Harnessing Mobile Technology to Improve Student Retention

Dr Lori H. Silverman

HARNESSING MOBILE TECHNOLOGY TO IMPROVE STUDENT RETENTION

Dr Lori Silverman, an expert in education and student retention, is the Co-Founder and Chief Executive Officer of Colytix. The company, founded in 2016, is developing innovative tools for higher education students to improve success and retention rates in class, while creating a platform for the analysis of factors that contribute to student success rates.

Student Dropout in Community Colleges

Community colleges in the United States are public institutions that primarily offer two-year lower-level education degrees (AA, AS, AA-T, and AS-T) that focus on allowing students to transfer subsequently to traditional four-year universities. Besides associate degrees, they also offer technical degrees and certificates, in addition to providing remedial education and a limited number of bachelor's degrees.

Over 6 million students enrolled in community colleges in 2015, making it a popular choice among students. Data from the Education Longitudinal Study (2002-2006) showed that 44% students from low-income backgrounds preferentially attended community colleges as their first college after high school, compared to 15% of students from high-income backgrounds. This highlights the importance of community colleges in promoting a less expensive alternative route to higher education.

Furthermore, among all college students who enrolled in 2010 for the first time, 48.5% of Black students and 50.8% of Hispanic students started at a two-year public college, compared to 35.6% of White students and 37.8% of Asian students. More interestingly, for those college students who obtained a degree at a four-year institution in 2015-16, 49% had enrolled at a two-year institution in the previous 10 years.

However, one of the major issues facing community colleges is the high dropout rate of students – while students enrolled at four-year institutions are retained at a high level of 80–90%, only 60% of students in community colleges are retained from one year to the next. More importantly, although several programs are in place to increase student retention in these institutes, recent analysis shows there has been no real change in student retention rates over a period of eight years even though colleges spend almost 10% of their annual budget on improving retention rates. This suggests that the current strategies are ineffective.

### Understanding the Root Cause of Student Dropout Rates

A study sponsored by the Bill and Melinda Gates foundation in 2011 shed some light on the reasons for low student retention in community colleges. Interestingly, none of the factors were related to the student's intellectual capacity, with 'non-cognitive' factors, instead, playing a major role in student dropout.

These factors included poor time management skills – relating to the students' ability to effectively manage study-related activities – lack of belief that the degree is valuable or attainable by the student and a lack of support for the student in receiving positive feedback for their accomplishments.

Dr Lori Silverman, an expert in education and student retention, is the Chief Executive Officer for Colytix, a company founded to develop tools for higher education students to improve success and retention rates in class. Colytix also provides a platform for data collection on the non-cognitive factors that contribute to student success rates.

Through her research and expertise in the field, Dr Silverman has previously observed that non-cognitive factors greatly influence the success of students and subsequent student retention and performance. However,

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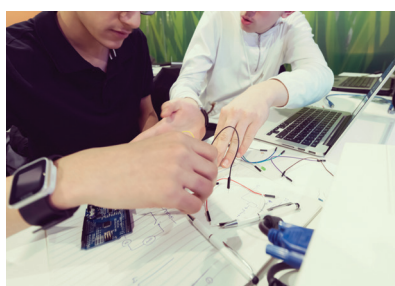
traditional approaches to improve student retention still focus on cognitive factors such as grades and standardised test scores.

Deploying an Idea to the College Community

Dr Silverman and colleagues have spent several years focusing on improving student retention in community colleges by addressing these non-cognitive factors. Colytix was founded in order to fulfil these unmet needs, by harnessing a powerful multi-million-dollar tool available on campus that was not being used to its full potential – mobile smartphones.

Drs Lori and Josh Silverman, co-founders of Colytix, realised that students were willing to engage with apps on their phone in a personalised way, and that they provided more information on social media than they would to a college administrator. This led them to the idea that a mobile app

would help students engage with their teachers and with each other in a more productive manner.

Over 85% of community college students own and use a smart phone, giving Colytix a platform through which they could deploy their technology. Accordingly, the company has spearheaded the development of several apps and web-based technologies that are used to engage with students in a meaningful way to provide benefit to both the students and the teachers.

The company takes advantage of Dr Lori Silverman's extensive research that helped identify key deficiencies in the current strategies of improving student retention. The vision of Colytix is to use this expertise to leverage technology in new and innovative ways in order to create new avenues of interaction between students, teachers and administrators.

Building a Strong Foundation

Dr Silverman has authored and coordinated several grants awarded by the National Science Foundation (NSF) that established her name as a pioneer in the field of student education and retention. The first of these, named STEMWay, was a five-year grant worth almost $1,000,000 that mainly intended to increase completion in college mathematics,

with an associated degree or transfer to a four-year baccalaureate program in Science, Technology, Engineering or Mathematics (STEM) at Foothill College, Los Altos, California.

As part of this project, Dr Silverman led the integration of classroom instructions and student services by introducing the idea of having a supplementary instructor for STEM and by having a dedicated STEM counsellor on-site. She also initiated an early alert system for students who were in danger of failing their course, in which students could reach out to an early alert coordinator for available resources.

These measures ensured that the students always had resources available to discuss any concerns about their course and ensured their continual interest and education. By overseeing the creation of new courses, workshops and materials for STEM students and by developing areas related to research and data collection, project planning and non-cognitive interventions, Dr Silverman fostered an environment conducive to high academic success.

Overall, at the end of the grant, the result was an increase in the use of the dedicated STEM centre, which resulted in higher success rates in students and improved performance especially in mathematics

courses. Moreover, these interventions created a sense of community and belonging among STEM students and faculty and encouraged other faculty to apply for other similar government grants.

Another NSF grant on which Dr Silverman is co-principal investigator is the S-STEM grant. This $600,000 award was granted in 2013 for five years to provide financial and academic support to students who are considered 'at-risk' of dropping out. Executed together with STEMWay, this grant saw increased retention of scholars funded through S-STEM and improvement in student grades. 83% of S-STEM scholars also transferred to four-year institutions, representing a great success over the 29% who transferred without this support.

Continued Investment for Improved Retention

The success of Dr Silverman in executing the STEMWay and S-STEM NSF grants led to additional funding. The latest project is a Small Business Innovation Research (SBIR) proposal that involves the Assessment in Real Time of Individual Student Training (ARTIST) – a mobile app platform developed to improve student goal setting and engagement.

This $200,000 grant, awarded in 2017 for 12-months, aims to build and develop the ARTIST app to allow for continuous, real-time assessment of student learning and classroom engagement. The app is already available on the Apple store and Android store, with multiple classes and colleges already engaging with the app regularly.

The ARTIST app leverages user experiences from a previous app developed by Colytix that is tailored to individual learning styles to allow efficient learning at a student's convenience. Since students interact with the app throughout the class term, this allows for data on non-cognitive data factors to be gathered and assessed, giving real-time information on a student's engagement and retention risk.

The ARTIST app lets students take control of their own schedule and learning. The ultimate goal of the team is to develop a 'fitbit for education' – an individualised platform that breaks each student's long-term goals down into manageable, short term, individualised targets, while providing a community of other students and faculty to monitor progress, provide encouragement, and provide timely and appropriate interventions when necessary. By implementing these features, the app helps students succeed in class and complete their goals such as a degree completion, which is a direct benefit to both schools and students.

Setting Goals for the Future

The team has more ideas in the pipeline – the next tool is a mobile-app called 'Lasso' that is based on geolocation features, which they hope will create a new mode of communication between students and teachers. By advertising their location and their availability for group-study/tutoring, both students and teachers will be able to conduct spontaneous meetings and study sessions.

The team hopes that these kinds of interventions can help overcome the 'clique' mentality that develops in college students and will promote a more open and accessible group-study and learning system that will lead to higher student retention. The team looks forward to a future where mobile apps will be routinely used to assess student performance and the non-cognitive factors that are crucial for predicting student retention.

Dr Silverman says of their work: 'by developing more tools for assessing and improving the non-cognitive status of students as well as facilitating each student's ability to better understand and adapt to their own learning, we are moving towards a college system with decreased dropouts and increased student performance. Eventually, we want to create an environment where students can feel confident to take control of their own learning.'

Meet the researcher

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Dr Lori Silverman obtained a PhD in Education from Walden University in 2010 and an MS in Mathematics from San Jose State University in 2000. She has worked in higher education for over 18 years, during which time she has received three grants from the National Science Foundation (NSF) for improving student success in Science, Technology, Engineering and Mathematics (STEM). She is Founder, Chief Executive Officer at Colytix, a company focused on improving retention in community college students. She was associated with Foothill College in Los Altos Hills, California for several years where she served as a tenured member of the mathematics faculty, interim dean of the Physical Science, Mathematics, and Engineering Division, and currently serves as the Director of the Science Learning Institute. Dr Silverman is dedicated to closing achievement gaps and increasing diversity in STEM through application of new technology and innovations.

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