Using Course and Student Profiles to Improve Student Success

An "explicit focus on students' natural talents builds the confidence and motivation necessary for achievement and persistence in college" [1].

Student success is measured in many ways including student retention, persistence, time to degree, number of changes in major, and matriculation rates. These are all issues of national concern [2], and it is no different at the University of South Carolina (USC). Recent data from USC's institutional assessment show 70% of Spring 2009 graduating seniors change majors at least twice [3]; 44.9% of full time students graduate in four years, and 64% in six year; 15.8% do not return for their second year, and 29.7% do not return for their fourth year [4].

The goal of this QEP is to improve student success through improved advising. The proposal strives to empower students and advisors through course profiles which identify characteristics, such as the Levels of Learning, student workload, and modes of delivery. While it is recommended to strive for balance when registering for courses, information needed to obtain that balance is typically not available. For example, how much writing, reading, and group work is required in ECON 224? Is MGMT 331 based on memorization, or are students expected to use their analytical and evaluation skills? Course profiles could provide this information.

The proposal has three parts. First, generate multi-dimensional profiles of all USC courses using factors drawn from the educational research literature. With these profiles, students and advisors will have a better understanding of what to expect before students enroll in the class.

Second, once course profiles have been developed, individualized student profiles can be developed using the profiles of courses the student has taken, and the grade earned. The student profile identifies course characteristics that relate to that student's academic success and can be used to inform advisors as to student strengths & weaknesses, and aid in course selection. Finally, use student and course profiles to assist in the advising process.

Research done at USC has shown that course and student profiles can be used to predict which of two courses the student would earn a better grade [5]. A grant proposal is being developed for submission to the U.S. Department of Education requesting funding for further research in this area. Attached to this QEP are letters of support for that research from Dr. Lorin Anderson, Carolina Distinguished Professor Emeritus, USC, author of the revised Bloom's Taxonomy [Attachment 1], and from Dr. Howard Gardner, Hobbs Professor of Cognition and Education, Harvard University, developer of the Theory of Multiple Intelligences [Attachment 2].

The impact of this QEP is cross-cutting, with potential to benefit students in all disciplines, grade levels, and colleges. The proposal benefits from the existence of mechanisms to monitor the impact of course and student profiles (the university already monitors student attrition and graduation rates, as well as the frequency of changing majors).

Proposed Course and Student Profiling

The QEP's underlying premise is students will succeed if they take courses and enroll in degree programs that are more aligned with their own strengths. Unfortunately, course information is often limited to what is in the bulletin. Course profiles provide students and advisors access to course characteristics. This permits better decision making and course selection, thereby improving student success.
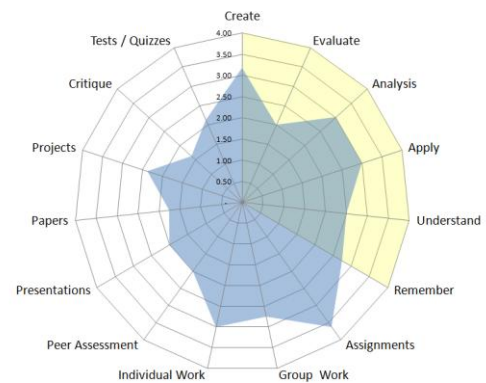

Figure 1: TSTM 443 (Business Education Technology Applications, Principles, and Management) Course Profile Spider Graph

We propose to create a multi-dimensional profile for each USC course by analyzing course syllabi. The sample course profile (Figure 1) reports the Levels of Learning, drawn from the revised Bloom's Taxonomy [1], and the student Course Work Load. The spider chart aids in visualizing the course profile. The distance from the center along each axis indicated the emphasis placed on that dimension for the class.

Having created a catalog of course profiles, it is possible to derive an individualized profile for each student by regressing course profile factors for courses taken against demonstrated performance (i.e., grade earned). The resulting factors can be either positive or negative. The higher the value, the better the student is predicted to perform in courses that emphasis that factor. The profile in Figure 2 suggests the student would do better in courses which
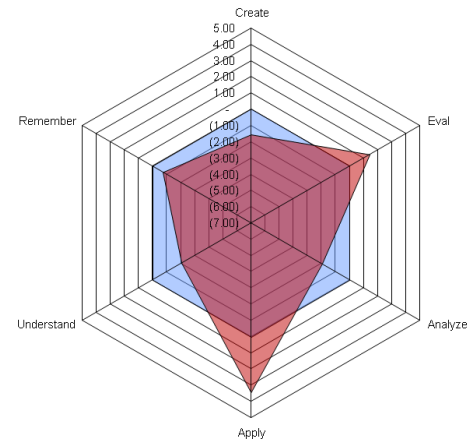

Figure 2: Student profile showing only the Levels of Learning dimensions. The inner, colored, background region indicates a negative relationship between profile dimension and student performance.

emphasize Evaluating and Applying rather than other dimensions. Also, given the negative factor for Understanding, the student would do better in courses that deemphasize Understanding.

Academic advisors (particularly faculty advisors) typically do not have information about course characteristics, such as the Levels of Learning addressed in the class, student workload, method of teaching, and academic skills needed to succeed. For example, a course may require extensive numerical analysis and critical thinking, and have a workload involving many in-class projects with a major team project. This would likely not be a good fit for a student with weak analytical skills, or one who prefers courses that draw on creativity and individual work. Course profiles would help identify these conflicts. The advisor could then discuss this issue prior to the student enrolling in the course. If the course is an elective, the student can choose another course that more closely matches his or her preferred academic approach to learning.

Building on Prior Research

The literature establishes advising as a beneficial, key factor in a successful student experience at the college level [6, 7, 8]. For example, the quality of advisor-student interaction has been found to be an important component in student retention [9, 10].

Certain noncognitive predictors have been shown to improve the prediction of future academic performance [11]. That study's approach focuses on overall academic performance, not on the performance in specific courses. Strength-based advisement has been proposed as a method of improving retention rates [12]. Schreiner and Anderson argue strength-based advising is a more useful way of approaching developmental advising than focusing on student's deficits.

"In many ways, focusing on student deficits and needs is focusing on the student who is not there. However, through a strengths-based approach, the advisor works with the student who is there – the one that brings talents into the room as a foundation for addressing the future". … An "explicit focus on students' natural talents builds the confidence and motivation necessary for achievement and persistence in college" [12].

Preliminary Study

A study funded by the National Academic Advising Association (NACADA) investigated the feasibility of using course and student profiles to predict future student performance [13]. The study involved students in the College of HRSM at USC. Profiles of 81 unique courses were developed by averaging responses from student surveys. In accordance with IRB approved procedures, transcripts from 3,521 HRSM students were analyzed to develop student profiles. To test the model's usefulness, the study used a holdback sample to assess ability to predict which of two courses the student would earn a better grade. The nominal model (considering ties as a successful prediction) was successful in 70.4% of pairwise comparisons. Using the more conservative approach (removing ties), the model correctly predicted 55.8% of pairwise comparisons (both significant at $\alpha = 0.01$). This is an improvement over the alternative of flipping a coin (i.e., 50%). Results also indicate the greater the difference in the profiles, the more accurately the model predicted student results.

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Implications to Students, Faculty and Administration

Course and student profiles provide more information to both the advisors and students, enabling better decisions. The access to course profile data empowers students. They can get a better sense as to what to expect in the class before registering for it. Current student profiling techniques are typically ad hoc or empirically based, grouping students into broad categories (i.e., students with SAT scores above 1300 do well in this degree program) [14, 15, 16, 17, 18]. In contrast, the proposed approach refines student profiles down to the individual student. The same is true for courses. Since the multi-dimensional profiles will be developed for each USC course along a common set of metrics, courses in different disciplines such as English Literature, Dance, Quantum Mechanics, and Music Appreciation can for the first time be compared and contrasted – not on course content, but rather on pedagogical and instructional dimensions (i.e., how these courses are taught). Taken together, the approach identifies student's specific strengths and weaknesses, and relates these to the characteristics of the individual courses. Consequentially, this approach allows students to be advised based on their individual strengths and weaknesses, and to more easily match students with courses. The approach can support both deficit-based advising and strength-based advising. When a course profile suggests a class will be academically challenging for a student, the student is forewarned. Proactive steps can be taken, such as scheduling the class when the student is most alert, or ensuring there is an overall balance in the student's workload. This is only possible when course profiles are available.

Improving student-course matching could impact student performance and retention. Research has found the quality of advisement is directly related to the likelihood of staying in school and graduating [19]. An added benefit is that administrative review of course profiles could be used to determine if pedagogical objectives are adequately addresses across the curriculum, and suggest areas where improvements can be made.

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Attachment 1: Letter of Support from Dr. Lorin Anderson for the proposal to Department of Education.

COLLEGE OF EDUCATION

September 19, 2008

Dr. John H. Gerdes
College of Hospitality, Retail, and Sport Management
University of South Carolina
Columbia, SC 29208

Dear Dr. Gerdes:

I have read with interest a draft of your proposal, "Utilizing Profiles to Improve Student-Course Matching as a Means of Impacting Student Success." I was pleased to see your use of the revised Bloom's Taxonomy as a framework to analyze the academic demands placed on students in various courses. I truly believe that finding ways of maximizing the "fit" between course demands and the student's ability and willingness to meet those demands is a key to improving student success in higher education.

I am impressed with the care taken in designing the study. I believe that using a two-stage methodology with Stage I being the generation of course profiles and Stage II being the determination of the extent to which these profiles are predictive of future success in these courses is a sound and defensible approach. Too often, researchers are content to stop with the generation stage, assuming that what they find will generalize to subsequent offerings of the course or courses.

I wish you well in your pursuit of funding. Should you receive funding I would be happy to serve in an informal, non-paying consulting role if such a role would be useful to you and the project staff. I would appreciate being kept appraised of your work in this area.

Sincerely,

Lorin W. Anderson
Distinguished Professor Emeritus

Attachment 2: E-mail Letter of Support from Dr. Howard Gardner for the proposal to Department of Education.

The message below was part of an email dialog with Dr. Howard Gardner, Harvard Graduate School of Education concerning the course profiling concept, received August 20, 2008. It is used with permission.

To: John Gerdes
From: Howard Gardner

thank you for sending me your draft proposal. I endorse the idea of looking at various factors-- such as students' profiles of intelligences-- as predictors of success in academic settings. The idea of crossing Bloom's taxonomy with the MI categories is promising. I like the idea of considering students' aptitudes in the various intelligences-- frequently, researchers confuse what an individual LIKES to do with what he/she is GOOD AT DOING. Finally, there is a huge asymmetry between the amount of writing and talking about MI theory, on the one hand, and actual empirical work on its educational implications, and your study can help to repair that imbalance.

In your work, it is important to distinguish between intelligences, on the one hand, and tasks-domains on the other. The only data that we can get is student performance/potential on various tasks/domains; figuring out which intelligences they are using involves inferences, but these inferences can be discussed and defended.

As indicated, I can't serve as a formal adviser to this project because I am hopelessly overextended in commitments; but if it is funded, I am happy to remain in informal contact with you, as time allows, and as this note signifies.

Good luck in launching a successful project.

hg

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