

UTC ASSETS: Supporting Underprivileged and Underrepresented Engineering Students

Dr Ignatius Fomunung



UTC ASSETS: SUPPORTING UNDERPRIVILEGED AND UNDERREPRESENTED ENGINEERING STUDENTS

When designing undergraduate engineering courses, educators typically assume that all new students will be academically prepared to begin higher education studies. The reality, however, is that not all students starting college are 'college ready', as some may have had fewer learning opportunities in the past. To help these students achieve their full potential, **Dr Ignatius Fomunung** and his colleagues at the University of Tennessee Chattanooga created ASSETS. This academic program is specifically designed to support engineering students that transfer to university from community colleges, who may be academically disadvantaged compared to their peers.

Obstacles Faced by Underprivileged Students

The curriculum and structure of higher education courses can play a crucial role in ensuring that students retain their motivation and commit to completing their studies. If students feel unsupported and isolated in their university course, they will be more inclined to drop out and pursue a different path.

Most existing higher education institutions implicitly assume that all students have the necessary background knowledge and academic preparation to begin the course they selected. However, many students who start college may not be 'college ready', as some may be less privileged and not as academically prepared as their peers. This includes students who have come from disadvantaged high schools, and those who are the first person in their family to pursue higher education.

In 2015, the state of Tennessee launched a program that allows high-school graduates to attend two-year community colleges without having to pay tuition fees. Because of the program's great success, the number of students who will transfer to universities upon completing these courses is expected to surge in the coming years.

Ensuring that all students transferring from community college courses receive the support they need to feel confident in their studies is thus of utmost importance, as it could ultimately improve student retention rates and increase the number of people graduating every year. This is particularly important within engineering disciplines, where a large number of highly skilled graduates are urgently needed to tackle some of humanity's greatest challenges, such as ensuring water security and developing sustainable energy technologies.



With this in mind, Dr Ignatius Fomunung and some of his colleagues at the University of Tennessee Chattanooga (UTC) introduced ASSETS – Academic Intervention, Social supports and Scholarships for Engineering Transfer Students. Funded by the National Science Foundation, this academic program is designed to improve the retention rates and reduce graduation times for engineering students who have transferred from community colleges.



2019 cohort of students on the ASSETS program

The ASSETS Program

Students who start attending an engineering course at UTC after completing a two-year community college course can sometimes take up to four years to graduate. Therefore, one of the goals of the ASSETS program is to reduce these graduation times, by providing students with the support they need to excel in their classes.

As part of the ASSETS program, UTC offers 80 scholarships to a total of 36 students majoring in chemical, civil, electrical or mechanical engineering who are talented but either financially disadvantaged or are insufficiently academically prepared. These provide students with much-needed financial support to enable them to complete their studies. Eight of these scholarships span over the course of three years and are specifically assigned to students who are most behind on prerequisite coursework, due to a misalignment between the topics covered at their previous college and the curriculum at UTC.

The ASSETS program tackles some of the issues typically faced by transfer students, including what is referred to as 'transfer shock'. Transfer shock typically

results from curriculum differences between courses offered at UTC and those previously taken by students, as well as differences in teaching environments – where community colleges tend to have small classroom sizes with individualised attention from tutors, while universities are notorious for larger classes, and decreased attention from faculty. Along with other challenges faced by transfer students, transfer shock is addressed using several strategies that have previously proven to be effective for supporting students in higher education settings.

A Comprehensive Support System

As many transfer students are financially disadvantaged, they often cannot afford to live on campus with their peers and miss out on the opportunity of becoming part of a 'living learning community'. The ASSETS program offers students the possibility to join a 'transfer learning community' and share their experiences with other students attending courses at UTC.

Students participating in the ASSETS program are also supported throughout their studies by both peer and faculty mentors. The role of these mentors is to ensure that transfer students are on

track with their academic work, and to provide them with course-related guidance and advice. Students are assigned a specific faculty mentor from UTC's College of Engineering & Computer Science, whom they meet with three times per semester. Alongside this, they also receive support from a peer mentor and can participate in tutoring sessions delivered by other students.

'This program was helpful in getting to know faculty, putting us in a group with peers who were like us, all having been to community college,' said one student. 'I got to meet civil and mechanical engineering students, expanding my group of who I knew. I also got to meet lots of faculty across the discipline areas.'

The ASSETS program also organises a summer boot camp, designed to strengthen new students' knowledge of the course material and increase their confidence in their academic abilities. The curriculum delivered in this summer camp is put together with the needs and strengths of the students in mind.

The final component of the ASSETS program focuses on the students' professional development. Every year, UTC organises several career development activities that can help disadvantaged students to gain a better understanding of the careers they are thinking of pursuing or preparing them for their professional endeavours.

These activities, organised in collaboration with different industry partners, include events where guest speakers talk about their professions, as well as industry tours, workshops, internships and collaborative research projects.

Impact of the ASSETS Program

The ASSETS program officially started running in Autumn 2018, so it is too early to evaluate its long-term effects on the students' academic and professional



2020 cohort of students on the ASSETS program

development. So far, Dr Fomunung and his colleagues have tried to determine the impact of the program by examining the participating students' sense of community, commitment to their chosen studies, and overall experience with the different activities they took part in.

Dr Fomunung's team analysed a variety of data, including the recorded participation of students in different activities and their responses to surveys completed at different times during the year. So far, a total of 23 students have participated in the program, many of whom are from disadvantaged backgrounds, were employed, or had attended disadvantaged high schools.

The first evaluation study carried out by Dr Fomunung and his colleagues suggests that students found most of the ASSETS program's activities useful for their academic development. In a survey completed at the end of their first year of college, all students said that they felt ASSETS had helped them to be 'better and more successful students'. Every student also highlighted the value of the financial support received from their scholarships.

In the surveys, students also reported that the support received from faculty mentors and the career development activities had been important for their academic development. On the other hand, peer mentoring, tutoring, the summer boot camp, and ASSETS seminar courses received mixed reviews and had lower attendance rates.

Dr Fomunung and his colleagues also organised four different focus groups, in which students who had participated in ASSETS shared their experiences and perceptions about the program. In the discussions that took place during these sessions, students reiterated that the financial support they had received, faculty mentoring, and career-related activities had been most beneficial for their academic development.

Supporting Students Throughout Their Academic Journey

'The ASSETS program has made inroads towards establishing a sense of community amongst transfer students,' said faculty member Dr Bradley Harris. 'This has been achieved through simple measures such as enrolment in shared seminar courses, participation in social messaging apps, and peer-to-peer mentoring, but the results

have been profound. These students, who come from diverse backgrounds, levels of academic preparation, and life circumstances, now have a network they can depend on for advice, encouragement, and support.'

So far, ASSETS has allowed several transfer students from disadvantaged backgrounds to pursue high-quality undergraduate courses in engineering, facilitating their academic development and social integration. The program is running again in the 2020/2021 academic year, involving some of the previous participants and new students.

Dr Fomunung now plans to adapt some of the program's components based on the feedback his team received from participating students over the past few years. For instance, the summer bootcamp is likely to change significantly, as students were not fully satisfied with some of its original modules and activities.

The ASSETS program and other similar academic initiatives could play a crucial role in ensuring that disadvantaged students and those from underrepresented minority groups are offered the opportunity to pursue their desired careers, while also receiving the support they need to perform well in their education and gain greater confidence in their abilities. This could improve graduation rates in engineering and other STEM courses, as transfer students might feel less inclined to drop out of college due to financial reasons or because they feel isolated and unsupported in their university course.

Dr Fomunung and his colleagues hope that UTC ASSETS will serve as a national model for increasing the retention of transfer students and ensuring that they complete their studies over a shorter period of time. The ultimate goal of their work is to foster greater diversity in engineering and other STEM-related fields, and help to meet the urgent demands for skilled professionals in these disciplines.



Meet the researcher

Dr Ignatius Fomunung

Department of Civil and Chemical Engineering

University of Tennessee at Chattanooga

Chattanooga, TN

USA

Dr Ignatius Fomunung is a professor of Civil and Chemical Engineering at the University of Tennessee at Chattanooga (UTC). He holds a PhD in Civil & Environmental Engineering, in addition to an MS in Civil Engineering from Georgia Institute of Technology, an MS in Physics from Clark Atlanta University and a BS in Civil Engineering from Nanjing Institute of Technology in China. Before he joined UTC, he worked as an assistant professor at several other universities in the US, including Clark Atlanta University, Spelman College. He is also a Visiting Professor in the International College at Changsha University of Science and Technology, Hunan, China. Dr Fomunung's areas of expertise include the application of Wavelet Theory in transportation analyses, transportation/air quality planning and analysis, the development of intelligent transportation systems, human factors and safety in transportation, and the use of smart materials in infrastructure health monitoring. Dr Fomunung is also the director of UTC's Center for Energy, Transportation and the Environment (CETE). In recent years, he has broadened the focus of his research to include topics related to STEM education, including devising strategies that enhance student engagement, confidence, and success in STEM-related disciplines.

CONTACT

E: ignatius-fomunung@utc.edu

W: <https://www.utc.edu/college-engineering-computer-science/profiles/civil-chemical-engineering/civil-faculty/cvc564.php>

KEY COLLABORATORS

Dr Gary McDonald, University of Tennessee at Chattanooga
Dr Bradley Harris, University of Tennessee at Chattanooga
Dr Marclyn Porter, University of Tennessee at Chattanooga
Dr Weidong Wu, University of Tennessee at Chattanooga
Dr Christopher Silver, University of Tennessee at Chattanooga
Karen Lomen, University of Tennessee at Chattanooga
Dr Audrey Rorrer, University of North Carolina, Charlotte
Lyn Potter, Chattanooga State Community College

FUNDING

US National Science Foundation

FURTHER READING

<https://blog.utc.edu/magazine/from-oil-fields-to-scholarship/>

