

# The South Carolina Merit Scholarship: Strategies Used by Engineering Students to Keep their LIFE Scholarship\*

CATHERINE MOBLEY,<sup>1</sup> CATHERINE E. BRAWNER,<sup>2</sup> MATTHEW W. OHLAND<sup>3</sup>

<sup>1</sup> Department of Sociology and Anthropology, Clemson University, 132 Brackett Hall, Clemson, SC, USA 29634. E-mail: camoble@clemson.edu

<sup>2</sup> Research Triangle Educational Consultants, 3504 Corin Court, Raleigh, NC, USA 27612. E-mail: brawnerc@bellsouth.net

<sup>3</sup> Department of Engineering Education, Purdue University, 701 W. Stadium Avenue, West Lafayette, IN, USA 47907. E-mail: ohland@purdue.edu

*We have examined the effects of South Carolina's LIFE merit scholarship on the decisions of engineering students at Clemson University. In Spring 2007, we interviewed 16 current and former engineering majors to learn more about their experiences negotiating their LIFE scholarship eligibility. While the LIFE scholarship influenced their decisions to attend Clemson, it had little influence on their decision to major in engineering. The students used a number of strategies to retain or regain their scholarship eligibility, including being selective about courses and professors, seeking grade redemption, attending summer school, studying harder, and seeking extra help. While merit-based scholarships seem to influence whether engineering students engage in certain behaviors, their reasons for doing so seem to be related less to financial issues and more to the belief that grades are important, a belief which is reinforced by the scholarship rules.*

**Keywords:** engineering pipeline; engineering scholarship; LIFE scholarship; merit scholarships; scholarship retention strategies

## INTRODUCTION

THE NATURE OF COLLEGE FINANCIAL AID has changed dramatically in the past decades. In particular, the initiation of merit scholarships in the mid-1990s has been cited as a revolutionary change in the landscape of college financing [1, 2]. Students are awarded merit scholarships based on several criteria, including standardized test scores, high school standing and grade point average. States have implemented these programs to broaden access to higher education, ensure students attend in-state colleges, and encourage students to remain in state after graduation. In particular, the “brain drain” of science, mathematics, and engineering students has been of concern to policy makers seeking to diversify their state economies.

We have examined the impact of the South Carolina Legislative Incentives for Future Excellence (LIFE) merit scholarship on the academic decisions and strategies used by engineering students attending Clemson University. We investigated two main questions:

- 1) To what extent did the LIFE scholarship affect students' decisions to attend Clemson and to major in engineering?
- 2) To what extent does the risk of losing the LIFE

scholarship influence engineering students' academic behaviors?

More specifically, what coping strategies did students use to maintain their scholarships, and how might these strategies have been mitigated by financial need? We investigated engineering student pathways and decisions in order to learn more about the intended and unintended consequences of the LIFE scholarship's grade-based retention requirement. Our qualitative analysis of students' personal experiences in managing their scholarship eligibility adds to the current research on merit scholarships, which tends to focus on institutional responses [3] and on quantitative analyses. Of primary importance, our study is one of the first to examine the impact of such scholarships on the experiences of engineering students.

## LITERATURE REVIEW

Since the early 1990s, growth of state funding for merit-based scholarships (200%) has greatly outpaced the growth in funding for need-based scholarships (41%) [4]. By 2005, 14 states had merit-scholarship programs [5], including states in the Southeast, a region known for making lower investments in education [6]. Merit scholarship programs aim to keep the most talented

\* Accepted 5 June 2009.

students in state before and after college graduation, and evidence suggests these scholarship programs meet these goals to some extent [7, 8].

#### *South Carolina LIFE Scholarship*

Like many states, South Carolina has faced challenges in funding higher education. During 2005–2006, tuition was 78.2% higher for students at four-year public institutions than it was in 1997–1998 and there has been a 144% increase in the average loan debt for students attending S.C. public institutions [9]. To ameliorate these funding constraints at both the state and student levels, in 1998, the S.C. General Assembly initiated the LIFE merit scholarship. In 2005, the LIFE program was the third largest merit program both in terms of program costs and in the number of students served [5].

At program inception, the scholarship amount of \$2000 covered 60% of tuition and fees for in-state residents. Similarly, support for the 2005–2006 first-year cohort we studied was 57% of Clemson tuition and fees. Currently, the scholarship awards \$5,000 to first-year students who meet two of three requirements:

- 1) a 3.0 high school Grade Point Average (GPA);
- 2) minimum SAT Reasoning Test (SAT) score of 1100 (or 24 on the ACT of the American College Testing Program);
- 3) graduation in the top 30 percent of their high school class.

To retain the scholarship, students must earn a minimum of 30 credit hours per academic year and a minimum GPA of 3.0 on a 4.0 scale by the end of the summer session that precedes the next academic year. The scholarship only covers tuition for fall and spring semesters and only for four years after initial entry or 120 credit hours.

These scholarships arose partly because of concern about the supply of engineers in the engineering pipeline. National research focuses on the loss of people from the Science, Technology, Engineering, and Mathematics (STEM) pipeline, but state legislatures are also concerned with the pipeline to neighboring states. As expressed by S.C. Congressman and Speaker of the House of Representatives Bobby Harrell: “We’ve got to keep our best brainpower, particularly [in science, math and engineering], in our state if we are going to drive the economy going forward” [10]. Thus, it is important to better understand how merit aid affects student decisions to attend college in state and their subsequent behaviors and choices.

#### *Impact of Merit Scholarships on Student Behaviors*

A relatively large body of research has documented the intended and unintended consequences of merit-based aid. Farrell’s [11] quantitative investigation of merit aid programs in 12 states found that educational attainment was improved in states where it was comparatively low, such as Alaska,

Florida, Kentucky, Nevada, and South Carolina. In South Carolina, there has been a 19% increase in total college enrollment and, between 1998 and 2004, the number of first-time, full-time students attending S.C. institutions increased by 23.7%. These outcomes have been attributed to the LIFE scholarship itself [9].

Several researchers have investigated the influence of financial aid on student choices, including postsecondary and career aspirations, access, choice of college, choice (and change) of major, persistence, and post-graduate choices [12–14]. We seek to expand student choice theory to examine the impact of merit aid on the course-related decisions of engineering students.

Positive consequences of merit scholarships include decisions to attend college [15], improved academic performance [16], and improved study habits [17]. Negative consequences include gaming the system, dropping courses, grade inflation, focusing too much on grades, taking fewer credit hours, and taking easier courses [8, 16–18]. Additional negative consequences were identified in a study of Nevada’s Millennium scholarship in which the authors contend that the scholarship “raises the dropout and transfer-out odds [of Millennium students] beyond the level of non-Millennium students” [19].

In light of policymakers’ concerns about engineering education and the potential loss of engineering students to neighboring states, it is important to explore how engineering students manage their experience with the LIFE scholarship. Below we analyze the experiences of engineering students at Clemson University, focusing on the influence of the grade-based retention requirements on student decision making. Dee and Jackson’s [20] study of Georgia’s HOPE scholarship found that math, science, and engineering students were more likely than students in other majors to lose their scholarship between their first and second year. The Zhang et al. [16] study of the Florida merit scholarship found that below the scholarship threshold, students were more likely to leave engineering than they were before the inception of the scholarships. Dee and Jackson [20] contend that these “horizontal inequities could have further important and unintended consequences because it might discourage students from choosing curricula that present such increased risks for scholarship attrition” [20].

We use a qualitative approach to provide a more nuanced understanding of the effects of merit-scholarships on students’ choice of college and major and their course selection strategies. These analyses extend the Cornwell et al. [17] study by examining whether LIFE students engage in similar HOPE-like strategies in a state that, unlike Georgia, has a fixed period (four years or 120 hours) for students to be eligible for the merit scholarship.

Our study addresses the need for more research on the LIFE scholarship as identified by Rogers

and Heller [6] and is particularly timely due to two modifications to LIFE program administration. Since summer 2003, a “LIFE GPA” has been used to determine scholarship eligibility. This alternative GPA, which is calculated separately from the institutional GPA, must take into account any courses that a student takes at any college or university at any point in their academic career, including during high school. And, in July 2007, state legislators passed an “enhanced” LIFE scholarship which will pay up to an additional \$2,500 to students majoring in engineering, math, and science areas of study. This program was implemented in Fall 2007.

**METHODS**

*Selection of sample*

Our research design called for interviewing students who had at one time received LIFE scholarships and were designated as engineering majors when they entered Clemson in the Fall of 2005. Further, we sought students whose cumulative GPAs at the end of the spring semester of their first year ranged from 2.8 to 3.2, assigning students to one of four study cohorts at the start of Fall of 2006:

- 1) they were still engineering majors and had GPAs between 3.0 and 3.2;
- 2) they had changed to a non-engineering major and had GPAs between 3.0 and 3.2;
- 3) they were still engineering majors and had GPAs between 2.8 and 2.99; or
- 4) they changed to a non-engineering major and had GPAs between 2.8 and 2.99.

All GPA data reported in our study are taken from

Clemson institutional data, and were measured on Clemson coursework only.

We interviewed eight of the 98 students in Group 1, two of the 14 students in Group 2, four of the 52 students in Group 3, and two of the 9 students in Group 4, for a total of 16 interviewees. Participants were recruited by a General Engineering advisor who contacted students in groups of 15 that were formed randomly from institutional records. Although we didn’t recruit specifically by race or gender, the interviewee sample included four (25%) women and two (13%) underrepresented minorities (both Black students in our case). The sample is too small to permit using chi-squared statistics to accurately estimate population representation, but the interview population as a whole nevertheless seems reasonably representative of the population of engineering students matriculating in Fall 2005, which was 18.8% female and 11% underrepresented minority.

Table 1 shows students’ gender and race, major (Column 5), the study cohort based on Clemson institutional data in the Fall of 2006 (Column 7) and student major (Column 8) and the study cohort in which the students placed themselves at the time of the interview (Column 9).

*Interview protocol*

All students were interviewed in February 2007, the second semester of their sophomore year. We used two interview protocols, one for students who remained in engineering and one for students who had switched majors. Participants in both groups were asked about the importance of financial aid and the LIFE scholarship in their decision to choose Clemson and to major in engineering. Those who left engineering were asked about the importance of LIFE in that decision. We also

Table 1. Participant study cohorts and strategies used to maintain LIFE eligibility

ID (1)	Importance of LIFE (2)	Spring 2006		Fall 2006			Feb 2007		Strategies used		
		CGPA (3)	Study Cohort <sup>1</sup> (4)	Major (5)	CGPA (6)	Study Cohort (7)	Major (8)	Study Cohort (9)	CU SS <sup>2</sup> (10)	Tech. Coll. SS (11)	Acad. Red. (12)
S1	Critical	2.93	3	Engr	3.06	1	Other	2	Y	N	N
S2	Important	2.90	3	Engr	3.00	1	Engr	1	Y	Y	N
S3	Important	3.18	1	Engr	3.18	1	Engr	1	N	N	N
S4	Important	2.70	3	Engr	3.00	1	Engr	1	Y	N	Y
S5	Critical	3.00	1	Engr	3.00	1	Engr	1	N	Y	N
S6	Important	3.06	1	Engr	3.06	1	Engr	1	N	N	N
S7	Minor	3.11	1	Engr	3.11	1	Engr	3	N	N	N
S8	Critical	3.18	1	Engr	3.18	1	Engr	1	N	N	N
S9	Important	3.03	2	STEM <sup>3</sup>	3.03	2	STEM	2	N	N	Y
S10	Important	3.03	2	Other	3.19	2	Other	2	Y	N	Y
S11	Not at all	2.89	3	Engr	2.89	3	Engr	1	N	Y	Y
S12	Critical	2.87	3	Engr	2.87	3	Engr	1	N	Y	Y
S13	Important	2.93	3	Engr	2.93	3	Engr	1	N	Y	N
S14	Not at all	1.85	3	Engr	2.97	3	Engr	3	Y	N	Y
S15	Minor	2.87	4	Other	2.87	4	Other	4	N	N	N
S16	Not at all	2.93	4	STEM	2.93	4	STEM	2	N	Y	N

<sup>1</sup>Study Cohort 1: Engineering major, GPA: 3.0-3.2; Study Cohort 2: Non-engineering major, GPA: 3.0-3.2; Study Cohort 3: Engineering major, GPA: 2.8-2.99; Study Cohort 4: Non-engineering major, GPA: 2.8-2.99.

<sup>2</sup>SS: Summer School.

<sup>3</sup>STEM: Science, Technology, Engineering and Mathematics.

asked both groups of students about their current courses, their reasons for choosing courses, and the strategies they employed to keep their scholarships when they realized they were nearing the 3.0 grade threshold for losing their scholarship. We asked the non-engineering majors if they would have remained or returned if the value of the LIFE scholarships was higher for engineering majors than for other majors or if the LIFE GPA requirement were lowered for engineering majors. Each respondent was provided with a \$20 honorarium for participating in the interview.

#### *Data analysis*

We analyzed interview transcripts by using two-variable case-ordered matrixes [21] that depicted four relationships, between:

- a) importance of the LIFE scholarship to them and course selection strategies;
- b) importance of the LIFE scholarship and the use of academic success strategies;
- c) students' reported concern regarding attainment of the 3.0 GPA cutoff and course selection strategies;
- d) students' reported concern regarding the 3.0 GPA and the use of academic success strategies.

We also used university data to calculate the percentage of students who attended summer school and whose GPAs indicated that they were eligible to keep their LIFE scholarships.

For (a) and (b), students were divided into four categories based on the importance of the LIFE scholarship to them personally: of critical importance, meaning that they would have to leave school without it; important, meaning that significant financial hardship would be imposed on them and their families if they did not have the scholarship, but they could remain in school; of minor importance, meaning that they were happy to have the scholarship, but the burden of losing it wouldn't be too great; and not at all important for students who had other resources (Column 2 of Table 1).

## RESULTS AND ANALYSIS

By talking with current and former engineering students who were in danger of losing their LIFE scholarships, we learned of the different strategies that students employ to try to keep them. (Note: Each quote and interview citation is followed by [Student Study ID] (as referenced in Column 1 in Table 1) and scholarship status ([LIFE or NO LIFE]).

#### *Influence of LIFE scholarship on initial decisions*

Of the 16 people we interviewed, 10 considered colleges in South Carolina exclusively and three of those applied to Clemson only, often citing the financial benefit of in-state tuition and the availability of the LIFE scholarship. Where the need for the scholarship was particularly important,

students started thinking early about how they would finance their college educations and the role of LIFE in that calculation:

I mean, the scholarship for me was very important. I started thinking about [the LIFE scholarship] in high school—what are the requirements? I needed to make sure that I can get the scholarship because that was really important to my parents that I have that financial aid. [S10, LIFE]

Students chose Clemson over other in-state and out-of-state public peer institutions because of the perceived quality of its engineering program combined with the financial advantages. As expressed by one respondent: "I knew I was going to an in-state school, because you just throw money away if you go to an out-of-state . . . and being at Clemson or [South] Carolina . . . are wonderful engineering schools. Why go anywhere else?" [S14, NO LIFE]

The other six students considered attending out-of-state public and private institutions and one service academy. But in the end, the relative bargain of remaining in-state tipped the balance toward Clemson for four of the six, as expressed by the following student: "Mainly I knew I could come here for almost free, whereas if I went anywhere else, I'd have to pay at least half of the tuition." [S2, LIFE]

In contrast to the decision to remain in South Carolina for college, the decision to major in engineering wasn't affected at all by the LIFE scholarship, which is logical given that, at the time of the interviews, there was no additional financial incentive favoring one major over another. For all but two of those interviewed, the decision to major in engineering, or ultimately to leave the major, was not influenced by financial concerns. Students who left engineering were asked if they would have remained in the major if there were additional financial incentive to do so. All five students we interviewed who changed majors indicated that they would not consider returning to engineering under any circumstances; those who might have considered remaining in engineering would have required a substantial amount of additional financial incentive. These students all cited an affinity for their new major and/or a dislike of the engineering program as the main reasons they left the engineering major. These findings support Seymour and Hewitt's [22] landmark qualitative study of engineering students in which these two reasons were among the top four that students cited for leaving engineering.

Our respondents were also asked whether their decisions would be affected if engineering majors were allowed to keep their scholarships with a lower GPA threshold than required for other majors. Again, those who left engineering would be disinclined to return with this additional incentive. Of those who stayed, more than half felt that it would be fair to lower the GPA just a bit, to about 2.8, for engineers. However, three interview-

wees indicated they liked the incentive to work hard provided by the GPA requirement and felt it ultimately improved their chances of attaining their career goals through landing internships or getting into graduate school.

#### *Influence of LIFE scholarship on course-taking decisions*

Students who found themselves in danger of losing their LIFE scholarships at the end of their first year were acutely aware of their grade point averages. As described below, these students invoked a number of strategies to keep their scholarships, including attending summer school, using Clemson's grade redemption policy, managing their course scheduling, and following degree progression requirements.

#### *Summer school*

For students with grade point averages slightly above or below 3.0 at the end of their second semester, the LIFE scholarship program might more aptly be named the "summer school enrollment act." (See Table 1, Columns 10 and 11, for data on which students took summer school courses.) In fact, 40% of SC resident engineering students whose GPAs were below 3.0 after the spring semester of their first year attended summer school at Clemson compared with only 27% of similarly situated out-of-state engineering students (Clemson University Institutional Data). Although students attended summer school at their own expense, they found the investment worthwhile given the \$5000 payoff for success. The three students whose GPAs were comfortably above 3.0 did not attend summer school while all but two of the others did, either at Clemson or at a technical college, to ensure that their LIFE GPAs would be at least at the 3.0 threshold before the fall semester of their sophomore years, when their eligibility would be reassessed. One student's GPA did not go below 3.0 until the third semester while the remaining student said that he would have gone to summer school if he had realized that an A in one course would have allowed him to keep his scholarship.

Due to parallel calculations, grades earned at technical colleges count toward a student's LIFE GPA, even though they only count for credit hours in Clemson's GPA. Because of this, six students took summer courses at a technical college, primarily to boost their LIFE GPAs and thus keep their scholarships for their sophomore year. Three of these students took or retook a calculus class from which they had withdrawn because they perceived that an A or B would be easier to attain at the technical college than at Clemson. One student admitted taking a technical college class for which credit wouldn't transfer solely to raise his LIFE GPA, while a student who lost his scholarship intended to take the "easiest courses I can find" [S7, NO LIFE] in the summer in order to regain his scholarship.

Five students took summer school classes at Clemson, one of which was an online course. Four deliberately took easy general education classes to raise their GPAs high enough to keep LIFE while one did so to redeem course grades. One student indicated that she took summer school courses to smooth out her course load because of the demands of having a minor along with a major in engineering. Among all SC resident engineering students, 22% of those with GPAs below 3.0 who attended summer school at Clemson were successful at raising them above 3.0 before the beginning of the next academic year (Clemson University Institutional Data).

The parallel GPA calculations do pose some risk for students who take advanced classes at technical colleges during high school. One student who did very well at Clemson [S7] took courses in community college while in high school and received C's which were factored in to his LIFE GPA and caused him to lose his scholarship in spite of his creditable academic performance at Clemson.

#### *Grade redemption*

Clemson's grade redemption policy allows students to retake up to nine hours of courses in which they earned a D or an F and to have the repeated, presumably better, grade the only one counted in their GPA, including their LIFE GPA. Six students took advantage of the redemption option to improve their grades in nine courses, six of which were calculus courses, an important gateway course for engineering students. The policy helped five of the six students keep their scholarships, but its nine credit-hour limit prevented the other one from doing so. This student indicated that he partied a lot in his first semester. He said he raised his GPA from 1.74 to 2.97 after attending summer school to redeem bad grades in three classes and take two others, but was unable to redeem a fourth course and consequently "kissed [LIFE] goodbye." [S14, NO LIFE].

Columns 4, 7 and 9 of Table 1 show the impact on students' cumulative GPA and the study cohort of the redemption policy and summer school attendance. Many engineering majors would have been ineligible to continue to receive the LIFE scholarship based on their spring semester GPA (Cohort 3) but the combined effects of summer school at Clemson and the redemption policy moved them into Cohort 1. Those cases where the self-reported cohort of students (Column 9) differs from the selection cohort (Column 7) reflect the impact of grades earned in technical colleges, which again, generally, but not always, moves students from being ineligible for LIFE (Cohorts 3 and 4) to becoming LIFE-eligible (Cohorts 1 and 2). This was the case for four students.

#### *Managing course scheduling*

During the academic year, to manage their GPAs, students took courses to yield "easy As," dropped difficult courses, and made course or

section decisions based on professors' reputation. Affinity courses, like leisure skills, chorus, and band were the courses most often selected by students for easy As. Although they tended to enjoy the courses, the students were well aware of the impact of these courses on their overall GPAs and how they might help them keep their scholarships.

Actually I took [tennis] for fun. But I took it up another level. I took a one hour leisure sports class connected with a three-hour English class in which I got As, which balanced out my four hour math class, which I got a C in. So four hours, if I wouldn't have taken the leisure sports class, I would have had three hours of A and four hours of C and got below a 3.0, where I ended up exactly on the dot. [S5, LIFE]

Eight of the 13 students whose scholarships were most at risk dropped courses that they thought were too hard or where there wasn't a significant likelihood of making at least a B. Four dropped difficult courses that were not required for their majors and that met no other requirements. Three dropped required engineering courses—two dropped calculus courses that they later took over the summer at technical colleges and one dropped general engineering “because I was afraid my grade in that class would turn out low and could potentially maybe make me lose my scholarship” [S10, LIFE]. She eventually changed her major. One student dropped from 17 hours her first semester to 15 her second semester with the intention of attending school year round to make her course load more manageable—she is majoring in engineering and minoring in a foreign language—while retaining her scholarship.

Throughout the engineering curriculum, many courses are prescribed without much opportunity for students to make decisions based on professorial reputation. When this was possible, even students who were doing well academically chose professors based on their teaching styles or reputation for easy or at least “student-friendly” grading policies. One student switched sections of a required English literature course because the first professor had more required reading than the second. Many students used the web site [www.ratemyprofessors.com](http://www.ratemyprofessors.com) to help them with their decisions: “I did change calculus professors one time. That was because I went to [ratemyprofessors.com](http://ratemyprofessors.com) and it had frowny faces so I changed it to someone that had a smiley face.” [S6, LIFE]

#### *Degree progression*

Many of the behaviors described thus far had implications for how students progressed through the engineering curriculum, whether that meant taking a gateway course several times or taking unnecessary electives to boost a GPA above the scholarship threshold. Such behaviors could possibly influence time-to-graduation, the opportunity to engage in more directed educational experiences such as minors, and the quality of engineering students' progress through the curriculum.

More than half of the students we interviewed made sure that they followed the degree progression requirements outlined by their departments. In spite of the relatively heavy credit load required of engineering majors they wanted to complete their studies in four years (or five if they were planning to co-op) because of the time limits imposed by the LIFE program. Three of the five who switched majors also indicated that they were trying to stay on track to graduate in four years even though changing majors may have caused them to be behind in their new majors.

#### *The influence of the LIFE scholarship on use of other strategies*

In addition to making decisions about when, where, how often, and from whom to take classes, students also made decisions about managing their time and seeking help as ways to improve their GPAs. None of those interviewed held jobs during the school year. All the engineering students and most of those who switched majors whose scholarships were truly at risk indicated that they gave more time to their studies after the first semester. Students also said they gave up extracurricular activities (partying, socializing, sports, and exercise) for studying and nine of 16 reported seeking extra help from Supplemental Instruction, other academic support services, and professional advisors.

### **CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH**

Given the increase in merit-based scholarships, there is a need to more fully understand the full-scale policy implications of these funding programs [5], and to highlight their effects on student choices and motivation. Results led us to conclude that it was the students' first-year GPA, and not their need for the scholarship money, that led them to employ the various strategies that we have described. No matter how important (or unimportant) the LIFE scholarship was to the engineering students initially, its potential loss led students of different economic circumstances to exhibit the same behaviors to maintain their LIFE scholarships.

Thus, the LIFE scholarship seems to reinforce the “meritocracy of difficulty” that is pervasive among engineering students [23]. This set of beliefs is characterized by the idea that engineers work much harder than other students and thus deserve material gain and rewards. These feelings were evident in student responses to our question about reducing the LIFE GPA for engineering students: most agreed that engineers should have a lower GPA (or should be awarded more scholarship money) because engineering is such a difficult major. The enhanced LIFE scholarship, while implemented to encourage students to major in engineering, may institutionalize these notions of meritocracy among engineering students and their

non-engineering peers. Future research will allow us to use our data to compare engineering student experiences before and after the enhanced LIFE scholarship that was implemented in Fall 2007.

Our findings reinforce previous research on the HOPE scholarship in Georgia which indicates that students on the GPA margin for retaining or losing their scholarship were more likely to exhibit changes in course taking behaviors. The authors contend that such behaviors “partially undermine [HOPE’s] objective to promote academic achievement” [17]. Yet, whereas Georgia students could be rewarded with an extra year of HOPE scholarship money if they slowed their academic progress, South Carolina enforces an annual credit hour minimum for the LIFE scholarship. This led Clemson engineering students, by and large, to try to do well in their classes, while also using whatever options existed within the rules of the program for them to raise their grade point averages, retain (or regain) their scholarships, and graduate on time.

Only 45% of all SC resident engineering students at Clemson who began college in Fall 2005 had GPAs at or above 3.0 by the beginning of their sophomore year. Some of them received scholarships other than LIFE, indicating that an even lower percentage of LIFE recipients managed to retain their scholarships. We surmise that the strategies and behaviors exhibited by engineering students, especially those attending summer school, which they did at the same rate as other SC residents with GPAs below 3.0, would be generalizable to the population at large who are at risk of losing their scholarships after their first year. Further research will determine whether engineering students in other states with merit-based scholarships exhibit the same behaviors as Clemson students or if the peculiarities of those programs encourage different actions.

*Acknowledgements*—This research is supported by the National Science Foundation under Grant No. REC-0337629 which funds the Multiple-Institution Database for Investigating Engineering Longitudinal Development (MIDFIELD).

## REFERENCES

1. D. A. Finken. A question of merit: Merit-based scholarship programs have gained huge popularity in a number of states, but many wonder at what (or whose) expense. *Black Issues in Higher Education*, **20**(5), (2004), pp. 32–35.
2. D. E. Heller. The changing nature of financial aid. *Academe*, **90**(4), 36–38 (2004).
3. B. T. Long. How do financial aid policies affect colleges? The institutional impact of the Georgia HOPE scholarship. *J. Hum. Res.* **39**(4), (2004), pp. 1045–1066.
4. National Association of Student Financial Aid Administrators Research Committee. *A scan of our changing environment, 2004–2005*. Washington, D.C.: National Association of Student Financial Aid Administrators. Retrieved 16 May 2007, from: <http://www.nasfaa.org/PDFs/2004/RN2004Scan.pdf> (2004, August).
5. D. Duffourc. State-funded college scholarships: General definitions and characteristics. *Rev. Policy Research*, **23**(1), (2006), pp. 235–248.
6. K. R. Rogers and D. E. Heller. Moving on: State policies to address academic brain drain in the South. *Forum on Public Policy in Higher Education*. Portland, OR. (2003). Retrieved 4 June 2007 from [http://www.personal.psu.edu/faculty/d/e/deh29/papers/ASHE\\_2003\\_brain\\_drain.pdf](http://www.personal.psu.edu/faculty/d/e/deh29/papers/ASHE_2003_brain_drain.pdf)
7. R. Ackerman, M. Young and R. Young. A state-supported scholarship program that really works. *J. Student Financial Aid*, **35**(3), (2005), pp. 21–34.
8. M. Binder and P. Ganderton. Incentive effects of New Mexico’s merit-based state scholarship program: Who responds and how? In D.E. Heller & P. Marin (Eds), *State merit scholarship programs and racial inequality*. Cambridge, MA: The Civil Rights Project, Harvard University, (2004), pp. 73–91. Retrieved 16 May 2007, from <http://www.civilrightsproject.harvard.edu/research/meritaid/5Binderch3.pdf>
9. South Carolina Commission on Higher Education. *Summary report on South Carolina scholarships and grants*. Columbia, SC: South Carolina Commission on Higher Education (2007). Retrieved 1 June 2007, from <http://www.che.sc.gov/StudentServices/ScholarshipsandGrantsReport.pdf>
10. C. William (Executive Producer). *Carolina Business Review* [Television Broadcast]. Research Triangle Park, NC: Public Broadcasting Service. (2007, June 1) Retrieved 16 June 2007, from: [http://www.carolinabusiness.com/program\\_archives/](http://www.carolinabusiness.com/program_archives/)
11. P. L. Farrell. Who are the students receiving merit scholarships? In D. E. Heller & P. Marin (Eds), *State merit scholarship programs and racial inequality*. Cambridge, MA: The Civil Rights Project, Harvard University, (2004) pp. 73–91. Retrieved May 16, 2007, from [http://www.civilrightsproject.harvard.edu/research/meritaid/report04/5Farrell\\_multich\\_3.pdf](http://www.civilrightsproject.harvard.edu/research/meritaid/report04/5Farrell_multich_3.pdf)
12. E. P. St. John. The influence of debt on college major. *J. Student Financial Aid*, **24**(1), 1994, pp. 5–12.
13. E. P. St. John, E. H. Asker, and S. Hu. The role of finances in student choice: A review of theory and research. In M.B. Paulsen & J.C. Smart (Eds), *The finance of higher education: Theory, research, policy & practice* New York, Agathon Press, (2001), pp. 419–436.
14. E. P. St. John and C. G. Chung. Student aid and major choices: A study of high achieving students of color. In E. P. St. John (Ed.), *Improving access and college success for diverse students*. New York, AMS Press, (2004), pp. 217–248.
15. R. L. Smothers. The influence of state merit-based aid on access and educational experiences: An exploration of the Louisiana Tuition Opportunity Program for Students (*TOPS*). Unpublished doctoral dissertation, Louisiana State University, Baton Rouge, (2004), Retrieved 12 June 2007, from [http://etd.lsu.edu/docs/available/etd-08312004-165648/unrestricted/Smothers\\_dis.pdf](http://etd.lsu.edu/docs/available/etd-08312004-165648/unrestricted/Smothers_dis.pdf)

16. G. Zhang, Y. K. Min, S. A. Frillman, T. J. Anderson, and M. W. Ohland. Student strategies for protecting merit-based scholarships: Grades, courseload, and major choice. *Proceedings of the 2006 IEEE/ASEE Frontiers in Education Annual Conference*. San Diego, CA (2006).
17. C. M. Cornwell, H. K. Lee, & D. B. Mustard. Student responses to merit scholarship retention rules. *J. Hum. Res.* **40**(4), (2005), pp. 895–917.
18. P. Healy. HOPE scholarships transform the University of Georgia. *Chronicle of Higher Education*, **44**, (1997), pp. A32(3).
19. S. Herzog. Measuring determinants of student return vs. dropout/stopout vs. transfer: A first-to-second year analysis of new freshmen. *Research in Higher Education*, **46**(8), (2005), pp. 883–928.
20. T. S. Dee and L. A. Jackson. Who loses HOPE? Attrition from Georgia's college scholarship program. *Southern Economic Journal*, **66**(2), (1999), pp. 379–390.
21. M. B. Miles and M. Huberman. *Qualitative data analysis: An expanded sourcebook, 2nd edition*. Thousand Oaks, CA, Sage (1994).
22. E. Seymour and N. M. Hewitt. *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO, Westview (1997).
23. R. Stevens, D. Amos, A. Jocuns and L. Garrison. Engineering as lifestyle and a meritocracy of difficulty: Two pervasive beliefs among engineering students and their possible effects. *Proceedings of the 2007 American Society of Engineering Education Annual Conference*, Honolulu, HI (2007).

Note: A list of the majors approved for the enhanced LIFE scholarship can be found at: [http://www.che.sc.gov/StudentServices/MathSci\\_SchEnhancement.htm](http://www.che.sc.gov/StudentServices/MathSci_SchEnhancement.htm)

**Catherine Mobley** is an Associate Professor in the Department of Sociology and Anthropology at Clemson University. She earned her M.S. in Policy Analysis from the University of Bath in England and her Ph.D. in Sociology from University of Maryland in 1996. She has conducted research and designed evaluations for a number of government and non-profit agencies, including the American Association of Retired Persons, the Rand Corporation, the US Department of Education, and Walter Reed Army Institute of Research. She is currently assisting with a quantitative and qualitative policy analysis of South Carolina's Education and Economic Development Act.

**Catherine E. Brawner** is president of Research Triangle Educational Consultants. She received her Ph.D. in Educational Research and Policy Analysis from North Carolina State University in 1996. She has been an active evaluator and researcher in engineering education serving as the principal evaluator for the NSF-sponsored SUCCEED coalition. She has also worked extensively with the NSF-sponsored MIDFIELD partnership as an evaluator and researcher. Her other work includes studying gender issues in both engineering and computer science and evaluating technological literacy and teacher education programs.

**Matthew Ohland** is Associate Professor of Engineering Education at Purdue University. His research on the longitudinal study of engineering students, team assignment, peer evaluation, and active and collaborative teaching methods has been supported by over \$9 million from the National Science Foundation and the Sloan Foundation and his team received the William Elgin Wickenden Award for the Best Paper in the Journal of Engineering Education in 2008 and multiple conference Best Paper awards. Dr. Ohland is Chair of ASEE's Educational Research and Methods division and an At Large member of the Administrative Committee of the IEEE Education Society. He was the 2002–2006 President of Tau Beta Pi.