
AC 2011-218: AN ONLINE ALTERNATIVE TO THE ON-CAMPUS SUMMER BRIDGE PROGRAM

E. Bernard White, George Mason University

Dr. E. Bernard White is Associate Dean for Undergraduate Studies in George Mason University's Volgenau School of Engineering in Fairfax, Virginia where he has worked for over 20 years. He earned bachelors and masters degrees in mathematics from Mississippi Industrial College and the University of Illinois respectively. He also earned masters and Ph.D. degrees in systems engineering from Howard University and the University of Virginia respectively.

Eileen Patricia Mazzone, George Mason University

Eileen Mazzone, M. Ed., is the Learning Specialist in the Learning Services division of Counseling and Psychological Services (CAPS) at George Mason University. She is completing her licensure requirements in Special Education and has started work on her ABA graduate certificate. She has a Master of Education degree in Curriculum & Instruction Secondary Education from George Mason University, and a Bachelor's degree in Government & Politics from George Mason University.

As the Learning Specialist Ms. Mazzone provides direct and consultative academic support to college students with learning disabilities (LD) and attention-deficit/hyperactivity disorder (AD/HD) as well as students without identified disabilities who are struggling in their post secondary coursework. She consults with faculty and other units that support the learning process, and provides academic skills workshops and individual assessments of academic skills to students. Ms. Mazzone teaches a University course each spring for second semester freshmen on academic action.

Vicki Dominick, George Mason University

Vicki Dominick, MEd, is a Learning Specialist at George Mason University.

An Online Alternative to the On-Campus Summer Bridge Program

Abstract

As rumors spread that new freshmen LSAMP Program student participants would be entering the University without the benefit of having participated in a Summer Bridge Program, current LSAMP Program student participants made their concerns known. Of all of the University's LSAMP Program activities, services, and programming, many of the student participants ranked skills gained and adjustments made during their Summer Bridge Program experience among the greatest contributors to their success during their freshman year in college. When asked to share information on specific activities, programming, and services packaged in their on-campus Summer Bridge Program from which they benefitted most, they listed areas such as: improving their study skills, knowing what will be expected from them as college students, learning how to manage their time, getting organized, and interacting with peers and mentors. After much thought and consideration to the students' perceived need for a way to bridge the gap between high school and college, then exploring ways to exploit the capabilities of today's educational technologies and media resources, the idea of developing an online alternative to the traditional on-campus Summer Bridge Program was born. Interestingly, a search of the literature did not reveal many previous initiatives employed by other engineering schools to provide an online program for assisting with transitioning STEM freshmen into college.

When Learning Specialists from the University's Counseling and Psychological Services (CAPS) Office who had provided the lion's share of workshops on academic skills and support services during previous Summer Bridge programs were approached with this concept, they welcomed the opportunity to pilot an online "distance education" program for transitioning freshmen into college. This paper provides an overview of the programs and activities that comprised the Summer 2010 Online Bridge program, including the deliberations and analytical processes and procedures followed when determining curriculum to include. Additionally, the paper provides a description of the technology used to facilitate interactions between the staff and students, as well as collaborations and interactions among student participations. This paper also provides a summary of successes as well as challenges faced by the CAPS Learning Specialists during the five-week (July 11th through August 13th) Online Summer 2010 Bridge Program. Finally, some reflections and plans for refining and broadening the academic concepts, skills, and support services for next year's Online Summer Bridge Program are also presented. A follow-up paper will be prepared on the effectiveness of the Online Summer Bridge Program after we have had time to collect sufficient data and make comparisons of the academic performances of the On-Campus versus Online Summer Bridge Program participants.

Background Information on Summer Bridge Programs

The Virginia-North Carolina (VA-NC) Louis Stokes Alliance for Minority Participation (LSAMP) Program received a five-year grant from the National Science Foundation during the summer of 2007. The goal of the VA-NC LSAMP Program is to increase the number of underrepresented minority students who earn degrees in science, technology, engineering, and mathematics (STEM) majors. Additionally, the program aims to ensure that the majority of these graduates are well prepared to pursue graduate studies in STEM programs.

Tester¹⁰ and others provide a summary of the “best practices” employed by engineering educators with respect to improving retention of undergraduate engineering students in general, with a special focus on strategies for retaining and graduating students who are from underrepresented population groups in engineering. The “Summer Bridge Program” was identified as an effective program for reducing the college readiness gap between incoming students from underserved communities and those of more privileged socio-economic-educational backgrounds and experiences⁸. Reducing this readiness gap can assist “at risk” students in enhancing their success, improving their retention, and increasing completion rates⁸.

The Summer Bridge Program aimed to provide a pre-college experience to high school graduates accepted in a STEM program that enhances preparedness to succeed in the fall and coming year⁵. More specifically, the Summer Bridge Program intends to empower students who experience university life while living on-campus in a residential hall and participating in intensive workshops that promote academic success in gatekeeper courses. The On-Campus Summer Bridge Program provides programming and activities that smooth the process of transitioning from excellent high school students to high performing university students pursuing STEM related careers.

Alkhasawneh and Hobson² provide a sufficiently detailed model Summer Bridge Program for impacting first-year retention rates for underrepresented groups. Generally, On-Campus Summer Bridge Program student participants take workshops on University Life and Academic Success Skills (e.g., study skills, test taking strategies, time management, and procrastination) as well as a course focused on problem solving and tutorials on mathematics (e.g., in pre-calculus or calculus). Additionally, the On-Campus Summer Bridge program student participants: seek guidance from Peer Instructors as they finalize their fall semester course schedules and prepare to transition to college; learn about University and academic support services and other resources available to LSAMP student participants; interact with faculty mentors and Peer Mentors (who provide academic tutoring and advising); develop friendships with students in their major; and become familiar with the campus.

Generally, requirements for participating in an On-Campus Summer Bridge Program are student availability and commitment to participate fully for the entire period of the program as well as the ability to attend an early New Student Orientation session and take the math placement test prior to the Summer Bridge Program start-up.

Ackermann¹ provides a detailed description of the benefits of a Summer Bridge Program for underrepresented and low-income students. Evenbeck⁵ provides a good discussion of the influence of a Summer Bridge Program on college transition, student learning outcomes, academic performance, and retention.

Summer 2010 LSAMP Bridge Program Development

The Summer 2010 Louis Stokes Alliance for Minority Participation (LSAMP) Bridge Program was developed by the collaborative efforts of George Mason University’s LSAMP Program’s Principal Investigator and Learning Specialists from George Mason’s Counseling and

Psychological Services (CAPS) Office. The purpose of the program is to provide academic skills workshops for incoming STEM majors. The difference in this year's program is that we found it necessary, due to funding issues, to come up with a program to reach students through distance learning. This was a departure from previous years when students were on campus for two to three weeks. This circumstance provided an opportunity to build a new program incorporating similar academic and study skill tutorials, but designed to reach an audience that would never share a classroom until they arrive on campus for the fall semester.

Planning took place over several months during which time we had the opportunity to clarify the program's objectives, outcomes, and performance criteria, as well as incorporate input from previous Bridge student participants, non-Bridge participants, and staff. Information gathered from students and staff, in conjunction with research based findings of what college readiness skills students most need were reviewed. According to the research, cognitive strategies, content knowledge, academic behaviors, and contextual skills all determine college readiness⁴. Additionally, we looked specifically at college readiness for STEM students and found that more responsibility for learning at the postsecondary level must be managed by the student. According to Bernold, Spurlin & Anson³, in order for students to effectively take responsibility for their learning, they must "understand how to acquire knowledge, how to develop personal strategies, how to discern their own capacities and limitations, and how to approach new bodies of learning." We set out to develop a curriculum that would provide opportunities for STEM students to develop these skills. Because we were departing from our typical on-campus program and were determined to create a quality online version, information on how to build an effective online class was also researched. Johnson and Aragon⁷ state that "powerful online learning environments need to contain a combination of these principles: (1) address individual differences, (2) motivate the student, (3) avoid information overload, (4) create a real-life context, (5) encourage social interaction, (6) provide hands-on activities, and (7) encourage student reflection." With these criteria in mind, we created our curriculum to include the following activities:

College Readiness Skill Area	Activity	Purpose/Description
Cognitive Strategies – A student's ability to develop and apply higher level thinking skills such as curiosity, analysis, and synthesis as a consistent means of gaining and using knowledge	Critical Thinking	In an effort to expose students to the idea of thinking at a higher level, we posed open-ended questions similar to those they may encounter in a college class. In order to respond effectively, students had to provide original thought and justify their answer with research-based support.
	Problem Solving	Students were required to view a short video on problem solving in college. They were then instructed to read two articles on math and science scores of high school students in the United

		States. A follow up activity required them to develop five questions regarding the main ideas in the article. They posted these questions and then collaborated with peers to provide comprehensive answers to each others' questions.
	Exam Preparation	Students were required, after receiving information on exam preparation (PPT, DVD), to discuss the specific skills they currently possess and those they will require after moving into the postsecondary environment.
	Research skills	A comprehensive "scavenger hunt" through the GMU library system in which students were required to determine resources available and use them to answer questions was arranged.
Content Knowledge – A student's core knowledge upon which they will build as they gain additional knowledge in college.	Math Self-Assessment	In order to understand their personal strengths and growth areas, students were required to complete a comprehensive math assessment addressing their attitudes and practices related to studying mathematics. They then reflected on their results with peers.
	Math Tutoring for Placement Exam Preparation	The purpose of this activity was to provide the students an opportunity to work independently through exercises designed to prepare them for taking the math placement exam. They were given consistent access to a "live" math tutor as well as online recommendations for assistance in completing the practice problems.
Academic Behaviors – The ability to be aware of one's own abilities and to manage one's time and resources.	Study Skills Self-Assessment	In order for students to accurately reflect on their current study skills and habits, we administered a comprehensive Academic Skills assessment. The instrument measures student self-report on nine study skills areas, as well as a measure of test anxiety and a learning styles inventory.

		Following review of their results, students collaboratively reflected with their peers on areas of need.
	Active Listening and Note taking	Students were required to listen to a short YouTube video speech (during which they were instructed to take notes about what they believed to be the important points) and then respond to questions. Depending on how well they were able to accurately answer the questions, students were prompted to listen again and to utilize the active listening model (information for which was provided online) and then answer the questions again. Students were then required to reflect on their ability on the Discussion Board and discuss the importance of listening actively and how doing so impacted their ability to answer questions.
	Scheduling and Time Management	Students were required to complete a weekly schedule including all of their academic and non-academic activities. From this framework, they were then asked to assign a particular amount of time to each activity and determine the amount of “free time” they currently have. After tracking this for a week, they reflected on whether or not they had given themselves adequate time to complete each activity.
	Exam Strategies	Taking exams at the college level is different from exams at the high school level. The purpose of this activity was to familiarize students with the kinds of exams and exam questions they would encounter in college. Additionally, they were given opportunities to learn and practice test taking strategies while working independently.
Contextual Skills – The information necessary to understand how college operates as a system and culture.	High School v. College	The use of this DVD provided students an opportunity to understand (through interview style reports from current college students) the key differences between what is required of them in college when compared with high

		school. Students answered questions online through the Discussion Board.
	Collaboration and Utilization of Resources	Students were required to work together through the Discussion Board and the formation of study groups to fulfill the requirements of the class as well as establish contacts for their arrival on campus.
	Values and Goals	The purpose of this assignment was to introduce the idea that students would be going through the developmental process of autonomy, and they would soon be making choices based on the value and goals they had developed during their earlier years. Students were required to view a short (10 minute) video on how one's values and goals impact choices in a college environment. Students then responded to a writing prompt focused on how this would change their decision making process and level of responsibility. Students discussed their responses via Discussion Board and commented on one another's posts.

The next phase was to select existing materials and create those that we did not already have access. The Learning Specialists selected a series of six DVD's with online streaming from Cambridge Educational Productions. Curriculum was developed to complement the DVD content along with required reading from *How to Get Good Grades in College*⁹, a publication provided to the students by the LSAMP Program. Students were required to work both independently and in groups. They were required to read, listen, watch, write, think critically, problem solve, reflect in an open forum, apply skills and concepts to their own lives, communicate with one another as well as their instructors, use on campus resources, analyze feedback and correct their mistakes.. The use of technology (PPT, YouTube and Webcam) was incorporated into the curriculum as a means to get students used to using these tools before they arrived on campus. The class was set up on Blackboard (Bb) and was scheduled to run for a period of five weeks. Each week assignments were posted with links to any required websites, documents, or course content. Directions were clear, detailed and concise in order to allow students to work independently. Each assignment was given a maximum point value which was reflected on the assignment as well as in the grade book.

Brief Summary of the Online Summer 2010 Bridge Program Implementation

The class started with twenty students; however, during the first week, two of these students indicated that their insufficient access to computing resources would not permit them to

participate. Students were quick to respond to assignments and regularly asked for assistance when needed. This communication was done primarily through email, although students also had access to the course instructors via telephone. Due dates were generally met and students received daily feedback on their progress, both through email and the Grade Book function on Bb. Student knowledge and comprehension of concepts covered were assessed through online quizzes based on the assigned readings and videos. Students' ability to apply and analyze the concepts were assessed through written assignments and discussion board responses. The Discussion Board postings were initially less extensive than originally hoped, but quickly picked up as students became more familiar with their peers. Students had the option of re-submitting assignments that were not completed correctly and they took advantage of this option.

The asynchronous format of the course meant that students' learning was not restricted to a classroom at a certain time for a specific duration. Students had the flexibility to study and complete assignments at any time of the day or night for whatever span of time they wanted. Also, students could complete assignments when they were ready and were not limited to a traditional class meeting. Since most of the materials were available in advance, students could complete assignments early. Those who needed more time to complete assignments were able to do so as long as they completed them by the end of the course.

One advantage of the online environment was that the instructors were able to use multimedia such as streaming videos and webpages to convey information which appealed to different learning style preferences. Use of Discussion Board promoted active participation and interaction by all of the participants. This is something that is difficult to do in a face-to-face setting where some participants can dominate class discussions while others remain passive and disengaged. The Discussion Board allowed students who are introverted or need additional time to reflect and formulate their responses.

All students who remained in the course for the duration were conscientious and made significant effort to improve in growth areas. After the course was completed, these eighteen (18) students were awarded a \$400 scholarship to purchase textbooks.

During the third week of the course, The Principal Investigator offered participants two "Grand Challenges" with the opportunity to receive special recognition as well as an additional \$100 for each challenge. In Grand Challenge A, students were encouraged to identify study partners and study groups using the Discussion Board on Blackboard and to report on their progress throughout the semester. In Grand Challenge B, students were invited to report their successes in overcoming an academic challenge related to their majors (e.g. successful placement into the first mathematics course required for their major after several previous unsuccessful attempts). Participants were given until the end of the Fall 2010 semester to complete these Challenges.

Student Feedback and Reflections on the Online Summer Bridge program

Students' impression of the value of the class was positive. Significant feedback provided by students included:

“I think this course was very helpful to me and many of the others that actually took the time to do all of the assignments. I learned a lot about myself and what I can do to make my college experience the best that it can be.” -T.W.

“I thought I was going to be a good student my freshman year but with the help of this program I think I'm going to be a great student. Thank You to all parties involved.” -M.T.

“I feel that I have benefited most from the student interactions through Blackboard. It is nice to have people with common interests already on your side before stepping foot on campus.” -A.R.

As instructors, we were very pleased with the entire experience and have already met to make improvements to the class should we have the opportunity to do it again next year. Ideally, we prefer having the students on campus, but with this online class we believe we have developed a powerful alternative to getting students prepared to excel once they arrive on campus.

Students who began the program in earnest remained throughout the course of the class. After prompting by the instructors, students independently initiated ongoing Bb conversations to further their connection as well as to discuss the content. They were able to demonstrate critical thinking in their online discussion board responses.

Many students went above and beyond in their completion of assignments -- showing initiative and creativity, as well as an excellent work ethic.

Students made regular contact with instructors through Bb and email to clarify instructions and ask questions. Students also contacted instructors regarding feedback and felt accountable for getting the assignments completed and submitted according to the due date. Students found the tasks related to on campus resources to be useful as it gave them a feeling of confidence regarding their ability to access these resources once on campus. Instructions for and posting of assignments was consistent and students were able to navigate the site independently. Tasks involving assessment and self-reflection of study skills currently possessed by the participants resulted in lively discussion and a deeper understanding of what they needed to do differently once they get to college.

Summary of Challenges and Opportunities for Delivering an Online Summer Bridge Program

One challenge was that the online course needed more preparation time and almost the entire course had to be ready before the class began. In a face-to-face course the syllabus is planned in advance, but instructors can usually develop materials as the course progresses. Now that the preparation has been done, future iterations of the online course will not need as much time because current materials and assignments can be updated rather than created from scratch. Another challenge to offering an online Bridge course is that computer literacy is needed by both the participants and instructors. For this course, the instructors needed to learn how to use many of the features of the Blackboard platform, video production, as well as video streaming. Many of the students' questions were technology related and included issues with activating their email accounts, how to post YouTube videos, how to use Blackboard, and browser problems.

Another challenge was that there were fewer opportunities for students to get to know each other, the instructors, and the Principal Investigator. While the first assignment, an icebreaker, was intended to help everyone get to know each other, the other online interactions were mostly task-related rather than social. During the On-campus Bridge Program, Peer Mentors were available to guide the students and serve as role models. It is important for new students to develop social support in the college environment because their existing social support will not be available or they may not be knowledgeable about the higher education environment. Also, the Online Bridge Program did not afford students the same opportunity to explore and get to know the campus as did the on-campus version.

Some of the students indicated that a few of the assignments, especially those early in the course, were simplistic and they suggested that these be made more challenging. In addition, there was not enough material related specifically to mathematics or science. One challenge of integrating additional mathematics material into the online course is the varied levels of previous math experience the participants have. While some students may need extensive mathematics review, others may be able to pass the placement exam without any support from the program.

Plans for Refining and Broadening the Online Summer Bridge Program Experience

All student participants indicated that they benefitted immensely from the Online Summer 2010 Bridge Program activities and services provided. Media technology enabled them to recognize each other when they arrived on campus to begin fall 2010 classes.

Welcome receptions were held the first week of classes so the Online Summer 2010 Bridge Program student participants could meet each other face-to-face early on. During these Welcome Receptions, students also had opportunities to meet the Learning Specialists who delivered the workshops and instruction, as well as provided timely feedback to the student participants. Continuing LSAMP Program student participants arrived during the latter part of the Welcome Receptions, and some of these students were assigned as mentors for the Summer 2010 Bridge Program student participants who are pursuing their same major.

As we plan for the Online Summer 2011 Bridge Program, much reflection will be given to the unexpected benefits (and possible pitfalls) of the less structured online experience, which required that students learn how to study on their own and become proficient in the use of educational technologies that they are likely to encounter in the college classroom. The online system allowed us to keep track of and gauge the level of individual student participation in the Bridge program's activities, so we did not have to wait to determine which participants might be procrastinating or experiencing difficulties.

Although some students who had not placed in the first mathematics class required for their major were able to use Bridge Program-recommended online tutorials to eventually obtain the required score on the Mathematics Placement Test, this is an important area where previous on-campus Bridge Programs were much stronger. Even though a mathematics tutor was available to assist student participants who were preparing to re-take the Mathematics Placement Test, the tutor was rarely called on for assistance. The possibilities for using online tutorials for strengthening new freshmen preparation for college mathematics and science courses are

exciting and seem to be limitless. As an example, one advantage of the online bridge program is that we can use online mathematics and science to target identified needs of each individual student participant – providing any essential foundation skills for the less prepared STEM major, as well as providing more meaningful and challenging quantitative and mathematics experiences for students who are better prepared to be successful in their first semester major related courses. Instead of being perceived by some as a program that provides remedial work necessary for gaining the prerequisite score on the calculus placement test for a few students, the perception would be that we are helping all student participants, even the more advanced students get a jump start on the materials that they will be studying in their mathematics and other gate-keeper courses during their first semester.

Conclusions and Recommendations

Although we have not had sufficient time to collect and analyze data comparing the academic performances of the On-Campus versus Online Summer Bridge Program participants, feedback from student participants has been extremely positive.

The Summer 2010 Online Bridge Program, in addition to meeting the needs of entering freshman STEM majors, served as a test bed and learning environment for George Mason's staff who participated in delivering the program. Development of and planning for inclusion of additional and improved curricular units related to cognitive strategies, content knowledge in preparation for the Mathematics Placement Test, and formation of study groups is well underway for the Online Summer 2011 Bridge Program.

In the area of cognitive strategies we believe students need to have more experience learning and applying higher level thinking skills, as these will be necessary as they engage in college level work. Students need to be able to analyze, explain, evaluate and make inferences which are skills not necessarily mastered at the high school level. The other part of critical thinking we would like to address is the students' willingness to be open minded and take risks in their thinking. In experiencing these thinking skills we want to encourage students to utilize their creativity while feeling confident in their ability to do so. Careful consideration in the formulation of open-ended questions to be answered through Bb discussion and the possible inclusion of a cumulative project are two ways currently being considered for improvement in this area of the course.

Another area we found lacking in the online program is the area of content knowledge, specifically the math component. In the past, students were on campus and completed daily tutorials and regular assessments to develop their mathematic skills and prepare for the Math Placement exam if necessary. As a result, more students were able to place at their desired level on the required entry exam. We need to incorporate this kind of mastery curriculum into the online version and plan to collaborate with the Mathematics Department and the Math Learning Center in order to do so. Ideas currently being considered include: pre and post assessments to guide students in their pace and focus on specific content, additional online math tutorials, and regular online assessments. .

Although the Online Bridge Program did not afford student participants the same opportunity to explore and get to know the campus as did the on-campus version, feedback from student

participants did not reveal any complaints or concerns about campus familiarity. There are implications for the sustainability of the Summer Bridge Program far beyond the life of the LSAMP Program here at the University, and the feasibility of extending Summer Bridge Program services to a much larger group of new freshman STEM students will definitely be explored.

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