PracticePlan Program

Charles H. Shubert
Massachusetts Institute of Technology
December 19, 2012

Executive Summary

Consider: According to data available on the National Center for Education Statistics web site (http://nces.ed.gov/datalab/tableslibrary/viewtable.aspx?tableid=7477) there are almost 8 million full-time undergraduates in 4-year colleges in the United States. Of these almost 8 million students over 42% will not graduate within six years (http://nces.ed.gov/datalab/tableslibrary/viewtable.aspx?tableid=7469).

This PracticePlan Program focuses on building and disseminating practice tools for students to use to help them remember what they have learned and to decide what they want to remember. These practice tools will be freely available on the Internet. The target audience is the 8 million or so students who are in college today.

Our focus is on improving graduation rates and the overall performance of all students. We will explore how students can use and create practice activities that are likely to have a direct impact on their ability to perform and graduate. Our intent is to help students be successful competing for jobs, seeking admission to graduate and professional schools, and improving their prospects whether they graduate or not.

This program will not address policy issues, structural changes to existing education institutions, improvements to curriculum, programs to advance teacher preparation, advocate that online education tools should replace classroom teaching, or seek financial support for students. While all of those things may be important and might have a positive impact on students' educational experiences, they are beyond the scope of this program. By focusing our efforts on helping students remember and use what they learn, we hope to fulfill our intent.

Our approach assumes students: want to succeed, both academically and professionally; are capable of succeeding; are willing to be proactive in creating personal, on-going goals and reporting on their own scholastic behavior and performance; are interested in tracking their progress; will revise and refine their goals and level of effort based on their own assessment of their performance.

Background

Why All Students?

A group representing the White House Initiative on Historically Black Colleges and Universities, the MIT Dean of Undergraduate Education, and Howard University faculty have engaged in a series of conversations aimed at helping students prepare for success. As has often been noted in these conversations, programs designed for minority students are models of best practices for all students.

From *Improving the Retention and Graduation of Minorities in Engineering* (Raymond B. Landis, editor) Chapter 15 Developing Institutional Support (by William E. Hogan II, Nathaniel Thomas):

… by allocating resources to address the particular problems of minority students in engineering, an institution is laying the groundwork for significant results that can be expanded to include all students. Many of the services an MEP [Minority Education Program] develops to improve the success rate of minorities can be applied to the general student population.

… Methods and tactics that aim at overcoming academic deficiencies – tutorials, students helping students, faculty mentors – have potential for widespread application. The research that explores and then attempts to solve the low retention rate of minority students in engineering can provide valuable conclusions for other students … One approach an institution can be encouraged to take toward an MEP is to view it as a pilot program that will turn up new possibilities for improving the education of student throughout the campus.

Why Positive Assumptions?

This program will follow the lead of successful Minority Engineering Programs that view students as motivated, willing to work hard, interested in learning and practicing new skills, and confident in their outlook.

Much of the language that is currently used to describe programs designed for students to build college completion skills is negative (e.g. need to improve retention, need for remediation, insufficient preparation, inadequate motivation, lack of resources, absence of self-confidence, excessive expenditures of time) and fairly non-specific. It winds up communicating the following: "If we require you to use this remedial course, you are unprepared, lazy, poor, and unmotivated with low self-esteem. It is unlikely that you will be able to meet acceptable standards."

We will avoid this pitfall by encouraging students to participate in the assessment of their own skills; to compare themselves with their competition; and to decide for themselves how they would like to compete.

Approach

Students Measure their own Success

Ranking institutions by graduation rate is useful. Graduation rates are a measure of the probability of success for students entering an institution. The impact of graduating from an institution on the success of its graduates in competing for jobs and admission to graduate and professional schools is also suggested by its graduation rate. Unfortunately, the knowledge of graduation rates may not motivate students at a specific institution to improve their performance nor is it likely to help students understand how to go about improving their performance.

"You get out of it what you put into it" is an expression that places the burden of skill building on the student, exactly where it should be. The challenges for students are to determine what they want to get out of their educations, to understand how much effort it will take, to compare their current level of effort with what it will take, and to adjust their level of effort to achieve what they want. In this program we will assist students in meeting their challenges by creating activities designed to clarify goals, to assess their current skills and effort, to plan a personal skill-building practice program, and to act on their plan.

We will ask students to sense the gap between where they are and where they want to be, choose their personal goals, identify what needs to be done to achieve the goals, identify possible strategies, select a plan, define activities to practice, report on their level of effort, report on their progress, and report their level of success in achieving their goals. We will ask questions to help students think and write critically about what they choose to practice.

We will instrument the activities and software tools to discover what helps students persist in attaining their goals. We will ask questions to help students discover where they are, where they want to go, and what they want to do next. It is important for students to be aware of how their own practice of skills compares with other students. We will help students track their progress toward their goals and identify when to decompose goals into sub-goals to make progress. The insight that students get from understanding how to create deliberate practice plans to achieve their own goals will allow them to create their own personalized paths to achieve success.

Students Build what they know

From Wikipedia (http://en.wikipedia.org/wiki/Skill)

A skill is the learned capacity to carry out pre-determined results often with the minimum outlay of time, energy, or both. In other words the abilities that one possesses. Skills can often be divided into domain-general and domain-specific skills. For example, in the domain of work,

some general skills would include time management, teamwork and leadership, self-motivation and others, whereas domain-specific skills would be useful only for a certain job.

The U.S. Department of Labor has identified a set of general skills that are useful for employment in a changing workplace. Among those general skills: computation, reading, writing, oral communication, listening, problem-solving, and creative thinking. The PracticePlan Program intends to incorporate the practice of these general skills into practice activities to help a student remember what they have learned and to decide what they want to remember.

Lori Breslow, Director of MIT's Teaching and Learning Lab identifies eight ways Educational Technologies can foster learning based on what educational research tells us:

1. *Allow students to be more actively involved in learning. Learners are active agents, who purposefully seek and construct knowledge within meaningful (and specific) contexts.*
2. *Present the same concept in different contexts. Opportunities for transfer are strengthened by presenting the same idea in multiple contexts.*
3. *Provide easily referenced frameworks to show relationships among different concepts. Successful learners develop mental models and strong frameworks of related concepts.*
4. *Describe the same concept using different means of representation. Learning and recall are strengthened when learners integrate information from both auditory-verbal and visuospatial channels.*
5. *Tailor feedback more individually thereby providing a solution to Bloom's "2-sigma problem". Tailored feedback serves as a substitute for effective one-on-one tutoring.*
6. *Increase time on task (and make that time more flexible). "The single most important variable in promoting long-term retention and transfer is 'practice at retrieval'."*
7. *Provide opportunities to demonstrate new mastery to others … which increases motivation to improve.*
8. *Provide more opportunities for interaction between faculty & students and students & students … which are the two factors that correlate most closely with college students' achievement and satisfaction.*

from a presentation to the Workshop on MIT Online Learning & Residential Education, May 24, 2012,

The PracticePlan Program will explore ways to ask students to define what they already know about their goals so they can use existing knowledge as a framework for adding new knowledge. This approach is intended to help create a domain-specific context for deliberate practice and recall of the new knowledge. We will help students explore: approaches to exercising control over the practice activities so practice is challenging, but not overwhelming; the use of various media to demonstrate their mastery of the concepts they have learned to others; application of what they have learned to other domains.

Student Motivation

Sometimes, when learning something new, a student will ask a teacher the question, "Why should I care about learning this?" This is a great question, but it needs to be reframed so students are asking themselves this question as only they can answer it.

This modest reframing of this question is important. Without understanding the value of learning something the student is likely to view the process of learning as a roadblock. Student motivation is based on understanding the value of learning something either on its own terms or in the context of a specific domain of interest to the student. When a general skill (e.g. computation, writing, etc.) is identified as important in the context of a specific domain (e.g. engineering, business, psychology, etc.), the value to the student becomes clear. As noted in Lori Breslow's presentation, providing additional domain-specific examples can help the student achieve a deeper understanding of the value of the general skill. We will seek to ask the students to provide their own examples.

To be motivating the activities for learning something must be interesting, self-contained, complete, and require minimal prerequisite information. Examples of using a general skill in a domain-specific context will enrich a student's understanding of the general skill. Domain-specific activities must also be interesting, self-contained, complete, and require minimal prerequisite information for those students wanting a context to establish the relevance of a general skill. By starting with what students already know and have as a goal, we hope to help the students learn to build and assess their own interesting, self-contained, and complete deliberate practice plans.

Attracting Students

Practice tools that can have a positive impact on the likelihood of students completing college are a great goal, but creating them and motivating students to use them is challenging. As important and challenging is having a sufficiently large volume of students who use these practice tools to have a measurable impact on college completion rates nationwide. Recent experience with online education suggest that something less than 5-10% of students who use online educational tools spend enough time on task to extract value from the activity. The implication is that, if all the 8 million or so college students visited the program web site, we might expect 400,000 to 800,000 students to persist in using really good practice tools. This probably defines an upper limit for the number of students who would use the online software created by the PracticePlan Program. If the program is successful in helping students practice recalling the information and skills they will need later, it has the potential of reducing the number of students who do not graduate in 6-years by 10%.

Students can be attracted to practice tools in a variety of ways. Two approaches that seem likely to have positive results are inexpensive online advertising targeted at college students and engaging with groups of existing student services organizations.

Attracting students directly through targeted advertising is likely to be a very important approach. MIT's STAR program has experienced success building a large (240,000+/yr) audience with the use of targeted Google AdWords. We expect to use

that experience in reaching a large number of college students.

Targeted advertising for domain-specific practice activities seems like a good place to start. The domains for targeted early advertising efforts would be those domains with large numbers of students (business, social sciences and history, health sciences, and education). The domain-specific activities pointed at by the targeted advertising would serve as a gateway into practicing general skills activities. Over time we will use survey results to refine the delivery of practice activities. We believe that the success of our ability to attract students will reflect the effectiveness, relevance, and quality of our domain-specific activities.

Attracting students through existing student support services covers a fairly broad spectrum of activities. Examples are Career Offices and Minority Programs. Many of these services are affiliated with professional organizations. Many of the student-support activities have practice components.

Attracting students indirectly through professional organizations for student-support activities will be explored during this project. While it is unlikely to generate the high student volumes of targeted advertising, it is likely to yield high quality information about both general and domain-specific activities.

The most student-centric and well-developed of the existing student services programs are for minority students. Particularly effective are the Minority Engineering Programs (MEPs). We will seek the help of the National Association of Minority Engineering Program Administrators (NAMEPA) in creating, evaluating, and disseminating activities. Of particular interest for dissemination are mission critical activities at NAMEPA institutions. Mission critical activities for an institution are things like admissions and course registration where students are required to visit institutional web sites. We believe that having a presence during mission critical activities on those institutional web sites will help us attract students at an important time in their academic careers. Clearly a presence on an institution's mission critical web sites is not limited to either engineering students or minority students.

We will work with the MEP Administrators to share meaningful assessment data, to develop practice activities, and to determine the effectiveness of those activities. We expect that many of the activities will supplement programs that already exist at the MEP institutions. We also expect to adopt existing MEP best practices.

Our activities and tools will be available to all students. We believe that focusing on encouraging students to practice what they want to learn will yield better outcomes for the students, their institutions, and their faculty than will attempting to change how institutions work or how faculty teach their courses.

The task of attracting students to the PracticePlan Program activities and software is a major component of the program.