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reflecting that idea. At times the write-in answers were brief and represented a single category, but more frequently, responses contained ideas that fit under multiple categories, and these were coded separately.

## B. Demographic characteristics of the survey sample

Twenty-three students completed the Summer Bridge survey. Because the Summer Bridge is designed for incoming freshman, the vast majority of survey participants were freshmen. Summer Bridge students also hailed from a variety of disciplines. Chemistry was the most common major with 22% of students. Biological engineering and biological sciences were also popular majors with 13% of students each. Physics/Mathematics and civil engineering had 9% of students each. Other less well represented majors included computer science, mathematics, industrial engineering, environmental engineering, and chemical engineering. Congruent with the LA-STEM program objective to increase diversity within STEM fields at LSU, the summer bridge survey participants represented a racially diverse group. Approximately half of the students were African-American and half were Caucasian. One student was Asian-American. There were no Hispanic/Latino survey respondents. There were also 14 male and 9 female respondents.

## C. Evaluation Findings

**Overview of survey findings:** The means for all scales were between 3.0 and 4.0 on a 5-point scale, indicating that students received benefits from their participation in the summer bridge program, yet there is still room for improvement. Students made the greatest gains in personal and affective areas, such as enthusiasm, confidence and comfort. Affective gains are particularly important for minority students because their persistence in their major is more closely related to their enthusiasm for their field than their grades (Grandy, 1998).

Students also made very strong gains in their understanding of professionalism, ethics, their majors, and organizational skills. Students also rated the transferability of their gains very highly, indicating that they planned to carry the friendships and academic skills that they gained from Summer Bridge into their lives as undergraduates. Students rated specific program activities, such as field trips, and the resources that were provided through the summer bridge program, such as the blackboard site and program handbook, less highly. Students found the more general benefits of summer bridge—increases in their enthusiasm and confidence, and the creation of a community of scholars—as more helpful than specific aspects of the experience, such as field trips or hand-outs. Therefore, the experience as a whole had a much larger impact on students than any particular component of the Summer Bridge program.

Resources:

**Program activities** Individual program activities were rated less highly than the program overall by students. Nevertheless, students rated social activities highly, though they rated



**Personal and affective gains** Students rated their personal and affective gains as their greatest gains from the summer bridge program. Almost all students became more comfortable with the LSU campus. Students also became more socially integrated into campus life and gained confidence in their ability to succeed. Students also enhanced their appreciation of diversity.

**Aspirations** The Summer Bridge program influenced students' educational aspirations, particularly in increasing students' interest in the pursuit in terminal degrees. Many students entered LA-STEM with pre-determined educational and career goals. The majority (57%) of students planned to go to graduate school in a STEM field prior to participation in the LA-STEM Research Scholars program; however, almost one-quarter of students (22%) were introduced to the idea of graduate school through their Summer Bridge experience. Moreover, most students (83%) reported that they were "somewhat more likely" or "much more likely" to enroll in a Ph.D. program than before Summer Bridge. Therefore, while Summer Bridge did not introduce the idea of graduate school to many students, it increased their interest in enrollment in a Ph.D. program.

**"Best part" of the summer bridge program** In an open-ended question, students were asked to describe the "best part" of the summer bridge program. Students overwhelmingly responded that the "best part" of Summer Bridge was the sense of belonging and community created by the program. A sense of social support, particularly in the first two years of college, is important for minority students and contributes to increased retention and graduate rates (Fries-Britt, 1998; Grandy, 1998). Students also mentioned social activities and diversity as the "best" parts of Summer Bridge. Therefore, students valued the social benefits of Summer Bridge more than other aspects, such as academic support.

**"Worst part" of summer bridge** Students did not demonstrate the same consensus about the "worst part" of the summer bridge program as they did for the "best part." Students' answers were more varied. Some students commented that guest speakers or service learning were the "worst parts" of Summer Bridge. The other responses were all from individual students, referencing mentor workshops, social activities, or not enough to do on the weekend. Students' open-ended responses to both questions indicate that they valued the program as a whole and the community created through the program more than they valued particular program activities, such as field trips, guest speakers, or service learning.

**Advice for improving the summer bridge program** There was a lack of consensus among students regarding how to improve the program. Two students each cited more structure, better or shorter presentations, and fewer activities. The rest of the responses were all from individual students. These responses included the selection of a better service learning activity, more activities to do on the weekend, fewer activities on the weekends, more emphasis on diversity, and less emphasis on diversity. These latter responses, in particular, highlight the lack of consensus and differing opinions about the strengths and weaknesses of the Summer Bridge program.

## D. Conclusion

The summer bridge program was clearly a valuable experience for most students. Though students did not always value individual components of the summer bridge experience as highly (e.g. field trips, workshops, program handbook, blackboard site, etc.), they clearly valued the experience as a whole. Students learned about life as a college student and gained awareness of resources, information and skills that may help them to succeed academically at LSU. Most importantly, students formed a social network with their peers and began to build a community of scholars which they would carry with them into the rest of their lives.

## II. Evaluation design and methods

### A. Introduction

The Summer Bridge program is a key element of the Louisiana Science, Technology, Engineering, and Mathematics Research Scholars program. The LA-STEM Summer Bridge program helps to ease the academic and social adjustment to college life for incoming freshman through the creation of a community of scholars, peer mentoring, academic courses and workshops, and tutoring. Summer Bridge programs for minority students have been demonstrated to facilitate students' adjustment to college life (Ackermann, 1991), enhance students' social support networks (Person & Christensen, 1996), improve academic performance (Ackerman, 1991) and increase retention rates (Ackermann, 1991; Reyes & Anderson-Rowland, 1998; Walpole et al., 2008). Moreover,

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understanding of academic support services and resources on campus, and enhanced study and organizational skills; social support, such as mentoring from peers and program staff, and the creation of a community of scholars among students; and personal gains, such as increased confidence, greater familiarity with LSU and Baton Rouge, and increased comfort with college life. In addition to the assessment of these academic, social, and personal gains, the Summer Bridge survey also examines students' perceptions of the value of specific Summer Bridge activities, such as field trips, social activities, and workshops.

For this study of the LA-STEM Summer Bridge program, student participants of Summer Bridge 2007 were invited to complete the evaluation survey. The survey and data collection methods are described in detail below. Surveys were collected from 23 Summer Bridge participants. Surveys were collected during the fall semester of the 2007-2008 academic year.

### C. Study method and samples

In this section we outline the Summer Bridge survey instrument. The present evaluation was designed to focus on the gains that students make from their participation in Summer Bridge, students' satisfaction with specific Summer Bridge activities, and the influence of the Summer Bridge program on students' educational aspirations, particularly the pursuit of terminal degrees in STEM fields.

#### 1. Description of the survey instruments

The Summer Bridge survey instrument focused on students' outcomes in a number of areas that were originally described in the research literature on minority STEM students, and by LA

## 2. Procedures for obtaining the samples

We collected surveys from Summer Bridge participants during the fall semester 2007. All LA-STEM students who participated in Summer Bridge 2007 were invited to complete the survey. The surveys, informed consents, and study procedures were approved by the Human Research Committee of the University of Colorado at Boulder.

LA-STEM Research Scholars staff provided the evaluators with lists of LA-STEM Summer Bridge participants from summer 2007. Three separate email invitations to participate in the survey were sent to 29 summer bridge participants and 23 of them completed the survey for a response rate of 79%. Two students declined to participate in the survey and the others never responded. Approximately two weeks after the initial email, reminders were sent individually via e-mail to persons who had not returned the survey.

## 3. Analysis methods

The quantitative data were entered into the statistical software package SPSS where descriptive statistics were computed. Means are reported for most of the ratings items, and frequencies for some of the multiple-choice items. Tests of statistical significance, such as t-tests or one-way ANOVAs, were

Fig. 1

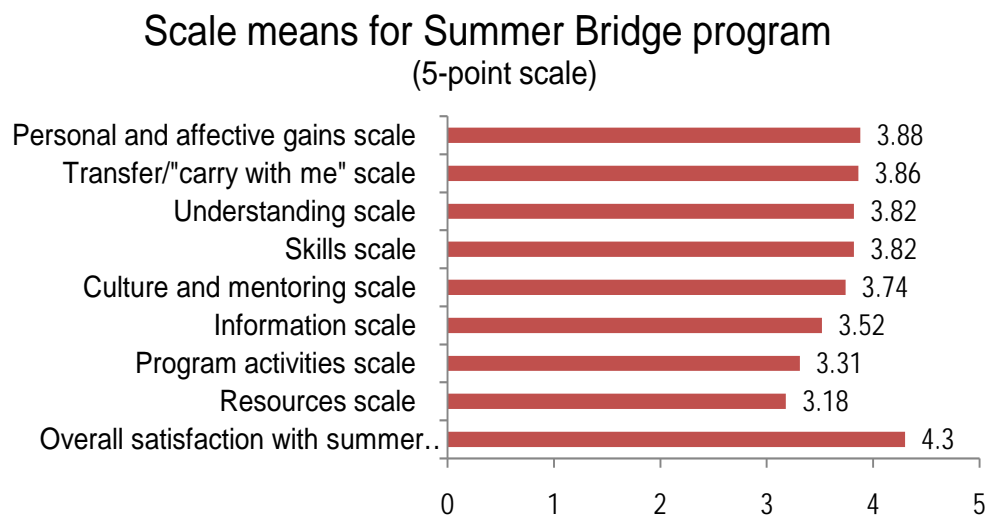
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Fig. 5

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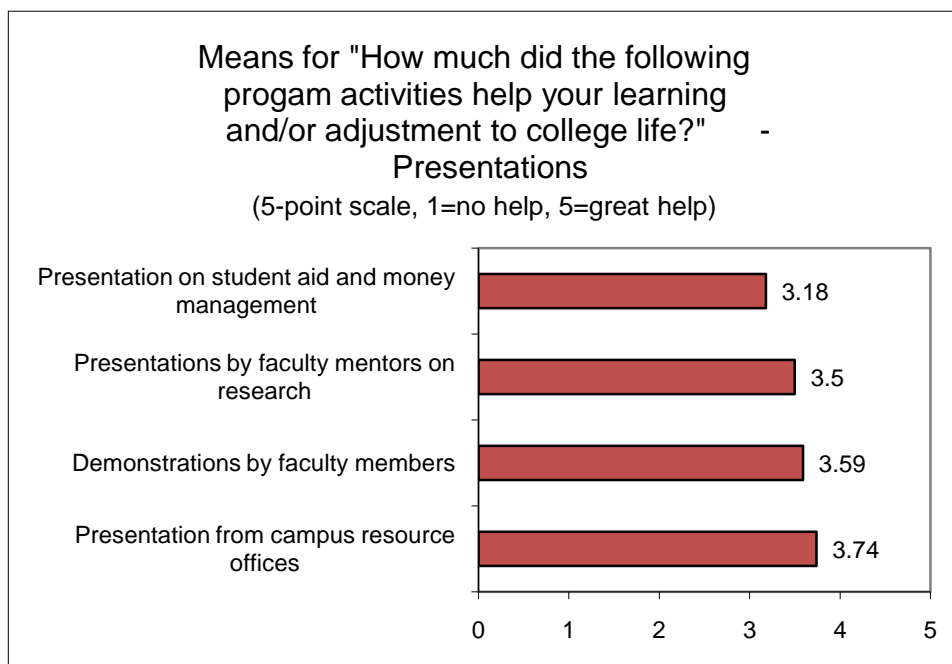


The means for all scales were between 3.0 and 4.0 on a 5-point scale, indicating that students received benefits from their participation in the summer bridge program, yet there was some room for improvement. Students made the greatest gains in personal and affective growth and development, such as enthusiasm, confidence and comfort. Affective gains are particularly important for minority students as enthusiasm and confidence are more closely linked with minority students' retention and graduation rates



the presentation on student aid and money management as the least helpful. Fifty-seven percent of students rated the campus resources presentation as “much help” or great help.” Students also found faculty presentations about research to be helpful. Fifty-five percent of students rated the presentations by faculty mentors on research as “much help” or “great help.”

Fig. 7



Students also rated the Summer Bridge field trips. Students felt that the field trips were the least helpful aspect of the Summer Bridge program to their learning and transition to college. Interestingly, students' were asked to rate the “field trips overall” and their rating for that item was much higher than their ratings of any of the individual field trips. Thirty-nine percent of students rated “field trips overall” as “much help” or “great help” to their learning. For individual field trips, students rated the field to Southern University and AAAS the highest and gave the lowest ratings to the Albermarle field trip.

Fig. 8

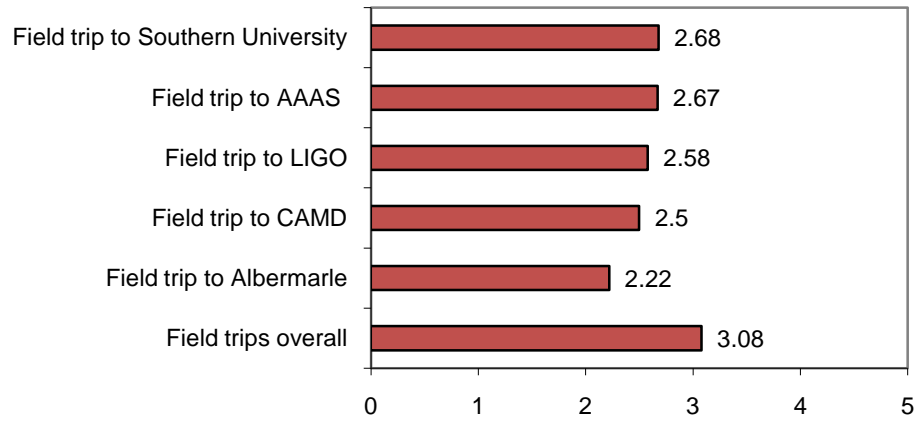
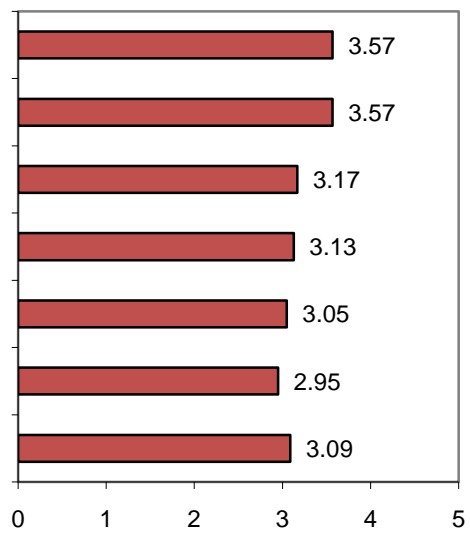
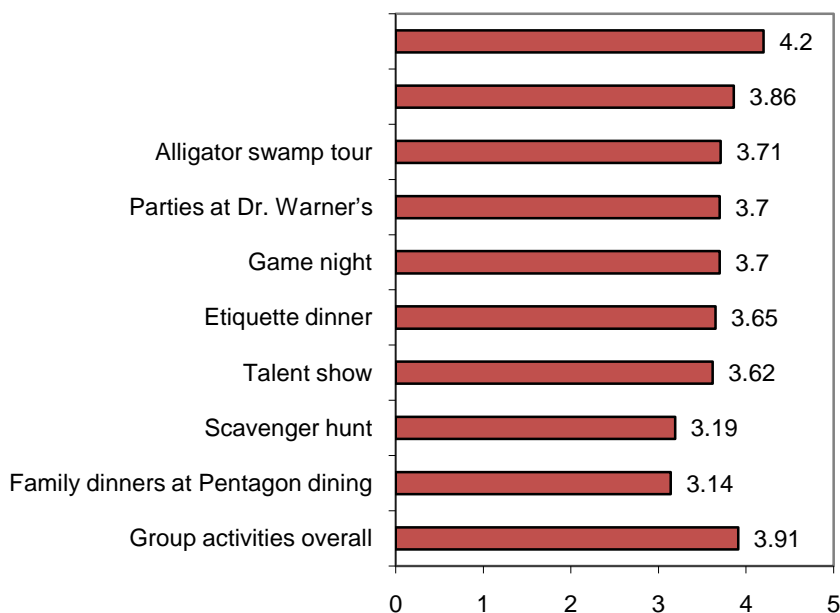


Fig. 9



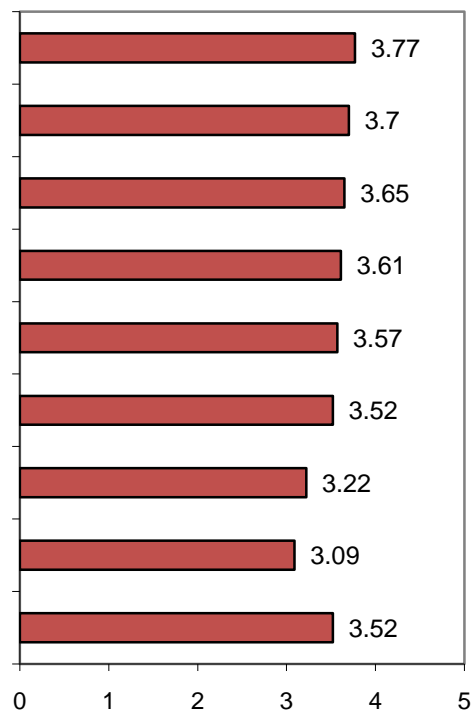
Students felt that the Summer Bridge social activities were the most helpful aspect of the program (most means were close to 4.0, or “much help,” on a 5-point scale). The “free weekend to explore LSU and Baton Rouge” was rated the highest by students. Almost three-quarters of students (74%) found the free weekend to be “much help” or “great help” to their adjustment to college life. Students also rated the bowling very highly. Almost two-thirds of students (62%) rated the bowling activity as “much help or “great help” to their college adjustment. In addition, 52% of students thought that both the “alligator swamp tour” and “parties at Dr. Warner’s” were “much help” or “great help” to their adjustment to college life. In contrast, “family dinners at Pentagon dining” were rated the lowest. Overall, students valued the social activities of Summer Bridge more than some of the other program activities, such as field trips or workshops—not surprising given that one of students’ primary outcomes from the Summer Bridge experience was a sense of belonging to a community.

Fig. 11



the LA-STEM program were also very helpful to students. A majority of students (56%) of students found information about coursework expectations to be “much help” or “great help,” while 48% of students found information about program expectations to be “much help” or “great help.” Students also found information about LSU campus resources and information about locating academic year research and the role of the faculty research mentor to be valuable (means for these items were between “some help” and “much help”). Information about weekly program activities and leadership opportunities on campus was less helpful to students.

Fig. 12

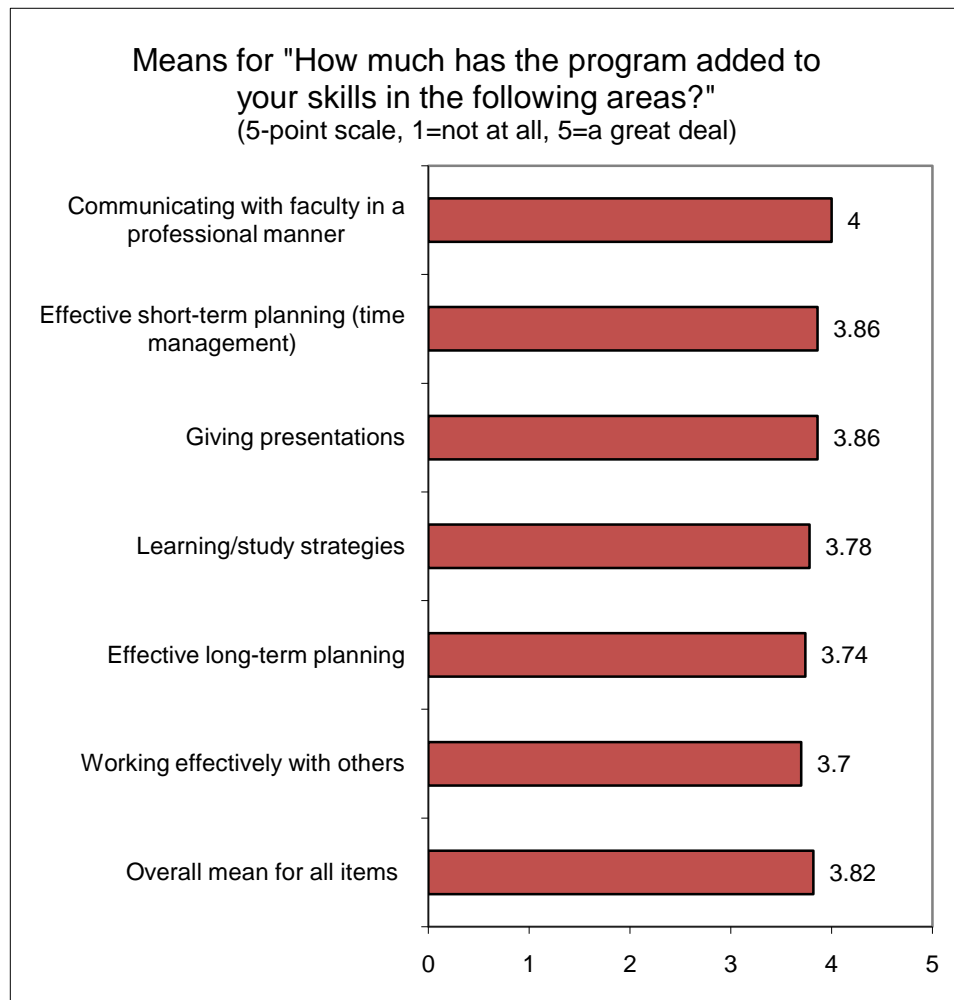


scholarly peers or they risk isolation during their undergraduate experiences (Fries-Britt, 1998). Students also rated their quality of contact with LA-STEM program staff highly. Almost two-thirds of students (65%) rated their contact with program staff as “much



manner.” Most students (78%) felt that the Summer Bridge program increased their ability to communicate professionally with faculty “a lot” or “a great deal.” Students also made gains in time management skills (64% of students reported that their skills increased “a lot” or a “great deal”) and oral presentation skills (68% of students reported that their skills increased “a lot” or a “great deal”). Students reported fewer gains in “working effectively with others,” though the mean for this item (3.7 on a 5-point scale) was still higher than for many other items on the survey. Overall, students’ academic and professional communication skills increased from their participation in the Summer Bridge program.

Fig. 14



## F. Students’ understanding of collegiate life

Students were also asked the extent to which the Summer Bridge program increased their understanding of areas that are essential to academic and professional success, such as time management, professionalism, and stress relief. Students’ understanding of “professionalism” increased the most from their participation in Summer Bridge. Over two-thirds of students (68%) reported that their understanding of “professionalism”

increased “a lot” or “a great deal.” Likewise, students made strong gains in understanding, “my current major,” “time management,” and “basic ethics”—close to two-thirds of students reported that their understanding of these areas increased “a lot” or a “great deal.” Students made slightly lower gains in “understanding LSU research projects” and in understanding their “diagnostic profile.” However, the means for these items were still located in between “somewhat” and “a lot” of understanding. In sum, students’ understanding of general areas, such as professional behavior and their major increased more than their understanding of more specific areas, such as campus research projects or their diagnostic profile.

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Means for "As a result of Summer Bridge, how well do you understand the follow ofhics



quarters of students (78%) felt that they would carry their friendships from Summer

Fig. 16

though still strong. Sixty-one percent of students made “good” or “great” gains in their “enthusiasm for attending graduate school.” Finally, students made only moderate gains in “enthusiasm for coursework at LSU,” and “enthusiasm for research.”

life, such as coursework and research. Therefore, the social support and confidence fostered through the program made a stronger impact on students than academic support and resources.

### I. Students' overall satisfaction with the Summer Bridge program

Students rated their overall summer bridge experience very highly. Almost all students were “satisfied” (35%) or “very satisfied” (52%) with the experience. Two students were “neutral” about the program and one student was “very dissatisfied.” However, this single “very dissatisfied” response seems unusual given that this student generally rated all other aspects of the program between 3.0 and 5.0 on a 5-point scale (in line with other student responses). Nevertheless, almost all LA-STEM students were highly satisfied with the Summer Bridge experience. Moreo

pursuing graduate school, the Summer Bridge program also increased students' interest in this educational goal. For example, 83% of students were "somewhat more likely" or "much more likely" to enroll in a Ph.D. program than before Summer Bridge. Almost half of the students (44%) were "somewhat more likely" or "much more likely" to enroll in a M.D./Ph.D. program. On the other hand—although it is not a goal of the program to encourage students to obtain medical or professional degrees—some students also reported that they were likelier to enroll in a medical degree program (30%) or professional degree program (26%).

Table 2. The influence of the Summer Bridge program on students' educational aspirations

Item.	Mean (on a 4-point scale)	% of "somewhat more likely"
		or "much more likely"
Are you more likely to enroll in a graduate program leading to a Ph.D. than before summer bridge?	3.04	83%
		44%

I really liked the ability to easily access someone for help, a morale boost, or just to socialize with.

Students' secondary responses about the "best part" of Summer Bridge were also related to the sense of community created by the program. Four students (22%) referenced the program's social activities and three students (17%) mentioned diversity.

Interacting with the different students and getting to know people of different backgrounds than I.

The best part was the bonding activities on the weekends.

Three students (17%) also mentioned that Summer Bridge helped to ease their transition to college.

The transition into college. I believe that this fall semester was very successful because I already knew my way around campus and had friends I could rely on to ask for help.

The facilitation of new friendships and the formation of a community of peers among Summer Bridge students were essential to students' social integration into campus life and constituted the "best part" of the Summer Bridge experience for students.

## B. The "worst" part of Summer Bridge

Students were also asked about the "worst part" Summer Bridge. Fourteen students responded to this question, though their answers did not represent the consensus of opinion as did students' responses about the "best part" of Summer Bridge. Instead, four students (22%) responded that the guest speakers were the "worst part," while three

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A few students were also dissatisfied that they did not get to see the results of their service learning project.

[The worst part of Summer Bridge was] putting so much effort into designing a playground and not actually building one.

Overall, students' responses to the "worst part" of Summer Bridge were more varied and

The Summer Bridge program was clearly a valuable experience for many students. Though students did not always value individual components of the summer bridge experience as highly (e.g. field trips, workshops, program handbook, blackboard site, peer mentoring, etc.), they clearly valued the experience as a whole. Students' survey responses demonstrated that the Summer Bridge program helped them to learn about life as a college student and gain awareness of resources, information and skills that may help

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Gandara, P. & Maxwell-