Bridge Programs

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INTRODUCTION

Bridge programs ease the transition of students from secondary education to postsecondary institutions. They are customized to assist a particular subpopulation of students to be successful. They were originally created for students with high rates of academic difficulty and withdrawal than the general student population. Then, the focus of most bridge programs was academic preparation for increased academic rigor of college. In recent years, a variety of purposes have been added: meet the needs of culturally diverse students who are underrepresented in college, increase student success in particular college degree programs, and increase the number of students who aspire and are prepared for college. Bridge programs range from an intensive program of coordinated courses and noncredit learning experiences to a single academic term course or a workshop lasting a day or two.

One example of the expanded role of college bridge programs is use during multiple transition points throughout secondary and postsecondary education. Previously, these programs were a programmatic effort by colleges to span high school graduation and fall college matriculation. Transition presents different challenges for students, especially first-generation college, historically-underrepresented, economically-disadvantaged, and lacking social capital commonly held by privileged students (Engle & Tinto, 2008). More than academic competency development, bridge programs often deal with psycho-

social factors that impact academic success (Allen & Bir, 2011-2012; Tinto, 2012, 1993). A review of the professional literature revealed a strong emphasis on bridge programs supporting higher student success in Science, Technology, Engineering, and Mathematics (STEM) since these fields seek increase enrollment and graduation of the aforementioned demographic groups.

Since founding of U.S. postsecondary institutions in the 1600s, bridge programs have been common. At that time, most students attending college were white male students from affluent backgrounds. Women and students of color were not afforded the same opportunities to attend college. Most white male students lacked formal education. As a result, many were placed in private schools subsequent to enrollment in private colleges. During the 1800s, academic preparatory academies were created for them to gain perquisite skills necessary for admission to college. In the early 1900s, one purpose of junior colleges was a bridge program to prepare students academically for transfer to senior institutions. For some institutions today, requirements to pass prerequisite remedial or developmental-level courses before enrollment in the corresponding college-level course is a manifestation of bridge programs (Arendale, 2010). Additional information on this topic is available in the *History* chapter in this handbook.

Bridge programs became less important for economically and socially privileged students since they often attended high-quality private schools and were members of families who for generations graduated from college. These

family members provided mentorship, guidance, and financial resources for the privileged to be successful. Today, a new demographic of students aspire to college lacking social capital enjoyed by others. Those new college enrollees are increasingly culturally-diverse, economically-disadvantaged, and lack family members who completed college. Those factors place them at risk of not aspiring to or completing college (Braxton, Doyle, Hartley, Hirschy, Jones, & McLendon, 2014; Tinto, 2012; Ward, Siegel, & Davenport, 2012). These students benefit from bridge programs to have equal access to the benefits of college. This curricular opportunity is important for increased access and social justice for a diverse U.S. (Damico, 2016; Greenfield, Keup, & Gardner, 2013; Upcraft, Gardner, Barefoot, & Associates, 2005). Other researchers challenge the research data on social capital efficacy for advantaging some students over others since they have unique psycho-social challengers for themselves (Luther & Latendresse, 2005; Kingston, 2001). See the *Student Diversity* chapter in this handbook to learn more about diversity issues.

Tinto's model for student departure broadly states academic and social integration, or the lack thereof, is a powerful predictor of students dropping out of college (2012, 1993). His model helps explain the efficacy of bridge programs to address clusters of integration events that influence student departure: (1) academic and social adjustment to a new environment; (2) failure to meet academic standards after prior success in high school; (3) incongruence between

the previous student comfort zone and the new institutional culture and environment; and (4) social isolation in a new environment. Each time students encounter a transition point in the education journey (high school to college, first-year experience, undergraduate to graduate or professional school), these four event clusters endanger college graduation and goal attainment. Bridge programs often incorporate one or more of these event clusters in their program design.

Another confirmation of bridge program importance was identified by Steele's groundbreaking research (1997) of stereotype threat as a major barrier for women and African Americans in school. His general theory of *domain identification* states students are more successful academically if they perceive themselves as part of the school and its environment. Steele identified *stereotype threat* occurs when others perceive the student is at risk academically, despite previous academic achievement, simply because of their gender or ethnicity. His research found women and African Americans scored lower on standardized tests who embraced the negative stereotype. Bridge programs can support higher achievement for underrepresented students by creating a cohort of students in a program to support their transition into college and academically-rigorous programs such as STEM with a supportive cohort group.

ORGANIZATION OF THIS CHAPTER

Bridge programs have grown in sophistication and sequencing through the academic journey. This chapter examines six transition zones: (1) Middle-school

to high school. (2) High school to the first year of college. This period includes bridge programs during high school before graduation and matriculation in college. (3) Orientation prior to college classes. This include single-day and extended orientation programs. (4) The first-year experience in college. (5) Transition from community college to four-year college. (6) Undergraduate college to graduate or professional school. Middle-school bridge programs are included in this chapter since it has been demonstrated that academic experiences for students at this level impact them with success in the following transition points. Colleges and external funding agencies are often involved with the secondary school programs to increase viable postsecondary applicants.

Within these six zones, institution-specific bridge programs have been highly-customized based on demographics, academic program content, academic rigor, and institutional priorities for graduating students of a particular profile. Most bridge programs are unique to a single institution. While evaluation studies have been published on bridge programs identified in this chapter, most institutions create their own programs due to unique local needs and the lack of detailed instructions how to implement models developed by others. Some bridge programs have been implement at many institutions nationally. An example are the federally-funded *TRIO programs* that serve 800,000 students at nearly 3,000 institutions with different approaches at each of the aforementioned six zones. A deeper examination of those TRIO programs are contextualized for the student

populations served and the most common academic programs pursued by the students. For example, at the University of Minnesota the TRIO *Student Support Services* (SSS) program is hosted in the College of Education and Human Development (CEHD). While these college students are free to pursue any academic program, most enroll in programs offered by CEHD and SSS services are customized to support their success.

BRIDGE: MIDDLE-SCHOOL TO HIGH SCHOOL

Influences for high school graduation and college admission occur much earlier than previously believed (Knaggs, Sondergeld, & Schardt, 2015). For students and parents, commitment to college begins as early as late elementary or middle-school. This commitment is especially important for families with no family members who attended college. This lack of role models, mentors, and information regarding financial aid are significant social capital deficits (Ehlert, Finger, Rusconi, & Solga, 2017). Goals for these programs are cultivating the possibility of attending college and availability of financial aid. The target student population for these programs are first-generation college, economically-disadvantaged, and students of color.

It is for these reasons the federally-funded *Gaining Early Awareness and Readiness for Undergraduate Programs* (GEAR UP) was created. This program operates with more than 40 educational partnerships and states serving nearly 120,000 students. GEAR UP serves cohorts of students enrolled in low income

schools beginning in middle school and continues until high school graduation. Common activities include peer mentoring, tutoring, field trips, financial aid information, federal and state financial aid application assistance, college admission assistance, summer academies, and other activities. Services are provided for students and their family members. A national study of 173 institutions found GEAR UP involvement increased college readiness when compared with those not participating from other impoverished schools (Bausmith & France, 2012; Knaggs, Sondergeld, & Schardt, 2015; Maxwell, 2015). Evaluation studies are limited to quasi-experimental since all students at the middle-school must be served by the GEAR UP program.

A similar middle-school bridge program is TRIO's *Educational Talent Search* (ETS) program. It is similar in approach to the federally-funded GEAR UP programs. Bowden and Belfield (2015) evaluated ETS regarding a benefit-cost and cost-effectiveness analysis. In both regards, the evaluators found ETS benefits exceeded program costs but found the cost-effectiveness varied widely by program sites.

BRIDGE: HIGH SCHOOL TO COLLEGE FIRST-YEAR

Bridge programs during high school

These college preparation bridge programs occurred during the regular high school day or were after school activities by an external agency. An example of the regular school day approach was reported by Barnet, Fay, and Pheatt

(2016) on credit-bearing transition courses offered by high school teachers during the senior year in California, New York, Tennessee, and West Virginia. The target student population were academically-underprepared students predicted for enrollment in developmental-level courses when admitted to college. While there was variability in delivery, the courses shared the common goal of college readiness in mathematics and reading. Improved outcomes with these college readiness skills appeared promising but the qualitative assessments and diversity of the implementation among the states limited generalizability. The evaluation system did not follow the high school students to college and include academic performance and persistence to college graduation data. The largest embedded approach is dual high school-college enrollment (What Works Clearinghouse, 2017). This approach is used widely in the U.S. The national study found positive results for completing college courses as high school students, especially for the historically-underrepresented. Positive outcomes included higher academic achievement in high school, increased high school graduation rates, higher college matriculation rates, and improved college readiness.

The second approach was external to the high school curriculum. The federally-funded TRIO *Upward Bound Program* (UB) provides an assortment of enrichment curriculum, after-school tutoring, Saturday workshops for the family, field-trips, counseling, college-readiness coursework, college admission test preparation, college application assistance, and college visits. More than 60,000

students are served by UB across the nation. Students must met eligibility requirements of at least two of the following criteria: low-income, physically disabled, and first-generation college aspirant. Cultural or ethnic background is not a criteria for admission as with all other TRIO programs. Most UB participants enter the program as 9th graders (Epps, Jackson, Olsen, Shivji, Roy, & Garcia, 2016). UB evaluation studies often examined high school grade point average, high school graduation, and enrolled in college. These studies have reported mixed results: short-term benefits cited by Mathematics Policy Research (1997), moderate effectiveness by McLure and Child (1998), and stronger evidence based on a multi-institutional study by Seftor, Mamun, and Schim (2009) and Thomas (2014).

A weakness of most TRIO evaluation studies is limitation to a single institution rather than multi-institutional, regional, or national evaluations. A criticism of the studies is the employment of quasi-experimental design and qualitative measures. The federal Department of Education (DOE) conducted a series of controversial national UB studies between 1998 and 2005. The TRIO community resisted pure experimental design since it requires recruiting eligible students for admission and then randomly accepting one group into UB (treatment) and denying other students (control). TRIO advocates argued that UB-eligible students were a *vulnerable population* since they experienced historic discrimination and were from disadvantaged backgrounds. They argued that

denial of service increased their likelihood for college failure and as a result facing a lifetime of diminished quality of life. Some colleges hosting UB programs prohibited involvement with the DOE studies since it violated their institutional review board rules for treatment of vulnerable student populations.

Proponents of experimental design argued the practice of using wait-listed students for acceptance into UB as the control group (quasi-experimental design) since it did not create an acceptable comparison group with random-assignment to treatment and control groups. TRIO advocates raised the issue of morality about denial of services to eligible students. Proponents of random-assignment design argued the short-term sacrifice of some students in the control group was worth it since positive evaluation study results increased likelihood of stable or increased federal funding. Besides, the denied students could seek other campus services to help them succeed. However, this endangered the study since the control group students may have received similar services and thereby depressed the differences in outcomes between the two groups.

The UB community was able to stop the final DOE study by successfully lobbying Congress who passed legislation that stopped them. While the TRIO community celebrated the suspension of the study, little has been done by them to conduct rigorous state or national studies. As mentioned elsewhere in this chapter, most evaluation studies of TRIO programs are single-institution quasi-

experimental studies often reported through student dissertations rather than rigorous peer-reviewed education journals.

Some bridge programs in this category focused on particular demographic groups or students pursuing specific college majors. Katz, Barbosa-Leiker, and Benavides-Vaello (2015) found efficacy with increased enrollment of American Indian and Hispanic students for a baccalaureate of science in nursing (BSN) degree. A two-week summer residential program was offered to high school students. This approach was intensive with math and science curriculum, work in a human anatomy laboratory, field visit to a local hospital, and group discussions among participants dealing with leaving home, emotional support, motivation, and dealing with the academic rigor of college.

Bridge programs during summer following high school graduation

Summer bridge programs following high school graduation differ based on the types of students. All participating students with these programs were accepted for college enrollment at a particular institution. In the first two types of summer bridge programs, the students had adequate to excellent academic preparation for college, but could benefit from participation through higher academic achievement, persistence to academic program competition and college graduation. Only in the final bridge program type was developmental-level curriculum needed since students were predicted at-risk for college completion.

The first type of bridge program focuses on improving outcomes of historically-underrepresented students pursuing diverse postsecondary degree programs. Institutions or particular academic departments seek to increase the diversity of their admitted students. A second types of bridge program is narrowly focused on an academic program such as STEM. In this case, the institutional priority may be to increase diversity in the program or increase graduation rates of enrolled students. The final approach in this category of bridge programs focuses on conditionally-admitted students due to low scores on standardized admissions assessments and other measures.

Bir and Myrick (2015) examined the impact of a summer residential bridge program before first-time fall enrollment at a Historically Black University (HBCU). Students in the program were conditionally-admitted African American males and females who were assessed for placement in developmental-level courses during fall term. Students entered the summer program with significantly lower admission test scores and grades from high school in comparison with nonparticipant control group. The students enrolled in a five-week courses in mathematics and English with a Saturday academy that addressed issues such as conflict resolution, financial literacy, social networking, and others. The curriculum was based on evaluation of factors influencing African American academic outcomes. Learning communities of mixed gender were created with out-of-class social and development activities under the guidance of a mentor who

lived in the residence hall with them. The female bridge students achieved statistically significant higher college grade point averages (GPA) and persisted to the second and third year at higher rates. Cabrera, Miner, and Milem (2013) reported on *The New Start Summer Program* at the University of Arizona. Since 1969, it has served more than 13,000 students with most from historically underrepresented backgrounds. Significant outcomes included higher first-year GPA and persistence rates. The article explored challenges for accounting for variables when calculating statistical significance.

Most often cited are bridge programs preparing students for STEM majors. Seymour and Hewitt (1997) found in a national study variables influencing undergraduates, especially females, to switch academic majors from the hard sciences in which they are enrolled such as chemistry and physics. Their study has been frequently cited by subsequent research studies of the unsupportive culture for women and other underrepresented students in the sciences and has influenced a rise in bridge programs represented in this chapter. Boedeker, Bicer, Capraro, Capraro, Morgan, and Barroso (2015) reported success with an intensive two-week STEM summer camp. Students worked on projects eight hours daily on robotics, bridge building, solar power, and other activities. These students were not at-risk academically, but represented students not often enrolled in STEM majors. Assessment revealed significant improvements in reading and writing skills expected for first-year college courses. Matriculation

rates for college were statistically higher for the participants. Other studies report similar findings (Constan & Spicer, 2015; Dagley, Georgiopoulos, Reece, & Young, 2016; Lesik, 2015; Rahm & Moore, 2015; Snipes, Huang, Jaquet, & Finkelstein, 2015; Stolle-McAllister, 2011). Creating student cohorts before the fall term begins provides supportive classmates of similar backgrounds who can encourage one another as they journey together towards graduation (Patton, Renn, Cuido, & Quaye, 2016).

Brown (2015) reported on a six-week residential program for underprepared students of color at a HBCU in the Southeast. Students enrolled in a math and composition courses coupled with daily tutoring sessions. They worked with faculty and staff mentors, participated in skill workshops, and attended symposiums on psycho-social issues. The qualitative study focused on participant's perceptions of confidence with academic skills and ability to persist to graduation. Themes that emerged from the bridge experience included the importance of peer networks and developing new approaches to studying and help-seeking. Wathington, Barnett, Weissman, Teres, Pretlow, and Nakanishi (2011) reported on an evaluation study from eight colleges of a summer bridge program for students determined at-risk academically. Participants were more likely to enroll in college-level courses with rigorous demands in math, reading, and writing than the cohort of nonparticipants. Program components included

accelerated instruction in math, reading, and/or writing, tutoring, and a $400 stipend.

BRIDGE: FIRST-YEAR COLLEGE EXPERIENCE

First-year college programs have a long history in American higher education. During the late 1800s, programs with noncredit course were established Boston University, the University of Michigan, and Oberlin College (Gordon, 1989). The first credit-bearing course was offered at Reed College in 1911 (Fitts & Swift, 1928). Hunter and Linder (2005) analyzed national surveys of first-year courses and found the average use was approximately 75%.

These programs include three approaches. The first is enrollment in a single course during first semester of college. Sometimes this model is referred as *extended orientation*. The second approach is a comprehensive *First-Year Experience* (FYE) program involving coordinated curriculum of multiple courses and noncourse activities. The final approach is a holistic model providing comprehensive services for students enrolled in the first two years of college. Often this approach focuses on historically-underrepresented students (Greenfield, Keup, & Gardner, 2013; Upcraft, Gardner, Barefoot, & Associates, 2005).

The first approach are first-year seminars and extended orientation courses during the fall semester of a student's initial enrollment in college. The content varies among these courses: student transition issues, study strategies, career exploration, campus resources, and other topics. First-year seminars have the

additional feature of a small enrollment of 15 or less and a discussion format ensuring high interaction among students and the course instructor. For more information about the possible curriculum of orientation courses, consult other chapters in this handbook including *Strategic Study-Reading*, *Study and Learning Skills*, and *Test Preparation and Test Taking*. Berry (2014) examined extended orientation courses at a carefully selected 45 institutions through meta-analysis of their individual studies. Berry's study found statistically significant improved first term and first year grade point average and higher persistence to the second year. The outcomes were greater if a single faculty member taught the course than teams of faculty and staff or staff alone. Regarding persistence rates, outcomes were higher for students of color. Soria, Lingren Clark, and Koch (2013) reported similar outcomes plus students had greater sense of belonging than nonparticipants. Upcraft, Gardner, and Barefoot (2005) identified a variety of evidence-based first-year seminars and courses.

The second approach are coordinated and comprehensive FYE programs. These programs employ a combination of learning communities involving several classes, service learning projects, common book reading and discussions, first-year seminars and extended orientation courses, and other activities. The *National Center for the First Year Experience and Students in Transition* is hosted at the University of South Carolina (http://sc.edu/fye/). Greenfield, Keup, and Gardner (2013) identified a successful models of FYE programs across the U.S.

An example of the third approach targeting services during the first and second year of college are federally-funded TRIO *Student Support* Services Programs (SSS) serving a similar demographic to Upward Bound programs. Operating at more than 1,000 institutions serving nearly a quarter million students nationwide, common activities are tutoring; economic literacy, supportive group of peers; academic advising; counseling; direct instruction in reading, writing, and other content areas; financial aid locating and application assistance; and help with applying for graduate school. Chaney, Muraskin, Cahalan, and Goodwin (1998) conducted a rigorous evaluation of SSS participation and found it was statistically significant for improved student retention rates. Contributing variables for SSS efficacy included peer tutoring and social support by grouping SSS students into cohorts.

BRIDGE: TWO-YEAR COLLEGE TO FOUR-YEAR COLLEGE

As reported in the *Academic Preparedness* chapter in this handbook, more than half of postsecondary students begin careers at community colleges with many aspiring for transfer to a senior institution despite their often lower academic preparation levels. Much of the professional literature has identified the problem of *transfer shock* (Hill, 1965) for these students that results in lower GPAs and higher dropout rates. Review of the professional literature identified few solutions offered by colleges. There were few evaluation studies of transfer programs of any type in the recent professional literature. Chrystal, Gansemer-

Topf, and Laanan (2013) conducted a qualitative study of community college transfers to Iowa State University. The program served all transfer students regardless of their previous levels of academic achievement or demographic background. Several themes emerged including adjustment to the new campus and feelings of social isolationism. The researchers noted the institution must do more than place information online, encourage voluntary interaction with an academic advisor or other student affairs staff member, and access the myriad of student services on a large college campus. The research noted there were often little, if any, structured interactions between college staff. As a result, the institution did not create a cohort of similar transfer students to provide support. Townsend and Wilson (2006) identified most institutional energy for transfer students has been limited to developing articulation agreements for credit acceptance by the senior institution but little effort for academic and social integration of the transfer student into the four-year college. Lack of attention to integration and other factors (Tinto, 2012, 1993) previously described in this chapter are associated with decisions to drop out of college. Mitchell, Alozie, and Wathington (2015) found limited success for transfer students by offering a summer bridge program at the two-year institution before matriculation to the senior institution.

BRIDGE: UNDERGRADUATE TO GRADUATE OR PR0FESSIONAL SCHOOL

These bridge programs have grown due to continuing high rates of noncompletition of doctoral degrees and an institutional goal for increased diversity of students with doctoral degrees and professional school licensure such as dentistry and medicine. While some students in these programs are academically-underprepared, most participants are well-prepared academically and historically-underrepresented (examples: females, students of color, first-generation in college) which places them at risk as described earlier in this chapter. Most often, these students in these programs are selected through holistic assessment process for voluntary applicants. The programs are divided into three approaches: (1) preparing students as upper-class undergraduates for transition to graduate school, (2) a bridge program between undergraduate graduation and matriculation in graduate school, and (3) a comprehensive approach beginning with summer bridge before matriculation and continuing through graduate school.

One of the most successful bridge program models occurring at the upper-division, undergraduate level is the federally-funded TRIO *Ronald E. McNair Post-baccalaureate Achievement Program* (McNair). McNair students are first-generation college students with economic need or are historically-underrepresented in graduate and professional school education. McNair operates at more than 150 institutions. Common activities are: (1) academic advisement, (2) counseling, (3) supportive group of peers, (4) involvement with research through a summer internship, (5) mentorship by a professor, and (6) other

scholarly writing and presentation activities. Exstrom (2003) identified the importance of a supportive group of peers for pursuing graduate education as a first-generation college student. Gittens (2014) identified important student factors that improved the doctoral experience were increased self-confidence, social and academic integration into the campus environment, and development of an identity as competent postsecondary learner.

The second approach of a bridge program in this category was reported by Hall, Harrell, Cohen, Miller, Phelps, and Cook (2015). They identified a successful postbaccalaureate one-year training program to increase application and success of historically-underrepresented students in biomedical sciences doctoral programs. Acceptance into doctoral programs doubled for these participating students in comparison before the program was created. Components included development of presentation skills, time management, scientific writing, and development of a supportive peer group. Jackson-Smith (2015) reported on the challenges of intersecting identifies of culture and gender with success of STEM students. Her research focused on African American women pursing STEM majors. Summer bridge increased confidence levels of the students and adjustment to the graduate school culture.

The third approach began prior to graduate school and continuing through graduate school was reported by Hodapp and Woodle (2017). The *American Physical Society Bridge Program* (APS) serves underrepresented students to

pursue doctorates in physics as institutions across the U.S. Some activities occurred before graduate enrollment and others continued while completing the doctoral degree. Key components of APS: (1) clearinghouse of available doctoral programs bridge programs, (2) financial aid to help students relocate, (3) financial literacy to manage finances and make wise choices with financial aid, (4) development of a supportive peer group, (5) mentorship by multiple faculty members, and (6) progress monitoring to graduation.

BRIDGE: THROUGHOUT THE ACADEMIC PIPELINE

The *Health Careers Opportunity Program* (HCOP) promotes recruitment of students from disadvantaged backgrounds into health and allied health profession programs in the U.S. Hosts for these federally-funded programs are graduate and professional health-science schools. Common activities include financial aid information, ACT/SAT/MCAT exam preparation, counseling, mentoring, and primary care field trips. These programs begin as early as middle school and continued through professional school. A study by Kosobuski, Whitney, Skildum, and Prunuske (2017) found significant increase in knowledge gained and increased confidence for success by historically-underrepresented students pursuing medical careers at the University of Minnesota.

AREAS FOR FURTHER RESEARCH

While evaluation studies have been numerous and robust with STEM bridge programs, other approaches need periodic rigorous studies at the quasi-

experimental or experimental design level. This is especially true with the TRIO programs as described earlier in the chapter. Leadership by the national association representing TRIO, *Council on Opportunity in Education* (COE), must work with the U.S. Department of Education to develop an acceptable plan for conducting periodic national studies. The same is true FYE programs. There is an over reliance of single studies published in peer-reviewed journals or dissertations. With the large numbers of students transferring from community colleges to four-year institutions, more research is needed to identify evidence-based practices to help bridge the gap which imperils college graduation. The few studies cited in the professional literature are focused on a small student populations from a few institutions scattered across the U.S.

IMPLICATIONS FOR PRACTITIONERS

The research cited in this chapter generates several implications for practitioners and policy makers at secondary and postsecondary institutions. First, practice must be guided by research and national standards upon which they are based. Over the past four decades, the *Council for the Advancement of Standards in Higher Education* (CAS) has published national standards in nearly fifty areas of the student experiences in college. CAS is composed of leaders from over forty professional associations who collaborated on the standards creation, continuous revision, and endorsement to their members and the wider college community (CAS, 2015). While many of CAS standards are helpful in guiding bridge

programs, the following standards are of direct application: orientation programs, parent and family programs, transfer student programs, and TRIO and other educational opportunity programs.

A second implication is an introspective assessment of the institution's current bridge programs. In particular, are programs offered at all transition points in the student learning experience? It does little good to support a first-year student's transition into the institution but ignore transitions for transfer students, students entering rigorous academic degree programs, and students in graduate and professional school. In addition, with the increasing diversity of the student population, are the bridge programs provided in a culturally-sensitive manner and addressing issues for historically-underrepresented students in college.

The investment expense for some of bridge programs in this chapter are high. Most college budgets are not projected to receive more state or federal funds. Often, the amount from those sources are flat or declining. Institutional leaders have to ask the hard questions that if the evidence-based approaches from this chapter are not being offered at their institution, the question is why not. Can colleges and society accept the current rate of dropouts or students switching from high demand degree programs like STEM into other college degree programs?

A third implication of the research is increasing the rigor and frequency of program evaluation. As indicated in the previous section on areas for further research, there is much work in this area. The evaluation studies needed to be

repeated on a periodic basis rather than relying on a single study when the practice is first implemented. These evaluation studies are needed for practionners to make program revisions for institutional policymakers to make the difficult budget decisions on funding an expanded number of bridge programs in the midst of dwindling fiscal resources.

Finally, more professional development of the leaders and staff of these bridge programs is needed. First, they need to establish their own best practice centers that identify, validate, and disseminate evidence-based practices for their programs. An example is one established by the Educational Opportunity Association, a regional COE association (http://besteducationpractices.org). Second, most bridge staff need to develop more expertise with conducting evaluation studies through enrollment in college courses in this area.

CONCLUSIONS

Significant growth has occurred with bridge programs at critical transition points through the secondary and postsecondary education pipeline. While program activities are diverse, they often share common approaches: (1) attention to cognitive and psycho-social factors, (2) peer tutoring, (3) mentoring by staff and especially faculty members, (4) development of student cohorts for mutual support and encouragement, (5) rigorous academic content, and (6) strong institutional investment in the bridge programs through personnel, facilities, and budget. While the growth of STEM-related bridge programs is commendable,

colleges need to expand offerings for other groups such as transfer students and those in other academic majors who too often silently depart without detection or intervention by the institution and do not graduate at the end of a long and difficult academic journey. The diversity of college graduates must match that of the first-year students for higher education for an equitable future of the nation.

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