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A REASSESSMENT OF STRATEGY-STRUCTURE FIT: PARALLEL ACHIEVEMENT VERUS RECONCILIATION

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ABSTRACT

Research and development units are faced with the challenging objective of being cost effective while developing high quality, innovative products. Advanced technology is only part of the solution. It is increasingly clear that organization structures and managerial processes must also be designed and structured to meet the dual objectives of quality and efficiency. This paper presents the results of an empirical case analysis of a large R & D division which is attempting to meet the challenge of achieving high performance along two conflicting dimensions.

One of the guiding premises in both strategic management and organization theory is the notion of "fit." Fit is defined as compatibility or congruence among an organization's purposes, its social and technical systems, and its administrative structure and processes. Achieving fit suggests that different organization purposes require different organization forms. Current competitive pressures have created a challenge to the successful implementation of such fit by requiring some organization units to achieve goals which have traditionally been seen as in conflict. Competition in terms of both price and product quality demand a single organization form which encourages optimal and simultaneous attainment of conflicting goals. This is quite different than designing organization processes to resolve or limit goal conflicts. Establishing superordinate goals, for example, typically results in satisficing behavior rather than in attempts to simultaneously achieve the highest levels possible of two distinct goals.

This design dilemma is typified by the situation facing many research and development units in highly competitive industries. When companies face increasing competition, their R&D units are often required to focus both on the short-term and the long-term, to achieve engineering-application advances as well as basic research, to deal with many stages in the product life cycle (not just the initial design), and to incorporate manufacturing concerns directly within the design process. While such varied research and development goals are common among diversified companies with decentralized research in different product divisions, multiple R & D goals of this type are relatively new to the single-product firm in maturing industries. Furthermore, research and

development units in single-product firms are required to be cost effective while developing high quality, innovative goods.

Organization theory literature and strategy research is filled with prototypes of organizations which contrast these two basic types of goals. Examples include Porter's (1980) cost leadership versus differentiation strategy, Miles and Snow's (1978) defenders versus prospectors, Burns and Stalker's (1961) mechanistic versus organic organization types, and Mintzberg's (1980) machine bureaucracy versus adhocracy. In each case a basic assumption is made that innovation coupled with continuous change places substantally dif ferent demands on the organization's managerial systems than do efficiency and stability.

Therefore, given the notion of fit between function and form, an important question is raised: Can an organization structure be devised which allows firms to simultaneously achieve high levels of two conflicting goals over a long period of time? If such a structure can be designed, then a basic challenge is presented to a number of premises underlying much of the theory of organization design and strategy implementation. Since the goals of creativity/innovation and efficiency/cost effectiveness have frequently been used as prototypical opposites leading to contrasting organization forms, the current research problem is the design of an organization form which facilitates the collaboration of efficiency and innovation rather than separation and competition between these two objectives.

THE RESEARCH SETTING

Much of the academic research done with respect to research and development activity has focused on the diffusion of innovations or has described the behavioral and structural features of of R&D units engaged in basic scientific

research. The former approach assumes the "development" activity has already taken place. The latter focus considers research and development as a process for achieving long-range goals, fuzzy objectives and entailing little prior knowledge of cause-and-effect relationships or appropriate procedures for achieving the desired outcomes. These conditions do not accurately describe the typical research and development environment found in many large, mature, manufacturing firms. In these latter firms the product goals may be quite precise and the causal relationships may be known but difficult or expensive to control. As outlined above, the current competitive situation requires many R&D units to meet complex demands. Little empirical analysis has been done on the means to simultaneously achieve conflicting objectives without satisficing.

While the notion that organization structures and processes are important factors in achieving organization effectiveness is not new, this concept has often been overshadowed by technological features in the research and development environment. This paper assumes that advanced technology is available. The paper focuses instead on the work environment and organizational processes which facilitate or inhibit the attainment of diverse research and development objectives.

An empirical and case-based analysis undertaken at a large-scale (900 employee) research and development division of a major midwestern manufacturer provides the data for this research effort. The company is one of a consortium of five firms actively pursuing simultaneous innovation and cost reduction programs in an effort to improve their competitive positions. The research and development division which was studied provided a natural quasi-experimental design. The structural design permitted comparison among units having different work environments and workflow processes and facing different task

contingencies, yet attempting an unprecedented effort to achieve high levels of two conflicting goals.

This research project leads to a re-evaluation of several hypotheses of organization design which have been assumed rather than tested. One of the limitations of research in strategic management and organization theory is that field research frequently is based on observation rather than experimentation. As a consequence, it is only as organiations face new demands that we see new organization forms emerge and add these mutations to our analytic map. Current competitive pressures have created such an opportunity. Analysis of diverse responses suggests how to devise an organization structure that allows achievement of conflicting goals without segmentation and division of labor. Further, this investigation prompts a re-evaluation of some fundamental assumptions which have guided theory generation in these disciplines.

TWO IMPORTANT CONTINGENCIES

It is generally conceded that there is no one best way to organize. It is also agreed that not all ways of organizing are equally effective. If an organization is to marshall its resources effectively and efficiently to achieve some desired objective, the way in which the firm is designed should be compatible with the goals which are to be achieved and with the situational and task-related factors providing the context for organizational activity (e.g. Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Hage & Aiken, 1969). Thus, organizational goals and task characteristics are two important contingencies which influence what type of organization structures and processes are likely to be most effective in a given situation.

Organizational Goals

Organizational goals serve a number of different purposes. Goals establish

a direction for activities or describe a future state which the firm is attempting to realize. Goals help to legitimize the existence of a firm or unit, and goals provide a standard for evaluation. Research and development units, like most other parts of an organization, have many goals. However, because of the nature of the research and development unit's contribution to the activities of the organization as a whole, two types of objectives are of particular importance: (1) providing for high quality research applications, and (2) assuring product design efficiency and effectiveness.

In this study high quality research applications were measured by items such as improved engineering standards, improved service standards, improved manufacturing standards and decreased cost of design changes. These items appear crucial to developing a product which is distinguished in the marketplace by exceptional quality and by responsiveness to customer needs. Such factors permit a firm to adopt a competitive strategy of product differentiation based on quality. These factors also affect how well the research and development unit is integrated with other functional units in the organization. Application quality is one indicator of the innovative and integrative capacity of the research and development unit.

The contrasting type of goal, design efficiency and effectiveness, was measured by items relating to increased efficiency in design, increased effectiveness in design, increased efficiency in developing product definitions, and increased efficiency in blueprint and document production (this was one of the primary deliverables of the research and development department). These latter items are linked with costs. The more efficiently a research and development unit is able to design and develop specifications for various products, the fewer resources it will require to achieve a given magnitude of

performance, or the greater its performance will be with a given level of resources. These factors permit a firm to adopt a price sensitive strategy.

Clearly each of these goals is desirable, yet each draws upon different skills and focuses on different types of problems. Within the somewhat restricted range of an R&D environment they represent a classic goal conflict. Goal focus (application quality versus efficient, design) comprises one contingency considered in this study.

Task Characteristics

In a research and development environment, one of the most important contextual factors is the extent to which the task to be done is understood, familiar, routine, and otherwise analyzable (Perrow, 1967; Galbraith, 1973; Tushman, 1979). Issues which indicate a high degree of analyzability or familiarity include: job monotony, lack of inherent challenge in the work, the belief that the longer an employee holds a job the more boring it becomes, a job situation where change is minimal and the employee has more than adquate training and skills. Issues which suggest a low degree of analyzability/familiarity include the feeling of challange a job provides, a belief that the job may be frustrating but it is never dull, and indications that something new happens on the job every day.

On an absolute scale, a resarch and development environment is considered largely non-routine, having many exceptions, surprises, and situations which are difficult to analyze. Yet, on a relative scale, some of the tasks are clearly more easily understood and more repetitively performed than others. Therefore, this task characteristic remains important despite the overall "uncertain" nature of research and development activities. A measure of the extent to which the work environment and subsequent tasks are seen as familiar and analyzable is the second contingency considered in this study.

METHODOLOGY

Managers, support technicians, engineers, and administrative employees in the research and development division of a major mid-western company were given a version of the Michigan Organization Assessment Questionnaire (MOAQ). Added to this questionnaire were items which measured various types of individual, group, and organizational performance. The sample size of 274 represents slightly over 50 percent of the relevant employees. Organization culture dictated that participation in the study be voluntary. As a result, the sample has disproportionately high representation from non-union employees such as managers, technicians and engineers. However, data analysis shows no significant difference in responses between union and non-union employees. Demographic data on gender, tenure with the company, ethnicity, age, and job classification indicated no other significant differences between the sample and the non-respondents in the population.

In addition to the questionnaire a content analysis of formal organizational documents provided diagnostic information regarding goals, structure, organization performance and organization culture. Fifteen interviews with key decision-makers and multiple observations of the unit in operation over a period of a year and one half provide the context for the empirical analysis.

Eighteen months prior to data collection the division changed from a decentralized, hierarchical and functional structure to a workgroup-centered structure. Twenty-three workgroups were identified within the division. Each workgroup has a unique set of goals, tasks, criteria for evaluation, time-frames for deliverables, and relationships with other parts of the division and other parts of the company. Each workgróup also has distinct and measurable norms of behavior, authority, and decisión-making processes. Further, each workgroup

contains a mixture of skills and hierarchical levels. Yet each workgroup is required to maintain or improve their rate of innovation and simultaneously reduce costs by 30 percent. This structure permits comparison among units having different work environments and work-flow processes and facing different task contingencies yet attempting to achieve similarly conflicting goals.

Based on composite responses to items related to task familiarity and analyzability, the workgroups were split into two categories: Those which faced conditions of comparatively high familiarity and analyzability (eleven workgroups) and those which faced conditions of relatively low familiarity and analyzability (twelve workgroups). As mentioned previously, the scores reflect relative, rather than absolute, scales of these items.

Every workgroup was to a major extent responsible for achieving goals related to both quality applications and efficient, effective design. Employee's aggregate perceptions of the extent to which goals are being achieved were the performance measures used in the study.

Although these measures of performance are subjective, they represent the judgements of managers, professional and technical workers actively engaged in the research and development process and its evaluation. These individuals are responsible for both providing and interpreting performance feedback on a regular basis.

A two-by-two correlational analysis enabled investigation of those structural and organizational process characteristics which facilitated or inhibited goal achievement under high and low classifications of the two contextual conditions. Five categories of organization structure and process variables were investigated: (1) supervisor characteristics, (2) workgroup characteristics, (3) employee attitudes and feelings, (4) job characteristics,

and (5) information processing emphasis. Each of these factors was considered for quality application and for efficient, effective design goals under conditions of high and low familiarity/analyzability.

RESULTS AND DISCUSSION

Results of this study suggest an interesting pattern of relationships. Looking first at conditions of relatively high familiarity and analyzability, quality application goals are fostered by encouraging creative discontent among employees, by encouraging job and company involvement, by encouraging supervisory interaction and by discouraging turnover and the use of complex decision approaches. Efficient and effective designs, on the other hand are facilitated by encouraging open discussion and a desire for mobility while discouraging structural controls and job variety. It appears that quality applications are fostered in an actively supportive environment, while efficient design achievements seem to thrive under a more passively-managed work situation. Structures, processes and actions can be specified which lead to increased innovation rates but it is more difficult to make a direct contribution to efficiency in research and development. It may be that a lassez faire approach aids performance by removing bureaucratic impediments to productivity, and that eliminating such obstacles is a major contribution to efficient performance.

Conditions of low familiarity and analyzability, for example, present a different picture. With increased uncertainty efficient design is facilitated by an actively-managed work environment. Encouraging subordinate interactions, fostering commitment to the organization and the job, promoting job enrichment while discouraging conflict and over-analysis contribute to efficient design productivity. Achieving quality applications on the other hand, seems to rely

more on inspiration and motivation as familiarity and analyzability declines. To achieve quality goals, challenge and learning should be encouraged while a desire to leave is discouraged. The pattern which emerges under conditions of low familiarity suggests that efficiency is largely achieved by managing the external environment and that creativity is attained by influencing the individual.

A correlation analysis was conducted to investigate the effect of various aspects of organization design and processes on achieving quality applications versus efficient designs under conditions of relatively high and relatively low familirity. The performance effects of supervisory characteristics, workgroup characteristics, employee attitudes, job characteristics, and approaches to information processing are disucssed in turn.

Effects of Supervisory Behavior

Supervisory behavior and managerial style appear to have the strongest positive effect when promoting quality applications under conditions of high familiarity and analyzability (see Figure 1). Under this set of contingencies, supervisors who actively encourage employee participation in decision-making, facilitate subordinate interactions, goal setting and problem solving, are aware of work progress and activities, and who treat subordinates as respected individuals make a positive contribution to achieving quality applications. In contrast, these same behaviors have a strong negative effect if analyzability remains high but the goal is to develop efficient designs. It appears that under this latter evaluation contingency, active, facilitative supervisors interfere with group performance.

When the tasks are less routine, however, some of the active supervisory characteristics (such as facilitating decentralized control) appear to have a

positive effect on efficient design performance. Supervisor behavior did not appear to have any significant influence on the development of quality applications when familiairity/analyzability is low.

Insert Figure 1 about here

These findings support the argument that the most effective supervisors may be those who are both versatile and adaptive, effectively matching their behavior and direct involvement in the workflow to each situation. They further suggest that training supervisors to expand their repertoire of skills might be particularly useful when the task environment is fairly familiar and analyzable, but that this type of investment would not have a strong effect on performance when the job is performed under conditions of extremely low analyzability. Perhaps an area where training would be most beneficial is in developing a supervisor's ability to recognize the degree of familiarity perceived by those performing the tasks. Supervisors might also become more adept at substituting various individual characteristics (e.g., intrinsic satisfaction for socio-emotional leadership) or job characteristics (e.g., job feedback for task leadership) for supervisory activites.

Effects of Workgroup Characteristics

Workgroups are hypothesized to affect the productivity of individual members in three ways: (1) by increasing their job-relevant knowledge and skills, (2) by increasing their level of job satisfaction, which in turn lowers turnover and other related withdrawal behaviors, and (3) by increasing the level of effort members exert.

Correlation of group characteristics with performance measures indicates

three important outcomes. First, the data suggest that workgroups have an important effect on performance. Further these data indicate that some characteristics are more important than others. Finally, they indicate that as analyzability increases, workgroup characteristics become more significant. The characteristics of the immediate workgroup have the strongest effect when the situation is relatively familiar and analyzable (see Figure 2). Similar to the findings for supervisory characteristics the direction of influence is reversed for the two types of goals. Group fragmentation and

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Insert Figure 2 about here

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heterogeneity have strong positive effects on quality goals and strong negative effects for design efficiency. Open communication among group members has a negative effect on quality applications yet a positive effect on design efficiency. This pattern suggests that work segmentation and some degree of specialization may be appropriate for achieving quality applications, but that shared values and group cohesiveness are important conditions for achieving efficient designs. The question is raised as to whether or not these conditions can be achieved through alternate, noncontradictory means.

Effects of Employee Attitudes

An interesting pattern is evident when employee attitudes are correlated with strong performance under the four contingent situations considered in this study (see Figure 3). If employees feel challenged by their jobs and if they

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Insert Figure 3 about here

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have no desire to change jobs, quality applications are enhanced under conditions of low familiarity/analyzability. Similarly, an overall feeling of commitment (to the organization and to the job) has the strongest influence on design efficiency under conditions of low certainty. This suggests that in both cases internal motivation has a strong effect on performance. Further, it appears that quality goals require more of a job focus, while efficiency goals respond to a more general organization orientation.

Conditions of high familiarity and/or analyzability suggest a different attitude pattern. The greatest design efficiency is achieved by moderately discontented employees. Design industries are frequently characterized by employee mobility. Further, it is recognized that movement is dependent on recent performance; an employee is only considered as good as his or her last design in many cases. Perhaps this interest in change, and knowledge of the performance prerequisites, foster desirable engineering and design activities or perhaps such employees are more willing to take unconventional approaches to design. High performance with regard to quality applications, however, appear to be fostered by a more contented attitude. Job satisfaction, feelings of responsiblity and involvement, a more centralized, directive structure, and an interest in remaining in the current position contribute to high quality applications under familiar/analyzable conditions.

Job Characteristic Effects

Three of the four contingent conditions show a positive response to task

characteristics generally associated with "enriched" jobs (see Figure 4). Only an effort to achieve efficient designs under highly familiar circumstances

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Insert Figure 4 about here

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circumstances seems positively influenced by a tightly focused, more independent job-task characterization. Variety and feedback seem to be the most important factors overall. Quality applications appear to be aided by an interconnectedness with other units in the organization. This complements feelings of organization involvement which make a similar contribution. The positive effects of interdependence may also indicate greater knowledge of interests and functions of diverse operations within the firm. This knowledge increases the feasiblity of implementing research and development efforts.

Information Processing Relationships

Achieving efficient designs appears linked with insuring that two undesirable conditions don't occur; with prevention rather than creation. First, the manner in which information processing takes place should not be dictated. This suggests that under conditions of high analyzability, information processing activities should flow from the specific tasks at hand rather than from some predetermined approach to information analysis. Under conditions of low familirity, the greatest danger seems to come from premature analysis. A second condition to be avoided is having routine information and information processing use such a large proportion of time or resources that none is left for nonroutine, explorative, inventive approaches.

More active approaches to information management contribute to quality

applications. Such applications are facilitated by insuring that adequate information is shared and available and that prior decisions and solutions are recorded. These results are presented in Figure 5. The composite pattern

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Insert Figure 5 about here

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suggests that efficient designs are most likely to be inhibited by information overload, while quality applications are most vulnerable to omissions in information. The ability to select and assign priority to information seems to be a critical feature of designing organizations which are able to achieve multiple goals.

CONCLUSION

The correlational patterns which emerged from this study suggest two important considerations for the structure and design of units intending to achieve high levels of innovation and efficiency. First, it is clear that a decision needs to be made whether to separate or to integrate the two primary types of goals most often present in these units. If the choice is made to separate these activities, then diverse organization structures must co-exist in the same unit, and must frequently interact to achieve organizational goals. Separation will increase the need for information sharing and for conflict management, since developing quality applications and efficient designs cannot and should not be self-contained activities. This has been the traditional choice, and often leads to satisfactory performance rather than excellence along each of the goals.

If the choice is made to integrate two types of goals within a set of

job or workgroup activities the stress of reconciling diverse objectives becomes an individual rather than an organizational problem. Thus, if integration is the choice, supervisors, workgroups and individuals require training and experience in stress management and in making choices. Individuals will need to develop many different sets of skills and operating styles as well as the ability to choose an approach to fit a given situation. Rapid, accurate situational analysis will become an increasingly important competence to develop. Implementing an integrated approach is further complicated by the lack of any consistency in sources of organizational power. Traditional lines of authority are not sufficiently flexible. Expert power varies with the issue or problem. Reward and sanctions must focus more on groups than individuals. It may be that referent power will emerge as the strongest consistent source of organizational influence. This will present a significant challenge to effective decision-making.

A second issue also emerged. Researchers and practitioners appear to know much more about how to structure and manage circumstances which have some degree of familiarity and analyzability. Despite the range restriction inherent in looking solely at an R&D environment, strong differences were found betweeen lower and higher degrees of familiarity and analyzability. An important issue to be resolved, therefore, is whether performance under highly uncertain and unfamiliar circumstances is almost exclusively a result of individual talents and capabilities or whether the traditional measures and indices of orgnizational structure and process are just not the appropriate factors to consider. If the former explanation is true, selection rather than training or organization design must be the dominant human resources issue for many firms facing increasingly complex environments. If, however, the latter explanation

is true, there is a need for designing creative and unconventional organization processes and measures to accommodate the unique environnment of organizations which must sustain conflicting goals rather than attempt to reconcile them.

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FIGURE 1 : Correlates of Various Supervisor Characteristics With Quality and Efficiency Goals Under Conditions of High and Low Familiarity/ Analyzability

FAMILIARITY/ANALYZABILITY

TYPE OF GOAL	LOW	HIGH
QUALITY APPLICATIONS	None Evident	POSITIVE FACTORS Participation (.58*) Control of work (.80***) Facilitative relations (.52*) Goal setting (.81***) Problem solving (.69**) Consideration (.50*)
EFFICIENT EFFECTIVE DESIGN	POSITIVE FACTORS Facilitative relations (.53*) Goal setting (.76***) Consideration (.61*)	NEGATIVE FACTORS Participation (-.66**) Control of work (-.75***) Facilitative relations (-.60*) Goal setting (-.58*) Problem solving (-.80***) Consideration (-.56*)

* p = .05; ** p = .01; *** p = .005 N = 23

FIGURE 2: Correlates of Group Characteristics With Quality and Efficiency Goals Under Conditions of High and Low Familiarity/Analyzability

TYPE OF GOAL	FAMILIARITY/ANALYZABILITY: LOW	FAMILIARITY/ANALYZABILITY: HIGH
QUALITY APPLICATIONS	None Evident	POSITIVE FACTORS Fragmentation (.76***) Heterogeneity (.76***) NEGATIVE FACTOR Open processes (-.72***)
EFFICIENT EFFECTIVE DESIGN	NEGATIVE FACTOR Fragmentation (-.58*)	POSITIVE FACTOR Open processes (.83***) NEGATIVE FACTORS Fragmentation (-.64*) Heterogeneity (-.72***)

* p=.05; ** p=.01; *** p=.005

N = 23

FIGURE 3: Correlates of Employee Attitudes With Quality and Efficiency Goals Under Conditions of High and Low Familiarity/Analyzability

FAMILIARITY/ANALYZABILITY

TYPE OF GOAL	LOW	HIGH
QUALITY APPLICATIONS	POSITIVE FACTOR Challenge (.56*) NEGATIVE FACTOR Desire to Change Jobs (-.67*)	POSITIVE FACTORS Job satisfaction (.81***) Org. involvement (.59*) Responsibility (.56*) Control (.76*) NEGATIVE FACTOR Turnover intent (-.75***)
EFFICIENT EFFECTIVE DESIGN	POSITIVE FACTOR Committment (.70***)	POSITIVE FACTORS Desire to change jobs (.58*) Turnover intent (.60*) NEGATIVE FACTORS Org. involvement (-.61*) Responsibility (-.59) Control (-.67**)

* p=.05; ** p=.01; *** p=.005 N = 23

FIGURE 4: Correlates of Job-Task Characteristics With Quality and Efficiency Goals Under Conditions of High and Low Familiarity/Analyzability

TYPE OF GOAL	FAMILIARITY/ANALYZABILITY: LOW	FAMILIARITY/ANALYZABILITY: HIGH
QUALITY APPLICATIONS	POSITIVE FACTOR Variety (.69**)	POSITIVE FACTORS Variety (.52*) Feedback (.51*) Training (.68**) External interdep (.59*) Internal interdep (.64*)
EFFICIENT EFFECTIVE DESIGN	POSITIVE FACTORS Variety (.62*) Feedback (.58*) NEGATIVE FACTOR Know results (-.57*)	NEGATIVE FACTORS Variety (-.71***) Task importance (-.79***) External interdep (-.59*)

* p=.05; ** p=.01; *** p=.005 N = 23

FIGURE 5: Correlates of Information Processing Emphasis With Quality and Efficiency Goals Under Conditions of High and Low Familiarity/ Analyzability

FAMILIARITY/ANALYZABILITY

TYPE OF GOAL	LOW	HIGH
QUALITY APPLICATIONS	POSITIVE FACTOR Instruction (.53*)	POSITIVE FACTORS Instruction (.57*) Routine info exch (.54*) Nonroutine info exc. (.86***) Compiling info (.59*) Documentation (.63*)
EFFICIENT EFFECTIVE DESIGN	POSITIVE FACTORS Negotiation (.53*) Interviewing (.54*) NEGATIVE FACTOR Analysis (-.56*)	NEGATIVE FACTORS Advising (-.62*) Instruction (-.61*) Routine info exc (-.71***) Nonroutine info exc (-.64*) Combining info (-.65*) Compiling info (-.81***)

* p=.05; ** p=.01; *** p=.005 N = 23