

Transfer Student Retention

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Abstract – Efforts are underway to significantly enhance support activities at the University of South Alabama for transfer students, utilizing a community building model. A seminar has been created to familiarize students with university resources, academic success skills, and engineering productivity tools, such as Excel. The seminar also aims to help students recognize when they need assistance and how to effectively seek help. Group activities encourage the development of team skills and facilitate the formation of study groups. Faculty and student mentor triads are formed to further assist in the transfer process, providing an opportunity for direct interactions with faculty and upperclass students.

Keywords: Transfer Student Transition Seminar

INTRODUCTION

Many students are not adequately prepared for the transfer from a two-year college to an engineering curriculum at a four-year institution. A comprehensive program has been developed at the University of South Alabama to address issues associated with the transfer process. This student success initiative, USA-LINK, is an NSF funded program that stimulates enrollment, enhances retention in engineering programs at the university, and increases the technical workforce.

A key component of the program is the student success seminar that was created to assist in the transition process. Other program initiatives will be presented at the Annual ASEE Conference. [1] The USA-LINK seminar concentrates on student support activities designed to enhance the academic success of transfer students. Academic success skills (such as time management and study skills) are introduced in the seminar through small-group discussions as well as resources for homework assistance. The students explore engineering majors through problem-based applications, gaining essential experience with engineering problem solving. The seminar also focuses on social involvement and interpersonal skills. Students are introduced to careers and research/internship opportunities and to job placement skills so they are well prepared to enter the technical workforce.

Since an important factor in student retention is the sense of community that a student develops, the USA-LINK program incorporates a community-building model to build a cohort among the participants. The model is enhanced by the success seminar. In addition, each USA-LINK student is assigned both a Peer Mentor and a Faculty Mentor. These triads meet regularly to assist in the student's transition to and involvement in the university.

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STUDENT SUCCESS SEMINAR

The Student Success Seminar is a required course for the USA-LINK Scholars and is modeled after USA's successful Freshman Year Experience classes for entering freshman. However the success seminar is designed for sophomore/junior level students. The class meets once a week for 2 ½ hours in a lecture/lab format. The text used for the course is Thinking Like an Engineer [2].

The course, which was first offered fall 2011 for twelve students, is designed to address issues that are essential for a successful transition to a four year program and on to the technical workforce [3]. These areas include: university requirements and policies, study skills, advising and curriculum requirements, career planning, oral and written presentation skills, and problem solving approaches.

The seminar also emphasizes using engineering tools such as free body diagrams, simple sketches, P-v and T-v diagrams, and Excel spreadsheets for data analysis. The students gain experience with collecting and analyzing laboratory data, as well as how to present and report the results. In addition, a portion of each seminar class is devoted to collaborative learning to encourage the students to work together, ask questions about class assignments, and form study groups.

Introduction to University Procedures

Helping the students become familiar with the university and its programs is done through a variety of activities and readings. A survey about study habits is given during the first class and the results are used several times throughout the semester as discussion topics, usually before and after prime testing weeks. A Jeopardy style game is used as an informal, fun way to cover facts about the university, deadlines, and many aspects of campus life.

A particularly successful assignment is the production of a short video for incoming students on topics new students need to know. The students are organized into small groups of 3 or 4 and give oral presentations on their topic and plans for the videos. Topics have included: Financial Aid, library resources, Student Health Center, the Recreation Center, Career Services, Student Organizations on campus, explaining transfer credits, important dates for students to know, Parking Services, JagSuccess (a new set of university resources to help students succeed) and advising tips. The videos will be placed on a College of Engineering website as a form of FAQ's. The videos take many different forms, depending on the creativity of the students.

Career Planning

Career Services staff are invited to a class to discuss the resources available to students searching for co-op jobs, internships and permanent jobs. The staff provide useful handouts and discuss the workshops presented throughout the year to help students with interviewing techniques, etiquette for meals and site visits, and how to build a resume. The students are required to bring a resume to be reviewed in class and then revise their resumes based on information presented by Career Services. These sessions increase student awareness related to the principles, methods and practices in achieving career goals.

Problem Solving

Three sessions are spent discussing effective problem solving techniques and how to interpret problem statements. The prerequisites for the class are: completion of Calculus I and II, Physics I, and Chemistry I. Since the students in the class are usually in some combination of Statics, Thermodynamics, and Circuits, emphasis is placed on interpreting these types of problems, the usefulness of diagrams such as free body diagrams, control volumes, and thermodynamic property diagrams, and the importance of units. The associated homework sets are critiqued for both correctness and layout/presentation of the problem solutions.

Excel applications

Since many students come to a four year program with disparate computer skills, three sessions are devoted to using Excel for problem solving, graphing, and data manipulation. These skills are extremely useful for engineering students, especially as they make their way into upper division classes and labs. Even the students who have Excel experience find the exercises with engineering applications to be quite useful. Lessons include graphing, statistical analysis, cell assignments, and equation building.

Laboratory Procedures

Since all engineering students take at least one lab class as part of their curriculum, a laboratory assignment is included in this seminar class. The first year, the lab involved calibrating a windtunnel, so students learned about Bernoulli's equation and differential manometers. They computed densities, pressures and voltages and made a calibration curve to translate Hertz measurements on the control panel for the windtunnel to velocities that defined the wind speed in the tunnel. This year, the students conducted a filtration lab to investigate techniques for filtering lake water into drinking water. Each group evaluated a water sample using differing amounts of a coagulation mixture followed by differing depths for a filtration process. The students shared their data, subsequently creating plots that were then evaluated to find the optimum values for the two processes. They were also asked to expand their findings to encompass a full scale water treatment plant and calculate the required amounts of chemicals and resources.

After the students completed the lab analysis using Excel, they were given instruction on how to generate a well-written engineering report. These were group lab reports, so time was also spent discussing how to share efforts and work together. The senior capstone design classes at USA require group reports, so this was a good introduction to the requirements for a technical report and on the group dynamics of working together.

Engineering Careers

As a final project, each student was asked to prepare a 5 minute oral presentation on an aspect of engineering in his or her new field. This can be what drew them into the field or a particular project that caught their imagination. Students were expected to describe the career path or project, discuss the steps necessary to get there (beyond getting an engineering degree), give examples of people on that path or who were once on that path, and explain why this path is of interest to them. Some of the questions given to them as guidelines include: Is an advanced degree required/desired? Is professional registration necessary? What makes a good entry level position to get on this career path? Are there clear decision points to get on to the path? Do many companies have this path, or just a limited few? What drew them to this path? What was interesting about these presentations were the many different views of engineering the students brought to the class within the five disciplines available to them in the college program.

COMMUNITY BUILDING

An important aspect of an education at a community college is small class size which facilitates the formation of study groups among students, who are generally enrolled in the same classes. In addition they have immediate access to faculty. When these students transfer to a larger four-year institution, they are often "lost in the forest". Many of USA's transfer students do not live on campus, and frequently commute more than an hour each way. Thus there is little opportunity for these students to develop a sense of community.

The student success seminar has been extremely effective in getting the students to work together. The small, intimate class (17 - 22) and the numerous group projects and activities lead to collaborative student interactions that last after the end of the class.

Another mechanism that promotes community building is the formation of Mentor Triads. Each USA-LINK student is paired with a previous USA-LINK scholar and a faculty mentor. These triads meet to assist in the student's transition to the university. This is an opportunity for the students to develop relationships with faculty, which they perceive to not be as approachable as the community college faculty.

OBSERVATIONS

Preliminary results indicate that the program has been successful and that the seminar is a key component. A focus group is held with the USA-LINK students at the end of the first semester. Several issues have been identified: advising, faculty approachability, homework and exam frequency, campus resource availability, as well as personal/family problems. For many students, including high academic achievers, the community college experience did not adequately prepare them for the rigor and pace in the engineering curriculum.

Some of these issues can be addressed by better advising. Hence we have identified a specific advisor in each department to deal with all the transfer students; these advisors are also better equipped to handle personal/family

problems. Other issues are addressed in the success seminar so transfer students are more aware of university procedures and resources. We have recommended that all transfer students be offered the opportunity to take the seminar.

We are also working with area community colleges to address these issues. These schools can provide orientation session(s) for students transferring to 4-year schools. Community college faculty need to be better acquainted with curricula for each engineering degree, so students are better prepared for the transition.

It was important to the USA-LINK students that the instructor was available to discuss all aspects of their degree paths. Eventually, each student has found a mentor in his/her discipline, but for the first year, many were more comfortable with the seminar instructor. They often used the study time to discuss time management, grading policies, testing policies and study skills. Many report that after two semesters, they have figured out how to study for and manage their engineering classes.

ASSESSMENT

The first students were accepted into USA-LINK for the fall semester, 2011. Another cohort began the program fall 2012. On-going assessment of the program is being conducted to validate program outcomes. [1] Assessment strategies focus on student recruitment, academic achievement, attitudes, and career options.

In addition to the focus groups held with the first two groups of USA-LINK students, data is collected for each cohort of scholarship students. This data, which includes hours completed and GPA data, is compared to a control group, with comparable demographics, to evaluate the outcomes of the program.

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REFERENCES

- [1] Jefferson, Gail D., F. Carroll Dougherty, Sally Steadman, Tom G. Thomas, "Transfer Student Retention: Lessons Learned", *Proceedings ASEE Conference*, 2013.
- [2] Stephan, Elizabeth A., et. al., *Thinking Like an Engineer*, Pearson, N.J., 2013.
- [3] Duggan, M. H., and J. W. Pickering, "Barriers to transfer student academic success and retention," *Journal of College Student Retention: Research, Theory, & Practice*, 9(4), 2008, 437-459.

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