

Investigating the Impact of a Hybrid Summer Transition Program

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Abstract—Pre-college summer transition programs are prevalent at colleges and universities around the country and are generally associated with positive impacts on student retention and graduation rates. At Virginia Commonwealth University, a six week hybrid on-campus/online program is offered to incoming science, technology, engineering, and mathematics majors from racial and ethnic backgrounds underrepresented in those disciplines (i.e., African American, Latino/a, Native American). This work-in-progress investigates the participants' perceptions of the program in facilitating their academic and social integration into the university. An explanatory mixed methods approach is used. Participants perceive the hybrid program to have played a vital role in their social integration and an integral role in supporting their academic integration into the university.

Keywords—summer transition programs; underrepresented students; academic integration; social integration

I. INTRODUCTION

Many universities and colleges across the United States have established summer transition (or summer bridge programs) [1] [2] [3]. The goals and purposes of summer transition programs vary depending on institutional context, however, most of these programs operate under the shared belief that they improve student outcomes at the post-secondary level. While the evidence base of the effectiveness of summer transition programs is not extensive [4], there are multiple examples in the literature suggesting students who participate in these programs are more apt to successfully complete their first and second years of college when compared to their peers who did not participate in such programs [3] [5].

Summer transition programs are typically multi-week programs attended by students prior to the Fall semester of entry. The program is held at the college or university into which the attendees intend to matriculate, and attendees have

usually been successfully admitted to the institution prior to the summer transition program. Many programs enable students to take courses that are considered remedial and intended to address deficiencies in key subjects such as mathematics, writing, or reading [1]. Summer transition programs are also used to address issues of academic and social integration, which are key predictors of student retention [6] [7]. Academic integration support can involve teaching study skills, ensuring students are aware of and able to access university support services (e.g. tutoring or library), and helping students become more confident interacting with faculty [8]. Support for social integration can help students build peer support groups, develop networking relationships, and increase their level of comfort within their institutions [9]. Both forms of integration are particularly important to selective institutions dealing with first generation or low income students, female students (particularly in science, technology, engineering and math, or STEM, majors), or students from racial/ethnic backgrounds underrepresented at the institution. Summer transition programs are also well-suited for underprepared students. Students who might otherwise need to take prerequisite low-level mathematics and science courses before beginning their intended STEM major curriculum can do so prior to their first semester in college. In many cases, this enables the student to enter college in the Fall on track with other members of their cohort, facilitating both academic and social integration into their majors.

When viewing STEM education through a lens of Bourdieu's forms of capital [10], other ways in which summer bridge programs may be particularly beneficial to underrepresented students in STEM become apparent. According to Bourdieu, it is "impossible to account for the structure and functioning of the social world unless one reintroduces capital in all its forms." Knowledge, behavior, and disposition – i.e., cultural capital – and membership in a group – i.e., social capital – take on value in Bourdieu's view alongside economic capital. All forms of capital contribute to a person's *habitus*, or way of being, and studies suggest differences in *habitus* between low and high social economic

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status (SES) students [11] and between students of various racial/ethnic backgrounds [12] play a role in determining post-secondary educational outcomes. High SES students not only have access to more economic capital, but also benefit from prior experiences that allow them to accrue a knowledge of how to exist and succeed in college environments that low SES students often lack. Similarly, STEM majors at predominantly-White institutions have historically been imbued with the attitudes, expectations, values, and beliefs – i.e., the culture – of the White males who dominated the fields. As a result, the common structure of many post-secondary STEM fields favors students who exhibit certain behaviors (e.g., attending office hours, engaging in mentored research, participating in student clubs, etc.), that could be considered forms of *academic capital* [11]. Summer bridge programs designed with a sensitivity to the experiences of low SES and underrepresented students can provide safe and nurturing environments that address students' lack of social, cultural, and academic capital, in addition to their lack of economic capital.

While summer transition programs appear to be a meaningful and effective component of efforts to broaden participation in STEM, they can prove cost prohibitive for many institutions and students. Even when institutions are able to cover housing, meals, and tuition costs, low-income students may still need to weigh the benefits of participation against the need for earnings from fulltime summer employment. Hybrid transition programs that leverage online learning tools present a cost effective alternative that provides flexibility to students because of the decreased on-campus time commitment and reduced financial obligations. Changing instructional methodologies in high school (increased prevalence of online classes) and social media advances also make offering a hybrid program attractive [13] [4]. However, it is not clear whether minimizing the amount of summer time students spend on-campus would undermine the students' academic and social integration into the university environment.

Through this research we investigate the impact of a hybrid summer transition program for African American, Latino/a, and Native American students majoring in a STEM discipline at a predominantly White institution in terms of student academic and social integration. Three research questions are investigated to determine if the program adequately supports the academic and social integration of participants:

1. Do participants in the hybrid summer transition program exhibit the social and academic integration predictors of academic success?
2. What role do participants perceive the hybrid program summer transition program played in their social integration into the university?
3. What role do participants perceive the hybrid summer transition program played in supporting their academic integration into the university?

II. METHODOLOGY

An explanatory mixed methods research design is employed for this study, consisting of four stages as identified in Creswell and Plano Clarke [14]. During the quantitative data

collection phase, a 63 item survey was used to collect a broad array of data as related to academic and social integration, in addition to demographic and individual attributes of the subjects. The data were analyzed to determine prevailing contributors to social and academic integration and to inform the qualitative data collection.

In the second data collection phase, focus groups were used to expand, refine, and inform the quantitative results as they related to participation in the hybrid summer transition program. The protocol allowed students to reflect on the factors influencing their integration into the university, self-confidence, and goal formulation. Three 50 minute focus groups were conducted consisting of 7-9 students, during which the students were asked to respond to seven open ended questions (see Table 1). Two groups were facilitated by program staff and the third was conducted by a non-program affiliated graduate education researcher. At this stage of the research, only the survey data and focus groups have been completed. Two additional data collection methods will be employed in future stages of the research: document review and interviews.

TABLE I. FOCUS GROUP QUESTIONS

Item	Question
1	From where does your confidence in completing your degree at Virginia Commonwealth University, in your current STEM, discipline come?
2	What types of experiences have led you to your current academic and career goals?
3	How have your experiences in the summer transition program influenced your current academic and career goals and your confidence in graduating from VCU?
4	What role if any do you feel the summer transition program has played in you becoming engaged in scholarly or academic pursuits including conducting research, attending office hours, supplemental instruction, academic advising, professional development, study groups, etc.?
5	What makes a good student in STEM and what types of things do successful STEM students do?
6	Did participation in the summer transition program provide you with information about these "academic norms" and do you think participation in the summer transition program helped you academically; for example an increased GPA?
7	How has the summer transition program influenced your integration into the VCU community socially?

A. Program Description and Participant Selection

This research was conducted at Virginia Commonwealth University (VCU), a large diverse urban public research-intensive university that offers BS degrees in 15 STEM disciplines. The university is part of the National Science Foundation (NSF) funded Virginia - North Carolina Alliance for Minority Participation (VA-NC AMP), a consortium of nine colleges and universities whose goal is to increase the number of underrepresented minority (URM) students graduating with degrees in STEM disciplines. As part of the activities supporting the goal of the consortium, VCU hosts a hybrid summer transition program for matriculating URM freshmen enrolling in STEM degree programs. Eligible undergraduate participants must be 1) US citizens or permanent residents, 2) identify as African-American,

Hispanic, or of Native American descent, and 3) plan to major in a STEM discipline such as Bioinformatics, Biology, Chemistry, Computer Science, Engineering, Environmental Studies, Forensic Science, Mathematics, and Physics. The six week program consists of both an online (5 weeks) and on-campus (1 week) component. The students enroll in three online classes: introduction to chemistry, pre-calculus, and study skills. The program uses an adaptive web-based intelligent assessment and learning tool, ALEKS [15] for the introduction to chemistry and pre-calculus courses and the Blackboard course management system for the study skills course. Students spend the second week of the program residing on-campus, during which time they familiarize themselves with the university, participate in workshops, attend guest lectures, visit research laboratories, participate in community building activities, receive face to face instruction in chemistry, pre-calculus, and study skills, and attend advising sessions. Participants also engage in a team design/research project that culminates in oral and poster presentations. A modest stipend is provided to each student who successfully completes the entire hybrid program. When these students enroll in their freshmen year they are invited to attend a year long freshman academic success seminar and are assigned a peer mentor. A total of 74 students have participated in the hybrid summer transition program (HSTP) across two cohorts. Sixty-eight (92%) of these students have remained at VCU and have completed their freshman or sophomore year, (slightly higher than the VCU freshman/sophomore retention rates). Of the 74 HSTP participants, 73 successfully completed the study skills course requirements, 38 the chemistry course requirements, and 27 the mathematics course requirements. This factor inspires another line of inquiry on student motivation to complete online course requirement that will be explored in a future study.

For the purpose of this research, an invitation to participate in the survey was extended to all 74 HSTP participants. Approximately 80 VCU AMP student scholars who did not attend the HSTP were also invited to participate in the survey as part of a larger study. In the fall of 2015, thirty-six students participated in the survey. While we cannot differentiate between the HSTP and traditional STP students who participated in the survey, only HSTP students were invited to participate in the focus groups. Of the twenty-four HSTP students participated in the focus groups all of them indicated that they had completed the survey.

B. Data Analysis

As part of the explanatory mixed methods design of this study, analysis of the quantitative data was performed first. This process centered largely on analysis of descriptive data to observe key trends in student responses. Mean response scores were used to highlight areas where students felt strongest such as career goals and use of academic supports. Linear correlations were also calculated between students' engagement with program activities, social and academic integration, and students' self-reported GPA. These findings informed the development on a focus group protocol, and in turn informed the analysis of the qualitative data.

Following Creswell's description of the systematic process of data analysis in grounded theory, the researchers first reviewed audio recordings of the focus groups independently to develop codes and identify themes in the responses to the questions. They then met to review their focus group findings and developed, sorted, compared, and contrasted codes and categories until no new codes were created.

III. FINDINGS

A. Survey

Participants ($n = 36$; 11 male, 24 female, 1 unspecified) largely identified as Black or African-American ($n = 33$) and non-Hispanic ($n = 29$). A large majority of the sample ($n = 34$) were first- or second-year students. The majority of respondents' ($n = 29$) parents/guardians had attended college, twenty-three of whom obtained a bachelor's degree ($n = 9$) or higher ($n = 14$). When asked about their academic preparation, the majority of students ($n = 22$) felt their high school *somewhat prepared* them for college. When asked about their plans for the future, most participants indicated they planned to work in industry or for the government or that they planned to pursue further education over other options including teaching or starting their own businesses.

Student responses indicate that they are very/fairly confident in their future graduation from VCU ($n = 33$) in a STEM discipline ($n = 32$), but confidence was slightly lower that they would graduate in their current STEM discipline ($n = 30$). The investigators chose to explore this topic further in the focus groups. In relation to this, students were asked several survey questions about different sources of academic capital and how they take advantage of available supports. Of the options presented, participants were most likely to get help from their classmates, see their academic advisor, or sit in the front of the classroom. They were least likely, however, to work with a tutor, visit the writing center, or receive academic coaching. Respondents were also unlikely to meet with a faculty member during office hours or talk with them outside of class. This factor, in addition to their reluctance to ask questions in class when a topic was unclear, merits further investigation.

In regards to STEM related academic support activities, students expressed willingness to attend peer mentoring sessions and career/professional development events. Students felt positively about the social interactions they had with other students in their program and their choice in academic major, but were neutral about their faculty members' knowledge about their future. No statistically significant relationship emerged between the examined social and academic integration variables and students' GPAs. The most highly indicated reasons for staying in STEM were personal interest, aptitude, and employment and salary opportunities. However, the most commonly cited reason for considering leaving STEM was unappealing employment opportunities.

B. Focus Groups

Focus group questions were structured in two parts; the first part focused on general state of mind, while the second stage of

inquiry explicitly asked the students about the role the HSTP played in their development. Two themes emerged with respect to confidence in completing their degree: 1. support - both familial and social and 2) intrinsic motivators (self-efficacy, personal, internalized social pressure and personal obligations). In identifying why they initially chose their STEM major, factors included: 1) exposure to field through STEM camps, the media, or other personal experiences (i.e. specific scientific discoveries or innovations that helped improve their lives), 2) role models, 3) familial expectations. It should be noted that no participants reflected on how their experiences at VCU may have affected their goals; rather, the students' goals seemed established well in advance of attending the HSTP.

When asked about how the HSTP program specifically influenced their current academic career goals, participants frequently referred to the peer support system the program provides. They also noted the significance of seeing people from similar backgrounds who shared similar passions. In contrast to the survey findings, most of the respondents noted that the HSTP gave them confidence and decreased anxiety in approaching professors and in fact combated the stereotype that faculty want to see you fail. Given that this is in direct contrast to the information gleaned from the surveys, this topic merits further exploration. Multiple students also discussed how participation in the HSTP decreased their anxiety at the start of the school year, since they were already familiar with the campus and had a network of friends once they returned for the fall semester.

IV. CONCLUSION

Findings from the survey and focus groups provide compelling evidence that participants in the hybrid summer transition program exhibit the social and academic integration predictors of academic success as described by Tinto [6]. In many ways the program helped them adjust to college schedule/setting, gave them people to form study groups with and overall increased their motivation to do well and finish the program. While the students could not definitively say the HSTP improved their academic performance, they did note the significance of being familiar with both the academic topics in their chemistry and mathematics classes, along with the behaviors and norms to which the study skills class exposed them. In these ways, participants perceived the hybrid program as playing a vital role in their social and academic integration into the university.

Students' comments also serve as evidence that they value their membership in the community established by the HSTP and feel a responsibility to succeed in order to remain integrated into that community. The realization that many URM students entering STEM disciplines do not complete their programs of study has motivated them to finish their current degrees because they do not want to be another statistic. They formed a sense of accountability to one another.

The focus group findings suggest much of the HSTP's impact on student integration at VCU is related to the social networks students developed while participating in the program. This finding is supported by other studies that have

documented the social integration benefits provided by cohort-development in summer transition programs [16]. However, the preliminary findings also suggest many HSTP participants entered the program with high levels of perceived self-esteem, high motivation, and well-formed career goals, and students provided only few examples of how participation in the HSTP helped them develop in those areas. This raises the question: is it the program or the students who are primarily responsible for guiding the integration aspects at work here? The HSTP may be providing students access to social networks and academic and social capital that they didn't necessarily realize they needed. Alternatively, the HSTP may be one of many tools that motivated, engaged students are able to wield in order to build their own local communities in which they hold valuable academic and social capital.

If participating students are indeed playing an active and intentional role in developing their own communities, then there may not be a need to extensively support such elements programmatically. Hence, a brief residential experience (to familiarize students with campus and their peers) combined with online academic support (e.g. ALEKS) similar to the HSTP may be sufficient to ward off feelings of isolation that might impede otherwise motivated and academically-talented students.

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REFERENCES

- [1] A. Kezar, "Summer bridge programs: Supporting all students," *ERIC Digest*, 2000.
- [2] K. Stolle-McAllister, "The case for summer bridge: Building social and cultural capital for talented Black STEM students," *Science Educator*, vol. 20, no. 2, pp. 12-22, 2011.
- [3] M. Walpole, H. Simmerman, C. Mack, J. T. Mills, M. Scales and D. Albano, "Bridge to success: Insight into summer bridge program students' college transition," *Journal of the First-Year Experience & Students in Transition*, vol. 20, no. 1, pp. 11-30, 2008.
- [4] L. D. Garcia and C. C. Paz, "Evaluation of summer bridge programs," *About Campus*, vol. 14, no. 4, pp. 30-32, 2009.
- [5] C. R. Cooper, R. G. Cooper, M. Azmita, G. Chavira and Y. Gullatt, "Bridging Multiple Worlds: How African American and Latino Youth in Academic Outreach Programs Navigate Math Pathways to College," *Applied Developmental Science*, vol. 6, pp. 73-87, 2002.
- [6] V. Tinto, "Dropout from higher education: A theoretical synthesis of recent research," *Review of Educational Research*, pp. 89-125, 1975.

- [7] E. Pascarella and P. Terenzini, "Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: A path analytic validation of Tinto's model," *Journal of Educational Psychology*, vol. 75, no. 2, pp. 215-226, 1983.
- [8] N. L. Cabrera, D. D. Miner and J. F. Milem, "Can a summer bridge program impact first-year persistence and performance? A case study of the New Start Summer Program," *Research in Higher Education*, vol. 54, no. 5, pp. 481-498, 2013.
- [9] S. L. Fletcher, D. C. Newell, M. R. Anderson-Rowland and L. D. Newton, "The Women in Applied Science and Engineering Summer Bridge Program: Easing the transition for first-time female engineering students," in *31st ASEE/IEEE Frontiers in Education Conference*, Reno, NV, 2001.
- [10] P. Bourdieu, "Cultural capital: The forms of capital.," in *The Handbook of Theory and Research for the Sociology of Education*, J. G. Richardson, Ed., Stanford, Stanford University Press, 1986, pp. 241-258.
- [11] M. Walpole, "Socioeconomic status and college: How SES affects college experiences and outcomes," *The Review of Higher Education*, vol. 27, no. 1, pp. 45-73, 2003.
- [12] S. M. Ovnik and B. D. Veazey, "More than "Getting us through:" A case study in cultural capital enrichment of underrepresented minority undergraduates," *Research in Higher Education*, vol. 52, pp. 370-394, 2011.
- [13] J. R. Reisel, M. Jablonski, H. Hosseini and E. Munson, "Assessment of factors impacting success for incoming college engineering students in a summer bridge program," *International Journal of Mathematical Education in Science and Technology*, vol. 43, pp. 421-433, 2012.
- [14] J. W. Creswell and V. L. Plano Clark, *Designing and Conducting Mixed Methods Research*, Los Angeles: SAGE Publications, 2011.
- [15] McGraw Hill Education, "ALEKS," [Online]. Available: <https://www.aleks.com/>. [Accessed July 2016].
- [16] K. Stolle-McAllister, M. Sto. Domingo and A. Carrillo, "The Meyerhoff Way: How the Meyerhoff Scholarship Program Helps Black Students Succeed in the Sciences," *Journal of Science Education and Technology*, vol. 20, no. 1, pp. 5-16, 2011.