DEGREE COMPASS: THE PREFERRED CHOICE APPROACH

Leah S. Whitten, PhD
Assistant Professor, Department of Educational Specialties
Austin Peay State University
Clarksville, Tennessee

Anthony R. Sanders, PhD
Assistant Professor, Department of Teaching and Learning
Austin Peay State University
Clarksville, Tennessee

J. Gary Stewart, EdD
Associate Professor and Coordinator of Graduate Studies
Department of Educational Specialties
Austin Peay State University
Clarksville, Tennessee

ABSTRACT

While engaged in academic reading, a college provost converged on an idea to use a preferential approach to students' selection of college courses, similar to the recommendation ideas based on Netflix and Amazon. The result of this idea came to be known as Degree Compass and was implemented on the campus of Austin Peay State University in 2011. Herein the reader will learn about the idea, the program, and the results of students' surveyed perceptions of efficiency and effectiveness regarding the programs' use at the university.

INTRODUCTION

In 2011, Austin Peay State University, Clarksville, TN, implemented a "Netflix approach" program called Degree Compass. The idea was formulated and subsequently implemented by the Provost and Vice President for Academic Affairs, Dr. Tristan Denley, after consideration of and employing ideas emerging from reading on preferential decisions in recent literature.

Denley (2011) described Degree Compass as a course recommendation system developed by Austin Peay State University. Inspired by recommendation systems implemented by companies such as Netflix, Amazon, and Pandora, Degree Compass successfully pairs current students with the courses that best fit their talents and program of study for upcoming semesters. The model combines hundreds of thousands of past students' grades with each particular student's transcript to make individualized recommendations for each student.

This system, in contrast to systems that recommend movies or books, does not depend on which classes are liked more than others. Instead it uses predictive analytics techniques based on grade and enrollment data to rank courses according to factors that measure how well each course might help the student progress through their program. From the courses that apply directly to the student's program of study, the system selects those courses that fit best with the sequence of courses in their degree and are the most central to the university curriculum as whole. That ranking is then overlaid with a model that predicts which courses the student will achieve their best grades. In this way the system most strongly recommends a course which is necessary for a student to graduate, core to the university curriculum and their major, and in which the student is expected to succeed academically.

Recently, the system has gained national attention and played a central role in Tennessee's successful Completion Innovation Challenge application, which received a $1,000,000 award from Complete College America and the Gates Foundation to support implementing Degree Compass at three other campuses in Tennessee.

The authors of this paper will extend the idea to gauge patterns of usage and students' perceptions of effectiveness, impact, and efficiency regarding the use of the program.

LITERATURE REVIEW

Ayres (2007) described data-based decision-making and provides examples of quantitative prediction and its role in "reshaping business and government," positing that experiential and intuitive expertise are increasingly discounted in favor of number crunching. Using large datasets, the Super Crunchers employed statistical analyses that "impact real-world decisions." Not only are they impacting the way decisions are executed, but also the decisions themselves. In effect, different and better choices are being made as a result of number crunching, across different contexts affecting people (e.g., consumers, patients, workers, and citizens).

He concluded that data-based decision-making is not a substitute for intuition, ideas, and experience, but rather a complement evolving to interact with each other, resulting in a new cadre of innovative Super Crunchers. These new thinkers will go back and forth between intuitions and number crunching envisioning more than either could in isolation (Ayres, 2007).

Thaler and Sunstein (2008) posited the idea of choice and preference, as means to success across the many areas of life issues: money, health, and freedom. They coined the term "choice architect" as a person responsible for the contextual organization in which people make decisions. Comparing choice architecture with the traditional form of architecture, they concluded foremost that a "neutral" design does not exist, as in everything is important for the resulting design to be effective once completed, in addition to being attractive. Major impact emerges from details even from what some would consider as insignificant. Consequently, power emanates from seemingly small details by pointing the users' attention toward a specific direction. In other words, a choice architect can "nudge" others toward certain choices or decisions.

According to the authors, nudging "alters people's behavior in a particular way without forbidding any options or significantly changing their economic incentives." Choice architects can make major improvements to lives of others by designing user-friendly environments (Thaler & Sunstein, 2008). The authors pointed out one false assumption and two misconceptions about freedom of choice. The false assumption is that all people will elect choices that will promote their best interest or the choices made by someone else on their behalf.

One of the misconceptions centered on the thought that avoiding influencing other's choices is possible, noting there are situations where an entity must choose an option affecting behavior of other people, whether or not that was the intent. Secondly, there was a misconception that paternalism, defined as a mandate by a government or other entity, is always coercive. The authors concluded that developments in the public sector must strengthen both the "principled commitment to freedom of choice and the case for the gentle nudge" (Thaler & Sunstein, 2008).

Button and Wellington (1998) developed a modified version of the O'Banion academic advising model called the Integrative Advising Model. The original model, as designed by Terry O'Banion (1972), consisted of five elements in the process of advising students:

a) exploration of life goals; b) exploration of vocational goals; c) program choice; d) course choice; and e) scheduling options. The linear progression of his model progressed sequentially and became the basis for future advising decisions. With the Integrative Advising Model, the elemental dimensions become interactive in that students are continuously returned to the initial two elements at each advising session, as refinement of life and vocational goals impact program and course choices. The authors concluded that this approach tends to be "flexible and useful" with diverse populations, allowing connections to all the elements simultaneously, rather than proceeding through a tedious structured process (Burton & Wellington, 1998).

Hannah and Robertson (1990) concluded that approximately 45 percent of freshmen at surveyed institutions indicated the need for assistance to make choices regarding education and occupation. In addition, they found that college freshmen need more information than they actually received.

Precursors to Degree Compass emerged in the past with similar purposes. In 2006, Shugart and Romano reported that Valencia Community College had implemented a developmental advising program called Lifemap, in 1994, to direct students' attention on developing educational and career plans. College resources, including faculty and staff were integrated into a 5-stage conceptual model, based on selected developmental theory. Lifemap tools permitted students to create and save educational and career plans, their portfolio and job search information into a portal platform. Student self-sufficiency, as one goal of Lifemap, afforded students the capability of accessing transcripts, degree audits, and financial aid information.

Redesigning student services delivery also resulted in the replacement of traditional offices (e.g., admissions, financial aid, advising) with answer centers of cross-trained staff members. Sughart and Romano (2006) concluded that it was important to have a conceptual model of transformation and collaboration which focused on the college's student experience.

Software suggestion of student courses was highlighted by Young (2011), comparing it to when Netflix, the movie database giant, suggested movies according to the frequency that renters liked the movies. Describing Degree Compass at Austin Peay State University, he noted that the automated system takes into account students' planned major, data on their past academic performance, and finally data on how well similar students performed in a specific course. Early findings indicated that students who took courses from the software recommendation earned grade point averages a half point higher than students who selected courses not selected by the software.

Perry (2011) described how colleges mine data to improve education and inform decisions. Comparing data mining for this purpose to the *Moneyball* approach (Lewis, 2003), a book and later a movie, where the main character reinvigorates a struggling baseball team through statistical analyses of predicting players' success. He described a process as a robot adviser assessing the profiles of students and suggesting courses in which success is likely. Students' transcripts are compared with countless others of past students to make suggestions for each individual student.

As students logged on to the online portal, called Degree Compass, a screen labeled "Course Suggestions for You" appeared and suggestions were ranked on a scale of one to five stars. A complex algorithm exists behind the recommendations, including computation of degree requirements and common courses (e.g., freshmen writing) that is used in most programs. Similarly, courses in which student may display a talent, based on previous grades in high school or American College Test (ACT) scores, were suggested (Perry, 2012).

Quoting Dr. Tristan Denley, Perry (2012) noted that a common theme emerged that when people are presented with a myriad of options, but little information, difficulty existed in making wise choices. With students, they tend to do substantially better when they enroll in the courses that are recommended. The author also indicated that three other colleges in Tennessee had adopted the software, and that other institutions are exploring similar ideas.

RESEARCH QUESTIONS

The current study sought to explore student usage and opinion of the Degree Compass Tool. The study explores five separate research questions in relation to the demographic information of gender, age, ethnicity, classification, type of student (traditional and non-traditional), family educational history (first generation student and non- first generation student), number of years in attendance at the university, and Pell Grant recipient status.

1. Who is aware the Degree Compass tool exists?
2. Who is using the Degree Compass tool?
3. Who has taken classes based on a Degree Compass recommendation?
4. Who feels that Degree Compass accurately predicts course success rate?
5. Who would suggest using the Degree Compass tool to a friend?

DATA COLLECTION AND METHODOLOGY

Data for the current study was collected from a survey distributed via e-mail to Austin Peay State Universities undergraduate student population in the Fall of 2012. The self-created survey contained a total of 21 items. Thirteen items dealt with student perception and understanding of the Degree Compass Tool, while the remaining 8 items related to demographic information. For purposes of this study, the first five questions were explored as well as the last 8 items dealing with demographic information. The survey was peer checked amongst faculty at the university as well as by the creator of the Degree Compass Tool. The Flesch-Kincaid Readability Test was used to determine the survey to be at an appropriate reading level for entering college freshmen.

The University undergraduate population consisted of 8841 students. Surveys were returned, via Campus Lab's Baseline program, from 875 of these students. The survey sample size constituted analyzed results reported at a 95% confidence level with a confidence interval of 4. An independent samples t-test was conducted to assess demographic differences.

RESULTS

The descriptive results indicated that the majority of students (>55%) were aware of the Degree Compass Tool prior to the distribution of the survey. An independent samples t-test was conducted for each demographic to assess differences on the awareness of the Degree Compass Tool. Results indicated statistically significant differences based on classification ($t_{(961)} = 1.97$, $p = .007$), type of student ($t_{(961)} = 1.82$, $p = .015$), and Pell Grant recipient status ($t_{(961)} = 1.92$, $p = .041$). Results suggest students who have entered "Senior" status, non-traditional students, and Pell Grant recipients to be more likely aware of the Degree Compass Tool.

The descriptive results indicated that the majority of students (>66%) have not used the Degree Compass Tool in any capacity. An independent samples t-test was conduct-

ed for each demographic to assess differences on who has used the Degree Compass Tool. Results indicated statistically significant differences based on classification ($t_{(961)}$ = 1.23, p = .01), type of student ($t_{(961)}$ = 4.32, p = .00), and Pell Grant recipient status ($t_{(961)}$ = 3.33, p = .14). Results suggest students who have entered either "Junior" or "Senior" status, non-traditional students, and Pell Grant recipients to be more likely to have used the Degree Compass Tool.

The descriptive results indicated that the majority of students (>82%) have not taken a class based upon a Degree Compass recommendation. An independent samples t-test was conducted for each demographic to assess differences on who has taken a class based upon a Degree Compass recommendation. Results indicated statistically significant differences based on classification ($t_{(961)}$ = 3.45, p = .01), family educational history ($t_{(961)}$ = 3.12, p = .03), and Pell Grant recipient status ($t_{(961)}$ = 4.9, p = .00). Results suggest students who are non-traditional, first generation, and Pell Grant recipient to be more likely to have taken a class based upon a Degree Compass recommendation.

The descriptive results indicated that the majority of students (>86%) who took a course based on a Degree Compass recommendation (n=160) felt the tool was accurate in it's predictions of success in the course. The majority of these students (>93%) would suggest using the tool to a friend. Significance in relation to suggesting the use of Degree Compass to a friend and Pell Grant recipient status was found ($t_{(160)}$ = 3.11, p = .00). Results suggest students who are Pell Grant recipients to be more likely to suggest using the Degree Compass tool to a friend.

DISCUSSION

The purpose of this paper was to explore the usage and opinions of The Degree Compass

tool amongst the population of undergraduate students at Austin Peay State University. Though Degree Compass has been implemented on the campus of APSU, the developmental process of the tool is on going. This research serves the purpose of aiding in the direction of this developmental process.

Of the 171 students who reported having used the tool to select a course, one hundred and thirty eight (86.25%) reported the tool to be accurate in its predictions of success. The complex algorithms and analysis driving the suggestions generated by Degree Compass are attributed to this success. If the percentage of students aware of the tool (>55%) knew of its success rate in predictions of success, it is possible the percentage of students using the tool (<34%) would increase. Researchers suggest this success rate be advertised to the student body, along with the increased advertisement of the availability of the tool itself.

Analysis of demographic results suggest students reaching "Junior" and "Senior" status, Non-Traditional, Pell Grant recipients, and first generation college students likely more invested in the educational process to the extend of being aware of available resources and the usage of these resources. Students coming from these backgrounds are generally older in age and are likely to have overcome economical hardships in the quest for their degree. The researchers suggest students who are older in age and students who have overcome economic hardships to be two separate areas of concentration for which the degree compass tool has proven to be effective. It is suggested that through the increased advertisement of availability and success of the tool, that students outside of these two areas could become more aware of the tool and would be more likely to use the tool.

REFERENCES

Ayres, I. (2007). *Super crunchers: Why thinking-by-numbers is the new way to be smart*. New York: Bantam Dell.

Burton, J., & Wellington, K. (1998). The O'Banion model of academic advising: An integrative approach. *NACADA Journal*, *18*(2), 13-20.

Denley, T. (2011). *Degree Compass: What is it?* Retrieved from http://www.apsu.edu/information-technology/degree-compass-what

Denley, T. (2012). Austin Peay State University: Degree Compass. In D. G. Oblinger (Ed), *Game Changers: Education and Information Technologies* (pp. 263-267). Washington, DC: Educause. http://net.educause.edu/ir/library/pdf/pub7203.pdf

Hannah, L. K., & Robinson, L. F. (1990). How colleges help freshmen select courses and careers. *Journal of Career Planning & Employment*, *50*(4), 53-57.

Lewis, M. (2004). *Moneyball: The art of winning an unfair game*. New York: W. W. Norton & Company, Inc.

Netflixo. (2011). *APSU "Netflix Effect" program helps Tennessee win $1 million grant*. Retrieved from http://www.netflixno.com/2011/07/apsu-netflix-effect-program-helps-tennessee-win-1-million-grant/

O'Banion, T. (1972). An academic advising model. *Junior College Journal*, *42*, 62, 64, 66-69.

Perry, M. (2011). Colleges mine data to tailor students' experience. *Chronicle of Higher Education,* *58*(17). Retrieved from http://chronicle.com/article/A-Moneyball-Approach-to/130062/

Perry, M. (2012). Big data on campus. *The New York Times*. Retrieved from http://www.nytimes.com/2012/07/22/education/edlife/colleges-awakening-to-the-opportunities-of-data-mining.html?pagewanted=all

Shugart, S., & Romano, J. C. (2006). Lifemap: A learning-centered system for student success. *Community College Journal of Research and Practice, 30*, 141-143.

Thaler, R. H., & Sunstein, C. R. (2008*). Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.

Young, J. R. (2011). The Netflix effect: When software suggests student's courses. *Chronicle of Higher Education*, *57*(32). Retrieved from http://chronicle.com/article/The-Netflix- Effect-When/127059/