to generate this information during mid-winter break.

What project adjustments did you have to make based on the data analysis, student reactions, feedback from consultants, etc.?

I continue to work to present as much material as possible in a visual way to support the learning styles of the majority of my students.

I have adjusted content in my lectures (on the fly) based on students not understanding a concept just covered in lecture. ConcepTests are great for this.

Overall, the use of clickers has been well received by students. Student reaction has generally been positive and has not prompted any major changes.

How did you use collaboration within your project?

Peer instruction during lecture, as described above.

Pair programming during labs.

How did you utilize a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Attended both of Karl Smith's workshops.

I have read:
Peer Instruction: A User's Manual
Strategies for Energizing Large Classes
Pair Programming Improves Student Retention, Confidence, and Program Quality
Cooperative Learning Techniques in CS1
Closed Laboratories with Embedded Instructional Research Design for CS1
Combining Cooperative Learning and Peer Instruction in Introductory Computer Science
Peer Instruction: Engaging Students One-on-One, All At Once
Scholarship of Teaching and Learning
Along with several documents from the Web.

I co-presented:
Clicking into Bloom
At the *Academy of Distinguished Teachers Conference*

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3, December 2007

Campus: Duluth

Faculty Member(s)/Instructor: Jill D. Jenson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Three more Graduate Instructors observed the course but were not actively involved in the study. They did, however, use the reflection sheets used for the study in their own courses (each teaches one section of Comp 1120). Therefore, in addition to my using the surveys in one course each fall semester, a total of 11 Graduate Instructors have also used the surveys over the past three years.

Course Impacted by Research (e.g., Theatre History TH 3171): Composition Comp 1120: College Writing (i.e., freshman comp)

Course Description: *(Please provide the course overview that appears in course bulletins)*

Instruction and practice in writing argumentative prose for academic situations with integrated computer lab. Emphasis on academic research, documentation, and the writing process.

Student Learning/Teaching Issue/Research Question:

The issue I am studying is how to help students reflect more intentionally and more thoughtfully on what they learned, particularly in terms of writing reflection statements to accompany work uploaded into their electronic portfolios. My research seeks to answer these questions:

1. Will students write longer reflection statements regarding their work for Comp 1120 after answering straight-forward survey questions about their writing process than students who did not respond to such surveys?
2. Will students recognize ways in which they could alter the writing process they chose to use in order to improve the future products they produce?
3. Will students' reflection statements make connections between the writing they do for the first-year writing course and the writing they anticipate doing or are doing in other college courses by referring to specific lessons learned in completing a particular assignment?
4. Will students' reflection statements make connections between the writing they do for a first-year writing course and the writing they may do beyond college by referring to specific lessons learned in completing a particular assignment?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

At several points during the semester, students are filling out a survey after writing a paper but prior to getting it returned with a grade on it. They answer questions such as these: What was the most important goal you had for this assignment? In preparing to write this paper, how much of the assigned reading did you do? How did you approach completing the draft you brought for peer review? They also complete questions that deal with the extent to which they revised the paper, the extent to which they had been reading the teacher's as well as a peer's comments on the paper, the effort put into getting questions answered prior to submitting the paper, and the number of points (i.e., the grade) they predicted they would get on the paper. After they receive the graded papers, they are asked to write about what they learned in terms of the assigned material, what they learned about the process they each used to compete the assignment, and what they might keep or change in that process when completing future writing assignments. These surveys and response writings were then used to prompt students during the class period in which they uploaded assignments into their electronic portfolios and wrote reflection statements for them.

Evaluation Plan:

My plan for evaluating the project is to analyze the reflection statements (as typed into the portfolio) of the group of students who completed the survey instruments, comparing them with reflection statements written by students prior to the time the surveys were used. I plan to do a qualitative assessment of the content of the comments as well as a quantitative assessment of the length of the statements. Although I had planned to analyze the reflection comments that were handwritten on the back of the survey instrument after the assignment was graded and returned to them as well as the final reflection statements written in the portfolios (to determine the number of references made that were connected to learning occurring in other courses and learning that may be connected to life beyond the university), I have found that unnecessary. The reasons why are further explained below. I have now analyzed reflection statements written Fall semester 2005 as well as Fall semester 2006. Although data has been collected for fall 2007, I have not yet decided whether to include it as part of the study. At some point I need to stop collecting data and write the article for publication. I am confident I have enough data to do that without adding any from yet another semester.

Summary of Outcomes:

Example: Student survey data revealed . . .

At this point I have conducted a quite thorough analysis of the data. The analysis appears to show that:

- Most students (75% to 85%) over estimate the grade they believe they will receive on any given assignment by, on average, a full letter grade.
- Over 60% of students believe they revise their papers "thoroughly" and half to three-fourths say they pay a "great deal" of attention their peer reviewers' as well as my comments on their papers.
- The number of students who reported having questions they needed to have answered outside of class fluctuated, from 21% to 29% at the beginning of the semester to nearly two-thirds at the mid-point to 45% to 60% at the end; however, they consistently reported that the place they most commonly seek answers to their questions is from their classmates (one-half to two-thirds go to a

peer for answers).

- Students' survey statements often identified problems in their writing process as well as steps they could take to correct these problems. This heightened level of awareness was also reflected in their electronic portfolios.
- The average length of end-of-the-semester portfolio reflection statements increased from an average of 3 words per student in 2001 to 125.5 in 2006 (over a 4,000% increase).
- Prior to the time in-class surveys were used to promote reflection, fewer than 15% of the students' portfolio reflection statements even mentioned learning outcomes, and none included discussion of the following concepts, which were mentioned at the following levels of frequency after surveys were used: over 40% discussed learning outcomes, 53% to 80% discussed self-regulation techniques; over 40% discussed how the class was tied to other courses; and nearly 40% tied this class to life beyond the college classroom. All of these outcomes indicate that goals of the project are being met to a certain degree.
- The comparison between reflection statements written prior to the time that the surveys were used and those written after that time show that the later statements are greatly improved, both in length of the statements and in ideas presented (as noted above).

Reflection Log/Status: (To be updated at a minimum bi-monthly)
Reflection for December 14, 2007

Describe the activities/work you have completed since the last time you reported.

Since the last reporting, I have made significant progress on data analysis. After learning about the qualitative software NVivo last spring, I did more research to determine the value of the software for my particular project. In the end, I decided that the software would not work well for my analysis because my project involves more than simply looking for particular terms (which is what the software does). Having determined that, I decided to devise a coding technique for the portfolio reflections. Six codes were needed to cover the array of statement types the students wrote and to respond to my research questions. I then electronically captured all of the students' reflection statements from their electronic portfolios for the three papers for which surveys had been completed in class. Once collected, the statements were coded by hand. In addition, I did electronic word counts on all of the statements to determine the quantitative increase in what the students wrote before and after using the in-class surveys. This process was quite time consuming, but yielded excellent results (as noted above in the findings section). This fall, I have attended as many of the regularly scheduled meetings as possible, having had to miss two due to other commitments. I also attended the two November workshops on the scholarship of teaching and learning presented by Toru Iiyoshi, director of the Knowledge Media Laboratory at the Carnegie Foundation. His presentation on the KEEP Toolkit was especially helpful.

What successes have you experienced with your work/project?

The biggest success I have experienced since the last reporting period is the tremendous progress made in data analysis. I was quite amazed at the vast differences in the students' work before and after the research methodology was applied. In addition, it was exciting to see all of the attendance at meetings, small groups, presentations, and workshops finally pay off. I am now especially eager to finish writing the draft of the article because I truly believe I have something important to share with the greater academic community. Although I was not able to complete the draft this summer as originally planned, I still made excellent progress on the project.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Currently, the largest challenge is finding time to write. My teaching, service, and administrative duties are greater than ever this semester, so time for writing is nearly nonexistent. To this point the group meetings have kept me going. As I said last spring, I appreciate the chance to discuss my project with others; at the same time, it's a bit frustrating that there's not time to delve into the project with one other person who understands it in order to have deeper discussions on the many issues that arise: data analysis, journal selection, level of detail, audience analysis, etc. Therefore, I have initiated one-on-one conversations with other Bush group members on these issues. For all these reasons, I am sad to see the formal Bush cohort end, now that the funding period is complete.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

As indicated earlier, based on some of the presentations we have had in the large group meetings, I reconsidered the measures I planned to use in data analysis. Having members of the science disciplines that are so quantitative in their analysis be part of the group has challenged me to be more quantitative as well. While that increased my interest in using the qualitative software, which, in essence, quantifies qualitative date, the fact that the software did not ultimately prove useful was not a problem. In fact, contemplating how and whether to use it led to the breakthrough I needed to devise a way to do the data analysis. This led to being able to provide quantitative date to support my qualitative research. Having this sort of evidence has increased my confidence that I have a significant contribution to make in regard to students' self-regulation and reflection.

How are you using collaboration within your project?

As noted above, the cohort meetings continued to be valuable. As I get closer to completing a draft of my article, I hope to have a small number of the group read the draft and offer feedback. Last summer I met with one member of the group to discuss how I was analyzing data and that proved to be very helpful, which is why I have continued having similar discussions. At the same time, the writing process can be a very solitary experience, so keeping engaged with other members of the group even after we have quit meeting as an "official" cohort will be especially helpful.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

While I would consider doing additional conference presentations based on the newly completed data analysis, my main scholarly activity for the foreseeable future has to be writing. At the same time, I continue to read materials shared in the group and continue to do research related to my article. Locating an appropriate journal for manuscript submission is also something I'm working on. A colleague from the Bush cohort is helping with that as well.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: UMD

Faculty Member(s)/Instructor: Joseph Johnson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research (e.g., Theatre History TH 3171): Chem 4351/Phar 6151

Course Description: *(Please provide the course overview that appears in course bulletins)*

Biochemistry - Introduction to structural classes of biologically relevant molecules. Descriptions of monomeric small molecules and their incorporation into macromolecules. Covers amino acids, proteins, fatty acids, lipids, sterols, carbohydrates, nucleic acids, RNA, and DNA structures.

Student Learning/Teaching Issue/Research Question:

I am addressing multiple issues in my research. My major focus is the use of personal response systems ("Clickers") to evaluate the comprehension of the students during lecture. The second issue is to help the students develop critical thinking abilities and to critically assess their own understanding and take responsibility for areas of deficiency.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

As I taught this semester, I focused on issues related to the personal response systems. Specifically, what type of questions will best probe the students' understanding and impel them to evaluate their own proficiencies and deficiencies. In order to accomplish this, I wrote clicker questions that required higher level critical thinking as measured by Bloom's revised taxonomy.

Evaluation Plan:

The subset of the Bush group working with the personal response systems (clickers) prepared a presented one additional workshop at the beginning of this semester in relation to our work. This was sponsored by IDS and was similar to the ones presented in the spring at UMD sponsored by the Instructional Development Service (IDS) and another workshop at the *Enhancing Student Learning: Conversations about Research and Teaching* conference at the University of Minnesota Twin Cities campus. All three workshops focused on the value of using clickers in a lecture-type format, but more importantly we emphasized the need and value of asking questions that get to the higher levels of Bloom's revised taxonomy. Our group presented personal examples of questions that get to higher levels of Bloom's revised taxonomy, which was followed by a hands-on session by the participants. We also presented tips for effective use of clickers.

Summary of Outcomes:

Both workshops in the spring were very successful and valuable as evaluated by the participants. The workshop offer this semester had poor attendance and so its broader impact was minimal. I also personally presented a similar type of presentation to the College of Pharmacy Faculty on the UMD campus in addition to the Twin Cities campus via ITV. Richard Brown, who is in the UMTC College of Pharmacy Office of Educational Development, requested that I present a brown bag luncheon to both campuses. The College of Pharmacy is planning on using the clickers and ITV in tandem utilizing a new software package that is currently in the beta testing phase. The reviews that I received after the seminar from the 40 or so that attended were very positive, and should have an immediate impact on the use, and hopefully thoughtful use, of the clickers.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

The workshop offer this semester had poor attendance and so its broader impact was minimal. I also personally presented a similar type of presentation to the College of Pharmacy Faculty on the UMD campus in addition to the Twin Cities campus via ITV. Richard Brown, who is in the UMTC College of Pharmacy Office of Educational Development requested that I present a brown bag luncheon to both campuses. The College of Pharmacy is planning on using the clickers and ITV in tandem utilizing a new software package/feature that is currently in the beta testing phase. The reviews that I received after the seminar were very positive, and should have an immediate impact on the use and hopefully thoughtful use of the clickers.

What successes have you experienced with your work/project?

Opportunity to present two more workshops (for a total of four) one at UMD (4 people enrolled, 2 showed up) and the other at UM-TC and UMD simultaneously via ITV (approximately 40 people attended, about 12-15 from UMD and about 25-28 from UMTC via ITV).

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

My greatest challenge has been to find a quantitative way to effectively evaluate the effect of the clickers on critical thinking. My questions and use of the clickers has improved, but I still do not have an effective means to evaluate their impact. Trying to gauge their value by asking the students when there is a grade at stake has seemed to bias the results.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

The quality of the clicker questions that I ask continue to improve. This improvement relates not only to the quality of the questions, but also towards making a conscious choice about the level of each question (according to Bloom's revised taxonomy) and the desired goal or outcome of asking the clicker question.

How are you using collaboration within your project?

I am collaborating heavily with the clickers subgroup, which includes faculty from IDS, Mathematics, Health, ITSS, and Computer Science.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We are using the well-established Bloom's revised taxonomy to understand the level of the questions we ask relative to what we had intended.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3
Due: December 14, 2007

Campus: University of Minnesota - Duluth

Faculty Member(s)/Instructor: Olaf Kuhlke

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1 (Principle Investigator – Olaf Kuhlke)

Course Impacted by Research: GEOG 5612 Field Techniques

Course Description: *(Please provide the course overview that appears in course bulletins)*

This course is a required part of the curriculum for geography majors, and prepares students to conduct their own I research project in geography, or the application of geographic information systems. The course addresses the following steps of conducting a research project.

1. SELECTING A TOPIC. Defining a geographic problem. What is geography and what is a geographic problem? What are the different approaches to science and scientific methods that can help me solve this problem in an appropriate fashion?

2. LITERATURE REVIEW. Assessing past research related to my research problem. Has my research problem been addressed before? How can I find materials related to my research interests? How do I conduct a literature review? How do I develop a detailed problem statement based on my literature review?

3. FIELD METHODS. What methods can/should I use to solve a geographic problem? Which method is most appropriate/feasible to solve my problem? Where do I find my data? How do I collect, analyze and organize it? What possible obstacles might slow down or even stop my field research.

4. RESEARCH PRESENTATION. How do I write up and present my findings? Writing techniques, presentation techniques, software use, and copyright issues. How do I present my findings in an organized fashion? What are the components of a research paper? Ho do I present my own research in a public setting? What software is available for the preparation of a presentation?

Throughout the course, students work on preparing a literature review, learn about numerous field techniques in both human and physical geography, conduct their own research, and write a final project report.

Student Learning/Teaching Issue/Research Question:

My first principle concern that led me to apply for this grant is the apparent difficulty of students to come up with their own independent, creative and original research projects in my GEOG 5612 Field Techniques class. This course is typically one of the last that geography majors take during their time at UMD, and I have been surprised by the lack of ideas and concern for originality in student's research projects, which I attribute to their lack of motivation and inexperience with reflective thinking. My observations are in line with other geography faculty members, who consistently argue that research projects conducted by geography student in their senior projects fall short of departmental expectations.

In Spring and Fall semester of 2007, I spent several weeks in class on exercises to help students with their research creativity and originality. I believe that the Bush Grant workshop helped me find better strategies for student involvement, independent thinking, and reflective and motivated learning. I learned more about how I can tailor and change my teaching strategies in this course to the variety of skill levels and experience that students display, to help them explore their own research interests.

My second concern was to improve the opportunities in this class for shaping a student group that is more self-motivated and reflective. While this course is based on individual assignments, and group work time is included (especially on a mandatory field trip), I developed strategies that help students to be more productive in group work and to use this time effectively. I developed more interactive, role-play based assignments based on real-world scenarios and research topics, to help students recognize the relevance of the projects that they will develop on their own.

Most importantly, I set a high goal for my students: This cohort was to conduct original, filed-based research in Ely, MN, and as a final product, they were to create a book manuscript that could either be published online or sent to a professional publisher for review. My goal was to assess how students would respond to such an ambitious goal, and how far they could actually take the project.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

First, I developed an introductory survey that assessed how prepared students are for doing scientific research and how well they understand the scientific method. In order for me to successfully tailor my exercises to a reasonable level of expectation in this class, and in order to respond to various skill levels among students, I need to know exactly how prepared they are when they start this class. Especially, it is important for me to find out how much knowledge of the scientific method they have at the beginning, and how their experience with research techniques evolves throughout the class. A detailed student survey would assist me with this. The survey questions have been developed in the Spring semester of 2007, and will be given to a cohort of students taking this class in the Fall semester of 2007. Throughout the remainder of 2007, these surveys were analyzed and used to evaluate student preparation for applying the scientific method to a geographic problem.

Second, during Spring semester 2007, I tested interactive scenarios in which students develop their own ideas, and created their own structured research project. I have asked students to keep a group log in which they enter their progress, discuss their problems in

designing research, and where they critically reflect on what they learn from each other and from me. The group logs were collected by the end of the semester, and subjected to content analysis. From the Spring semester 2007 class, I have now collected their final research projects, their individual reflections on doing research in a group, and all of their field notes. These will be analyzed using qualitative methods, particularly content analysis, and used to identify how and where students struggle with progressing in research projects. I again repeated this process with the Fall 2007 cohort.

Third, I have monitored my own responses, reactions and adaptations to student learning that occurs in the classroom. I recorded (with digital voice recording equipment I have available already) regular, weekly, notes on the class that I will transcribe to help me see my own thought process. Especially, I was interested in figuring out what types of exercises and student-faculty interaction are particularly effective in helping them understand proper scientific research.

Evaluation Plan:

The evaluation of successful efforts in this project will develop in two forms: First, I will use the student's notes on their own progress, and these will allow me to see their thought processes develop. Second, and probably most important, is that students who take GEOG 5612 will eventually complete a senior project in the geography department, and I should see significant improvements in the quality of these projects. The senior project presentation is the final course that students complete before they leave our department, and it is also an assessment tool for the geography department to evaluate our overall efforts to prepare them for their life as professional geographers. Senior project presentations are evaluated by all faculty members in the department in a standardized form with both qualitative and quantitative measures, and these forms will be available to me. Successive groups of students who take my class and then prepare their senior project could be compared this way, to see if the course has made a significant impact on the quality of student's work. While these are decisively qualitative approaches to student assessment, I am open to learning more about and potentially integrating other, more quantitative measurement of student success.

Summary of Outcomes:

This project will help me in redesigning the GEOG 5612 capstone course, to assist students in becoming independent researchers who are confident in their ability to come up with and design their own research project.

After a year of analyzing data and observing students, I have decided to completely revamp the course, and officer it as a 5-credit, year-long, two-semester class that will allow students to follow through with a research project.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Over the Fall semester, I have collected student narratives on their progress and their reflections on a group research project that they are designing in class. I have kept a log of my own reflections and notes to record how I have reacted to my student's work, and how I evaluate their progress. I continued this until the end of the semester, and will now conduct a content analysis of this data over the summer months, to determine what concerns and ideas students voiced most often when creating and conducting their own research.

Furthermore, I now have in hand the final research papers that five groups of students completed. The second cohort of Fall 2007 revised, added to and completed the original research project by collecting additional field data in Ely, MN, and they finished off the original project, now to be edited into a book. Several students have volunteered to spend the next semester assisting me in doing the final editing for a book proposal.

What successes have you experienced with your work/project?

This semester, students have again been very receptive of the group research projects and of tracking and evaluating their own progress. They were very eager to write (which surprised me), and like to be asked to reflect on their experience. My students were able to take the original group research projects, immerse themselves in the project, and independently establish their own fieldwork sites in Ely, MN. At the field site, students utilized a number of the research techniques that they had been learning in class, and successfully completed all their research in four days. Following the trip, students spent the rest of the semester reworking, adding to and completing what are now 30-page research papers that included their fieldwork results. These papers were all of high quality, and will be part of a book manuscript for a professional academic press, entitled: "Northland Geographies: Nature, Economy and Society in Ely, MN". The publishers they chose to pursue for a book contract are The Edwin Mellen Press and Ashgate Publishers. The enthusiasm and dedication of this group of students has exceeded all of my expectations, and I am happy that the project was successfully completed.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

The biggest challenge that I have seen is that students, like in previous years, have very little creativity and imagination when it comes to designing their own research. They seem to be struggling with what a geographic research question is, and how to define the boundaries and the breadth of their own discipline. However, this year's group successfully overcame the initial challenges, and the positive group dynamics fostered their cooperation in the project. I am very happy to see that the initial challenges to come up with a group project were mastered by the students, and successfully led to a completion of the project.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

In contrast to previous years, the Spring semester and the success that came with the group projects has encouraged me to continue group project work for the next semester, to see if another group of students may be just as successful in developing viable research projects on their own.

Students in the Fall semester of 2007 took up the original projects, kept a diary of their research progress, and were required to make regular entries. I found the reflection paper that I used in the spring to be very useful in getting students to commit to a research project, and the Fall 007 cohort did these assignments on a regular basis.

Overall, the major adjustment for the Fall 2007 semester consisted in providing the students with an already existing research project, and challenging them to critique and expand on the previously conducted work.

How are you using collaboration within your project?

Up to this point, I have been doing all of the research myself. Throughout the summer of 2007, four students assisted me voluntarily in reviewing the course material. I met with these students on a regular basis, and we talked about the completion the project in the Fall 2007 semester.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

The culmination of this project, at this point, will be completion of the book manuscript mentioned above. As the general editor of this volume, I will provide an introductory chapter that introduces the original goals of my field techniques class, describes the student's work schedule, their cooperative efforts, and introduces the reader to the individual papers. My contribution to this volume will very much be a reflection on my experience in a classroom that – at least this semester – created highly successful reflexive learners among my students.

In Spring 2008, I plan to submit a paper on the experiences in this classroom and with this grant opportunity to the annual conference of the National Council of Geographic Education (NCGE).

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Amanda Little

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 2

Course Impacted by Research (e.g., Theatre History TH 3171): Biology and Society Biol 1001

Course Description: *(Please provide the course overview that appears in course bulletins)*

Contemporary issues in biology.

Student Learning/Teaching Issue/Research Question:

I am investigating whether using team-based learning (TBL) in a large lecture, non-majors biology class is effective in improving student learning, retention, and attitude toward the course.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

I implemented TBL in the course last semester, and plan to compare student learning to the same course with no TBL (this semester). The following steps were involved: 1) Breaking the students into 28 permanent learning teams of 5-7 students each, 2) Conducting individual/group pre-quizzes for each new unit based upon text readings and reading guides that I constructed, 3) Utilizing group application and synthesis-based assignments during the course of each lecture and grading these assignments.

This semester, I am using the traditional lecture format as a control.

Evaluation Plan:

Evaluation will be based upon scores of students in individual-based exams. I am also conducting surveys with each exam in order to get student feedback. These surveys contain questions about the amount of time students study, grade expectations, and feedback about teaching methods.

In order to evaluate student learning, I will compare student performance on duplicate cumulative final exam questions to those obtained in semesters using traditional lecture methods. One of my hypotheses is that students will better retain long-term knowledge and perform better on the cumulative final.

Summary of Outcomes:

Preliminary results suggest that TBL had little impact on student performance on common cumulative multiple choice final exam questions in comparison to a traditional lecture control group. However, student populations differed significantly between the two treatments. Control (traditional F06 lecture) contained 67% freshmen (n = 189), TBL contained 11% freshmen (S07, n = 191).

TBL students obtained an average of 74.1% (SE = 2.7), while traditional lecture students obtained 72.5% (SE = 2.8). This difference was not significantly different ($P = 0.32$).

Students approved of TBL, but not clickers. Perceived benefits of TBL correlated inversely with expected exam score. Overall, students responded positively to the RAP quizzes. In general students felt the RAP quizzes helped them learn more than the group problems.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

I have completed 1 semester in which I implemented TBL, and collected data regarding student performance. This semester, I am collecting data on the control group in the form of surveys at the end of the exams.

I processed data from the S07 TBL semester, and ran a brief comparison with F06 traditional lecture data. However, I cannot use this comparison in any publications as I did not get permission from the F06 course.

What successes have you experienced with your work/project?

This semester, I am missing the group contact that was possible with the TBL. I feel like my students are more anonymous. However, I am using some of the same lecture questions that I developed during the TBL semester in my control section.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Current challenges concern compiling and comparing the data, which I have not had (or made) time to do yet. It should not be complicated, but will be tedious, and I will have to train a student to do it, and obtain funding for the student.

The responses that I have gotten in terms of student cooperation with my survey have also not been complete. They seem to need some type of incentive to actually check “yes” or “no” boxes and sign their names.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

If I use the TBL method again in the future, I will probably leave out the clickers, or provide a set to use in class for students on the team RAP quizzes. This would make my job significantly easier.

In addition, I will probably either make the group questions different (more challenging and fewer of them) or cut them out all together.

How are you using collaboration within your project?

I have shared my findings and struggles with several other biology faculty who are interested in using the TBL technique.

The project innately relied on collaboration between students to work in teams. The students collaborated with me in filling out surveys and allowing me to use their data.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Since I am still in the initial phases of the project, I have not yet presented results or written articles. I have done substantial research on TBL, using a book written by Michelson, Fink, etc… and the University of Oklahoma web page on TBL. I plan to make presentations and write articles about this project, because I think that others would be interested in it, and it is a novel approach in a non-majors class.

I created a poster that was presented at a University of Minnesota system poster session, summarizing faculty work in the Bush Grant.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Since I came in on the tail-end of this grant, enthusiasm for small groups had waned. I did not get the experience of sharing or cooperating with other faculty in the large-lecture setting, because only 2 people actually came to our small group, and we only met once. I did not get the opportunity to disseminate and really hash out my research with others as I had hoped I would.

In addition, it would be helpful to force us to give mini-presentations each semester so that we had to compile our data into some time of useful/presentable form more frequently. I realize that this is the point of the course profiles, but a mini-presentation (5 min per semester) from each of us would really help with the exchange of ideas.

Finally, it is really frustrating to not be able to use any funds to assess my research that just ended today. The granting agency should let us continue using the funds through the end of next semester so that we can complete our project, without requesting new proposals.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Deborah Petersen-Perlman

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): One

Course Impacted by Research (e.g., Theatre History TH 3171): Comm 3505: Media Communications

Course Description: *(Please provide the course overview that appears in course bulletins)*

Journalistic and public relations writing techniques: fact gathering; selection and editing of news – editorial content of newspapers, magazines, television and radio; reporting and editing court and municipal and county agency news; and practical application of public relations principles.

Student Learning/Teaching Issue/Research Question:

I am most interested in developing new strategies for managing the grading process. I tend to make the grading process a "career" in that I spend too much time on each paper. The process of grading becomes overly burdensome which sets up a terrible cycle of extensive effort on my part and not much appreciation for it on the part of students. This results in resentment and dread every time I face a new set of assignments.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

I reviewed various grading rubrics and applied what I learned from them to the grading templates I've been using since I developed this course ten years ago. I have also implemented a structured peer review which incorporates these rubrics. The class period prior to the submission due date students pair up with each other and use the rubrics to review each other's work. This strategy supplements a pre-read process which I've had in place for years (students may submit their work to me one week prior to the submission due date for my review). I discovered that this system did not engender a good level of accountability from students. After surveying and interviewing students about the peer review experience, I implemented a two-step process wherein I paired the students for the peer review. I gave them deadlines and instructed them to copy me on their submissions to each other. They were instructed to use the Microsoft Word Track Changes system in making marginal comments to each other. They were then given a deadline by which time they were expected to return their partner's documents with comments. This was over the weekend. Finally, the students were to print copies of the comments they made on their partner's papers, as well as the comments on their papers from their partners. They were to bring these documents to class for one-on-one discussions about their work.

Evaluation Plan:

Last spring I had students respond to the peer review process in an open-ended survey. This semester I followed up every peer review session with a request for in-class written feedback on how well the process was working. I had individual meetings with each student and assessed the effectiveness of the peer review process. In the in-class surveys I also asked students to give me suggestions or recommendations for change. When I met with the students individually, I was able to discuss their recommendations with them. They were able to provide me with more detail about why they made the recommendations they did. I implemented a few suggestions, but later decided not to continue using them.

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Students were most frustrated by the varying levels of preparedness of their partners. Some students were very well prepared. If partnered with an individual who had not come to class with a document for review, or only a minimal amount of work, the prepared student felt disadvantaged (and reasonably so). It was this disparity in preparedness that led me to implement the multi-stepped peer review process described in the Evaluation Plan. I had students give final presentations about the writing process they followed in preparing their final paper. The overwhelming majority of the students proclaimed the two-step peer review (track changes exchanged via email followed by in-class discussions) to be very helpful. They encouraged me to continue using this system in the future. I have decided to begin the class next term by modeling peer review and then moving to the two-step process.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you completed during the Bush Grant.

The primary activities for this term were to evaluate the peer review system I had implemented for the fall and to modify it in response to student feedback. I anticipate that I will continue to modify the system until such point as I am satisfied that the writing students submit demonstrates improvement and that the students improve their critical feedback. The use of peer review this term demonstrated a need for a greater level of accountability and a more effective system of holding students to their obligations to each other by way of the peer review process.

What successes did you experience with your work/project?

I began my work in the Bush group with an eye to improving the grading experience. I did in fact notice that peer review made a difference in my approach to grading. I'm processing the papers quicker than in the past. I also discovered that my existing grading templates were sufficient as tools to assist the students in evaluating each other's work. The new rubrics were more redundant than helpful. The grading templates can (and will) be modified somewhat to reflect the students' comments about what about the process worked best.

What challenges did you encounter with your research or implementation? (Consider activities or events that did not work as well as you had hoped or expected.)

Among the feedback students offered was the request for a checklist to accompany each assignment—outlining what needed to be included in each submission. This may still be a useful tool, but other students found it to be unnecessary. In the future I anticipate that students will become much more accountable. I will need to continue assessing the quality of students' feedback to each other's work.

What project adjustments did you have to make based on the data analysis, student reactions, feedback from consultants, etc.?

As described earlier, the biggest adjustment was moving from the one-on-one in-class discussions to the two-step process of using email exchange of Microsoft's track changes followed by informed discussions between the partners.

How did you use collaboration within your project?

I attended Bush Group large group meetings, and also talked with colleagues similarly interested in improving writing-based classes. We did some email exchanges as well. Ultimately, the most significant collaboration came in the form of student response to survey questions and interviews.

How did you utilize a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I did read a number of scholarly journal articles on writing rubrics. I also attended presentations by visiting scholars sponsored by Bush, as well as presentations by my peers. At the end of the term I presented my project to the campus.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The Bush Foundation Grant was extremely valuable to me and my peers by giving us the opportunity to listen to and learn from each other, as well as nationally recognized experts on teaching strategies. I would hope that now that we've established the larger group, as well as the smaller interest groups, that we will continue to gather together and share what we've learned. I hope there will also be more opportunities to do projects such as this. I certainly hope the administration would recognize the inherent value in doing this work.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Chad Pierson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171): Calculus and Precalculus (Math 1296 and 1250)

Course Description: *(Please provide the course overview that appears in course bulletins)*

MATH 1250 **- Precalculus Analysis (LE CAT2)**
(4.0 cr; Prereq-A grade of at least C- in 1005 or math placement; A-F or Aud, fall, spring, every year)
Inequalities, analytical geometry; relations, functions, and graphs; exponential, logarithmic, and trigonometric functions; complex numbers and De Moivre's Theorem; permutations, combinations, binomial theorem, and mathematical induction.

MATH 1296 **- Calculus I (LE CAT2)**
(5.0 cr; Prereq-3 1/2 yrs high school algebra or trig or geometry or college precalc course, a grade of at least C- in 1250 or math placement, = 1290 or 1596; A-F or Aud, fall, spring, every year)
First part of a standard introduction to calculus of functions of a single variable. Limits, continuity, derivatives, integrals, and their applications.

Student Learning/Teaching Issue/Research Question:

How can personal response systems be used effectively to help improve teaching and learning?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

I implemented daily personal response system (clicker) questions and surveyed the student to gain perspective about their perspective of the effectiveness of the technology.

Evaluation Plan:

Tracking end of the semester surveys and overall course results to try to gauge the effectiveness of clickers.

Summary of Outcomes:

Initial indications are that students are more involved in lecture (attendance has increased) and they perceive a benefit from the technology. Further analysis is required to gauge whether overall student performance has actually increased.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Continued use of clickers and the final end of the semester survey was given this week.

What successes have you experienced with your work/project?

Attendance has increased in all lectures. Students generally have a positive attitude about the clickers and seem to understand the desired outcome of the technology as a benefit to both themselves and the instructor.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

How to effectively analyze improved performance in a class and link it to the use of clickers. Too many variables each semester to really identify the exact cause of any up or down progress across semesters.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

I am constantly adjusting the reward system to encourage students to participate using clickers. How many points should be deducted for a wrong response should not be too punitive in order to encourage participation but shouldn't be too rewarding and encourage an apathy the attempt to answer any questions.

How are you using collaboration within your project?

The clicker group has shared many ideas amongst ourselves and given three presentations to our campus and outside. Each time audience feedback has yielded new ideas that can usually be immediately implemented to improve the approach in which the technology is displayed to the students.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Multiple presentations to the faculty at Duluth and to the Academy of Distinguished Teachers in the spring 200t at the Twin Cities campus.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Almost all changes in teaching that I have implemented have come either directly or indirectly from collaboration with faculty. The most revolutionary strategies that I have implemented have come from faculty not in my department or even collegiate unit. I can't see how else I would have found such wonderful and fascinating new ideas had it not been for the sharing sessions at the Bush grant meetings.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Justin Rubin

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research: Tonal Harmony I MU 1111

Course Description: *(Please provide the course overview that appears in course bulletins)*

Introduction to four-part harmony, Common Practice methods of composition and analysis.

Student Learning/Teaching Issue/Research Question:

Following extensive research over the past three semesters as part of this grant, I am trying to pull together all of my findings and provide an integrated approach in my freshman harmony class. I want to know if using technology in the classroom (in a more sophisticated way than I knew how apply just a year ago), supported with online resources that I developed for the students in the class, and group activities can provide the young music professional with the ability to be significantly more independent as a learner and be able to critically assess their own work as well as their peers'.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

First, I have changed the physical location of the class to a room that supports technology better than any of the music department's current rooms. I project the score onto a screen and apply virtual instrument sounds rather than piano to create more realistic renditions of the class projects. Already supported by my online resources, I am trying to use group projects that can then be projected and listened to realistically to engage the student better and see if this makes them better prepared to be intelligently critical, not only of the technical aspects of the musical problems but also the aesthetic.

Evaluation Plan:

I will assess the progress of each group from assignment to assignment separately as well as making an overall class assessment. This will be followed by surveys that allow me to see if my strategy is appropriate or if there are means for me to improve how I approach the class topics. Finally, homework will be assessed regarding each group member against how they performed together in class.

Summary of Outcomes:

Group work and individual homework seemed to be generally on par with one another; students in each group were scoring similarly to how their groups scored in class. Surveys revealed that additional examples by me in class before turning the projects over to the groups in class could be important. Using the technology was across the board extremely valuable and engaging.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you completed during the Bush Grant.

I tried different methods of using data projectors and music technology in class: all from the computer onto a screen (wherein comments were also digital), data projector onto a whiteboard (comments directly onto the board by hand), sounds generated by digital instruments from the computer, sounds generated by a keyboard (instructor performing), student projects projected and critically assessed by class, student projects kept off the board and assessed by me individually, group by group.

What successes did you experience with your work/project?

I have found a successful integrated use of both technology and personal attention that I believe is a good balance that takes advantage of the electronic resources without making the subject matter too distant. The student response has been improvement in attitude towards the material, better use of vocabulary, and better ability to be self-critical outside of class (homework).

What challenges did you encounter with your research or implementation? (Consider activities or events that did not work as well as you had hoped or expected.)

Not overwhelming the students with technology in the classroom or letting my abilities with technology to get in the way or cloud the material. Using technology-only based lessons were not as engaging as combined technological and standard music classroom activities.

What project adjustments did you have to make based on the data analysis, student reactions, feedback from consultants, etc.?

I have prepared additional examples for in-class examination before letting them approach the work separately as student groups and then as individuals (homework). I have also adjusted what sounds I use in class to best represent their work and emphasize the specifics of the material which is not possible with simple piano sounds.

How did you use collaboration within your project?

No true collaboration – however I am implementing approaches I have taken with other classes as part of the Bush grant with the freshman harmony class (Improvisation, Form and Analysis).

How did you utilize a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

NA

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The use of funds and availability of funds for equipment etc. has been exemplary. I have no recommendations – excellent administration of grant.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Angela Sharp

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 2 graduate TA's, one undergraduate support person

Course Impacted by Research (e.g., Theatre History TH 3171): Calculus I Math 1296

Course Description: *(Please provide the course overview that appears in course bulletins)*

This course covers the first part of a standard introduction to calculus of functions of a single variable. It includes limits, continuity, derivatives, integrals, and their applications.

Student Learning/Teaching Issue/Research Question:

Does the inclusion of visualization for key concepts in a calculus lecture improve student learning?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Students in a typical large lecture introductory calculus course have been shown visualizations that are either static or animated figures while a concept is being taught in lecture. The students have been surveyed to determine how much they thought the use of the visualization impacted their learning. Additionally, their responses to questions on either homework, exams or in class 'clicker' questions will be analyzed to determine the effectiveness of the visualization.

Evaluation Plan:

The use of the visualizations will be evaluated through a survey given to the students at the end of each course. Additionally, their performance on exams, quizzes and homework on concepts presented both with and without visualizations/animations will be assessed.

Summary of Outcomes:

Data has been collected and tabulated for the previous semester in Math 1297. It is still ongoing this semester in Math 1296. I have found that it is much more difficult than I could have imagined to really determine ways to measure student learning.

Using the clickers to determine the students perspective of the use of technology in the class, in Spring 2007 Math 1297 students responded (n=125) that 76% either agreed or strongly agreed that the technology used enhanced the course. In the previous spring semester (2006) when I was not yet part of the Bush Grant project Math 1297 students responded (n=121) that 90.08% either agreed or strongly agreed that the technology used enhanced the course. There were no students in the strongly disagree category in Spring 2006, but 3 in Spring 2007. More recently, in Fall 2007 Math 1296 students (n=111) responded that 80% either agreed or strongly agreed that the technology used enhanced the course.

Several of the visualizations that have been created have been made available online. Two weeks after I emailed the class about the online availability of these, 37% of the Fall 2007 Math 1296 students had accessed them and found them to be either ok or helpful. Also, 48% of the class stated they intended to access them now.

Analysis of the specific concepts by evaluating the student scoring on exams has been challenging to interpret (see graphs following all questions). The R^2 values vary between 0.249 and 0.491. None of these would be considered strong correlations. There is evidence that for at least one concept there was very slight advantage to having a graph present and that this advantage increased for weaker students.

The students' opinion of the effectiveness of PowerPoint presentations was not supported by actual scoring. The results show that 54% of the class believes that the PowerPoint presentations enhanced their learning. However, there is no evidence that this opinion correlates to better results.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Since starting the project, I have hired an undergraduate student to assist me in the programming required to make the visualizations to be used for instruction purposes. Since the ninth week of the semester when he started, Josh Fritz has produced 11 animations/visualizations that I have used in my lectures.

Additionally, surveys were carried out in class (rather than an online version) to collect student perspectives of the impact made by visualizations.

Data was collected on student performance on particular concepts, both those concepts that were taught using a visualization and those that were not.

I have continued to work on data tabulation and have started the analysis portion, but I am really not confident on how to proceed with reaching conclusions.

Josh is in the process of wrapping up the coding and preparing 10 visualizations to be used either in class by instructors or online by students in the future. This required two versions of each because the requirements for display in a class room setting are very different than online for optimal viewing.

What successes have you experienced with your work/project?

I have found an undergraduate student with an excellent background in mathematics and programming. Additionally, he is excited to work on the project. He has turned out to be a very hard worker and extremely reliable, even at the shortest notice.

I've enjoyed showing the students the programming results that have been created. There are now a handful of them available online at: http://www.d.umn.edu/~acates/Visualizations.html

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

I still run into technological glitches from time to time. I don't think there will ever really be a way around those. Since I am making the choice to introduce more technology, I will need to also choose to accept that it's going to be problematic at times.

I have found technical support to be less than supportive. Since this is a new version of Mathematica with new commands that are not yet well documented, this is certainly slowing down the progress considerably. For example, it took two weeks to get a response from Mathematica's tech support. When I tried to access their tech support through the UM central support I did not receive a response to my request for more than a month.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Based on conversations with other instructors, I made modifications to how to design exam questions to test the effectiveness of visualizations. Everyone I discussed the ideas with said that this is not at all straightforward to accomplish.

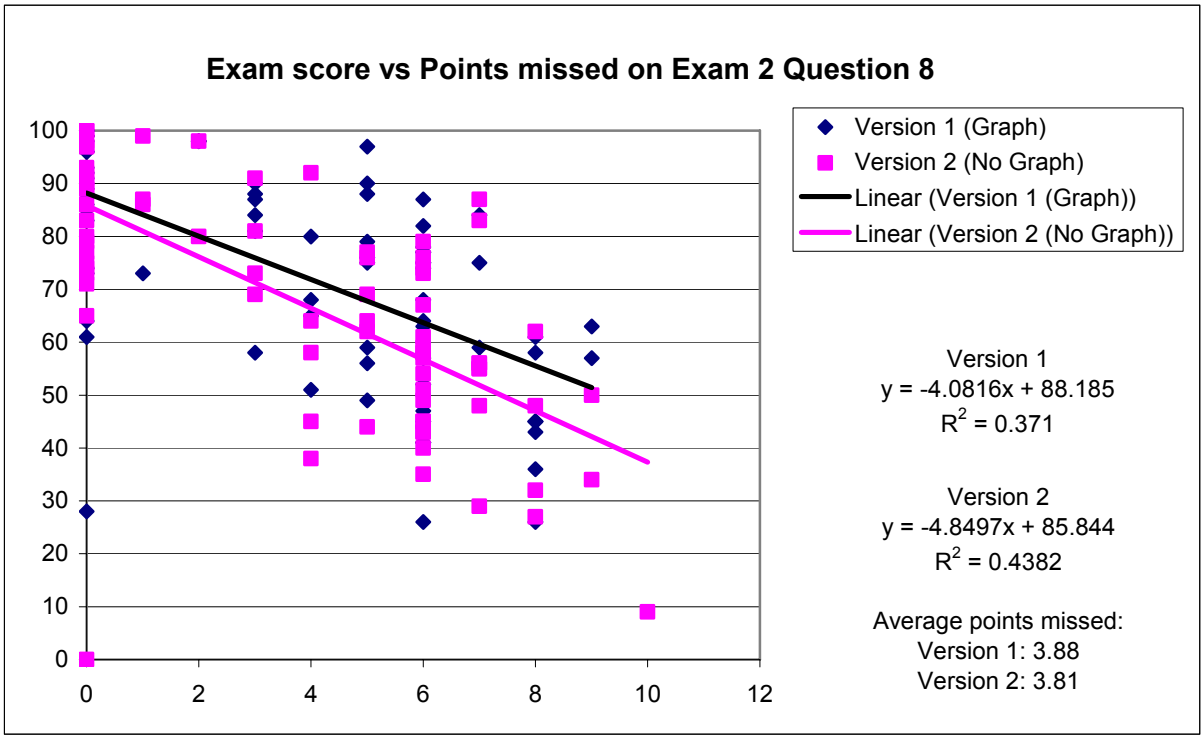
How are you using collaboration within your project?

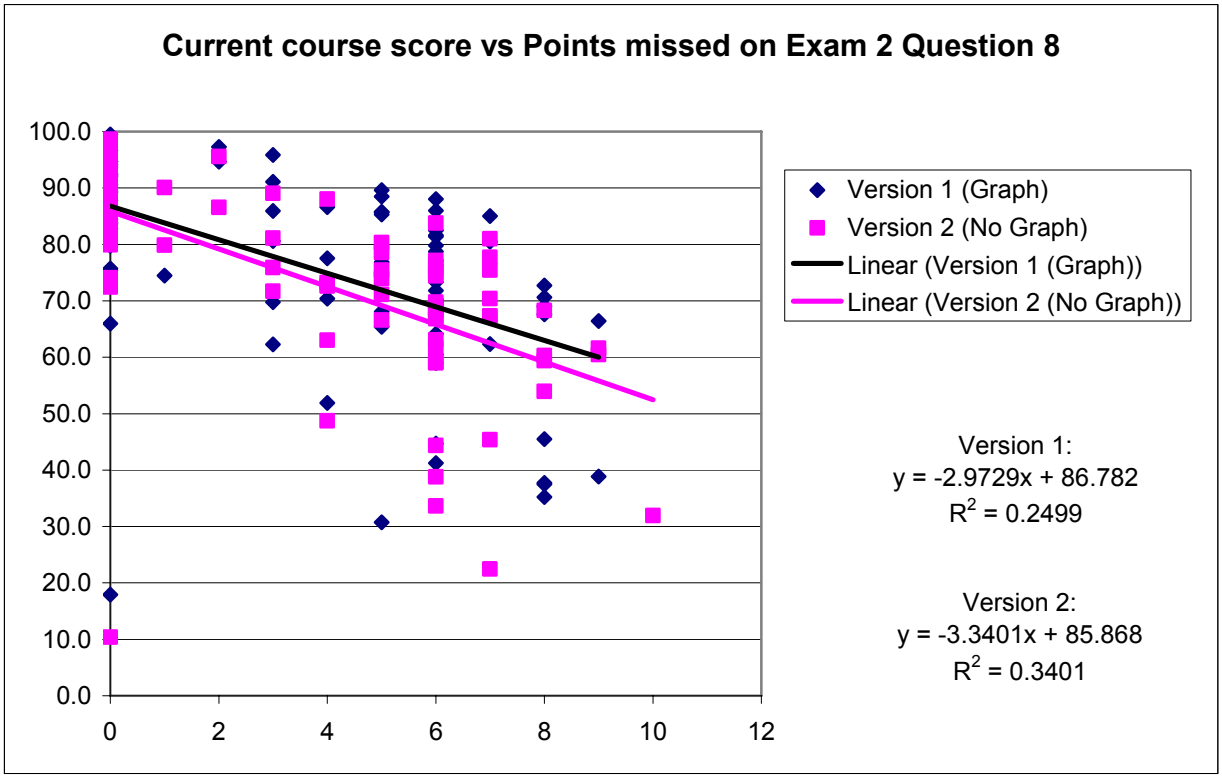
I am working with both an undergraduate student for the programming aspect of creating the visualizations and discussing the projects thoroughly with Chad Pierson prior to giving project assignments to the undergraduate. The resulting products have been used by both Chad and I in our lectures.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

A subset of this project (using clickers in instruction) has been presented in a workshop format twice in the past two months. Both presentations have been received with enthusiasm.

I would like to learn more about measurement of student data. I need to perform a literature search on this topic. I believe it would be wonderfully beneficial to many involved in the Bush grant if this were a topic of discussion by someone with experience with classroom based research.



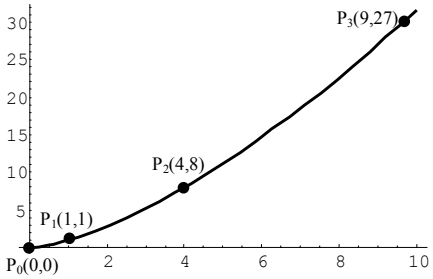


The topic of this question was Arc Length. I made no efforts in class to enhance this lecture with any visualizations. Both versions of the questions follow. These results seem to indicate that there was a very slight advantage to having a graph present and that this advantage increased for weaker students.

Version 1

8. Find the arc length **function** for the curve $y = x^{3/2}$ with starting point $P_0(0,0)$. Use this function to compute the distance along $y = x^{3/2}$ from the staring point to the following ending points:

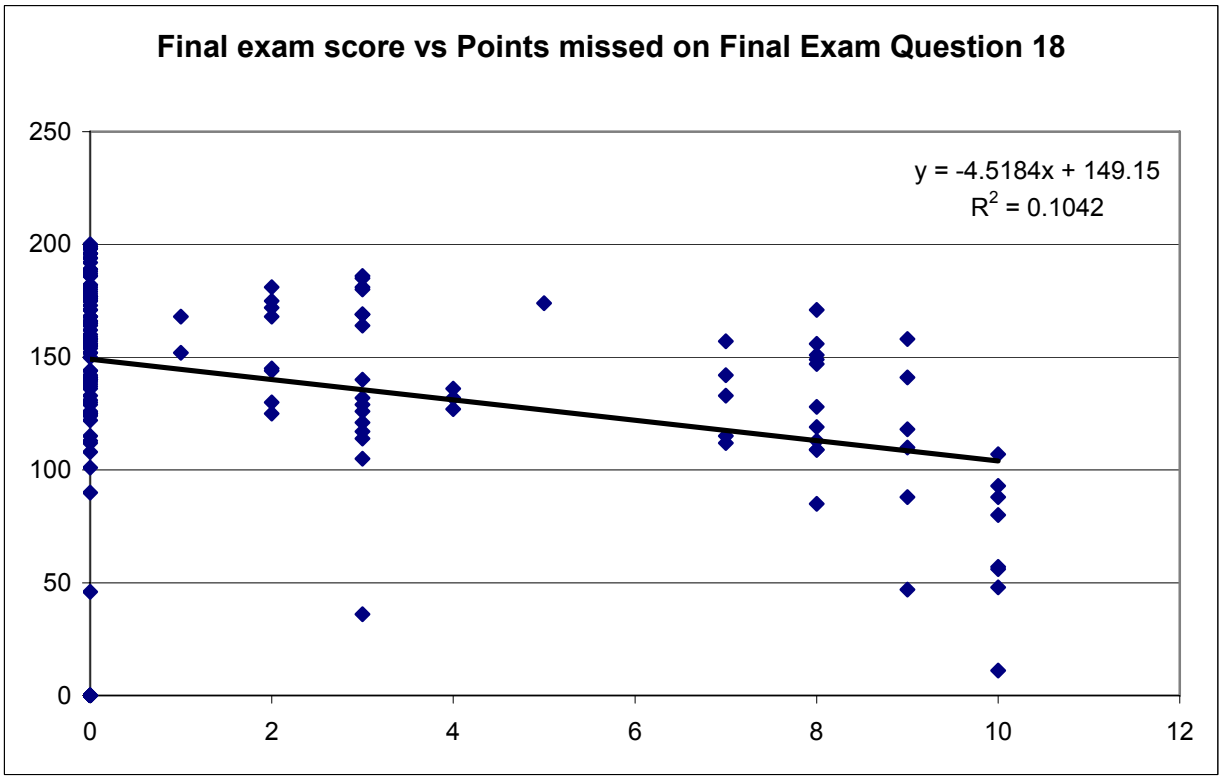
point	**distance**
P_1	
P_2	
P_3	



Version 2

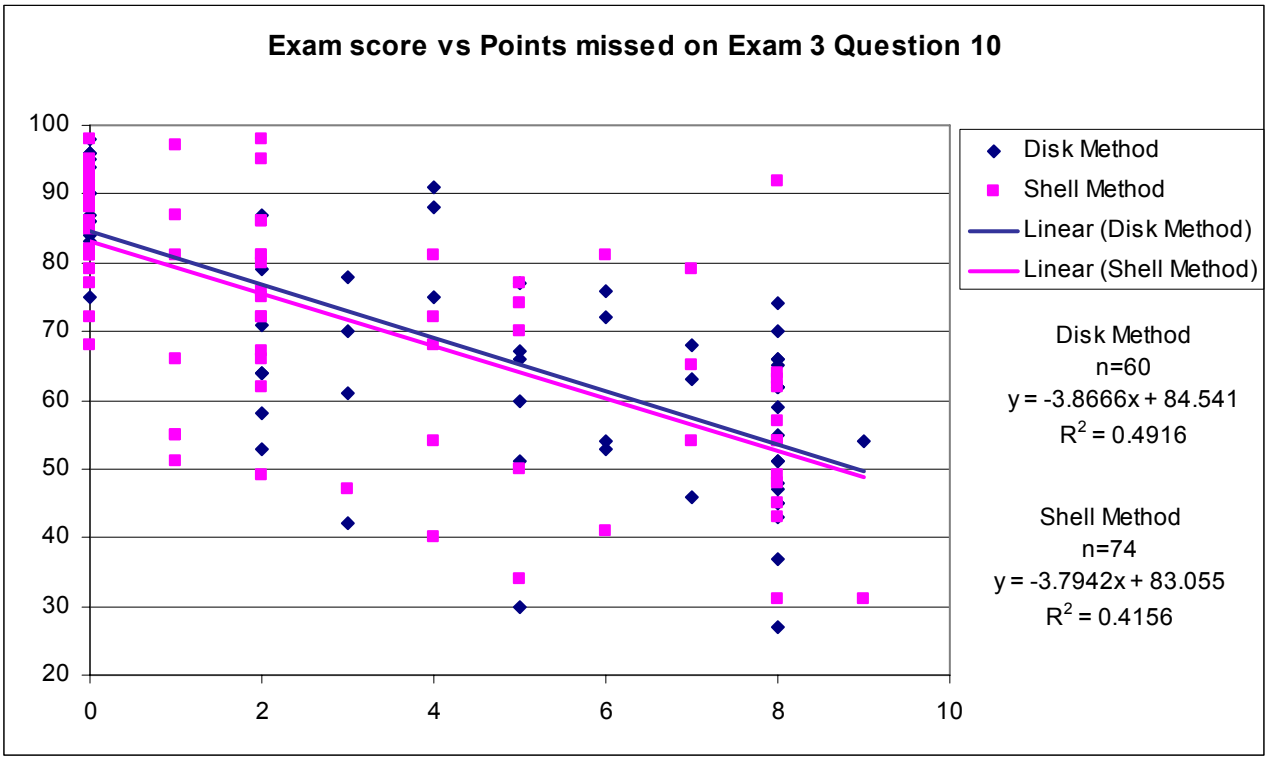
8.Find the arc length **function** for the curve $y = x^{3/2}$ with starting point P(0,0). Use this function to compute the distance along $y = x^{3/2}$ from the staring point to the following ending points:

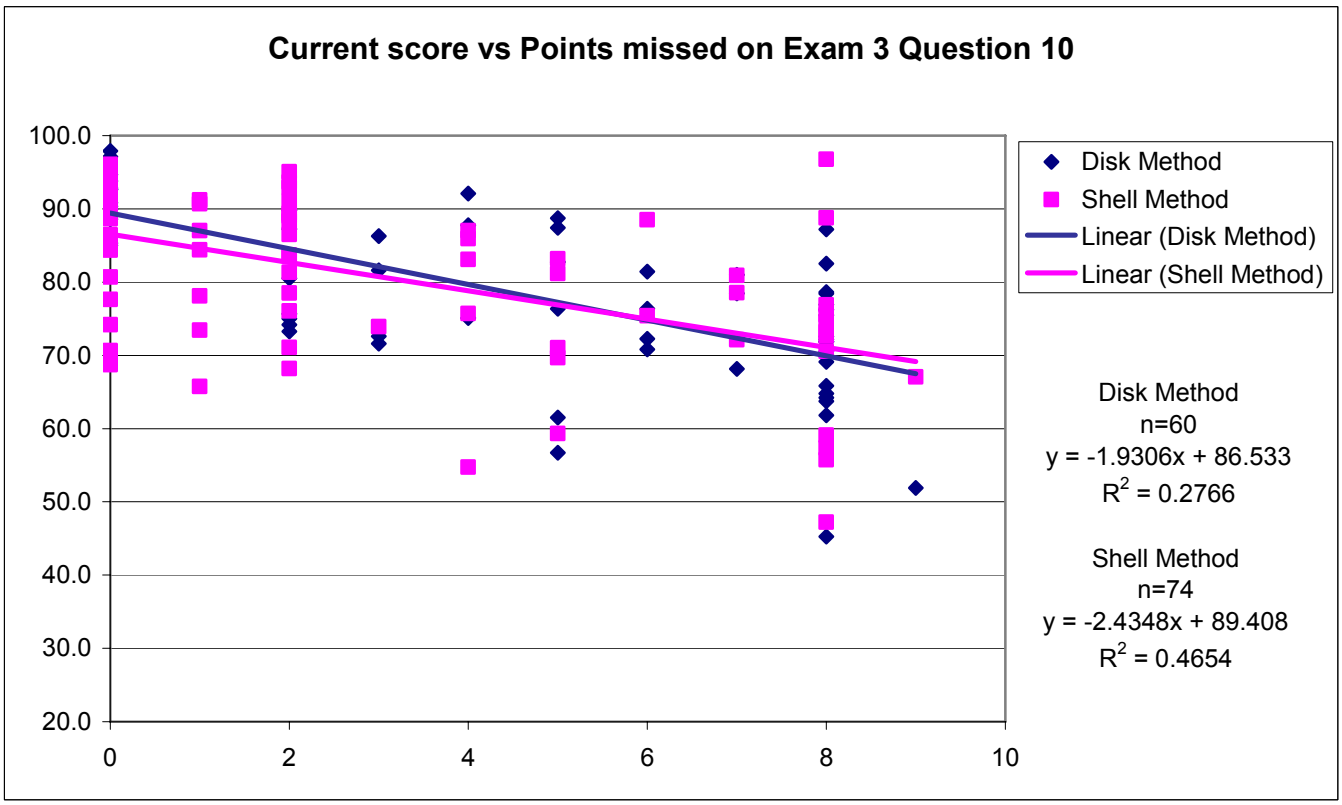
ending point	Distance
$P_1(1,1)$	
$P_2(4,8)$	
$P_3(9,27)$	



The topic of this question was level curves of a three dimensional surface. This is a lecture that I employed the use of visualizations. There was only one version of the exam and the exam was worth 200 points. I do not have any conclusions about this yet.

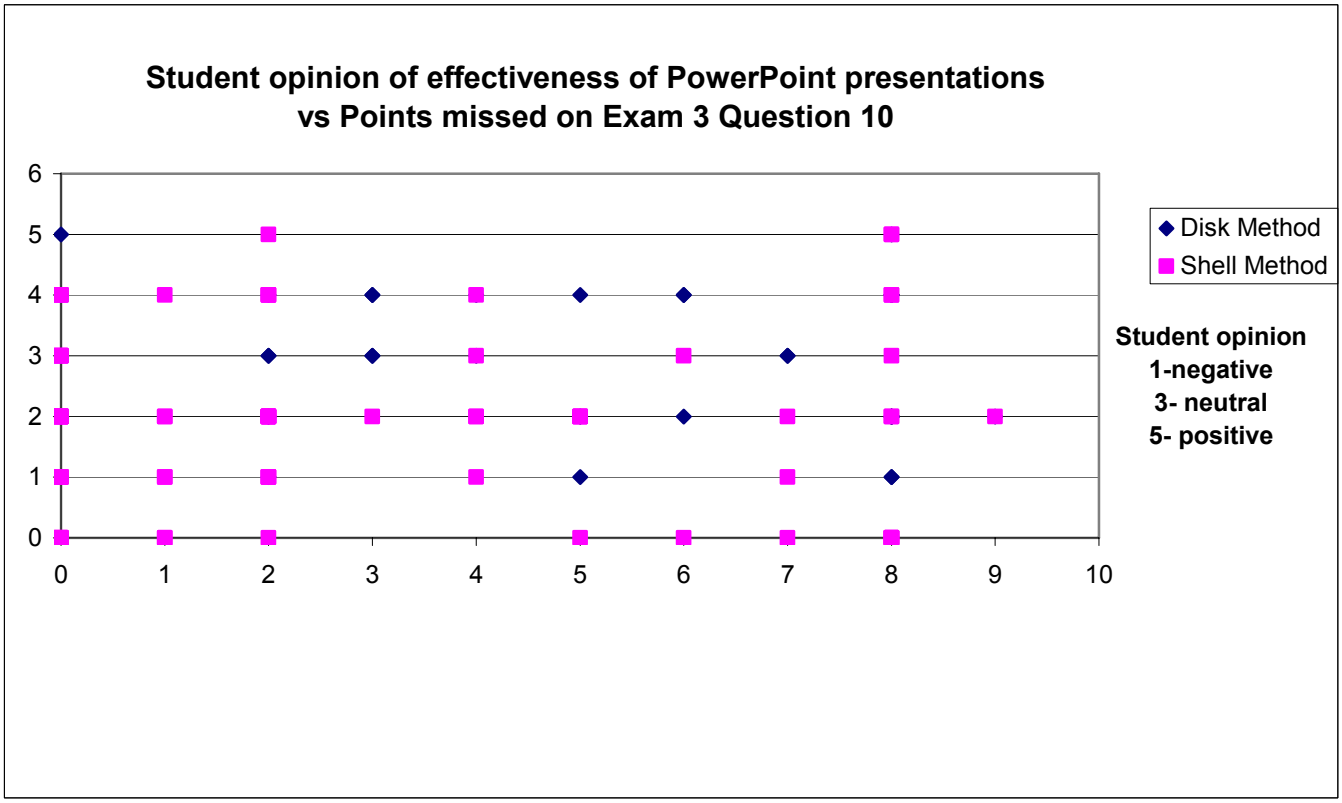
18. Sketch and label three level curves of the function $f(x,y) = x^2 + y^2$.





The topic of this question was computing the volume of a solid of rotation. The students were given the option to use either the Disk or Shell method. The lecture on the Disk method employed visualizations, but the Shell method did not. One interesting thing is that 14 more students choose the Shell method. It is possible that this is because the Disk method required the integration to be done with respect to y, which students typically avoid.

10. Using either method, calculate the volume of the solid obtained when the region bounded by the curves $y = \sqrt{x}\ and\ y = \frac{x}{2}$ is rotated around the y-axis.



The above plot shows students opinion of the effectiveness of PowerPoint presentations (All three shown in the semester and not just the Disk Method presentation). The results show that 54% of the class believes that the PowerPoint presentations enhanced their learning. However, there is no evidence that this opinion correlates to better results.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

December 13, 2007

Campus: Duluth

Faculty Member(s)/Instructor: LeAne Rutherford and Shelley L. Smith, Instructional Development Service

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171):

Course Description: *(Please provide the course overview that appears in course bulletins)*

Shelley continues to work with Lynn Bye and Helen Mongan-Rallis on organizing, analyzing and writing up their research results. She presented information on the "clicker" group and use of Bloom's revised taxonomy in constructing clicker questions at the Annual POD Conference in November in Pittsburgh. LeAne worked with Janelle Wilson to publish two-thirds of her article on the Millennial Generation—in The Northern View and in Instructional Development newsletter. (Janelle was not able to continue with the current cohort, but persevered in working on her project nevertheless.)

Student Learning/Teaching Issue/Research Question:

How can we assist our Bush group in presenting and sharing their research projects on and/or off campus, in print or in person, with or without technological-assistance?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

- To plan and present a series of workshops. There were nine in all, counting:
  - Four Bush colloquiums
  - Two by members of the cohort presenting practical applications of their research
  - Finding co-sponsors for inviting 3 nationally recognized guest speakers (Marilla Svinicki, Karl Smith, Toru Iiyoshi) to present workshops on issues pertinent to the Bush group focus.
- Serving as consultants for members of the cohort on classroom pedagogy and research analysis

Evaluation Plan:

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that the number of students using them is increasing on campus, that they are a method of engaging students, yet they can be used in more pedagogically profitable ways than they are now being used. Faculty members have been intrigued at the potential of using Bloom's Revised Taxonomy and seemed to think favorably about using it themselves. This is a very positive outcome.

High levels of interest in and satisfaction with the 9 workshops presented (above)

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you completed during the Bush Grant.

LeAne solicited funding from the University Education Association, the Knowledge Management Center, ITSS, the Bush Grant, and IDS to bring Toru Iiyoshi to UMD to present two workshops on the scholarship of teaching and the KEEP Tool on Nov. 15, 2007.
Shelley made all the arrangements and handled promotions for Toru and the event.

We have regularly attended all Bush grant meetings, including meeting with Robert Holloway in Oct. 2006 & 2007, and sessions about the potential unfunded extension of the Grant.

Shelley prepared a poster for the December Twin Cities poster session picturing IDS workshop flyers, which promoted the presentations made for and with the Bush grant over the last three years.

Shelley presented at the POD national conference on the work of the clicker group to rave reviews

We have been informally promoting Mark Harvey's use of blogs in his Theatre class. He spoke to the Tech Talk group at the last meeting. He may take part in the new grant effort after Dec.

LeAne coordinated and facilitated the repeat of the workshop: *Clicking into Bloom, Realizing the Potential in PRS Systems* on Sept. 25, 2007.

IDS produced and facilitated Take Four! as a project showcase

Tuesday, December 4, 2007, 3-4:30, Garden Room:

IDS and the Bush Grant Faculty present….

Improving Student Learning:
What We Know/What We're Learning

Three years into the Archibald Bush Foundation Grant for *Enhancing Student Learning through Innovative Teaching and Technology Strategies* and participants are still learning. Their practices continue to evolve but in newly informed ways. Nevertheless, even though "the paint is still not dry," these project presenters who have been reflecting on their own teaching procedures are eager to share what they know about improving student learning. Attending this event will pique your interest and cause you to speculate on how its application might color your own teaching and your students' learning.

The fourth in the series, this colloquium spotlights a new set of projects. Members from this cohort are ready to display the outcomes of their research and to provide you with ideas for innovative teaching and technology-assisted strategies that could enhance learning in your own classrooms.

Moderator Bilin Tsai Chemistry and Biochemistry

Panelists

Jim Allert Computer Science
Visualizing Computer Science I

Olaf Kuhlke Geography
Exploring Potential Research Projects Creatively

Deborah Peterson Perlman Communication
Interviewing Insights

Amy Versnik-Nowak Health, Physical Education, & Recreation
Breathing Life into Critical Thinking Using CPR (Calibrated Peer Review)

Shelley and LeAne are offering the *Write Now* group series to campus faculty, with special invitations to the Bush members. *Write Now* is offered four times per semester

as writing support for faculty working toward promotion and tenure. The description of this group may be seen on the IDS web site at www.d.umn.edu/ids under "programs." For example, Jane Carlson has participated in Write Now and is happily publishing in her field and about her projects.

LeAne is working with Nik Hassan, a member of our group, on revising an article as requested by the journal editors.

In June LeAne met with two of the clicker group who want to independently write up their findings. She is available to them when they want input.

Steve Holtz is interested in writing up clicker information for the Web.

What successes did you experience with your work/project?

We were accepted for the program at POD's (Professional and Organizational Development) national conference in Pittsburgh, Oct. 25-28. The following is derived from our proposal.

Title: *Clicking Into Bloom: Realizing the Learning Potential of Clickers*

Abstract:

Clickers (personal response systems) promote active learning by directly engaging students with course content, providing immediate learning feedback to students, and allowing instructors to check on mastery of both content and concepts. But the system is only as good as the questions it poses to students. In this session, and using Bloom's Revised Taxonomy, participants will have a chance to use clickers as they analyze questions and purposely develop and categorize their own questions to decide if clicker technology can be used to lead students to critical thinking through using Bloom's Taxonomy?

Proposal Description:

Personal response systems (PRS), familiarly called "clickers," have captured the interest of instructors and students alike. On our campus, they are no longer peripheral. Almost a third of the students own and use them. Part of our job as developers entails assisting faculty members to decide not only when technology might enhance their students' learning, or which technological tool is most appropriate for reaching their goals but how best to use that tool.

Clickers can promote active learning by directly engaging students with course content, providing immediate feedback to students on their learning, and allowing instructors to check on mastery of both content and concepts. But because clickers usually employ multiple-choice format, the system is only as good as the questions posed to students. Choosing the level of the questions is more than peripheral; it is at the heart of engaging students by moving them into more complex cognition.

While questions of fact have their place in learning; they are at the bottom of the hierarchy in Bloom's Revised Taxonomy of Learning: remembering, comprehending,

applying, analyzing, evaluating, and creating. In 1956, Bloom and his group found that 95% of test questions students encounter require them to think at the level of remembering information. The increasing use of large lecture courses brought on the use of personal response systems to enlarge and enhance student engagement.

Planning questions that promote deep learning, and higher order thinking is not easy, but it is possible. When planning questions, instructors need to consider their goals, purpose, and priorities with regard to course content and student learning. Appropriate promotion and assessment of deep learning, and higher order thinking go beyond questions of fact. They also assume students' ability to perform at the level of application or higher.

At the workshop, participants will work individually and in groups in order to

- Have hands-on experience using clickers
- Receive an overview of the revised Bloom's taxonomy and the goals and objectives of higher level learning (depth here will range from an overview [60 min] to a more active exploration of learning goals and objectives [90 min.]
- Be exposed to a broad disciplinary spectrum of examples of clicker questions that are designed to move students through all the levels of Bloom
- Practice identifying the level of sample questions using Bloom's taxonomy
- Identify and discuss the challenges of creating questions that lead to and assess higher level learning
- Practice writing questions that tap into higher level learning

What challenges did you encounter with your research or implementation? (Consider activities or events that did not work as well as you had hoped or expected.)

1. Analysis of Lynn Bye's data revealed two things: the original research question could not be answered and the study will need to be redesigned to obtain the answers desired
2. New questions and answers regarding age differences and course goals were discovered and will be explored in more depth

What project adjustments did you have to make based on the data analysis, student reactions, feedback from consultants, etc.?

See above

How did you use collaboration within your project?

Collaboration is what this is all about for us in IDS. More importantly, this is collaboration across disciplines. The clicker group, for example, was comprised of faculty members from Math & Statistics, Chemistry, Nutrition, Computer Science, and Health.

Toru Iiyoshi's workshop on the Keep Tool Kit was appropriate for universal use and will be an effective collaborative instrument and involved close collaboration with the Knowledge Management Center. Shelley plans to create a demonstration of the Keep Tool Kit as it pertains to Bush.

Shelley's work with Lynn Bye (Social Work) and Helen Mongan-Rallis (Education) involves interdisciplinary collaboration.

How did you utilize a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

Shelley has been sending out information on places for Bush grantees to publish. That information is stored on the Bush web site that she created. That information is invaluable!

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

I believe that more project display and more discussion are needed. For example, We plan to feature some of the projects in the *Instructional Development* newsletter. However, that is not enough. Perhaps we need to put together some kind of forum on our grant topics to draw in other, non-Bush faculty members. Our UMD faculty seem to be drawn to the panels we have presented.

We will also be coordinating/facilitating another showcase workshop: *What We Know about Helping Students Learn* put on by the Bush Grant Faculty, Tuesday, December 4, 3-4:30 p.m. which is an example of one kind of forum we would like to hold.

I feel that some of the work and/or projects have not yet run their course. While there is momentum, I would like us to continue and benefit from closure.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Marty Sozansky

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1

Course Impacted by Research (e.g., Theatre History TH 3171): Writing Studies 1120

Course Description: *(Please provide the course overview that appears in course bulletins)*

Instruction and practice in writing argumentative prose for academic situations with integrated computer lab. Emphasis on academic research, documentation, and the writing process.

Student Learning/Teaching Issue/Research Question:

A primary goal in Writing Studies 1120 is to introduce students—mostly freshmen—to conducting academic research that can be used to support the arguments they will use in writing scholarly essays. We emphasize—even insist on—the use of scholarly sources (articles in peer-reviewed scholarly journals) accessed primarily through the library's data bases. This is challenging for several reasons, among which are

(1) Many scholars feel that students' increasing access to information of all kinds has rendered them unable to distinguish *good* information from *bad*, so they simply cannot see the value of searching the library's data bases when it is so much easier to obtain information the Internet—*information, no matter what its source, all looks the same to them*,

(2) As instructors, we have advised students to access information through specific avenues, instead of emphasizing rigorous evaluation of sources no matter what the means of access (we are to be forgiven for this, because, we say, a scholarly journal has already "done the work of qualifying the source for you"),

(3) The line between information that can be accessed only through library indexes and data bases, and that accessible through the Internet, narrows *daily*. We really can no longer give direction for research methods based on the medium through which it is accessed.

(4) The prevailing body of knowledge about classroom techniques seems to suggest students may learn best working in collaborative groups, yet we have no models for students working collaboratively or cooperatively to conduct scholarly research,

(5) Comp 1120 strives to teach *processes*, but evaluates student performance only by grading *products*; there may be little motivation for students to increase their expertise in research

methods since the skill is not directly graded,
(6) Reference librarians acknowledge that information in scholarly journals is rarely aimed at the audience we serve in Writing Studies 1120. A case in point is that a highlighted summary of new medical research that appears in *USA TODAY* may be much more appropriate for students at this level than the multi-page article summarizing the same research in *The New England Journal of Medicine*. Yet the latter is a "scholarly source," while the former is often not considered worthy as a source.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies (e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Research questions:

1. Can a collaborative model—groups of students assisting each other to access and evaluate sources for their own and each other's papers—be of use in helping students learn good scholarly research methodologies?
2. What can we learn about selecting such groups?
3. Will collaboration both face-to-face in small groups and through Web Crossing in the same small groups help students (freshmen are not experienced at working in groups and participation is an issue)?
4. Will such a model yield sources that are more highly qualified than those we have seen in the past?
5. Will attaching points (that will affect grades) to collaboration be important?
6. What is the best possible role for the teaching faculty in teaching research methods in this class?

Description of research project:

- I assigned students to groups in Week 3, following a lesson devoted to discussion of their roles in a group and their self-disclosure of the roles they see themselves in.
- Several lab and class periods Weeks 4-10 were devoted to students' searching for information on their topics and <u>seeking approval/help from their group members</u>.
- Students also will also have the opportunity to use e-mail and meet outside of class to consult on their projects.
- Students will need to "pitch"; that is, rationalize, their choice of sources to their groups.
- I will ask students to reflect upon and evaluate the value of this approach.

Evaluation Plan:

Students earn grades in Writing Studies 1120 based on the number of points of 1,000 they accumulate throughout the semester. One challenge, mentioned above, is that traditionally there has been no opportunity for students to earn points *directly* for the quality of their research and the sources they use in writing scholarly essays. (Rather, we state that poor research and inadequate sources are the biggest drivers of poor quality essays.)

For this project, I added a 75-point component to the class grading scheme called "Collaborative Research Project." Students were able to earn points for participating in group activities and for evaluating the activities.

Summary of Outcomes:

On April 2, 2007, I surveyed two classes regarding the project and its value. Following are findings that I presented to the Bush group on Friday, May 4:

Q1: How helpful was your team in helping you accumulate and validate your research? (38 students responded)
Not at all helpful – 3%
A little helpful – 34%
Somewhat helpful – 60%
Very helpful – 3%
Extremely helpful – 0%

Q2: If your group was helpful at all, describe how (42 responses, coded):
Helped with my topic – 29%
Helped me analyze my research – 43%
Other (reviewed assignments, citations, other) – 28%

Q3: Were one or two individuals in your group particularly helpful? (37 responses, coded):
No, no one stood out – 27%
One or two (named) – 62%
No, but I trusted one person more than others – 11%

Q4: How do you think you contributed to others' success? (35 responses, coded):
I helped find and analyze sources – 77%
I reviewed others' work – 11%
I didn't contribute – 12%

Q5: Describe "positives" about this process. (42 responses, coded):
Get to know people – 38%
Got ideas or help with work – 62%

Q6: Describe "negatives" about this process. (28 responses, coded):
Other people weren't helpful/absent – 71%
I wasn't a good participant/absent – 29%

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

On May 4, 2007. I shared the responses to the six questions, above, reflected on the results, and asked for feedback in the following areas:

1. My process for making group assignments was to ask students to assess their "role in a group" and then to assign groups. This has been a successful model for upper class groups but may not be for freshmen. Should I assign groups several times throughout the semester? Should I use a different model for making assignments?
2. Freshmen seem so reluctant to question each other's ideas. Will it help to model language for doing so?
3. Should groups be smaller than 5-6 students?
4. A surprising finding was that students valued their peers' feedback on topic selection, which was not an assigned group discussion. Should I start earlier in the semester with a topic selection small group discussion?
5. The Web Crossing for discussion seems bulky, but Instant Messaging, at a pre-arranged time, may be an idea to explore.

I received feedback on all of these issues from the group, and made changes to the project and its evaluation during Fall 2007 when I again empowered 55 freshmen students in Writing Studies 1120 to work in groups and then evaluate their success.

During **Fall semester 2007**, I again divided students into groups for the purpose of discussing topics and helping one another conduct scholarly research. And again, the first group assignments were made based on students' early (in the semester) self-disclosure of their best contributions to a group. However, based on input from the Bush group in May 2007, I dispersed the original groups after two weeks, and re-assigned groups based on students' reporting names of their peers who were helpful to them, and with whom they would prefer to work. I surveyed students on the process in weeks 10, 12, and 14. Following is an overview of the results of these surveys:

Evaluation I provided more confirmation of the great value of group work early in the semester on these fronts:

1. The groups provided a very useful venue for meeting and becoming better acquainted with students in the class.
2. The groups were helpful to individuals in topic selection, and less so in conducting research.
3. Most students were able to identify one or more students who had been particularly helpful to them, and with whom they would like to work in the future.

Evaluation II followed my re-assigning groups based largely on students' preferences for whom they would like to work with. Students responded regarding the value of a group peer review of an important assignment. Students were overwhelmingly positive about the group peer review experience, and many related the success of the review to the other members of their group.

Evaluation III asked the students to reflect upon their positive and negative experiences working in groups, and to reflect upon their own "style" that might benefit them (or not) in group work. Coding the responses resulted in the following observations:

- Continuing confirmation that students benefit enormously from working in groups when they already have a relationship with members of their group, and respect those members.
- Negative experiences in groups almost always revolve around working with "slackers" who are not prepared or not committed to the task at hand.
- Freshmen show a great ability to identify their own style and how it affects their ability to work in groups.

What successes have you experienced with your work/project?

The activity to discuss "roles you play in a group" and asking each student to reflect and note the role he or she might best play in a group was successful in that it was an engaging topic for the students and all were eager to communicate their best role.

There has been some success with specific groups that seem to have good chemistry and good leadership within the group.

I've spent more time in class on the research process that I have in the past, and students seem to appreciate the discussion.

I value more and more the careful attention to the process of selecting (or allowing students to select) groups based on relationship and perceived level of commitment.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

While the activity to describe roles in a group was engaging for students, I'm not sure it will ultimately be a successful way to build a collaborative group of freshmen. I think I need to consider how these students differ from upperclassmen: some will leave college this year, never to return, and their relative immaturity, coupled with their vastly differing levels of commitment, may mean that assigning groups should be done in another way.

It was extremely time-consuming for me to set up the Web Crossing so students could communicate within their groups, and only within their groups. I have no evidence at this point that students who find it difficult to collaborate face-to-face will find it any easier when they collaborate on line. This may be a component to drop in the future.

19-year-olds have two things working against them: they are reluctant to set aside social roles in order to truly contribute to a process, and (especially in Minnesota), they are reluctant to challenge their peers.

December 2007: My original goal was to examine the value of a group process in conducting scholarly research. I am ready to declare that while there appears to be enormous value in facilitating group work in college composition, it may be least effective when aimed at helping students do their research on individual topics.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

For two classes of Writing Studies 1120 I am teaching in Fall 2007, I have incorporated the following changes into the program:

- I assigned the first groups in Week 3 as planned; their first group assignment was to pitch their topic to their group.
- By Week 7 we will be changing groups, based partially on student input.
- After the first groups, which number 5 or 6, groups will number 4 or fewer.
- Students will have the opportunity to request skills they need in their group as well as specific peers they could like to be in a group with.

How are you using collaboration within your project?

The project is based on a collaborative model.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I've done research in the past for a paper to explore this issue: how to teach, and how students can best learn, the research process. I continue to add to the file of articles on this topic.

I've attended several workshops on collaborative learning and classroom techniques.

I'm regularly in contact with reference librarians at UMD, on the best ways to teach the process.

I keep up with the state of the art in scholarly publishing and on information retrieval in academia.

I depend heavily on assistance form my peers in the Bush group.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Duluth

Faculty Member(s)/Instructor: Amy L. Versnik Nowak

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Primarily 1 with some assistance from an undergraduate TA and an undergraduate intern.

Course Impacted by Research (e.g., Theatre History TH 3171):

Consumer Health HLTH 3115

Course Description: *(Please provide the course overview that appears in course bulletins)*

(3.0 cr; Prereq-Min 30 credits; A-F or Aud, fall, spring, every year)
Overview of concepts of marketing, analysis, selection, and decision making regarding health care, products, services, and providers.

Student Learning/Teaching Issue/Research Question:

CONCERN 1: LOW LITERACY LEVELS FOR CRITICAL THINKING

Students are used to a great deal of memorization and taking words at face value without consideration of deeper meanings, social influence, bias, etc. I would like to help them develop critical thinking skills, which are imperative for helping students become informed and intelligent health consumers.

CONCERN 2: LOW INTRINSIC MOTIVATION

Students seem to be driven by external motivators, such as grades. They say things like, “Just tell me what’s on the test” and are stressed out over grades instead of focusing on the personalization of the learning experience. I would like to help them connect with their intrinsic motivation for learning by creating an environment in which the students drive the educational process.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

- OBJECTIVE: The purpose of this project is to explore, design, implement, and evaluate learning experiences that promote critical thinking and intrinsic motivation among students.

- SKETCH OF WORK TO BE DONE: I will need to research current pedagogical practices and motivation theories that relate to critical thinking and learning. I can create an assessment, assess student needs, re-design the course to meet those needs, implement the interventions, and evaluate the effectiveness of the new approach to improve critical thinking and intrinsic motivation.

Evaluation Plan:

- The preparatory findings will inform the pedagogical practices and, in turn, influence the type of evaluation. Qualitative, quantitative, or combined measures might be used. Reflective measures will be used as part of the formative and evaluative processes.
- Calibrated Peer Review (CPR) is the technology being used to facilitate increased critical thinking and intrinsic motivation among students. CPR scores (quantitative) and student reflections (qualitative) will be assessed.

Summary of Outcomes:

QUANTITATIVE OUTCOMES

Exam 1 CPR (Calibrated Peer Review) Scores
Range: 60-97
Mean: 86.8

Exam 2 CPR (Calibrated Peer Review) Scores
Range: 63-95
Mean: 81.6

QUALITATIVE OUTCOMES

Student Reflections on CPR (Calibrated Peer Review)

PROS:
Learned better writer than thought
Convenient
Simple once learned
Want to use it more frequently
Laid out nicely, easy to follow
Will help improve critical responses
Nice to view others' work

CHALLENGES:
Good to read others' work, but don't understand value of CPR
Difficult to review other's work, especially if errors
Don't see how computer-based system is related to the class
Confusing at first

CONCLUSIONS

1. Students are improving in critical thinking and writing. Reflections describe instances where students have applied critical thinking in other classes, medical situations, and life in general.

2. CPR is linked to improvements in critical thinking and writing. One student wrote, "after doing the first exam I have understood a little better of what is expected from me in my responses and critical thinking as a whole. I hope to continue to think critically about topics in the future and not just accept what I hear."

3. CPR is a viable technological tool for promoting and developing critical thinking and writing in an undergraduate consumer health course.

RECOMMENDATIONS

1. Take time
    a. To learn & implement CPR process
    b. To create assignments and calibrations
    c. To facilitate student understanding
2. Pay attention to detail & process
    a. Calibrations can be tricky!
3. Be patient and flexible 1st time through
    a. Be patient with yourself as you are learning
    b. Be flexible with students as the unexpected might happen (technology)
4. Be responsive
    a. To student needs & feedback

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

- Wrote & posted second calibration text.
- Assessed calibration text.
- Designed and implemented two additional reflection components of course components.
- Presented findings at program entitled "Take Four! Improving Student Learning: What We Know/What We're Learning" at the University of Minnesota Duluth on Tuesday, December 4. The presentation was entitled "Breathing Life Into Critical Thinking Using CPR (Calibrated Peer Review)".

What successes have you experienced with your work/project?

- Learned and implemented CPR program.
- Students completed first of two exams using CPR.
- My presentation, entitled "CPR: Resuscitating critical thinking using Calibrated Peer Review", has been accepted for the 2008 HEDIR Technology Seminar—held at the AAHE national conference in Fort Worth, TX, in April 2008.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

- Time: It takes a great deal of time to design initial activities using the CPR process as it requires writing sample texts and completing calibrations.
- Scoring: The scoring used by CPR is a complex process. It can be initially confusing to understand and explain sufficiently to students.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

- The results and the reflections after the first exam indicated CPR was valued and understood by the vast majority of students.
- The results and the reflections after the second exam indicated that the second round was tougher as the calibration texts were more complicated. This told me that how I wrote the calibration texts has a strong influence on student success and reactions. This will have to be explored more.

How are you using collaboration within your project?

- The CPR process is collaborative in nature. It requires students to provide assessment and feedback on each other's work.
- I have involved two undergraduates in the project.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

- Collected many articles on self-regulated learning through a library database search.
- My presentation, entitled "CPR: Resuscitating critical thinking using Calibrated Peer Review", has been accepted for the 2008 HEDIR Technology Seminar—held at the AAHE national conference in Fort Worth, TX, in April 2008. The two undergraduate students are listed as co-authors.
- I plan to submit an article to a scholarly journal after this semester is completed.

PROJECT 1: *Expanding the Innovative Teaching Prototype Course*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Karen Cusey, Pam Gades and Katherine Benson**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course (Project) Name: Expanding the Innovative Teaching Prototype Course

Number of Students Impacted by Course _____

Student Learning/Teaching Issue: _____

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur:

Course Description: *(Please provide the course overview that appears in course bulletins)*

The focus of this project is to develop a course prototype with technology examples that support the "Seven Principles for Good Practice in Undergraduate Education". Examples include course management sites in WebCT/WebVista, Moodle (project site), Wikis, discussion forums, etc. This prototype will serve as a model for teachers in their respective courses, as well as to provide faculty with an opportunity to explore the use of technology to promote the seven principles in teaching and learning.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

This course has developed from spring 2006 to fall 2007 by Pam Gades and Karen Cusey for the Bush Technology Grant to demonstrate the various tools that can be used to promote elements of the Seven Principles for Good Practice in Undergraduate Education. Katherine Benson joined the project team to create the module for WebVista. We began by utilizing the UMWiki as a course container during the first phases of the project, and in summer 2007 moved course content to Moodle. The course has integrated many tools and examples of student-teacher contact through technology that are closely tied to the seven principles of effective learning. Our research included identifying appropriate readings to go along with the seven principles and these readings are included where appropriate in the course.

During fall 2007 we will further integrate concrete examples of tools and scholarly

readings related to the Seven Principles of Effective Learning. We are close to being done populating this course with a wide variety of content, examples, and assignments of technology tools that can be used to address all seven principles. If time and funding permits, we would also like to add resources related to learning styles, accessibility guidelines when selecting technology and creating electronic course resources that support the seven principles, and fine-tune the course for implementation in 2008.

We are making every effort to include all facets of the Bush Technology Grant work at UMM, including information about learning styles, student engagement, assessment, communication and interaction, and course content.

The first version of this project with most information can be found at:
https://wiki.umn.edu/twiki/bin/view/InnovativeTeaching/WebHome

Our current working project site has been moved to Moodle, but is not open for participation as the course is still in the development phase.

Activities/Work completed:

- (R.L.6/20/07 KC) We have continued our work to enhance the list of recommended tools that support the "Seven Principles of Good Practice in Undergraduate Education". We have completed areas of our course including: course overview, description and modules for each of the seven principles. Additional resources have been added to each module, and we are in the process of researching how the seven principles can be supported with tools that address different learning styles.
- (R.L.6/25/07 KB) I revamped the assignment that will be used as a sample for our project. I still have to update the html. Due to the fact that I was on a professional trip to China, I was unable to attend the June workshop, but I hope to see it on tape soon.
- (R.L. 8/10/07 KC) Our team met with our lead project consultant, Pam Solvie, to discuss learning styles resources and possible new ways to organize or wiki site content. We also have begun the process of moving course content from the wiki site into Moodle, which will allow us to better track participation and user ID's as they relate to the pre- and post-assessments and participant consent form.

Scholarly approach:

Successes/Challenges encountered:

- Many literature sources have been published in the past 5 to 10 years that describe online learning and educational technology which relate to the seven principles and educational pedagogy. **(R.L.6/20/07)**
- One challenge has been finding time to work as a group on this project, since it has so many facets and we are a 3-person team. Using a wiki for collaborative writing of the course has helped this aspect somewhat. **(R.L.6/20/07)**
- The changes in WebVista from Campus Edition have been extensive, and have required an enormous amount of time and effort in order to get the assignment feature to work again. I have finally managed to do this, and it made the transition to Wiki easier. (R.L.6/25/07 KB)

- The same thing, actually. WebVista is not at all transparent, and the WebVista support help is off the mark--they don't seem to understand the problem. It has been a real challenge. (R.L.6/25/07 KB)

Assessment/Evaluation of the project:

- (8/10/07) 1) We hope that this project will enhance faculty (participant) awareness of the Seven Principles of Good Practice in Higher Education, and that after completing this course they will be able to apply what they have learned to specific applications in their own teaching of undergraduate students at UMM. Our project will provide resources for faculty to read about multiple learning styles, as well as to provide a list of technologies that can be used to develop course materials in various formats (audio, video, text, other). Content delivery in our course will be enhanced by providing actual examples of what can be created using many of the tools suggested, and by allowing faculty to use the tools as a participant in this course (such as a discussion board or e-mail). 2) We will assess these elements through a pre-assessment, which will ask questions to help faculty think about how they have used technology in their teaching and learning, and how they may or may not already be using technology to support elements of the Seven Principles in their classroom. The post-assessment will be completed by participants after they complete the course, and will allow faculty to reflect on what they have learned in the course and what new strategies they might implement related to the Seven Principles.

Feedback received:

- (R.L. 6/20/07)No feedback yet, still in the stages of development. Hope to implement in late fall 2007 or early spring 2008.
- (R.L.6/25/07 KB) Students express interest. But we're just starting, so I haven't seen their work yet. I still have to show it to colleagues

Feedback from the TEL Office:

Feedback from consulting group:

This will be a great model for other online teachers. One can learn a great deal from examining a prototype. We hope to see the project in the implementation stage in spring 2008. Pam Solvie and Michelle Page will be very willing to offer any consultation needed along the way, particularly in terms of pedagogy and inclusion of learning style information, as the project leaders are already quite adept at technological implementation.

PROJECT 2: *New Course Design for Introductory Biology Course – Fundamentals of Genetics, Evolution, and Development*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Paul Z. Myers**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: **Fundamentals of Genetics, Evolution, and Development**

Number of Students Impacted by Course 75

Student Learning/Teaching Issue: accommodating a wide range of student abilities and interests in a large lecture course that must also prepare them for the biology curriculum

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: Fall 2008

Course Description: *(Please provide the course overview that appears in course bulletins)*

From course bulletin
Introduction to scientific methods and the history of biology, with an emphasis on mechanisms of inheritance, development, and descent with modification. Overview of pre-Darwinian scientific thought; the theory of evolution; a qualitative introduction to genetics and molecular biology; and a summary of developmental biology.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Myers is developing a new course this summer, Fundamentals of Genetics, Evolution, and Development, to replace the Biology Discipline's existing freshman introductory biology course. He will be developing new course content that will be both presented in class and available to the students online. In addition, he'll also be trying to enhance the interactivity of the lectures with a Personal Response System.

Activities/Work completed:

a. A moodle course page was set up
b. All lecture materials were made available as pdf files
c. Supplementary discussion questions were placed online
d. Online discussion tools were made available

Scholarly approach:

Successes/Challenges encountered:

- (6/15/07) KL reported in reflection log that Moodle was successful set up.

Assessment/Evaluation of the project:

Almost all of my effort was directed towards developing the course content – these were all new lectures at the freshman level. A PRS was not used this term; it was too much to add on top of everything else.

My initial plans were to give roughly equal weight to the four main topics of the course: the basics of the scientific method, and an introduction to evolutionary biology, genetics, and development. Genetics is a relatively abstract exercise in logic, and gave the students the most difficulty; I'll be expanding the time invested in that particular subject in the future.

I made a conscious effort to avoid straight lecture, and spend 1/3 of the class time in small group work and discussion. This has been successful; when I expand the unit on genetics, I will mainly be adding extra in-class work on genetics problems.

While I've implemented the online discussion capabilities of moodle, we really haven't taken advantage of them well. Next term I'll be adding more motivation to actually get discussions going on the web; as it is, it's mainly where students ask me what's going to be on the test.

Feedback received:

Feedback from the TEL Office:

Feedback from consulting group:

- Kristin Lamberty helped request a Moodle site for course.
- Kristin Lamberty saw Paul Myers and mentioned the PRS available for checkout.

PROJECT 3: *Web Development for History 3204 – Nazi Germany Course*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Marynel Ryan**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: **Nazi Germany (Hist 3204)**

Number of Students Impacted by Course 28

Student Learning/Teaching Issue: Multiple learning styles and web content delivery

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: ongoing; will culminate in December 2007

Course Description: *(Please provide the course overview that appears in course bulletins)*

From course bulletin

HIST 3204 **- Nazi Germany (HIST)**
(4.0 cr; fall, spring, offered when feasible)
History of Nazi Germany. Social and political origins, Nazi rule in the 1930s, the "final solution," World War II, and Germany's attempt to assess this era in its history.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Ryan will be teaching a new course in the fall, entitled Nazi Germany. She would like to develop a web component for this new course that would offer as many diverse exercises and opportunities to expose her students to interactive course material through course management software. With this added component, she hopes that her students will understand how and why Nazism was so effective in attracting true believers and eliminating the potential for dissent.

Activities/Work completed:

- In the process of creating populating a Moodle site and gathering and scanning in primary source documents. I am also developing the list of course topics and various readings right now. I hope to have at least the first half of the course hammered out completely by the time the semester begins. I often like to leave some flexibility for myself in terms of the primary sources I use from week to week, so I rarely have a syllabus that includes all of the information. (R.L. 6/15 MR)
- I built a basic Moodle site for the course and began to compile materials to add to it; I sent these to the team member responsible for scanning and adding them to the site and that work is underway. I am currently working on developing a WebQuest for students that will be one of the early activities of the semester.(R.L. 7/15 MR)
- More documents on site; more link resources; added details for the first few weeks to steer students in the right direction. (R.L. 8/15 MR)
- 10/11/07 I have a number of resources on the site at this point, which I would be happy to demonstrate; I've also responded to student requests for specific additions – Moodle makes this very convenient. For example, the students are regularly using the "forum" feature for additional discussion outside of class. This also allows me to assess participation for those who speak less in class but are more comfortable with the written format/web-based communication/the opportunity to "synthesize overnight" and comment on something later.

Scholarly approach:

10/11/07 My major scholarly approach in this class is to problematize our multiple perspectives on Nazi Germany – popular, scholarly, and individual. I expose the students to historiographical debates and open up their own impressions and interpretations for discussion. I offer them a great deal of access to translated primary sources to inform those impressions and interpretations. I also consistently relate the material to our own world; for example, I began the discussion of consent and cooperation in Nazi Germany with the question "Why do most Americans identify themselves as middle class?" to get at the value we place on consumption and symbolism in our identity construction. The question of consent under Nazism is all tied up with the same kinds of considerations.

Successes/Challenges encountered:

- (6/15/07)Successfully set up a Moodle site. Scanning in primary source documents is going well.
- (7/15/07) Moodle is really intuitive and I haven't had trouble using it. I think it will make a nice interface among members of the course and myself. I have been able to find most of the things I wanted for the site, thus far.
- (7/15/07)I am far less confident about obtaining and using images than I was before. I hope to solve this problem using WebQuests, at least initially. I now understand that I needed more lead-time and less in the way of other commitments to really do this. I am also challenged by constantly thinking about how the site will work/look/etc. relative to students' needs, but that is a good challenge.
- (8/15/07) I'm much more comfortable with Moodle now and feel confident continuing to work with it.
- (8/15/07) I'm still working on getting good, appropriate images for the site; I hope to load some of those next week.
- 10/11/07 The major issue I've encountered since the semester began is the one I

was encountering before – finding images I can use and loading them on the site. I've had some success and I have a clerical TA for the class who is adept at scanning, so he's helped me add some material. But I need to spend some time before I next teach this course getting permissions and good, appropriate images.

Assessment/Evaluation of the project:

- (8/15/07) I am planning to assess student response to the website on a regular basis; Brady provided me with some resources that will help me prepare the evaluation. I believe the site will enhance student learning by allowing students to explore beyond what we cover in the classroom and the assigned readings and by allowing them to integrate that information from beyond into what we are all learning together. The site and its various contents and direction (e.g., web quests) will appeal to different learning styles and - ideally - address different students' needs (something I will assess in the evaluations with questions about how well the resources and assignments do that). Content delivery will be enhanced immeasurably - without a website, I'm pretty much limited to what I can do in class and distribute there. The site will allow me to direct students to a virtually unlimited set of resources on the web and to use materials that I'd be reluctant to provide on paper for economic reasons. To repeat, in answer to the last question, I will be assessing the site and its effectiveness regularly using student evaluations.
- 10/11/07 The students have completed one evaluation relative to Moodle and will be asked to complete three more. Additional individual responses have largely been very positive, once the students learned the basic skills for navigating the site. The upload feature is very popular, since it saves students the cost of printing.

Feedback received:

- I am thinking about doing a learning-styles questionnaire at the beginning of the semester to help me think about how to assess the web component (and the course overall, actually). Do we have models for that? Pam suggested I look at Karen's materials for assessing GenEdWeb courses, as well as the Innovative Teaching site. (R.L. 6/15/07 MR)
- 10/11/07 I did not actually do this. It has become pretty evident what people's styles are, but I didn't find the time at the beginning of the semester for a questionnaire. I will incorporate that next time.

Feedback from the TEL Office:

Feedback from consulting group:

The incorporation of WebQuests and other tools to compensate for the difficulty in completing the image/document sourcing and scanning is an effective strategy. The consulting group directed Marynel to some resources on these tools and are excited to see how she is incorporating them into her course and project. We haven't needed to consult much on Moodle as she has figured out how to use it on her own and the tool is fairly intuitive and user-friendly. Great project and we hope it continues along the productive path already started upon.

PROJECT 4: *Creating an online Intro. Psych course with video lectures and PowerPoint*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Dennis Stewart**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: **Online version of Intro. To Psych**

Number of Students Impacted by Course _____

Student Learning/Teaching Issue: _____

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: _____

Course Description: *(Please provide the course overview that appears in course bulletins)*

From course bulletin

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Stewart will be developing an online version of Introduction to Psychology this summer. He has started taping all of his lectures and converting them into PowerPoint presentations so that students can stream them onto their computers at home. He hopes to incorporate both the video lectures and the PowerPoint presentations into his course on WebCT.

Activities/Work completed:

- (7/15/07) The video lessons are now complete and have been entered into WebCt
- (8/15/07) I have finalized the online course. It now has video files, audio only files and PowerPoint files.

Scholarly approach:

My approach was to try and mimic the in-person version of the Intro. Psych course as much as possible in an online environment.

Successes/Challenges encountered:

7/16/07

- The video lessons are now complete and have been entered into WebCt
- We had some difficulties getting the streaming videos to work in WebCt

8/15/07

- I have finished the course.

Assessment/Evaluation of the project:

(8/15/07)

- I will assess it through student feedback.

Feedback received:

Feedback from the TEL Office:

June 2007

- Student in the process of creating 58 'modules' for Dennis Stewart for an online course he is offering. This involves locating the different recordings he has made (some lost due to a computer glitch that he was recording on), separating the different modules, exporting them, and then converting them to a streaming file usable on the web. I am currently exporting the last 7 files, and beginning the conversion to Real Media (.rm).-

July 2007

- All the Stewart modules are now finished and online in 3 formats (streaming video, streaming audio, and mp3). This may not be complete yet, depending if Dennis wants to make Breeze presentation.

Feedback from consulting group:

- (6/15/07) We have completed video recording all lecture modules. A webCT course site has been developed. Andy G. has started to convert all video modules to real video format for loading to the SHOT video server. Mike Cihak will provide Dennis with url links to the server files to include in his webCT site.
- From a technology standpoint the project is going as planed.
- On reflection we might have researched Breeze a bit more thoroughly as a means to deliver the video/PowerPoint modules. We plan to convert one on the lectures to Breeze as a test project.

PROJECT 5: *Engaging World Politics Students by Offering Course Materials in Multiple Formats*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Seung-Ho Joo**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: **Pol 1401: World Politics**

Number of Students Impacted by Course 50 (Fall 2008); 25 (Spring 2008)

Student Learning/Teaching Issue: Providing instruction materials in multiple formats, i.e., lectures in streaming video and Power point formats available online (in the course website)

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: The data will be collected at the end of the spring 2008 semester.

Course Description: *(Please provide the course overview that appears in course bulletins)*

From course bulletin

POL 1401 **- World Politics (IP)**
(4.0 cr; fall, every year)
Basic concepts, theories, and trends in international relations. The contemporary international system, foreign policy, peace and war, diplomacy, international law, and global issues (environment, economy, and nuclear nonproliferation).

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Joo intends to make his lectures available in "streaming video" in the course website (WebVista) for students' easy access. He will also make lecture outlines available in Power Point slide shows in the course website. Additionally, he will expand and enrich his course website by including visual components (tables, graphs, and pictures) and useful website links. The outcomes will be used during classes, and will be made available online for students' preview and review. He expects the addition of streaming videos. Power Point slide shows, and other visual components will enhance students' learning and engagement by exposing them to diverse and stimulating course materials in multiple formats.

Activities/Work completed:

1) Collected and compiled videos (clips from documentary films and movies) and converted them into "streaming video" (June-Aug. 2007).
2) Requested copyright permits on these materials through Karen Cusey, Continuing Education (Aug. 2007)
3) Video recording lectures and converting them into "streaming video" (to be complete by Dec. 15, 2007)
4) Preparing lecture outlines in Power Point and uploading them in the course website. (to be completed by Dec. 15, 2007)
5) Adding supplementary course materials (links to websites, readings, etc.) (to be completed by Dec. 15, 2007)

Scholarly approach:

Successes/Challenges encountered:

A student assistant recording my lectures experienced some minor technical difficulties in handling the equipment.

Recording lectures and converting them into streaming video worked nicely. I encountered no problems using Webvista or uploading instruction materials there.

Assessment/Evaluation of the project:

This project will be complete by the end of the Fall 2007 semester. The assessment/evaluation on it will be made during the spring 2008 semester.

Feedback received:

Lecture outlines in Power Point and supplementary materials made available in the course website (Webvista) are well-received by the students.

Feedback from the TEL Office:

July 2007

- Will work on online lectures (if Joo uses Breeze).

Feedback from consulting group:

- (7/15/07) Seung-Ho Joo project No progress to report. Team will be meeting next week to set up timeline for completing project.

PROJECT 6: *Maximizing Efficiency in Undergraduate Chemistry Labs*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: Ted Pappenfus

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: General Chemistry I (Chem 1101) and Introduction to Research (Chem 2321)

Number of Students Impacted by Course: Chem 1101 (143); Chem 2321 (16)

Student Learning/Teaching Issue: Preparedness issues in lab and data handling

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: Spring 2008; Fall 2008

Course Description: *(Please provide the course overview that appears in course bulletins)*

Chem 1101: Scientific method, measurements, nomenclature, stoichiometry, atomic and molecular structure, thermochemistry, chemical periodicity, introduction to chemical bonding, and properties of common elements and ions. Development of scientific reasoning and problem-solving skills. Laboratory exercises concomitant with these topics.
Chem 2321: Interdisciplinary approach to experiment design and analysis of data. Synthesis of organic, organometallic, and/or inorganic compounds, with emphasis on purification and characterization using instrumental methods. Instruction in use of the scientific literature and scientific report writing.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Pappenfus hopes to maximize efficiency in the Chemistry Discipline's courses this summer. He would like to 1) develop video lab manuals to supplement existing hard copies of manuals, and 2) utilize NetFiles to maximize the efficiency of data collection in chemistry labs.

The videos were produced in summer 2007. The use of NetFiles in for data handling and analysis was also explored at this time. The use of these materials will be evaluated in 2008.

Activities/Work completed:

- (6/15/07) Attended Projects Meeting on May 14, 2007; Participated in Bush Grant Workshop on June 4, 2007; Developed an implementation plan on June 14, 2007
- (7/16/07) Began using Netfiles; Came up with a list of experiments for Fall 2007 general chemistry lab for making video supplements.
- (8/15/07) Worked with Andy Geyer in the production of videos for use in general chemistry laboratory; had students test NetFiles for transfer and analysis of experimental data

Scholarly approach:

Design an test the materials with upper-level chemistry majors. Implement and evaluate materials in actual courses.

Successes/Challenges encountered:

- As much of my time was devoted to research over the summer, the main challenge was finding time to work on the project. Concrete work began on the project in July and the production of the videos went very smoothly thanks to the experience and efforts of Andy Geyer. The use of Netfiles also went smoothly and students encountered no problems with the software.

Assessment/Evaluation of the project:

As Pappenfus is on leave during Fall 2007, implementation, evaluation, and assessment will occur in 2008.

Feedback received:

- Initial student response to the use of Netfiles in labs has been positive.
- Video lab manuals will also be pre-tested in Fall 2007

Feedback from the TEL Office:

July 2007
- Student working on video labs.

August 2007
- Edited lab tutorials.

Feedback from consulting group:

PROJECT 7: *Engaging Students with Multiple Learning Styles Using Kolb's Learning Cycle, Content Delivery Tools, and Blended Learning*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Pam Solvie**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty, 3 professional staff (IT Consulting Group)

Campus: UMM

Course Name: ELED 3102 Reading Methods: Literacy and Language Instruction in the Elementary School

Number of Students Impacted by Course 18

Student Learning/Teaching Issue: Engaging Students with Multiple Learning Styles Using Kolb's Learning Cycle, Content Delivery Tools and Blended Learning

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: Fall Semester 2007

Course Description: *(Please provide the course overview that appears in course bulletins)*

From course bulletin
ELED 3102 **– Reading Methods: Literacy and Language Instruction in the Elementary School**
(4.0 cr; Prereq-admission to elementary teacher education program; fall, every year)
Beginning and advanced reading instruction in the elementary grades. Includes study of theory, issues, literacy frameworks, assessment, materials, organization, and instructional strategies to scaffold children's literacy development.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

This project will employ research on Kolb's learning styles, content delivery tools and blended learning, to engage preservice teachers (ELED 3102) in meaningful learning of literacy and language methods. Application of Kolb's Learning Cycle will address students' multiple learning styles during lesson presentations and learning activities. Content ordering and sequence of concepts within lessons will be researched.

Research on blended learning will be reviewed in order to effectively link face-to-face with on-line learning tools. On-line tools such as UM Twiki, Moodle discussion board, and UThink tools will be used. These will not simply add to existing course work, but will be reviewed to learn how they might be used to help students understand content in more meaningful ways. This might be done by replacing some existing assignments and addressing learning styles, to specifically support abstract conceptualization and active experimentation learning style modes. Content ordering and sequence of concepts introduced/reviewed using these tools will be researched.

The course website for ELED 3102 will be restructured to become more interactive to address learning style preferences. Concept maps with links to content (including prerequisite knowledge) and tools (wiki, discussion board and blogs) associated with Kolb's learning style modes will be made available. Resources (perhaps audio and video links, URLs and pdfs, as well as links to the tools) on the course web page will support reflective observation and active experimentation.

Finally, Interactive Scenario Builder will be investigated as a simulation tool. Simulations may serve as learning checks. Concepts that are central to understanding literacy and language methods could be a part of such scenarios. These simulations could be made available on the course web page, providing concrete experiences for both accommodators and divergers.

Activities/Work completed:

- (6/18/07) I have had two meetings with my project consultant, Nic McPhee, and have completed a number of activities at this point in time. In addition to meeting with Nic on May 10th and June 18th, Nic, Pam Gades, and I, have been discussing a number of project issues on a wiki site Nic created for this purpose. Though I have used UMWiki in the past, the wiki site has allowed me to become familiar with more of the tools that are a part of this wiki program. Nic has also provided desk side assistance in setting up a wiki for my project course and has demonstrated a number of programming techniques that address many of the concerns I had about the wiki. Use of these techniques has helped me address the frustrations my students had in creating a collaborative document during the past year. Based on these additions and changes, I am excited about the possibilities for content delivery using the wiki in a more friendly and useable context. During the past five weeks, I have practiced using Uthink, a blogging tool with my May term students. Pam Gades helped me initially become familiar with this tool. Based on my use of the blog I have generated a list of questions about its use, which my consultant group members have been discussing on the wiki, and which I have been reading about in journal articles. Based on our June 18th meeting Nic and I developed a list of ideas to address these concerns including:
- creating a section on the blog that identifies the purpose of the blog and which

identifies the blog as a component of a university course,
- having students create shorter posts with teasers associated with expanded text,
- reporting who is blogging at the beginning of the post,
- identifying expectations for the blog as well as parameters for editing,
- providing tech support early and often concerning the blog tool,
- having students blog more than once on topics, and
- creating section headings to make the reading and writing process easier within the blog.

Nic and I have pondered the differences between discussion boards and blogs for content delivery in multiple discussions. These discussions included consideration of the affordances of the specific tools and expectations for student involvement with each tool and peers within the course.

Other activities completed at this time include consideration of a number of concept mapping software tools and investigation of the Moodle course management tool. At this point Inspiration and InDesign remain the top concept mapping contenders for further investigation and use in my project.

Nic has demonstrated multiple functions of Moodle and at this point we have set up a number of Moodle sites for multiple courses I will teach in the fall.
- (7/15/07) Since my last reflection log I have decided to use Inspiration as my concept mapping tool. I met with Linda P. to discuss making connection links and curved points within the concept maps. I have also reviewed Interactive Scenario Builder and am comparing its features to UM Connect and will decide soon which tool to use. I have also met with Nic M. multiple times to discuss Moodle and UM Think (Blog) questions. I've been adding content to my Moodle site and have set up a Blog site with a link to the Moodle site. I also met with Rebecca W. to discuss data collection on my course webpage.
- (8/15/07) Throughout the past few weeks I've worked on my Moodle site. Over the summer I have become familiar with several tools that are available within Moodle and have decided to make use of the discussion forum, the glossary, and the news forum. I will be posting information about assignments and uploading activities as well. Most recently, with Kristin and Brady's help, I have reviewed my site for possible bugs or inconsistencies, and learned to back up my sites. Kristen also reviewed Survey Monkey with me and demonstrated use of the quiz tool in Moodle. The quiz tool may help me collect important information on use of technology tools and their benefit (or not) to students with particular learning styles. Also this month I've reviewed multiple video clips that I will embed on my course webpage for use in my course. Thanks to Brady's assistance, I have multiple resources available for modeling of effective reading instructional practices which I have begun to embed on my course webpages
- I've been making use of Inspiration for creation of concept maps and with Linda's help have learned how to use a variety of lines for connections in the maps.
- Through further investigation of Inspiration I've learned to save my maps as a document while preserving the hyperlinks embedded in them, for uploading to my course web page.
- (9/07) After reviewing Interactive Scenario Builder, I decided to use Breeze Presenter (now Adobe Connect) at this time.
- (10/07) I have been using the Q/A forum in the Moodle Discussion Board for reflection exercises in my course. It is working well in that students all have the

opportunity to respond, before reading others' posts. I've made use of the glossary tool within Moodle. It's been a fantastic tool for use in my reading methods course. The blog has been up and running since August. I devoted some class time to instructing students in use of tools, including the blog, which supported their use of the tools. I feel the focus is now on the content and process verses the tools—just what I wanted.

- I've made some changes to my course web page, not yet as many as I would like. This continues to be a work in progress.
- I have received some data on student use of the tools on my course web page using Google Analytics. This data will be important in identifying amount of use—though I still cannot try *who or what learning style group* is making use of particular tools. I still want to find a way to do this.
- I continue to work on task analysis—looking carefully at the components of assignments to identify who might benefit from the assignments *and* to identify what I might do to make tasks clear for students. This is in an attempt to help students use learning behaviors (style characteristics) that would help them access, comprehend, and demonstrate knowledge of course concepts.

Scholarly approach:

My research has involved reading scholarly materials. Through reading I learn about what tools are available, how they might be used, and how they might be adapted for use in my project. Other reading has provided information on learning styles and blended learning. Workshops and meetings have informed my decisions and the direction of my project as well.

Identifying a clear research question, creating the research environment, and collecting data have been important scholarly components of my Bush Grant project. These will lead to writing about the results of the research and later dissemination of the findings.

Successes/Challenges encountered:

- (6/18/07) Successes described above include work with Uthink as a blogging tool along with plans for improved use of this tool, changes in set up and planned use of UMWiki for my project course, and investigation and creation of Moodle sites for multiple fall courses I will teach
- (6/18/07) My work is going well. I am extremely pleased with the support and advice provided by my project consultants. Time, of course, will be a challenge as I work to develop concept maps and interactive scenario components.
- (7/15/07) I am very excited about Moodle and UM Think. I'm thrilled with the expertise Nic has shared about both of these tools. Nic has been an excellent consultant. I am also extremely appreciative to Pam G. for the Breeze example she shared because of the great pointers about effective use of Power Point for content delivery.
- 7/15/07 I have great information and tools ready. My challenge will be to prepare them for use in the manner I desire before the new semester
- (8/15/07) All of the above have been successes for me this month. I am thrilled with the possibilities these tools afford.
- (10/07) Now that the semester is nearly half done, time is at a premium. I have decided to continue to investigate the survey tool in Moodle by trying it with smaller

surveys at this point. I will collect important project data via paper right now.

Assessment/Evaluation of the project:

- (8/15/07) I will know if this project is successful through data collection and analysis. Data to be collected will be course grades, students' survey comments, and frequency of use of resources on my course webpages. Grades and students' comments will be analyzed by learning style mode. The data I will collect will provide important information on the usefulness of the technology tools I have incorporated for content delivery. In the future, the Moodle quiz will replace work previously done "by hand". Separate quizzes for the four learning style modes will help me more efficiently analyze data collected.

Feedback received:

- (6/18/07) I've received positive feedback on my use of the blog from my colleagues, Nic, my project consultant, and others for my May term study abroad course. The positive feedback coupled with ideas generated through discussion with Nic concerning blog questions has been encouraging and exciting as I continue to make changes in the way I plan to use the blog for content delivery in the fall.
- (10/07) It seems most students are comfortable using the technology tools. Most have offered positive comments about the tools and seem proud of their ability to use them. I’ve offered and encouraged students to write to me for assistance and those who are uncomfortable or unsure have written or spoken with me after class and during office hours to get help with the tools.
- I am ready to collect midsemester data. I am looking forward to reading this information and to making any necessary changes in the use of tools and organization of them for learning in the context of this course.

Feedback from the TEL Office:

Feedback from consulting group:

- (8/15/07) K.L. met with and helped Pam sort out logistics for conducting a survey and were able to come up with a nice solution for Pam to conduct her survey to assess the success of the project she is working on.

PROJECT 8: *Vertically Integrated Course Material Development for Different Learning Styles in Statistics*

University of Minnesota
Bush Foundation Grant
Research Project Profiles

Faculty Member or Instructor: **Engin Sungur**

Number of people involved in course redesign team (e.g., teaching, specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational, Technology consultants) 4 students, 4 faculty,3 professional staff (IT Consulting Group)

Campus: UMM

Course (Project) Name: **VERTICALLY INTEGRATED COURSE MATERIAL DEVELOPMENT FOR DIFFERENT LEARNING STYLES IN STATISTICS**

Number of Students Impacted by Course: 45x2 (academic year) 25x3 (online and summer)

Student Learning/Teaching Issue: Learning preferences

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur: Assessment process is in progress

Course Description: *(Please provide the course overview that appears in course bulletins)*

STAT 1601 **- Introduction to Statistics (M/SR)**
(4.0 cr; Prereq-high school higher algebra; fall, spring, every year)
Scope, nature, tools, language, and interpretation of elementary statistics. Descriptive statistics; graphical and numerical representation of information; measures of location, dispersion, position, and dependence; exploratory data analysis. Elementary probability theory, discrete and continuous probability models. Inferential statistics, point and interval estimation, tests of statistical hypotheses. Inferences involving one and two populations, ANOVA, regression analysis, and chi-squared tests; use of statistical computer packages.

STAT 2601 **- Statistical Methods (M/SR)**
(4.0 cr; Prereq-Math 1101 or Math 1021; fall, every year)
Descriptive statistics, elementary probability theory; laws of probability, random variables, discrete and continuous probability models, functions of random variables, mathematical expectation. Statistical inference; point estimation, interval estimation, tests of hypotheses. Other statistical methods; linear regression and correlation, ANOVA, nonparametric statistics, statistical quality control, use of statistical computer packages.

Description of Research Project: *(Include specifics about your project such as your goals and objectives, the implementation timeline, etc.)*

Professor Sungur hopes to develop various content delivery tools (e.g. visual simulations) for various statistics and probability courses. In addition, he hopes to smooth the integration of statistical software into the various courses and to incorporate all of this material onto the course websites. You can view the backbone of this project by visiting this website: http://www.morris.umn.edu/~sungurea/introstat/index2601.html and clicking on "Alternative Content Presentation" on the site map.

Activities/Work completed:

1. Student opinion on instructional technology has been collected by using an electronic survey instrument from the past 5 years.
2. Student learning has been analyzed by using the data obtained from electronic learning checks that includes 4000 data points from past 9 years.
3. Learning challenge areas has been determined
4. Online learning materials including interactive course materials, lecture notes, learning checks have been developed/updated
5. Statistical computing tools have been developed and integrated throughout the all statistics courses. Common resources have been developed and tested.
6. First stage of student assessment of learning data has been completed.

Scholarly approach:

- Use of interactive course materials, such as activities, simulations, and computing, to enhance student learning by addressing different learning preferences.
- Integration of learning process at various levels of statistics courses

Successes/Challenges encountered:

- Enhanced student learning and performance
- Higher student motivation
- Increased interaction
- Restructuring of the courses based on the student needs

Assessment/Evaluation of the project:

- Learning checks after the implementation showed a statistically significant change compared to before implementation. Student performance/motivation increased significantly in all of the aspects of the course
- Vertical integration of the tools helped the statistics faculty to manage their time effectively and efficiently

Feedback received:

Feedback from the TEL Office:

June 2007

- Student analyzed raw data for Engin's Learning Checks for his Intro Stat course.
- Students and Jess, are helping Engin remodel the statistics website. Student is editing and modifying the Breeze presentation for Engin's Intro state course website. Student is re-writing the mid-term and final exam for Engin's Intro Stats.

- Restructuring statistics website

July 2007

- Created webpages for statistics site.

August 2007

- More Webpages for site.

Feedback from consulting group:

From reflection log 6/15/07 – JL

- Met with group and discussed design options and what Engin wants to maintain in website.
- Students gave great feedback about design and navigation, group also thinking about a "brand name" to make the content of the site easier to Google, or remember by students.
- The sheer size of the site will slow down renovation.

From reflection log 7/15/07 – JL

- Met with group and evaluated chosen design options.
- Students working on site being very thorough with mapping and changing web site, this will take a lot of hours to do.
- The project will be successful if it achieves a clarity in navigation that laymen and beginning students can see the route they need to take. Also, the faculty will have to support it and feel comfortable in upgrading it. Mostly it comes down to knowing that the content is above average and sought after by other institutions, and that the look and design of the site needs to be contemporary, efficient, and appealing to its target audience.

From reflection log 8/15/07 – JL

- Design renovation continues for Engin's site--he has fantastic content, but needed a design to give students better navigation through site.
- First design templates showed improved navigation, also group meetings and discussions provide valuable feedback and direction as to how much technology is possible to include for each project. I have become very aware of being clear why I would want certain new programs/formats/etc. and what time commitments they require and how students will react if not logically integrated into the curriculum. This is valuable information for myself as well as advising other colleagues in the future.
- Students give Engin's site better evaluations in relation to his course. Also, it would be interesting to have student focus groups from the Statistics Discipline to evaluate the site and its design.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Maria Gini

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 4

Course Impacted by Research (e.g., Theatre History TH 3171): Csci 1901

Course Description: *(Please provide the course overview that appears in course bulletins)*

This is the first course for computer science major. The course does not assume any programming knowledge. Some familiarity with Unix is useful. The course teaches how to use a programming language as a formal way of expressing ideas. Strong emphasis is on recursion, data abstractions to hide program details, modularity to manage complexity. The programming language Scheme is taught as part of the course. In addition, the fundamental aspects of Python are presented to ease the transition to other programming languages.

Student Learning/Teaching Issue/Research Question:

How to increase student engagement with the course material, given the size of the class and the complexity of the material we teach, and how to improve student retention without reducing the material covered and the level of skills we expect the students to master.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Interventions/strategies:

1. using small group work. The room in which the class is taught presents a barrier here, since the chairs can't be moved, so the groups couldn't be larger than three or maybe four. The group work could take the form of a pair-share activity or involve larger groups.
2. using "bonus quizzes", which would be relatively easy quizzes based on the readings and presented to students as a reward, not a punishment. The hope is to increase attendance in class, improve students' preparation for class, and to help students to keep up with the material. We thought about 10 quizzes would be a good number; they could be graded on a coarse-grained scale to keep the grading burden to a minimum.
3. trying different configurations of lab teams, such as picking partners for students for the first few labs, and later letting them choose their own partners.
4. a group project, which could be split into parts, so that different students would do different parts and then try to fit them together. This could help students to learn how real software engineering works. Simulation was mentioned as a possibility here.
5. create a student management group as a tool to give students a forum to express their opinions,
6. bringing the Sony robot dogs into the lab and ask the students to use Scheme to control them to move,. Play music, etc
7. setting up extra office hours to be used as a gathering place for students, to create a sense of community among them.

Evaluation Plan:

1. Do multiple (3-4) questionnaires to get students opinions.
2. Assess overall class performance (grades, number of students passing the class, etc).
3. Use the student management team to get student opinions and feedback.

Summary of Outcomes:

1. Pop quizzes were used as a way of assessing student progress but also as a way of cooperating with other students. Students were free to talk to other students while answering the pop quizzes but were evaluated individually on their submissions. This provided an incentive for them to discuss with other students and increased their understanding of the material.
2. The use of the robot dogs in the lab created a sense of excitement and a sense of belonging to a group.
3. The student management team provided a valuable way of sensing the pulse of the class.
4. Pair programming in the lab helped the students avoid frustration.
5. The non-mandatory game project attracted a large number of students (almost 40% of the class) and created a sense of community since students had to write parts of programs and connect all them together.

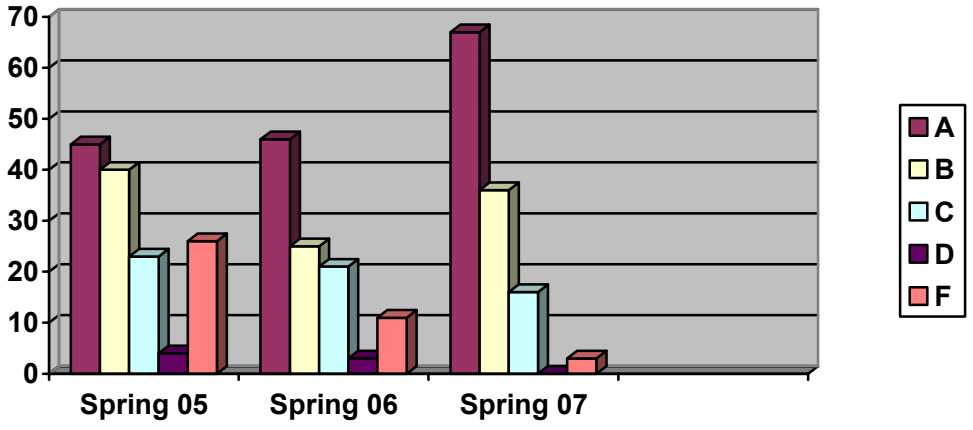
Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

No new activities.

What successes have you experienced with your work/project?

The overall success rate of the students in the class has improved significantly in the three years of the project, as the following graph shows.



What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Nothing major, things went smoothly with the planned interventions.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Nothing major, but during the course of the project we added various activities (such as pop quizzes) as a result of talking with the consultants on our experience.

How are you using collaboration within your project?

Developed multiple activities that require collaboration, including:

1. using pair programming in the weekly computing labs,
2. a project were students were divided into teams each to program a robot dog to move and each team competed against the other for the best program.
3. a non-mandatory day long programming marathon were students developed an on-line multiplayer game.
4. free discussion in class with other students during pop quizzes.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I have presented the work at the Collaboration conference (Minneapolis, 2006), the Conference on Enhancing Student Learning (Twin Cities campus, 2007), and the AAAI Spring Symposium on Robots and Robot Venues: resources for AI education (Palo Alto, 2007).
An undergraduate TA wrote his undergraduate honors thesis on the work done in this course.
We are analyzing the data collected for a future journal publication.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Active teaching strategies that engage students work and result in better student performance and lower dropout rates, so they should be not only encouraged but actively supported. The support of consultants was instrumental in making changes and reflecting on teaching, so it needs to be built in. The small amount of PD funds helped in showing that the University cares about teaching.

University of Minnesota
Bush Foundation Grant
Course Profiles
12/07

Faculty Member or instructor: Professor Steve Huchendorf

Number of people involved in course redesign team (e.g., teaching specialists, Graduate TAs, Undergrad TAs, technical support undergrads, Educational Technology consultants) 5 with Valerie Ruhe (consultant), Marco Habermann (grad student), Jana Fjerkensted (undergraduate student as a Peer Assistant).

Campus: TC

Course Name: OMS 2550H (Business Statistics) (T/Th: 8-9:40 Rm. 2-207)

Number of Students Impacted by Course: 40

Student Learning/Teaching Issue: How do ALT-CAT task variables and demographic variables affect students' attitudes towards statistics and their attitudes towards each other?

If assessment of student learning or evaluation data was not collected this year, please indicate when this will occur:

Data were collected during the spring of 2007.

Course Description: *(Please provide the course overview that appears in course bulletins)*

Business Statistics: Data Sources, Presentation, and Analysis

OMS 2550 – Business Statistics. This is an introductory service course for Carlson School and other colleges. Course content includes descriptive statistics, probability theory, random variables, sampling distributions, central limit theorem, statistical inference, interval estimation, hypothesis testing, correlation, bivariate regression, multiple regression, quality tools, ANOVA. Course delivery is via traditional lecture / discussion section. One hour and fifteen minute lecture delivered twice a week with a 50 minute discussion section. Five sections per semester with 90 students. Various class formats include evening and honors section.

Textbook: Bowerman and O'Connell, *Business Statistics*, 4th Ed. The course package also includes active learning techniques – classroom assessment techniques (ALT-

CATs) that were utilized during the class sessions.

Description of Research Project: *(Include specific research question/s. Also include the teaching and/or technology intervention strategies, e.g. learning style tests, new case studies, use of web forum, use of games).*

How do you measure student achievement and attitude when assessing the benefits of pedagogic innovations? An introductory statistics course for Carlson School of Management was delivered via a traditional lecture / discussion section delivery. The intervention eliminated the 50 minute discussion section and time was added to the lecture sessions. The extended time in lecture included Active Learning Techniques – Classroom Assessment Techniques (ALT-CATs)

The Intervention
The discussion section was eliminated and time added to the lecture session. Lectures were twice a week for an hour and forty minutes. The Experimental group – lecture consists of Active Learning Techniques – Classroom Assessment Techniques (ALT-CATs) completed in collaborative groups of 2-4 students. The Control group – consists of the same lectures and same problem-based learning but no ALT-CATs and no collaborative groups.

What is the effect of problem-based learning with collaborative groups versus no collaborative groups?

Utilizing Peer Assistants
Peer Assistants were utilized during the class session to administer

Purpose
The Peer Assistant (P.A.) Program is aimed at assisting the learning experiences of undergraduate students in large lecture sections of OMS 2550 – Business Statistics. A Peer Assistant is a student who has previously taken OMS 2550 (or equivalent). They attend lectures and assist with administering, collecting, recording and analyzing the results of Active Learning Techniques – Classroom Assessment Techniques (ALT-CATs). Weekly tasks are shown below:

1) Attend lecture sessions (attendance during lecture sessions is mandatory)
    - 3 hours, 20 minutes per week (lecture only – no attendance required during exams)
2) Assist with the learning experiences of the Active Learning Techniques – Classroom Assessment Techniques (ALT-CAT) groups
    - Assist with administering the ALT-CATs in the class
    - Answer any questions from ALT-CAT groups as they complete the collaborative learning exercises (key provided)
3) Collect the ALT-CATs
    - Record the date
    - Record the mean time to complete
    - Grade each completed ALT-CAT as '5 points'
    - If the student/group has not completed the ALT-CAT nor made significant

effort, write 'Resubmit', record the grade as 'R' and return to the student. Once the student has completed and resubmitted the ALT-CAT, change the 'R' to '5'.

4) Record ALT-CAT scores by individual student on class list (hard copy)
   - ❖ TA to enter scores into WebCT gradebook
5) Assess the results of the learning experience
   - ❖ Identify gaps or disconnects in the learning experience – what was learned successfully, what was not.
   - ❖ Create a one-page synopsis of the ALT-CATs for the instructor. Develop suggestions for improvement – topics to cover during next class session. ALT-CATs and synopsis to be provided to the instructor prior to the next class session.

Data Collection Techniques (e.g., surveys, CATs, focus groups, data analysis of online discussions):

1. A local survey to measure student attitudes towards statistics. The survey includes a series of items on a 7-point response scale, one qualitative item asking for suggestions for improvement, and a rank-ordering exercise of a list of learning tools.
2. A pre- and post-test survey was designed to measure students' self-assessment of their own knowledge and competencies. A statistical analysis of group differences was conducted.

Summary of up to three key findings from data collected *(bulleted list is acceptable):*

The Results: Preliminary (exploratory) Data Analysis

OMS 2550 – Business Statistics Spring 2006	**ALT-CATs / Collaborative Groups**	**Non ALT-CATs**
	n=86	n=84
Student Evaluation of Overall Teaching Ability SET score – median Q1	6.5	6.7
Background Variables		
College GPA to date (self-reported) 5(3.51+), 4(3.01-3.50), 3(2.51-3.0), 2(2.01-2.5), 1(below 2.0)	4.408	4.125 (p-value=.033)
Credit hours completed (self-reported)	57.1	57.8 (p-value=.883)
Avg Hours Worked per week	11.9	14.7 (p-value=.197)
Avg Hours Studying Statistics	4.24	4.33 (p-value=.837)

Measures of Student Attitude

OMS 2550 – Business Statistics Spring 2006	**ALT-CATs / Collaborative Groups**	**Non ALT-CATs**
	n=86	n=84
1-7 Likert scale 1-Strongly Disagree 7-Strongly Agree		
I have support from my classmates during class	5.732	4.81 (p-value=.000)
Working problems in class was effective in learning statistics	6.451	6.10 (p-value=.014)
I feel isolated from my classmates	1.901	2.78 (p-value=.000)
I got to know the 2-3 classmates around me	6.268	4.97 (p-value=.000)

What course adjustments were made this semester/year, or are planned, based on the data analysis, student reactions, feedback from consultants, etc.?

Based on the Bush Grant, course adjustments have been made in many areas. These include an expansion of the ALT-CATs during the class session. Additional student learning experiences and time spent during class sessions is centered more on formative assessments with active learning.

In addition, pre-class assessments were added to enhance the student learning experience during the class. The purpose of the pre-class assessments was to ensure that students were ready to learn. The 'Readiness Assurance Process' was developed around Immediate Feedback – Assessment Technique, Readiness Assurance Process quizzes (IF-AT RAPs). The students were asked to read the chapter ahead of the class period. They were given a 10 question multiple-choice quiz that was worth 20 points. 10 points were based on individual responses, then 10 points were based on team responses.

Also based on the work form the Bush Grant, the Peer Assistant program has been extended to other sections of OMS 2550. A pilot program for extending the Peer Assistant program to OMS 3001 is slated to begin Spring 2008.

Course redesign team members' definitions of what it means to take a scholarly approach to teaching? (Please obtain definition from each course redesign team member and list their role – e.g., faculty, graduate assistant, technical support person, etc.)

Faculty member
The faulty member establishes the pedagogic innovation to improve the learning experiences of students in the class.

Graduate assistant
The graduate assistant takes the survey data and conducts the statistical analyses

Peer assistant
The peer assistant helps administer, collect, record and analyze the ALT-CATs for the top disconnects.

Consultants
Valerie Ruhe and Connie Tzenis provided very helpful suggestions for small group instructional dynamics variables. Valerie helped Steve conceptualize the theory on which to base his regression model to measure the impact of demographic variables and alternative learning and classroom assessment techniques. Valerie compiled the following list of references to find relevant variables such as Respect, Team Selection, and Task Condition, which might inform this analysis.

References: Cooperative Learning

Baker, D. F., & Campbell, C. M. (2005). When is there strength in numbers? A study of undergraduate task groups. *College Teaching, 53*(1), 14-25.

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assessment as a feedback system in a learning environment aimed at fostering skills of cooperation in an entrepreneurial context. *Assessment & Evaluation in Higher Education, 29*(2), 177-201.

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Course redesign team members' definitions of what it means to take a collaborative approach to teaching? (Please obtain definition from each course redesign team member and list their role – e.g., faculty, graduate assistant, technical support person, etc.)

Students work in groups during the class session on the ALT-CAT's. The Peer Assistant helps analyze the ALT-CATs. The analysis is provided to the faculty member who can then provide additional instruction on the major points that were missed. Note that this is targeted feedback provided during the next class session. This represents much faster feedback than other pedagogic techniques.

They are then surveyed on their attitudes towards statistics and statistical literacy. The graduate assistant collects, compiles and analyzes the data on these tests.

Consultants assist with providing a window into the world of the voluminous education literature. They also provided invaluable support with measurement and assessment issues.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Minneapolis – Twin Cities

Faculty Member(s)/Instructor: Murray Jensen

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Five:

Murray Jensen, J.D. Walker, Paul Baepler, Gabriel Romero, Rachel Uppgard

Course Impacted by Research PsTL 1135 Human Anatomy and Physiology

Course Description: *(Please provide the course overview that appears in course bulletins)*

PsTL 1135, Human Anatomy and Physiology, is a developmental education course intended for freshmen in General College. The course has three components: First, a traditional lecture where students are expected to take notes and take exams, second, a computer lab where students engage in cooperative quizzes and activities such as a "do something cool" project, and third, a laboratory component where students dissect eyes, brains, hearts, etc., and participate in many other hands-on activities. The course is organized around body systems, e.g., the skeletal system, the nervous system, etc., and focus on many common diseases such as diabetes, cancer, and atherosclerosis. All students enrolled in PsTL 1135 will be required to read at least one book, such as "When the Air Hits Your Brain," outside of regular class time. This course makes considerable use of Web Vista and a course internet site. Do not take this course if you do not enjoy using computers or if you do not have access to a fast and reliable internet connection. Please look up the GC 1135 website for more details: http://msjensen.education.umn.edu/1135/

Student Learning/Teaching Issue/Research Question:

We are in a transition time for our whole department (Post Secondary Teaching and Learning). The total number of students in PsTL is declining quickly and we are trying to work on curriculum issues or the future, e.g., developing new courses, programs, and majors. PsTL 1135 will still exist in the future, but will probably take on new pedagogical strategies. Less “large group lecture” and more “small group projects.”

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

I have been working on students using "The Anatomy Bowl" (my own software program) and "Anatomy and Physiology Revealed" – which is a DVD by McGraw Hill.

Evaluation Plan:

I have students use the Anatomy Bowl in group and individually – and compare student reaction and performance on exams. I have students work on Anatomy Physiology Revealed to complete a course assignment. I have students using their regular text books to complete a couple of assignments. Comparisons are made between students using the text and students using the DVD.

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

The Anatomy Bowl is a wonderful too to help students learn basic anatomy. Results indicate that the program does not help promote higher order thinking skills.

Anatomy Physiology Revealed is equal to a "book" in terms of students' ability to complete a course assignment. Additionally, students "prefer" using the computer / DVD over the regular course text.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

We are implementing a series of investigations looking at how students use a DVD to complete a typical course assignment in anatomy and physiology.

Research has been completed on "The Anatomy Bowl" -- no addition research data is being collected for that program. However, modifications are being made to The Anatomy Bowl as a result to data collected last year. For example, we are modifying the game so students can "break in" at any time – and better instructor record keeping can be maintained.

What successes have you experienced with your work/project?

Students "enjoy" the anatomy bowl and we have evidence that indicates hat it pr0omote collaboration among students.

Student use of the DVD indicates that they may be more ready for DVDs than the instructors – many instructors still feel the need for a book. Students would rather use a DVD. Still, some students do not have adequate access to technology and so DVDs can not be assigned to everyone – need a computer lab.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

The anatomy bowl has a bug that will not allow us to break into a game in progress. We're working on fixing that bug. Otherwise, the program seems to be working well and students enjoy using it.

The DVD seems to be working well, but the cost is quite high. We're using it this year as part of project and so students get it for free. However, if students paid for it, it would be $40 – this is on top of a $130 text. Money is a huge issue!

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Because of the cost and technology issues with the DVD, I no longer assign that for homework, but rather use it for "in class" project when we are in the computer lab.

I have not run individual games with The Anatomy Bowl because it works better in groups. I use to use both individual and group games – now I just use group games. Time limitations also are a part of this decision.

How are you using collaboration within your project?

There is no collaborative component to the DVD project at this time. The anatomy bowl is 100% collaboration in that students team up and play other teams. It promotes both collaboration and competition – a very enjoyable atmosphere.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I'm doing much more "active lecturing" – for example, I'm posing questions at the beginning of the lecture that will be answered later on. I'm doing one minute lectures, etc.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

We still have big hurdles to overcome. How to teaching in a lecture auditorium where 50% of the students are doing their e-mail! How to keep their attention. How to "teach" in a large lecture environment. Many they should just cancel them all and have student download information on the web – I have far more questions than answers – this is a difficult issues. In terms of economics, we NEED large lectures. We can not afford small classes for everyone. Have to figure out how to give students their "tuition" dollars worth even in a large lecture environment.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Kent Kirkby

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Currently just two: Kirkby and Amy Chen

Course Impacted by Research (e.g., Theatre History TH 3171): GEO 1001/1101

Course Description: *(Please provide the course overview that appears in course bulletins)*

The Earth we live on is a far more dynamic place than most people realize. It is constantly, if slowly, changing as major segments of the Earth's surface shift and grind against one another. This slow motion not only produces our world's many active earthquake regions, but over time, is also responsible for the uplift of mountain ranges and the changing shapes of the Earth's continental masses and ocean basins. These global-scale processes directly and indirectly created the environment we live in. Even on a smaller scale, our environment is constantly changing - but on such a long time scale that few people recognize the very dynamic nature of our world. This course will explore how these global and regional-scale processes not only shape our world but also affect human society. One of the course's primary goals is to provide a better understanding of our planet in the context of current environmental issues and global change. Through lectures and labs, students can investigate how plate tectonics, volcanoes, earthquakes, wind, rivers, and glaciers sculpted our plant's landscape, and discover the many linkages between these processes and human society. GEO 1001 satisfies the Diversified Core Curriculum's requirements for both the environmental theme and as a physical science with lab. This course is designed for undergraduate students who are not geology majors and there are no prerequisites.

Student Learning/Teaching Issue/Research Question:

Over 80% of the students entering our 'introductory' earth science classes have no intention of ever taking another physical science class, and less than 1% foresee any possibility of continuing on in earth science. So for the vast majority of our students, this is really their concluding science course. Our goal is to design an effective 'concluding earth science course' - one that provides students with the knowledge and skills they need to become more informed citizens of an increasingly global community.

For this particular program, the basic question is how do we more effectively engage students in this concluding earth science course?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Four main approaches were used in the lecture portion of the course:

1) A historical approach was taken to highlight the many interactions of earth processes and human society.
2) Targeted interventions were used to try to offset known misconceptions and improve students' understanding of earth processes.
3) A second approach of multiple repetitions of the information from targeted interventions was used throughout the semester to gauge whether this improved performance.
4) Students used IF-AT's in small groups to review course material and prepare for quizzes.

Evaluation Plan:

Evaluations was a crucial component of our program and involved qualitative measures such as changes in student evaluations of teaching or opinion surveys and a robust quantitative measurement of pre-instruction and post-instruction changes in student knowledge.

Summary of Outcomes:

The targeted interventions were extremely successful in offsetting and correcting student misconceptions about the Earth.

The historical approach and use of IF-AT quizzes were both very well received by students and were frequently cited on evaluations as helping students to understand the course material.

Repetition of the information from targeted interventions though did not significantly improve student performance beyond the initial intervention.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Introduced use of IF-AT's into lecture component, which was very successful. This was an innovation that arose directly out of interactions in Bush Program. Learned of IF-AT's from Biology team and modified their use to better fit our program goals. Primarily focused on 'how' and 'why' questions rather than 'what' and used to break up class and initiate discussion, rather than as introductory exercise.

Explored a partnership with the Science Museum of Minnesota, the goal of which is to integrate their displays and materials into our curriculum. Over 300 students participated in this activity and feedback was universally positive. Long range goal is that when light rail is in place, museum will be an integral part of course structure. They provide new displays, technology and maintenance, while we provide them a missing demographic, and students benefit from having a wider range of technology and materials available.

Continued to survey efficacy of individual targeted interventions in correcting misconceptions. Dramatic increases in student performance on per- and post-instruction tests. Also tested an opinion survey instrument this fall to gauge changes in how students view science after completing the course.

Graduate student designed research study of student misconceptions with water flow. Completely re-invented our understanding of how non-geologists view river flow.

What successes have you experienced with your work/project?

Lots. The course consistently ranks in the top tier of courses on student evaluations, which is remarkable for a large enrollment introductory physical science class (these tend to have lower than average evaluations). On pre- and post-instructional surveys of changes in student learning, the sections associated with the Bush Program perform significantly, even dramatically, better than more traditionally taught GEO sections.

The use of historical case studies, IF-AT quizzes and the joint partnership with the Science Museum have all proven to be quite effective at increasing both student performance in, and satisfaction with, the course.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Trying to reinforce the targeted interventions by multiple references back to the intervention did not significantly change student performance beyond that of the initial intervention. Although we were initially surprised by this, it suggests that to get better retention you have to have students do more with the material. The initial intervention does work very well, but to improve on the changes, an entirely different tack is needed. Exploring this further will be one of the activities for the Spring 2008 semester.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Almost the entire course has been modified on the basis of the evaluation data. The consultants (Paul Baepler and Walker) were extremely helpful in generating some of the evaluation instruments and serving as a sounding board for new ideas.

How are you using collaboration within your project?

This is one of our project's strengths. Besides the Bush activities, we have also worked collaboratively with faculty from Curriculum & Instruction and Educational Psychology on the course design and evaluations of new educational technologies developed by our program. We also have established partnerships with the Electron Visualization Laboratory of the University of Illinois at Chicago, the Science Museum of Minnesota and the National Center for Earth-surface Dynamics to develop, test and distribute new educational technologies and practices. Much of this work was supported by a grant from the Fund to Improve Post-Secondary Education of the Department of Education.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We have not only integrated findings from the literature into our approach but have also presented results of our work at a minimum of three regional or national meetings each year.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Bring in more outside presenters. By far, the most effective meetings of the Bush Program were ones in which outside experts on instructional methodology or evaluation were brought in or made available. These were very useful sources of new ideas to try in the classroom.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Professor Julia W. Robinson

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.):

Course Impacted by Research (e.g., Theatre History TH 3171):

Course Description: *(Please provide the course overview that appears in course bulletins)*

ARCH 37111 addresses how the built environment affects everyday life and how cultural perspectives affect the way environments are constructed. Students examine the responsibility of the design professional to the human community and its shared context—global, local, political and ethnic. The course also develops skills in studying written texts, environments and professional institutions from a cultural perspective. As it is a writing intensive class, students learn to write essays that identity important issues, take a position and make an argument using evidence

Student Learning/Teaching Issue/Research Question:

How can we use the web more effectively?

How can we improve the lectures (both PowerPoint presentations and in-class exercises)?

How can we increase the links between the different aspects of the course, especially lecture and recitation.

Can we actually teach students to read and write by developing materials on critical reading and by improving the critical paper assignments?

What can we do to improve the Teaching Assistants' effectiveness?

How can we work with the Student Advisory Board more effectively?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

The final year we developed web materials. We created several learning modules, each associated with one of the 4 critical papers. We also used web postings more successfully. Finally the web was used to provide students with resources for their projects. Although we had planned to provide opportunities for students to work together online, the students preferred to work face to face.

A second focus was improvement of the lectures. Based on a videotape of the first lectures that we critiqued, we simplified the PowerPoint lectures to add more images and reduce the words. Additionally, after the mid-term assessments we shortened the lectures to allow more time for the class exercises.

We continue to address improved links between lecture and recitation classes, creating lesson plans for the first half of the semester. For the second half TAs felt they could do it themselves.

We also worked with the TAs, providing the grading protocols from last year, and meeting weekly to identify any problems needing to be addressed.

The Student Advisory Board this year used representation from the sections as a basis for participation. The ga e informal feedback weekly at the beginning of the semester, and then met every other week later, probing feedback on specific questions and a focus discussion session on the overall course at the end of the semester.

Evaluation Plan:

This year we once again evaluated the first week's lectures in terms of comprehension of the course material.

We evaluated the course again at mid-term to see if any interventions were needed at that time.

The Student Advisory Board focus group discussion was the main technique used to identify successes and weaknesses of the course,. This was supplemented by a classwide assessment of growth along the 3 course objectives.

Summary of Outcomes:

The first week evaluation showed continuing improvement from the 2 previous years, but also indicated that there is room for more. The syllabus is too long and intimidating. Next time the class is taught, to increase the effectiveness of the syllabus we will shorten it by as much as 50%. Rather than include paragraphs on the philosophy and suggestions for approaching the assignments, the syllabus will simply list objectives and requirements. Other, more substantive material will be put on the website for student reference.

The new web materials were generally well-received. The learning modules were useful to some of the students. There were no criticisms of access to project materials as in the past when they were on reserve in the library. The postings had mixed reviews from the students, some greatly appreciating them and others finding them extraneous. From the

perspective of the instructor and TAs, however they were valuable. They assured that the students completed the readings and thought about them and gave us an opportunity to address misconceptions or controversies in lecture and recitation.

The instructional materials on reading, used in conjunction with requirements to annotate the readings and with the critical papers has resulted in much better understanding of the material and also in a better understanding of what it means to write a good critical paper. By discussing the assigned readings as examples of good writing, the students better appreciate the significance of writing in this field. We developed a graduated approach to the critical papers that seemed to work quite well. Many students noted good progress in critical thinking during the semester.
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The Student Advisory Board noticed the changes in the lectures, and responded very positively. Overall, there was a greater appreciation for the lecture content than in the past. The class exercises were also appreciated by the students.

Students generally agreed that there was positive change in regard to the course objectives. The greatest change was seen in understanding the role of the professional in society, but there was strong growth in the other 2 goals also (reading environments and critical thinking as mentioned above)

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

Added learning modules to the website
Developed lesson plans for the recitations
Improved instructional materials for critical reading and writing
Improved PowerPoint lectures, reducing words and increasing images
Shortened lectures to allow more time for class exercises
Improved class exercises to link them better with recitation activities, projects and papers
Reduced course handouts

What successes have you experienced with your work/project?

Students are more positive toward the class
Fewer students drop out in the first weeks of class
Lectures are more appreciated
Students complete readings every week
Attendance is high
Students have a better understanding of the relation between the course parts (lectures, readings, papers & project)
Course is more fun to teach
Teaching Assistants appreciate the course more

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Students have criticized the portfolio that replaced the tests and exams. However, when asked, they say they prefer the portfolios to exams.

Web postings were not seen as uniformly positive by students in contrast to the instructors' positive reaction. But were more positively received than previously, perhaps because discussed in class.

Student Advisory Board this year was not as effective as the previous year. We hypothesize it was too large to be effective. Rather than having a student represent each section, next time we will revert to the procedure used last year where anyone who wanted could volunteer.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

Simplified the first lecture
Revised all the lectures, eliminating text and adding illustrations

Added teaching on critical reading and critical writing that discusses the readings.

Improved instruction on space syntax (still needs work)

Added learning modules to supplement readings for critical papers.

Revised the class exercises to focus better on project and critical papers. Also to create more variety.

Discussed the web postings in class as a way to inform students that I value them.

How are you using collaboration within your project?

Weekly meetings with the Bush team reviewed progress in grant goals.

Weekly meeting with the course TAs to identify problems, discuss the next recitation class and discuss future plans. I often asked TA opinions about approaches to a lecture or about how to handle situations we faced.

Student Advisory Board, led by the undergrad TA, gave regular student feedback on the class. The undergrad TA informed the team by written report and verbal presentation of the report in our Team meetings.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

I have been asked to put my poster up at in Rapson Hall and to give a brown bag lunch presentation to College faculty in the Spring Semester.

I am planning to develop a paper with Brad Cohen, perhaps for the London SoTL conference in London in May. It will be about faculty reflection on their teaching.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

It was unusual and beneficial to have the project last 3 years. That was the central aspect that made it so successful. It developed strong connections to the Center for Teaching and Learning that permitted significant and lasting changes both to the course and to the instructor's approach to teaching. Kudos to one and all!

Some of the successful elements:
The 3-year length
Provision of consultants on technology and on assessment
Providing money to support undergraduate TAs
Bringing in excellent outside (and inside) speakers
Having discussions on topics of significance with members of the course teams and with consultants..

Recommendations
Would have appreciated support for the grad TA, especially for summer time
Would have appreciated support for instructor summer time (about 2 weeks)
Rather than support students from the technology center, train the grad TAs to provide technological assistance and pay them.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Jole Shackelford

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 1 faculty member (I), 1 graduate student t.a., and 2 specialists assigned by CTL.

Course affected by research: HMED 3001W, HMED 3001V, and HMED 5200 (courses with different designators and different populations which are all dependent on the same core lecture sequence).

Course Description: *(Please provide the course overview that appears in course bulletins)*

HMED 3001, Health, Disease, and Healing I, is the first semester of a year-long survey course that covers the history of medicine in Western civilization from its earliest history into the 20th century. There are currently 8 sections of undergraduate students of mixed standing (HMED3001W), and also a section of freshman honors students (HMED3001V). Most students perceive themselves to be headed toward a health care related career. The course is a writing-intensive course with an emphasis on essential academic skills.

Student Learning/Teaching Issue/Research Question:

How can instruction be individualized and enhanced in the large-lecture format, writing-intensive survey course without sacrificing traditional course structures (lecturing, written exams and assignments)?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

In year three we have focused on implementing fully peer-reviewing of required essay assignments, further development of on-line instructional aids, and Power-Point-mounted lecture outlines that can be accessed on-line and printed off.

Evaluation Plan:

Evaluation has been and will continue to be based on 1) student performance on assigned writing tasks (essays and exams), 2) qualitative assessment based on teaching assistant responses, and 3) quantitative and qualitative feedback on the end-of-year course evaluations.

Summary of Outcomes:

Student performances on the mid-term examinations (qualitative assessment) were not significantly better than in previous years. The causes of this are unknown, but are a matter for some further consideration in course development. Teaching assistants report that students performed better on the multiple-draft writing assignments that are a core requirement of the teaching-intensive course, and they ascribe this to the implementation of peer-reviewing. This is a positive development, and an effort will be made to regularize and streamline the peer-reviewing process further next year. It is too early to report on end-of-year course evaluations for year three, but key questions on the year two survey indicate positive trend in critical thinking and reflective learning (more students reported that they believed that good writing reflected good thinking and that their writing had improved as a result of the course in Fall 2006 than in the corresponding 2005 survey).

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

The format of the course in year 3 was as close as possible to that in year 2, in order to facilitate comparisons. So, no changes were made in lecture topics and readings. Topics for the three written essay assignments (writing intensive requirements) were varied a bit from 2006, but within a normal range of variation to align essay topics with course lectures and readings. If anything, assignments were intentionally less well defined, in order to encourage students to develop meaningful thesis statements (a focus of the written instruction). Guidelines and teacher instructions discouraged use of extra-course materials for these assignments (web sources), which appears to have been effective. Incidences of plagiarism, never very numerous, are at a low this year.
Since last report, we have implemented a Reading Module mounted on WebVista that is designed to guide students through the reading of a formal, scholarly article and introduce them to the genre as well as providing supportive course content.

What successes have you experienced with your work/project?

Noted also above, the peer-reviewing seems to be a great success at this point. Students are spending more time on their drafts and, judging from peer-reviewing sheets and comments on rough drafts, they are also becoming more critically reflective about writing styles and quality. Good students continue to perform well on written assignments, and it appears that peer-reviewing has a differentially-good effect on the deficient and moderately proficient writers. Peer-reviewing has also resulted in less teaching assistant grading time, which is a positive outcome. The mounting of Power Point lecture outlines also has met with positive student response. It is difficult to assess the success of the on-line reading and writing modules, which are still under construction. Some students used content from the reading module model essay in formulating their first essay assignment, which was an unanticipated benefit.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

It dawned on me this past semester, only a few weeks ago, that there is a potentially serious negative outcome to investing in what I would call semi-rigid pedagogical structures, namely written, imaged, and on-line instructional aids that can be deployed year after year with minimal maintenance. The development of such structures is one goal of pedagogical reform, since it frees up class preparation, active teaching, and grading time, but it also discourages “continual evolution” of course content and structures, since to maintain continually these semi-rigid pedagogical structures, adjusting each one as needed to fit a changing syllabus and curriculum would consume whatever efficiencies that their creating generated. This is a next challenge for me.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

I am uncertain what this question means. If the question refers to adjustments to the aims and scope of the grant project, namely the improvement of the large-lecture undergraduate course without sacrificing course requirements or published aims and parameters, then I have resisted changes. If it refers to changes in the course curriculum and assignments, then I have made changes to incorporate on-line materials, more small group discussions within the discussion section meetings, and peer-reviewing of assigned take-home essays, all on the basis of presentations made by speakers invited by CTL under the auspices of the Bush grant over the past 3 years or by suggestions from CTL and related personnel. Student feedback is an important part of judging the applicability and success of any implementation, as is teaching assistant feedback. I have also utilized information provided by the Writing Lab personnel, in particular Pamela Flash, in designing and implementing written assignments and also revising some of the course documentation (syllabus, course aims, etc.).

How are you using collaboration within your project?

The teaching assistants and I collaborate continually.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We have done very little of this. This was not a clear part of the original scope of our involvement in the grant, which was focused on course modification and improvement within the large-lecture, undergraduate genre. Along with one of the CTL advisors, Valerie Ruhe, I hosted a round-table discussion concerned with teaching writing in the large-lecture class at the Academy of Distinguished Teachers meeting at the University of Minnesota last Spring, and our team prepared a poster on our grant project for inclusion in a poster session at the end of grant get together held 6 December 07. Otherwise, no publication.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The best parts of this grant were 1) funding and justification for making changes to the curriculum and venturing innovations in the teaching, 2) exposure to pedagogical experts and outside presenters, who can provide plain-English explanations of what might work in different situations, 3) a format for meeting colleagues engaged in teaching improvement. All of these are worth continuing. Involving undergraduates in the grant-driven end of the project proved difficult and, frankly, philosophically troublesome, inasmuch as it runs the risk of prioritizing some students' exposure and interaction over others, something that I was not comfortable with on the basis of fairness. Conversely, creating teams comprising faculty and graduate students is a terrific idea, and I think the process might have benefited by more t.a. involvement (multiple graduate team members).

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus:

Faculty Member(s)/Instructor: Kevin Smith, Mary Brakke

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): 2

Course Impacted by Research (e.g., Theatre History TH 3171): Agro 1101

Course Description: *(Please provide the course overview that appears in course bulletins)*

Grading basis/credits: 4 credit(s)

Liberal Educ. Reqs: Meets CLE req of Biology with lab and Environment Theme
Description: This course is designed for students who are not majors in a life science program, but who wish to acquire a better understanding of biological concepts especially as they relate to their lives. Throughout this course we will examine in depth, current issues related to food, food production and the environment. These issues will provide the context in which we investigate fundamental concepts of biology and examine ecological principles including productivity, energy, genetic change in populations, and environmental responses to human activity. You will interact with other students in a variety of ways to research and understand problems related food production, the environment and society. As a class or in small groups, we will discuss the biological basis of these problems and their possible solutions. The active approach to learning in the lecture and lab is designed to provide you with opportunities to pose questions, seek answers, develop analytical skills, to encourage intellectual curiosity and to promote your understanding of science as a way of knowing.

Class Time: 30% Lecture, 30% Discussion, 40% Laboratory.

Grade: Lecture assignments – 21%; Unit tests – 24%; Final exam – 15%; Lab assignments – 40%.

Exam Format: Multiple choice and short answer

Student Learning/Teaching Issue/Research Question:

Our over-arching question was, how can we improve our use of PBL? In response to changes we made in our approaches and information we gathered in the second year of the program we asked:

1) Can we enhance the use of PBL in a non-majors course by delivering content needed to understand the issue during the early part of the problem (first two weeks) rather than throughout the duration of the problem?

2) Can we improve students' attitudes toward group work by focusing on the benefits of shared understanding and the opportunities for discussion that are provided by small groups?

3) Can we reduce the extent and frequency of course surveys and still obtain useful information about students' attitudes toward PBL?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

1) Can we enhance the use of PBL in a non-majors course by delivering content needed to understand the issue during the early part of the problem (first two weeks) rather than throughout the duration of the problem?

To address this question we delivered content material for each problem during the first two weeks after it was introduced. Using WebCT Learning Modules, all content was available to students electronically. Our reasoning was that this exposure to pertinent biological concepts early in the course of working with the problem would better equip students to understand the problem and would enable them to think deeply and ask critical questions.

2) Can we improve students' attitudes toward group work by focusing on the benefits of shared understanding and the opportunities for discussion that are provided by small groups?

To address negative attitudes that students' often have toward working in small groups, we focused on the benefits that derive from sharing knowledge. To make this real to students, we used scratch-off tests that are first completed individually and then as a group. Discussion of questions and answers inevitably leads to improvement of test scores (individual versus group) and in this way provides proof of the benefit of working together.

3) Can we reduce the extent and frequency of course surveys and still obtain useful information about students' attitudes toward PBL?

In the previous year, students completed four surveys of 40 to 70 questions during the course of the semester. We felt that the integrity of the information collected was compromised by the extent and frequency of surveys. To address this problem, we focused on assessing student learning styles (Felder and Soloman Learning Styles Inventory), engagement with course material (Approaches to Studying Inventory) and

self-designed questions related to PBL and group work. Students completed the Felder and Soloman Learning Styles Inventory online at the beginning of the semester. They completed the ASI at the beginning of the semester (32 questions) and completed the ASI plus self-designed questions pertaining to PBL and group work at the end of the semester.

Evaluation Plan:

We will use survey data to evaluate students' attitudes toward delivery of background material during the first two weeks of each problem as well as group work and the PBL approach. We will compare the distribution of course grades to previous semesters to determine if how these approaches might have affected student performance in the course. We will use results of the Felder and Soloman Learning Style Inventory and the ASI in interpreting students' evaluation of course approaches.

Summary of Outcomes:

Delivery of course content during the first two weeks of each problem was generally a positive change. Students …..

Use of scratch-off tests was a success. For each of the three sets of tests, mean group scores were higher than mean individual scores. Students responded positively to the tests and generally had positive attitudes about working in small groups in class. Outside-of-class group work continues to be a burden, largely due to unequal workloads.

Placement of reading material online was not met with unanimous approval from students, largely due to problems downloading large files and student access to printers. In the future we will provide several options, including online access as well as hard copies for purchase.

Other outcomes will be determined after analysis of student surveys.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

All course reading materials were placed online to facilitate access. Lectures and reading assignments was modified to "front-load" information delivery during each problem.

Scratch-off tests were incorporated into lecture which entailed redesign of tests and the grading system.

Student surveys were modified and the Felder and Soloman Learning Style Inventory was implemented and results were compiled.

What successes have you experienced with your work/project?

There were successes in the use of group work and student engagement in learning from PBL.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

A significant challenge has been the development of valid measures of the effect of classroom approaches on student learning. While our understanding of the importance of valid measures of student response (attitudinal or cognitive) to teaching approaches has deepened, we still lack confidence in the measures (student surveys) we are employing.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

See above.

How are you using collaboration within your project?

Our collaboration involved working with Walker and Paul Baepler to design a quasi-experiment to test approaches and identify tools for evaluation.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We have shared our experiences with University colleagues at several events on campus. We continue to peruse educational literature for related work on using PBL and strengthening motivation.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

The participation of Walker and Paul Baepler was very valuable in helping us to articulate questions about student learning, design new teaching approaches and identify tools for measuring outcomes. The involvement of knowledgeable consultants and the availability of funding to hire students who can assist with tasks such as revisions of course websites or compilation of data is high on the list of recommendations.

University of Minnesota
Bush Foundation Grant
Course Profiles
Spring 2007

Faculty Member or instructor: Kevin Upton

Number of people involved in course redesign team: Two senior lecturers and 4 Peer Assistants.

Campus: TC

Course Name: MKTG 3001 Principles of Marketing

Number of Students Impacted by Course: 120/section for 4 sections over two semesters. This is double the usual registration and reflects the College's intent to increase all core courses to enrollments of more than 100 students.

Student Learning/Teaching Issue: how to enhance or at least maintain student satisfaction in a weeder course while increasing the enrollment count across all 30 sections per year.

Course Description: *(Please provide the course overview that appears in course bulletins)*

Introduction to terms, concepts and skills for analyzing marketing problems. Factors outside the organization affecting its product, pricing, promotion, and distribution decisions. Examples from actual organizations are used.

Since you last filled out a course profile in December 2006, has your **Student Learning/Teaching Issue** changed (see above), and, if so, how?

NO.

Since you last reported in December 2006, has your description of your research project changed, and, if so, how? *Please discuss how specific research question/s may have changed. Also include the teaching and/or technology intervention strategies that were changed, added, or deleted, e.g. learning style tests, new case studies, use of web forum, use of game. Please describe any other course adjustments – e.g. adding peer assistants)*

No.

Since you last filled out a course profile in December 2006, have you added or subtracted any data collection techniques? If so, please elaborate. (e.g., surveys, CATs, focus groups, data analysis of online discussions)

[Data collection techniques]
Mixed methods quasi- experimental design. Data includes survey data from two treatment groups, costs of two vs. four peer assistants, self-evaluation of progress notes and meetings with team members about the teaching and learning process.

Since you last reported in December 2006, if you have data that you analyzed, please provide up to at least three new findings. *(bulleted list is acceptable):*

UM Student Evaluation of Teaching (SET) scores were compared between the large enrollment sections (those covered by the current study) and the usual 48-60 count enrollment sections. The average SET for the large enrollment sections was 6.17 (Scale = 1-7, 7 is the highest) across 8 sections offered over six semesters. The average for the regular enrollment sections was 5.84 across thirty-two sections over six semesters.

An additional measure—Student Self-Evaluation of Learning—was created. The instrument asked students to assess how much they knew about an item prior to taking the class and how much they knew upon completing the class. The scale ranges from: 0= No Knowledge to 4= Enough Knowledge to Teach This. In the large enrollment sections students reported a gain of 1.48 in knowledge, versus a gain of 1.38 for the other sections.

Please have each team member review their past definitions of what it means to take a scholarly approach to teaching. Then, take a moment to update this definition or let us know if you would like to leave the definition as is. If you have new team members or team members who in the past did not write a definition, have them write their definition. (Please obtain a definition from each course redesign team member and list their role – e.g., faculty, graduate assistant, technical support person, etc.)

Gaining knowledge from the experience of successful instructors. Collecting and trying best practices. Sharing experiences. Collaborating within the course team.

Please have each team member review their past definitions of what it means to take a collaborative approach to teaching. Then, take a moment to update this definition or let us know if you would like to leave the definition as is. If you have new team members or team members who in the past did not write a definition, have them write their definition. (Please obtain a definition from each course redesign team member and list their role – e.g., faculty, graduate assistant, technical support person, etc.)

Sharing ideas, listening to student feedback, acknowledging student feedback, being willing to adjust based on discussions and feedback, respecting each other and each other's roles.

In relation to your students' learning, what are the biggest impacts your new interventions are making and how do you think you know this?

We are confident that we can train instructors and peer assistants to use active learning techniques to improve learning outcomes and satisfaction with instruction across a greater number of large enrollment sections in time to manage the shift to large sections beginning in September 2008.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Wick/Cotner/Fall

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): over the course of three years, about 10 people

Course Impacted by Research (e.g., Theatre History TH 3171): Biology 1001

Course Description: *(Please provide the course overview that appears in course bulletins)*

This course covers general evolutionary and ecological principles, emphasizing biological diversity from genetic variation to the diversity of species and ecosystems. Topics include scientific inquiry, history of evolutionary thought, principles of genetics, the nature of variation, ecology of populations, behavioral ecology, human evolution, and genetic, evolutionary and ecological perspectives on issues concerning human diversity, human population growth, health, agriculture and conservation. Laboratory is in a 2-hour block, which is designed to involve students in investigation, problem solving, and discovery.

Student Learning/Teaching Issue/Research Question:

Course enrollment has traditionally been about 95% non-majors, many of whom come to the lecture part of the course with low motivation and interest level. Our research questions were whether we could increase engagement, preparedness and success of students in the course.

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Over the three year grant period, in which our team taught more than 3500 students in several sections, we initiated multiple changes to the course. Frequent low-stakes assessment in the form of 15 quizzes per semester were added to lecture. Increased efforts were made to provide exam preparation throughout the semester in the form of exam-level questions that got at deep learning. Scratch-off immediate feedback forms (IF-AT forms), group work on in-class activities, and an experiment in one section with clickers were used to generate interest in learning course material.

Evaluation Plan:

Pre-class and end-of semester surveys were used to determine student attitude, and pre-class knowledge levels of course material were compared with performance on exams. We also planned assessment of course grades relative to previous offerings of the course.

Summary of Outcomes:

Example: Use of the individual response systems (clickers) revealed that . . .

Use of various interventions that increased student activity in class (quizzes, active learning exercises, IF-AT activities, clickers, games, some case studies) increased student attendance and engagement in lecture. Some increase in performance (grades) was observed in some sections of the course. Instructor satisfaction was also increased.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

We produced three posters summarizing parts of our project. One was presented at the American Society of Cell Biology (ASCB) annual meeting in Washington, D.C., and the other two were presented at the final gathering of the combined grant teams. We have worked on revisions of a paper that outlines our use of the IF-AT approach and compares it to a pilot experiment with clickers in increasing student preparation for exams.

What successes have you experienced with your work/project?

We tried several different ways of working with groups (permanent or casual, instructor-assigned or student self-assigned, some graded work or all non-graded) and in administering IF-AT questions, and each of the three instructors involved has determined what works best for his/her style and section characteristics. We also consider it a success to be able to work together as a team and brainstorm with each other about possible class activities. The poster presented at the ASCB meeting generated considerable interest.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

There continue to be some students who want to be able to sit back passively and not engage material, and they often complain loudly! For some sections, students are not as engaged by IF-AT activities as others. Simply managing all the extra folders, activity handouts, clickers, etc., can be physically challenging.

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

We provide immediate feedback on all quizzes and activities and assessments, rather than waiting even a day to release results. We also have answers to exam study questions available without requiring students to check with a tutor or the instructor. We do not intend to again have a section that is totally activity-based, with no lecture at all.

How are you using collaboration within your project?

Our team of three instructors, several undergrads, and two consultants has worked closely and collaboratively throughout the project. We feel we are bringing the various strengths of all members of the group to the project.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We have used various articles on immediate feedback techniques and active learning in the classroom to inform our project. Collectively our team has made numerous presentations to faculty groups on campus and at a few national and international venues. One article and one extensive interview for a local publication have appeared, and other manuscripts are in review or preparation.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Please do it! It takes a long-term commitment to determine exactly what interventions will work for a particular class, and it takes time for instructors to become comfortable with the logistics of changes. It has been critically important to have regular contact with other instructors who are also trying innovative things, both for the ideas that can be shared and for the moral support.

University of Minnesota
Bush Foundation Grant
Research Course Profiles
Year 3

Campus: Twin Cities

Faculty Member(s)/Instructor: Virginia S. Zuiker

Number of people involved in course redesign/research team (e.g., teaching specialists, graduate TAs, undergraduate TAs, technical support persons, consultants, etc.): Five People: 1 Professor, 2 Consultants, 1 Graduate TA and 1 Undergraduate TA

Course Impacted by Research: FSoS 3101: Personal and Family Finances

Course Description: *(Please provide the course overview that appears in course bulletins)*

Analysis of personal and family financial management principles. Financial planning of savings; investments; credit; mortgage and taxation; life, disability, health, and property insurance; public, private pensions; and estate planning.

Student Learning/Teaching Issue/Research Question:

Students take this class for both personal and academic reasons: they expect to be able to use the information learned in this class to inform financial practices in their own lives along with being able to use the information learned to assist future clients. Therefore, our challenge has been to teach for application and make the work relevant and useful in the students' lives now and going forward. Research has shown the use of case studies to be an effective means for approaching these tasks in this field of study. Our research questions centered on how to maximize the utility of the case study approach in large lecture based classrooms? How do we design an academic exercise (case studies) so that the students find them relevant to their lives and will continue to use financial management skills after they leave the class, and after they graduate?

Description of Research Project/Interventions/Methodology: *(Include specific research question and teaching and/or technology intervention strategies, e.g., learning style tests, new case studies, use of web forum, use of games, etc.)*

Our research focused on 1) methods to best implement the case study discussions; 2) methods to effectively integrate the case study with course content; and 3) making the course more relevant to the students. We have updated the case study so that it makes it more relevant to our college students and so it is integrated with the concepts taught in lecture for each chapter. We also rewrote many of the test questions to include case study situations and have the students analyze the material as they would have in their groups.

Evaluation Plan:

We used an iterative mixed methods approach. Each round of qualitative and quantitative surveys (every time the course was taught) was used to evaluate the effectiveness of the previous intervention (modification of the case study). Field notes from classroom observation and formal and informal interviews with students were also used in conjunction with the surveys to formulate new questions about how to adapt the case studies to make a better intervention. In our analysis, we found that the quantitative findings helped identify pertinent issues related to learning in the class and the qualitative data were helpful in understanding nuances of the issues that arose.

Summary of Outcomes:

68% of students preferred having case studies integrated into the lecture rather than devoting an entire class period to case study discussions.

In year 2, qualitative findings indicated that students asked that the case studies to be more like them versus the married couple case study that was currently being used. In year 3, qualitative findings indicated that students could relate to the newly developed case study that featured a college coed like themselves. Students did not request that we also include a married couple case study.

Students were able to take what they learned and apply it to their own situation.

Student Evaluation of Teaching (SET) scores increased from year 1 to year 2.

Reflection Log/Status: (To be updated at a minimum bi-monthly)

Describe the activities/work you have completed since the last time you reported.

N/A- We are not currently teaching the course. We will be teaching the course in Spring 2008.

We have presented at a national conference and are currently working on submitting a manuscript to a journal in the education arena.

We have written another case study that is a male college student, making changes to the types of questions asked and the format based on student preferences.

We also developed a game that is in the format of Jeopardy to use as a review for exams. We developed one for a review for the final at the end of last semester and students seemed to like playing the game in class. We would like to develop one to be used to review for each exam and possibly upload it to the course website as a review before an exam.

What successes have you experienced with your work/project?

Over the three years, we have had 2 national presentations and 1 international presentation on the work that we have done as a result of being a part of the Bush Grant.

Our team has worked well collaborating together. We have had a fairly consistent team over the three year period.

What challenges have you encountered with your research or implementation? (Consider activities or events that have not worked as well as you had hoped or expected.)

Finding extra class time in the course to administer the surveys.

APPENDIX E:

List of Publications, Conferences, and Internal Presentations by Faculty and Staff of the University of Minnesota's Bush Grant

What project adjustments have you made based on the data analysis, student reactions, feedback from consultants, etc.?

A new textbook which included case studies at the end of each chapter was selected at the end of year 1.

In year 2, we used a CASE STUDY approach to address the challenges identified by the instructor and team members. Delivery method changed from strictly lecture base to include small group discussions.

In year 3, a series of case studies were developed that mirrored a college student majoring in Family Social Science. We rewrote test questions to include case studies and we developed a jeopardy game to review for the final.

Student suggestions to case studies: Integrated case studies make them relevant, give sufficient time to work, and use case study exercises to prepare for real life application to students' own personal finances. Students offered many suggestions for making the case study exercises more meaningful.

How are you using collaboration within your project?

Our team has worked well collaborating together. We have had a fairly consistent team over the three year period.

Each team member has had a voice in the redesign of this course over the three year period and has been committed to the project.

How are you utilizing a scholarly approach to teaching within your project? *(i.e. research/articles collected for your project, presentations to faculty or at conferences, articles written, etc.)*

We have had 2 national presentations and 1 international presentation on the work that we have done as a result of being a part of the Bush Grant.

We are currently working on submitting a manuscript to a journal in the education arena.

What recommendations would you make to grant administration for continuing research projects for the purposes of improving student learning through innovative teaching strategies?

Assemble a team that can provide multiple perspectives and complementary strengths

Define team members' roles clearly

Commit to an iterative and scholarly design process with a reasonable timeline

Build in frequent and timely feedback that is collaboratively managed

Be open to change and receptive to feedback; changes need to be incremental and within instructor's comfort level and ability

Taken from ISSOTL (2006) presentation in Washington, D.C.

APPENDIX E

List of Publications, Conferences, and Internal Presentations
by Faculty and Staff of the
University of Minnesota's Bush Grant

Crookston
Publications

Grave, Marilyn. "Criterion Three: Student Learning and Effective Teaching." *Chapter 3, Self-Study Report for the Higher Learning Commission of the North Central Association of Colleges and Schools.* (pp. 86-151) University of Minnesota, Crookston, February 2006.

Conferences

Crawford, David. "A Series of Formative Classroom Assessment Techniques Used in Accounting Principles Courses." American Accounting Association, 46th Annual Meeting, Midwest Regional. Chicago. 30 March 2006.

Grave, Marilyn. "Designing and Building a System for Documenting and Analyzing Assessment of Student Learning Activities." Institutional Showcase Presentation, 112th Annual Meeting of the Higher Learning Commission, North Central Association of Colleges and Schools - "Leading for the Common Good". Chicago. 21-24 April, 2007.

Myers, Ken. "Situational Learning: Assessing and Developing Student Skills in Synthesizing Information from an On-The-Job Situation and Reflective Problem Solving." Midwest Association of Hospitality Educators Conference. Minneapolis. February 2007.

Sedaie, Behrooz. "The Effect of Graphs and Computers on Students' Achievement in College Introductory Economics Courses." Midwest Economic Association, 68th Annual Meeting. Chicago. 19 March 2004.

Sedaie, Behrooz. "The Effect of Principles Courses on Students' Attitude Toward Economic Literacy." Midwest Economic Association, 69th Annual Meeting, Milwaukee. 12 March 2005.

Sedaie, Behrooz. "The Effect of Technology Enhanced Collaborative Learning on Students' Achievement in College Level Introductory Microeconomics Courses." Midwest Economic Association, 71st Annual Meeting, Minneapolis. 24 March 2007.

Thompson, K., & Johnson, K. "Practical applications of classroom concepts for real world clients." The Collaboration for the Advancement of College Teaching and Learning November Conference, Minneapolis, Minnesota. November 2007.

Internal Presentations

Crawford, David. "Students' Academic Efforts and Their Perceptions Regarding Institutional Standards and Expectations." University of Minnesota, Crookston. 16 May 2006.

Myers, Ken. "Situational Learning as a Model for Innovative Teaching for Internships at UMC." University of Minnesota, Crookston. 21 December 2006.

Sedaie, Behrooz. "The Effect of Technology Enhanced Collaborative Learning on Students' Achievement in College Level Introductory Microeconomics Courses". 21 December 2006.

Duluth

2007 Presentations and Publications by the UMD Bush Faculty
December 17, 2007
Prepared by Bilin Tsai

The Academy of Distinguished Teachers, the Center for Teaching and Learning, and the Digital Media Center: *Enhancing Student Learning: Conversations about Research and Practice.* University of Minnesota, Minneapolis, April 30, 2007

Fifteen UMD Bush faculty attended this conference and ten of them presented their work.
Posters

- Duane Millslagle, *A Study of Meta-Cognitive Learning Strategies Among Undergraduate Students and Between Courses Delivered Face to Face and Online.*
- Jane A. K. Carlson, *Partnership in the Schools – Transitioning Away from the Traditional.*

Presentations

- Jill Jenson and Paul Treuer, *Encouraging Self-Regulated and Reflective Learning Through Electronic Portfolio Use in Composition.*
- James Allert, *Using Student Learning Data to Redesign Computer Science I.*

Workshops

- Jason Davis, Charlene Harkins, John Kowalczyk, Steve Holtz, Joseph Johnson, Chad Pierson, LeAne Rutherford, Angela Sharp, *Clicking into Bloom: Realizing the Learning Potential in Personal Response Systems*.
- James Allert, *Do Learning Styles Matter?*

Fall 2007 Academy of Distinguished Teachers Retreat, Oct 6-7, 2007

- *So Many Tools, So Little Time*, Helen Mongan-Rallis

Presentations to UM College of Pharmacy

Joe Johnson

- On the use of Personal Response Systems (clickers) for pharmacy students on two campuses (Twin Cities and Duluth). This was presented to CoP (@ 30-35) faculty as part of the development of the use of PRS in CoP courses.

December 4, 2007 Bush Poster Sessions, Minneapolis

- *Do Learning Styles Matter?*, Jim Allert
- *A Collaborative Model for Conducting Scholarly Research*, Marty Sozansky
- *Showcasing Scholarship: The Bush Grant for Enhancing Student Learning through Innovative Teaching and Technology*, S. Smith and L. Rutherford
- *Team-based Learning Using Clickers in a Non-majors Biology Course*, Amanda Little
- *Reflective Learners and Student Achievement*, B. Tsai
- *Impact of Reflection Using an Online Discussion Social Constructivist Forum*, L. Bye, H. Mongan-Rallis and S. Smith
- *Testing the Idea of Emergent IT Literacy in Information Systems Education,* N. Hassan
- *Critical Incidents, Collaboration, and Cyber-Reflection*, D. Glisczinski
- *Partnership in Schools*, J. Carlson

Presentations at UMD

- IDS Workshop on March 29: Jason Davis, Charlene Harkins, John Kowalczyk, Steve Holtz, Joseph Johnson, Chad Pierson, LeAne Rutherford, Angela Sharp, *Clicking into Bloom: Realizing the Learning Potential in Personal Response Systems.*
- Presentations at the biweekly Bush faculty meetings were made by
    - Justin Rubin, Music
    - Charlene Harkins, HPER
    - Nik Hassan, FMIS
    - Bilin Tsai, Chemistry
    - Marshall Hampton, Math and Statistics
    - Jane Carlson, HPER
    - John Kowalczyk, HPER
    - Dan Glisczinski, Education
    - Steve Vanderheiden, Political Science
    - Marty Sozansky, Composition
    - Nik Hassan, FMIS
- IDS Workshop on September 25, 2007 on the *Use of Clickers in the Classroom*
- Jim Allert, Scot Halverson
  Making Tutorials for CS Classes with Adobe Captivate
  UMD Visual and Digital Imaging Lab Colloquium on October 2, 2007
- Justin Rubin
  Virtual Instrument Sequencing
  UMD Visual and Digital Imaging Lab Colloquium on October 10, 2007
- Rob Wittig
  Weblogs and Podcasting to Support International Collaboration
  UMD Visual and Digital Imaging Lab Colloquium on October 30, 2007
- IDS Workshop scheduled for December 4, 2007 on 4 Bush Faculty projects: Amy Versnik-Nowak, Deborah Petersen-Perlman, Jim Aller, Olaf Kuelke

Presentations and Publications

Jane A. K. Carlson

- *Partnership in Schools-Transitioning Away from the Traditional*.

Presentation at the American Alliance of Health, Physical Education, Recreation and Dance National Conference. Baltimore MD March 14-17, 2007

- "University/School Partnerships in Teacher Education Programs" published in *Journal of Physical and Health Education*. Summer 2007, pp 6-11.
- *Partnerships in the Schools – The Missing Link*.
  Presentation at the Minnesota Association of Health, Physical Education, Recreation and Dance State Conference. Alexandria MN October 29, 2007.

Olaf Kuhlke

- Editor for book *Northland Geographies: Nature, Society and the Economy in Ely, MN* Edwin Mellen Press January 2008
- *Government Policy, Migration Flows and Recruitment Agency Location in Sri Lanka: Implications for Tsunami-Impacted Regions*
  Presentation at the Applied Geography Conference. Indianapolis IN October, 2007.

Steve Vanderheiden

- *Connecting Student Outcomes to Exam Preparation Strategies: Promoting Self-Reflective Learning*.
  Presentation to the Midwest Political Science Association annual meeting. Chicago IL April 12-15, 2007

David Doorn and Maureen O'Brien

- "Assessing the Gains from Concept Mapping in Introductory Statistics" published in *International Journal for the Scholarship of Teaching and Learning*. Vol 1, Number 2, 2007.

Duane Millslagle

- *Comparing Metacognitive Learning Strategies Among Undergraduate Students in Face-to-Face and WebCT Online Delivered Sport Psychology Courses.* Presentation at the American Alliance of Health, Physical Education, Recreation and Dance National Conference. Baltimore MD March 14-17, 2007

Bilin Tsai

- *Reflective Learners and Student Achievement.*
  Presentation at the National Conference of the American Chemical Society. Chicago IL March 25-29, 2007
- *Post-Occupancy Evaluation of a Leading-Edge Model for Teaching Labs.*
  Presentation at the 2007 Tradeline Conference on College and University Science Buildings. Albuquerque, NM October 3-5, 2007

Dan Glisczinski

- *Curriculum for Conscientization.*
  Presentation at the Midwest Qualitative Conference.University of St. Thomas, Minneapolis MN April 2007

Nik Hassan

- *Testing the Idea of Emergent IT Literacy in IS Education*
  AIS SIG Education IAIM Conference, Montreal Canada, Dec 7-9, 2007.

Shelley Smith and LeAne Rutherford

- *Clicking into Bloom: Realizing the Learning Potential of Clickers*. Professional and Organizational Development Conference. Pittsburgh PA October 25-27, 2007

James Allert, *Programming with Visual C++ 2008: Concepts and Projects*. Bostson (2008), Course Technology. ISBN 1-4239-0186-X, 704 pages

Morris

Morris

Conferences

Solvie, Pamela A., and Molly Kloek. Society for Information Technology & Teacher Education 17th International Conference. Orlando Florida. 20-24 March 2006.

Solvie, Pamela A., and Engin A. Sungur. "Concept Maps/Graphs/Trees/Vines in Education," The 5th WSEAS International Conference on E-ACTIVITIES. Venice, Italy. 20-22 November 2006.

Internal Presentations

Berberi, Tammy. "Disabled Students in Our Classrooms." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Berberi, Tammy. "Worlds Apart: Disability and Foreign Language Study." Inter-Campus Conversations on Innovative Teaching. 1 November 2005.

4-Bush ITTS Publications List Revised 10-3-06 Baepler

Boyd, Sylke. "Computer Modeling of Materials in Physics." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Bremer, Peter, Matt Conner, Pam Gades, Roger Boleman, and Karen Cusey,. "State of Technology Enhanced Learning (TEL)." UMM Fall Faculty Retreat: Enhancing Our Academic Environment. Alexandria, Minnesota. 21-22 August 2006.

Gades, Pam. "Course Tools: New Initiative." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Gercken-Hawkins, Becca. "Using Technology to Shape and Support Learning Communities." UMN TEL Seminar Series. 7 December 2005.

Kahng, Byungik. "Using Mathematica on Teaching Calculus to Diverse Learners." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Kahng, Byungik. "Programmatic Change with Learning Technologies" UMN TEL Seminar Series. 5 October 2005.

Kloek, Molly. "Learning styles." Learning Styles Resources, and Teaching to Diverse Learning. 3 October 2006. <www.morris.umn.edu/TEL/>.

Machkasova, Elena, and Nic McPhee. "Dynamic Web Page Teaching Tools." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22, August 2006.

Myers, Paul. "Reflection Logs for Research in Science (BLOGS)." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Solvie, Pamela A. "Using Technology Tools to Engage Students with Multiple

Learning Styles in a Constructivist Learning Environment." Inter-Campus Conversations on Innovative Teaching. 4 April 2006.
Solvie, Pamela A., and Engin A. Sungur. "Concept Maps." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.
Thorson, Greg. "Clickers and Wikis: New Opportunities for Student Participation Through Technology." UMM Fall Faculty Retreat: Innovative Learning and Teaching. Alexandria, Minnesota. 21-22 August 2006.

Twin Cities

Publications

Brakke, Mary, Kevin Smith, Paul Baepler, and J.D. Walker (2006). "Using problem based learning to enhance students' motivation to learn." *Creative College Teaching Journal.* (3) 1, 4-15.

John Chilton and Maria Gini, "Using the AIBOs in a CS1 course," AAAI Spring Symposium on ``Robots and Robot Venues: resources for AI education", *Technical Report SS-07-09*, AAAI Press, pp 24-28, 2007.

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