Developing Course Profiles to Match Course Characteristics with Student Learning Styles

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Advisors with a working knowledge about course workload and the levels of learning in specific classes provide the best possible advising. Unfortunately, they often have only limited information regarding important course characteristics. With a better understanding of these factors, advisors can assist students in making appropriate course selections during the advising process and promote a positive advisor-student relationship. We explain a new means of profiling courses that integrates information about the workload and levels of learning for each course. We also explain the benefits of these new course profiles for advisors, faculty members, students, and administrators.

KEY WORDS: Bloom's taxonomy, course selection, educational objectives, spider graphs, student success, tools for advising

Introduction

Research indicates that academic advising is an essential component to retention and academic achievement. Tinto (2006) noted, "Students are more likely to persist and graduate in settings that provide clear and consistent information about institutional requirements and effective advising about choices students have to make regarding their programs of study and future career goals" (p. 2). Previously, Tinto (1993) had stated that frequent contact and interaction with faculty members reduce the likelihood that students will drop out of college. However, academic success and retention reflect only two important results of effective advising.

Academic advising provides a positive experience through increased interaction between students and faculty members (Nutt, 2008). Students want a personal relationship built around academic issues (Fielstein, 1987), and a positive advisee-advisor connection reflects a successful advising outcome (Nadler & Nadler, 1993). Through the advising process, interaction helps develop a relationship between faculty advisors and students. The type of relationship established, either positive or negative, is a result of the advising experience itself.

However, a positive personal relationship alone does not create an exceptional advising experience. Additional information, for example, about program requirements, course pre- and co-requisites, and class descriptions, is essential for academic advising. "The challenge is to create an academic advising system that students, faculty, staff, and administrators view as essential, not peripheral, to the educational experience" (Hunter & White, 2004, p. 21).

While students enjoy some flexibility in scheduling classes, the information they receive regarding course characteristics is typically limited to the basics in the catalog. Students with a more complete course profile can create a more balanced schedule. The type and amount of work required in the course (i.e., the course workload) and the learning level (LL) (i.e., rigor) expected in the class impact academic performance. The definition of *level of learning* is drawn from the revised Bloom's taxonomy. In the revision (Krathwohl, 2002), six learning levels are defined (from lowest to highest): remembering, understanding, applying, analyzing, evaluating, and creating. At higher LLs, students need a deeper understanding of underlying concepts.

Because they drive the pedagogical design and rigor of the course, LLs impact student performance. For example, courses involving significant amounts of creating, the highest LL, engage students in designing, constructing, producing, and planning. In comparison, courses that emphasize remembering, the lowest LL, include activities allowing students to list, recognize, and identify. Many instructors evaluate the lower LL, through quizzes, tests, and worksheets.

Therefore, for the purpose of our study, we considered course workloads that consist of tests/quizzes, projects, reports/papers, presentations, individual work, group/teamwork, peer assessment, and individual assessment/critique. We defined *course profile* as the integration of the CW and LL dimensions. These profiles capture important course characteristics and are thus beneficial to advisors and students during the advising process.

As noted by McLaren (2004), "It is important that academic advisors take students' situations into consideration and advise them to keep their workloads manageable in order that they might realize their academic potential" (p. 173). While often a good strategy to balance the type of workload during a semester (e.g., students should not concurrently enroll in five courses that require heavy homework or extensive team projects), information concerning CW and LL expectations has traditionally been unavailable to students and advisors. Because they have limited information, advisors face difficulty in completing the advising process in the most beneficial way.

Purpose

The primary contribution of our work lies in the development of a new approach to profile courses based on CW and LL. These course profiles will be beneficial during the academic advising process as they present course aspects not typically captured through other means, and they provide a common framework for comparing diverse courses. We used spider graphs (also referred to as "radar graphs") to help readers visualize the information in a meaningful way such that they can make course comparisons.

We conducted the large study in a hospitality college to illustrate the type of information that can be collected using this approach. We present sample course profiles and offer discussion about the ways this information benefits academic advisors, faculty members, students, and administrators.

Literature Review

The literature establishes advising as a beneficial, key factor in a successful student experience at the college level (Frost, 1991; King, 1993; Light, 2001; Moses, 2001). Academic advising is a critical function in undergraduate education and the literature shows that it serves various purposes. Researchers attribute many factors to student success and retention. For example, they found that the quality of advisor-student interaction is an important component in student retention (Astin, 1993; Gordon, 1985; Pace, 2001; Winston, Miller, Ender, & Grites, 1984). Student retention increases as a result of active, ongoing relationships between students and advisors (Gordon, 1985). However, students need both information and personal support throughout the advising process (Andrews, Andrews, Long, & Henton, 1987).

Poor advising experiences result in a strong negative impact on student retention (King, 1993). Lau (2003) noted, "Students who have negative interactions and experiences tend to become disillusioned with college, withdraw from their peers and faculty members, and ultimately, the institution" (p. 127). Consequently, positive advisor-student interaction and positive advising are important components in creating a successful college experience and the retention of students. Positive relationships more likely evolve when appropriate and complete information is shared about CW and LL.

Students should take courses recommended by academic advisors. Lau (2003) pointed out that "instructors are the best appraisers of their [students] academic performance, and therefore, can validate their learning experiences" (p. 133). Instructors and faculty members are knowledgeable about the CW and LL involved in their courses. However, because of the diversity of students and courses, coupled with the limited information available, advisors may not know the ways to best advise students. While a student's chosen degree program has a standardized plan of study, often electives or available tracks within the major offer some flexibility. Students may also be undeclared. This lack of a major adds more variability to the advising process.

In addition, not all students have the same objective for scheduling classes. Students may want to maintain programmatic flexibility to allow a possible transfer into a different program, while others may want to raise their cumulative grade point-average or may need to schedule around work. Undergraduates need counsel from advisors to make viable choices about the complete curriculum (Katchadourian & Boli, 1985).

The typical, limited information available to advisors and students during the advising and course selection process is as follows:

- standardized program plan of study,
- brief course catalog description,
- prerequisite or corequisite course listing,
- maximum course enrollment, and
- course meeting times.

Not necessarily the most appropriate or complete for course selection based on students' needs, the above information basically assists advisors and students in completing a schedule that meets program requirements and scheduling preferences. However, it provides little guidance for flexibility scheduling. For example, to satisfy a fine arts requirement, a student may be able to choose from a variety of courses in theater, dance, graphic arts, cinema, or music. Selecting a class simply because

it is offered at a convenient time is not necessarily the best approach for the student's success.

Research shows that various nonacademic factors impact course selection. Reardon, Lenz, Sampson, Johnston, and Kramer (1990) suggested various reasons for student selection of a course:

- title of course,
- time course is offered,
- degree to which course satisfies program course requirements,
- recommendation by peer,
- enrollment with a friend,
- instructor reputation,
- number of available seats,
- perception of LL,
- credibility of the course, and
- relevance of course to career and life goals.

The course profiles we developed through this study provide the LL for the class. In combination with the CW, the LL provides valuable course information for advisors and students.

Many colleges have decentralized systems, which often means that faculty members, not professional advisors, handle advising. Filling this advising role may be intimidating and sometimes inconvenient for faculty members; however, students prefer to receive counseling dealing with academic matters from faculty (Belchier, 2000). Faculty duties typically include serving as student advisors and in particular providing advice and course information (Templeton, Skaggs, & Johnson, 2002).

In addition, research shows that faculty members consistently rate their own advising effectiveness higher than do the students they have advised (Kramer, Arrington, & Chynoweth, 1985; Stickle, 1982). Unfortunately, "faculty do not appear to be generally effective as advisors, unless special efforts are made to train them and provide resources to support this role" (Reardon et al., 1990, p. 18). Therefore, when helping students decide on the courses (required or elective) in which to enroll, advisors, and particularly faculty advisors, often do not have the resources and information to make the best judgments. Course profiles can help fill this gap by providing useful information about course characteristics.

Although not typically included in the information available to academic advisors, the CW and LL information is valuable when making course selections. For example, one course may require students to work at higher LLs with CW that involves several team projects and oral presentations. A student who performs better when working alone, such as when writing reports or demonstrating an understanding of the course content, would probably experience more success in a different course. Course profiles would help advisors and students identify the differences in course delivery and workload such that they can develop a balanced academic plan. The advisor and student can discuss these issues prior to the student enrolling in a course or the student can choose another elective course that is more suited to his or her preferred LL and CW.

Methodology

For the development of course profiles, we collected data on undergraduate courses offered in four departments of the College of Hospitality, Retail, and Sport Management (HRSM) in the University of South Carolina. The courses included a) hotel, restaurant, and tourism management (HRTM), b) retail (RETL), c) sport and entertainment management (SPTE), and d) technology support and training management (TSTM).

Participant demographics are provided in Table 1. An approximately equal number of males and females participated in the study. The majority were Caucasian students from within the state. The average age of participants was 21 years.

To collect necessary data to create course profiles, we administered in-class surveys, similar to traditional course-evaluation surveys, in accordance with university Institutional Review Board procedures. See Figure 1. We explained our goal before distributing the survey in each class and we informed students that their participation was optional, their answers would remain anonymous, and their decision to complete the survey or not would not impact their course grade. We also

Table 1. Demographics of study participants

Demographic	Variable	%
Gender	Female	52
	Male	48
Race	Caucasian	79
	African American	8
	Other	7
	No response	6
Age (years)	17–21	67
	22–25	28
	26–30	3
	> 30	2
Residency	In state	69
	Out of state	29
	International	2

provided students with a handout that included enhanced descriptions to illustrate each LL based on Bloom's taxonomy (see Kurwongbah State School, 2008).

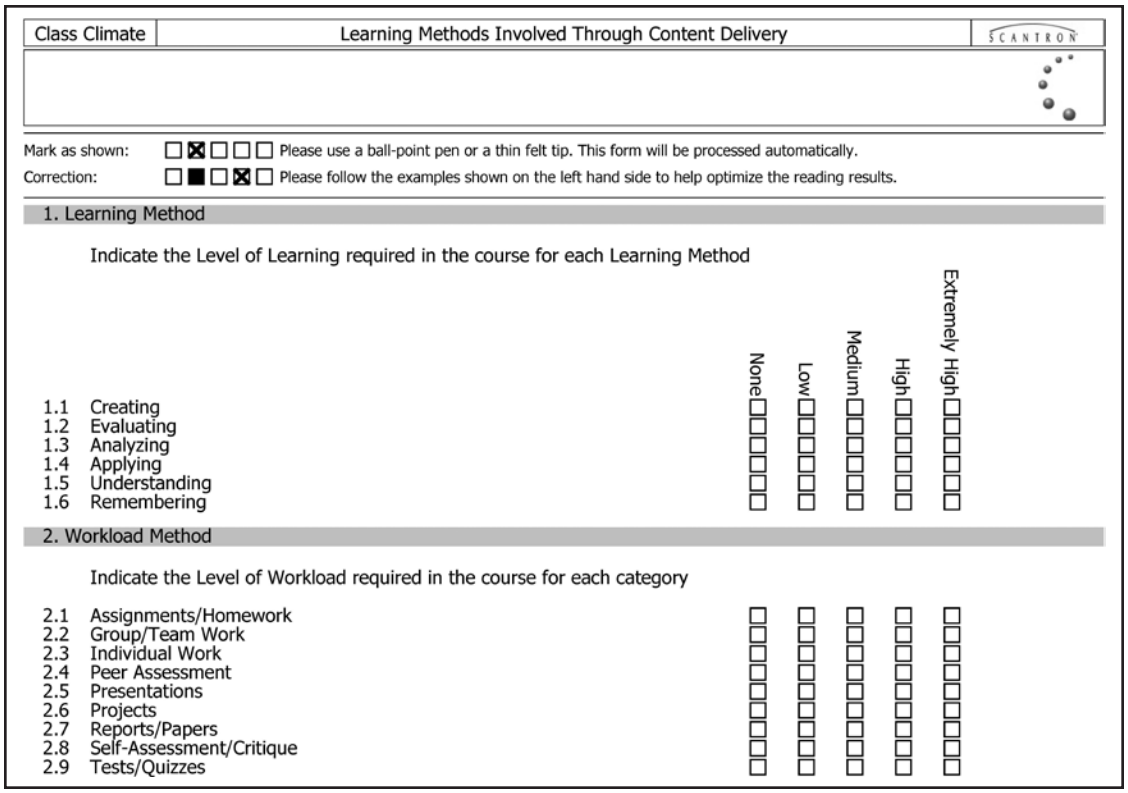
The survey design allowed participants to provide information regarding both the LL and CW involved in the course. First, participants were asked to rate the course demands for each of the six LLs based on a five-point Likert scale. For example, we asked respondents to indicate the level of Creating expected in the course: *none* (0), *low level* (1), *medium level* (2), *high level* (3), or *extremely high level* (4)? Participants were also asked to rate the CW for each of the nine categories of workload, including assignments/homework, group/teamwork, individual work, peer assessment, presentations, projects, reports/papers, self-assessment/critique, and tests/quizzes. Students used the same Likert scale as used to rate the LL: 0 = *none* to 4 = *extremely high level*. We then averaged the student responses for each category and for each course, resulting in a 15-point course profile (6 values for LL and 9 values for CW). We tabulated these mean values and plotted them on individual course spider graphs.

Results

After processing over 3,000 surveys, we obtained profiles for 70 courses offered in the college. We developed course profiles for each of the surveyed courses and used the data plotted on spider graphs to visualize each course profile and highlight profile extremes. Spider graphs allow the representation of multiple dimensions on a single graph. In the case of this study, all nine CW and six LL dimensions are plotted on a single graph for each course. Figure 2 provides a course profile of an introductory-level hospitality course.

A course profile consists of a vector of the mean values for each surveyed dimension. The spider graph represents each dimension of the profile vector as a point on the appropriate axis of the graph. Because we used a common scale for each dimension, all axes in the spider graphs also reflect a common scale. In each case, the axis has a minimum value of 0.0 (indicating none), and increases linearly outward, with 4.0 representing an extremely high level. This scale corresponds to the Likert scale used in the survey. While a scatter plot without the connecting lines between these points would accurately represent the course profile, the

Figure 1. Survey given to class


Class Climate | Learning Methods Involved Through Content Delivery | SCANTRON

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Correction: ☐■☐☒☐ Please follow the examples shown on the left hand side to help optimize the reading results.

1. Learning Method

Indicate the Level of Learning required in the course for each Learning Method

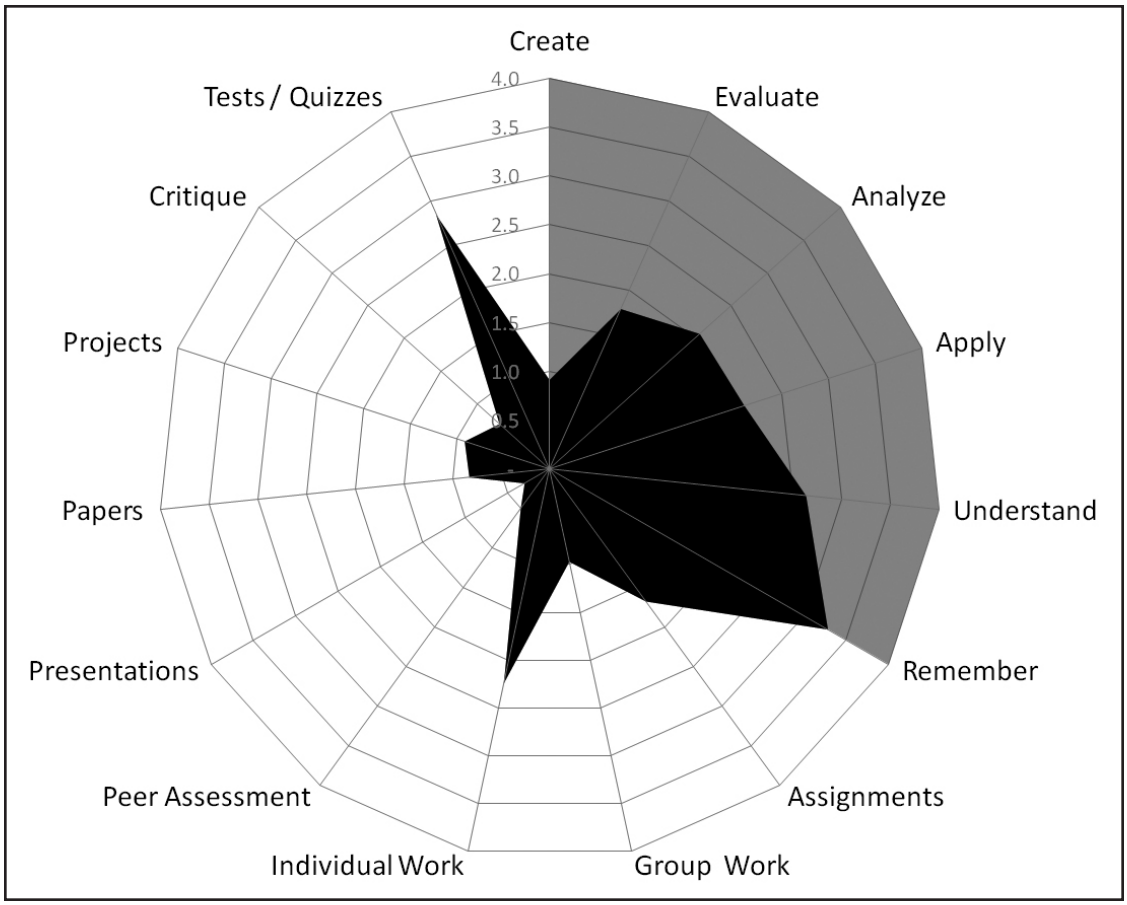
		None	Low	Medium	High	Extremely High
1.1	Creating	☐	☐	☐	☐	☐
1.2	Evaluating	☐	☐	☐	☐	☐
1.3	Analyzing	☐	☐	☐	☐	☐
1.4	Applying	☐	☐	☐	☐	☐
1.5	Understanding	☐	☐	☐	☐	☐
1.6	Remembering	☐	☐	☐	☐	☐

2. Workload Method

Indicate the Level of Workload required in the course for each category

2.1	Assignments/Homework	☐	☐	☐	☐	☐
2.2	Group/Team Work	☐	☐	☐	☐	☐
2.3	Individual Work	☐	☐	☐	☐	☐
2.4	Peer Assessment	☐	☐	☐	☐	☐
2.5	Presentations	☐	☐	☐	☐	☐
2.6	Projects	☐	☐	☐	☐	☐
2.7	Reports/Papers	☐	☐	☐	☐	☐
2.8	Self-Assessment/Critique	☐	☐	☐	☐	☐
2.9	Tests/Quizzes	☐	☐	☐	☐	☐

Figure 2. Profile of introductory hospitality course, HRTM260



connecting lines improve the readability of the graph. When interpreting the graph, one should note that the off-axis points are not meaningful and that the order of the axes is arbitrary. Also, the shaded portions of the graphs are just to distinguish the LL dimensions from the CW dimensions.

According to Figure 2, the course profile for the HRTM 260 CW indicates a relatively high (2.8) use of tests/quizzes and a moderately high (2.3) level of individual work. The profile further indicates a very low use (0.3 to 1.0) of group/teamwork, peer assessment, presentations, projects, or self-assessment/critique. Students have little opportunity to create in the course, which appears to stress understanding, one of the lower LLs.

In Figure 3, the profile for course RETL 366, the CW data indicate a high (3.5) use of group work and a moderately high (2.5-2.8) level of projects, papers, tests/quizzes, and presentations. The profile further indicates a very low use of self-assessment/critique, peer assessments, individual work, and assignments. The LL values are equally distributed across remembering, understanding, applying, analysis and evaluation processes, but low in the creating dimension.

The course profile for TSTM 443, a course on business education technology, indicates CW is high (3.0 and 3.7) in areas of individual work and assignments, but low in regard to self-assessment/critique and papers. The LL values are high for creating, analyzing, and applying information, but the course does not emphasize evaluations.

According to Figure 5, SPTE 580 offers no peer assessment, presentations, or self-assessment/critique. However, the course requires a high (at least 2.75 on graph) use of group work, papers, and projects. The course profile shows that LL values are balanced across creating, analyzing, and remembering, with a slightly higher score on understanding.

With these course profiles, the advisor can provide an informed answer when a student, trying

Figure 3. Profile of a retail buying course, RETL 366

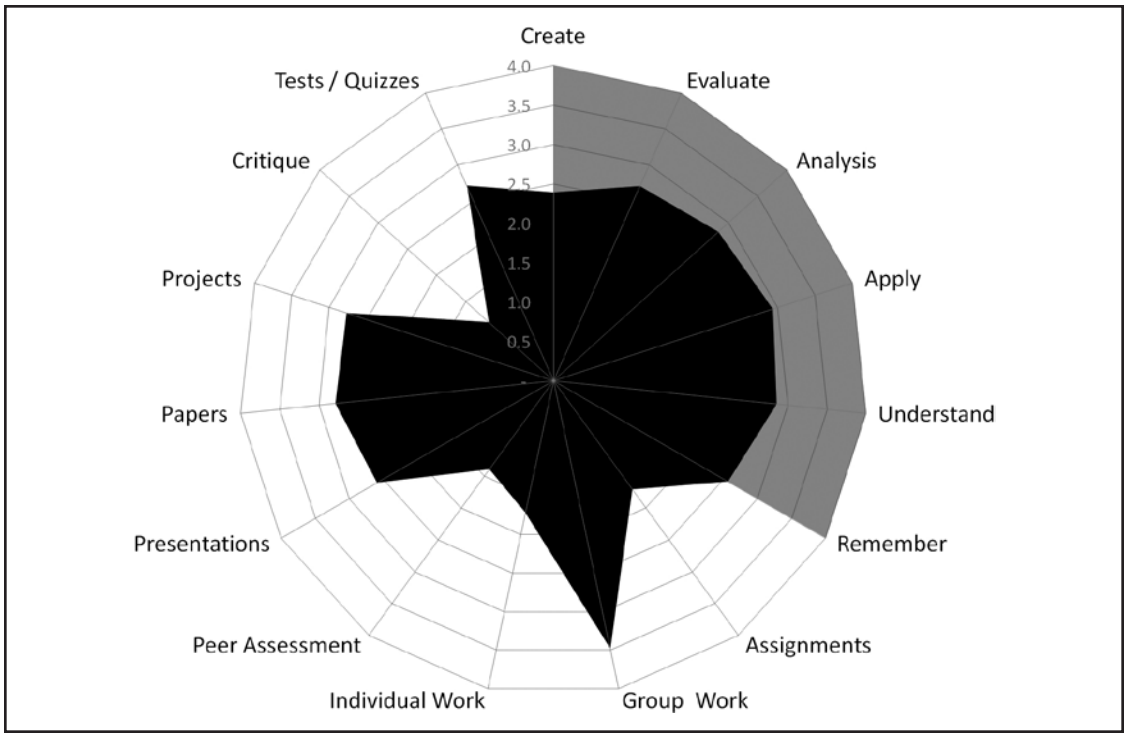


Figure 4. Profile of a business education technology course, TSTM 443

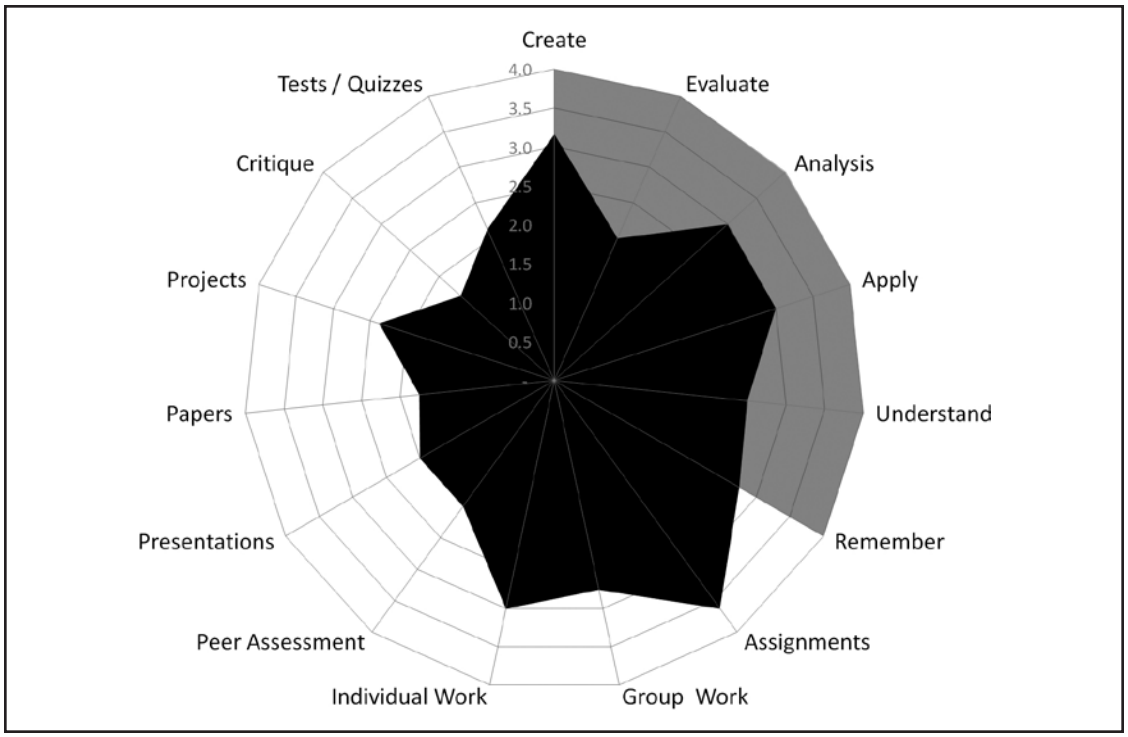
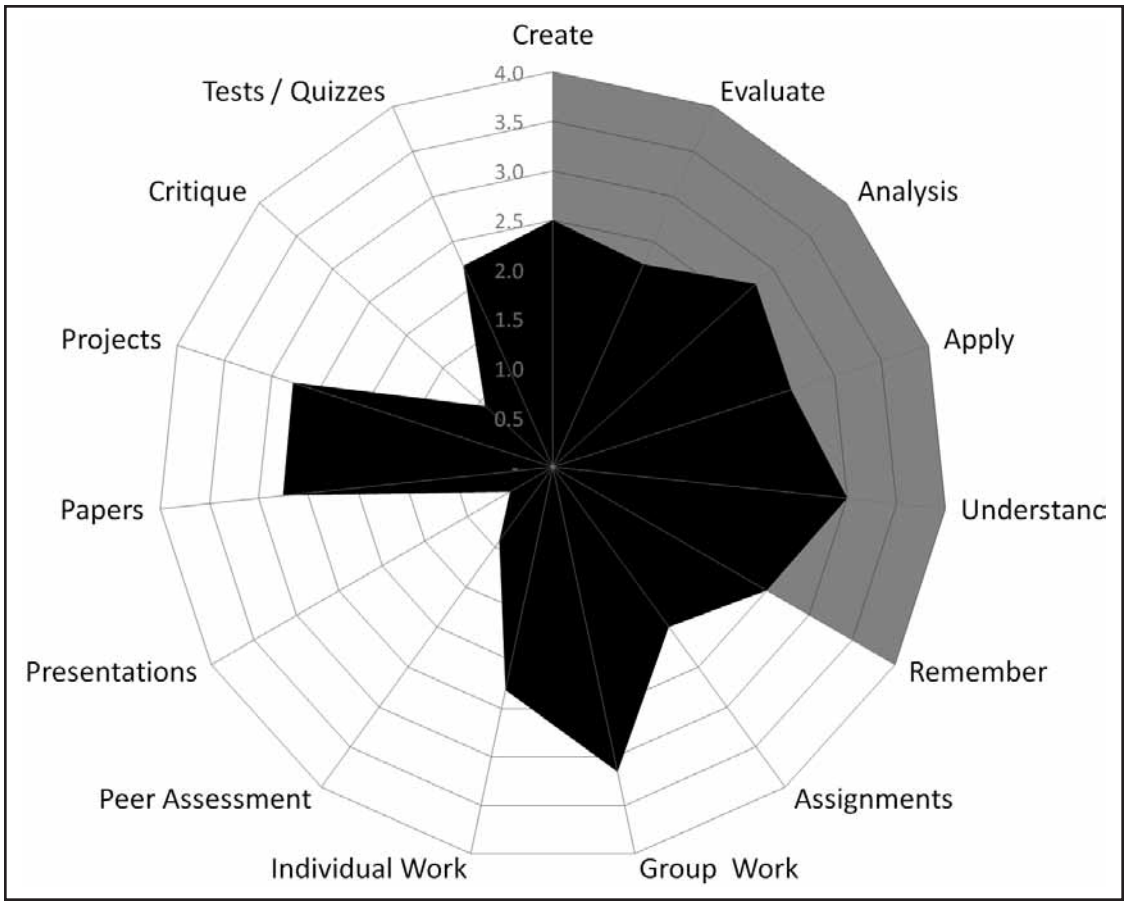


Figure 5. Profile of a business in sports management course, SPTE 580



to balance a course schedule, asks, "What type of work is involved in this course?" The course profile analysis provides an opportunity for advisors to develop a positive relationship with the student by providing accurate course information to assist in the decision-making process.

Course profiles employed throughout the college or within a particular major will reveal specific LL trends. For example, TSTM is an applied, hands-on type of major. This is reflected in the LL profiles of the 18 TSTM classes surveyed: 83% have relatively high profile values for creating and 77% score high in applying compared to the 52 other surveyed courses in other majors of the college. This information can be useful for advisors who may be speaking with an individual who cannot decide on a major or wants information about a particular major.

Assessing the Usefulness of Course Profiles

To assess their usefulness, we measured the extent to which course profiles can be used to predict students' future performances based on their prior academic performances. We computed individualized student profiles using the course profiles of classes the students had completed along with the grades they had earned in those courses. We obtained anonymous student transcripts from the university registrar and removed all personal identification information from each record, leaving each student's detailed academic record (i.e., courses taken as well as grades received). For each student, we split courses into a training set and a holdback set. We defined the student's threshold semester as the one in which she or he enrolled in the 20th profiled course. We defined the training set as all courses that the student completed through and including the threshold semester. This approach resulted in some students having more than 20 courses in the training set. We placed all courses in which the student enrolled after the threshold semester in the student's holdback set.

Using the training set, we performed a stepwise, multiple, linear regression with the 20 course profile factors as the independent variables and the grade earned in the course as the dependent variable. Using a stepwise model limited the resulting student profiles to only those with factors found to be significant in the regression. Of the 3,521 students in the sample, 527 had taken at least 20 profiled classes. Of these, 196 (37.2%) student profiles yielded no significant factors, possibly due to a lack of variability in the dependent variable (e.g., straight A and straight C students would fall into this category). The lack of significant information could reflect external forces (e.g., relationship issues, work status, health issues, lack of focus on academics, etc.) that overshadowed the factors in the study. Of the remaining 331students, 266 (80.4%) had a single significant factor in their student profile; 51 (15.4%) had two significant factors; and 14 (4.2%) had more than two significant factors.

In those cases where the student's profile reduced to a single term, the sign of the term indicates a positive or negative impact on the student's future performance. For example, if a student's profile shows a positive factor for Papers, one would expect the student to earn better grades in courses that offered opportunities to write papers. Our model holds that the student would perform better in the course with the higher Paper score in its course profile. Conversely, for a student with a negative factor for Paper, the model suggests that he or she would perform better in a course with the lower Paper factor. Based on these relationships, we generated the following hypothesis:

H1: The course profiles are useful in predicting relative performance in future courses.

To test this hypothesis, we compared the grades in each student's holdback course with those predicted using the course profiles to determine if the student's actual performance was consistent with the predicted one. Using this approach, rather than trying to predict specific grades for the classes, we used our model to predict in which course the student would earn a better grade. We found predicted course grades by adding the student's profile constant from the multiple regression to the sum of the products of the course and student factors. With these predicted course grades, we tested student's actual course performance pair wise to see if the grades earned were consistent with the model, which held that the student should earn a higher grade in courses with the higher value calculated from the student's and course profiles.

We assumed the model worked as long as the relative predicted grades were consistent with the actual grades; that is, when the course with the higher earned grade also had the higher predicted grade, the prediction was said to be consistent with the model. To deal with the situation where the student earned the same grade in the two courses being compared, we considered two options. In the first approach (nominal model) we considered courses with identical earned grades to be consistent with the model. In the second approach (conservative model), we omitted comparisons where the two courses had identical grades. Thus, we only considered courses where the student received different grades.

To assess this approach, we made 1,054 pairwise comparisons, which included 348 pairings with equal earned grades. For the purpose of this analysis, we only considered cases in which a student's profile showed a single significant factor. The nominal model was successful in predicting the relative performance of 742 (70.4%) of these pair-wise comparisons. Using the more conservative approach, the model correctly predicted 394 (55.8%) of the comparisons. Both of these results were significant at $\alpha = 0.01$.

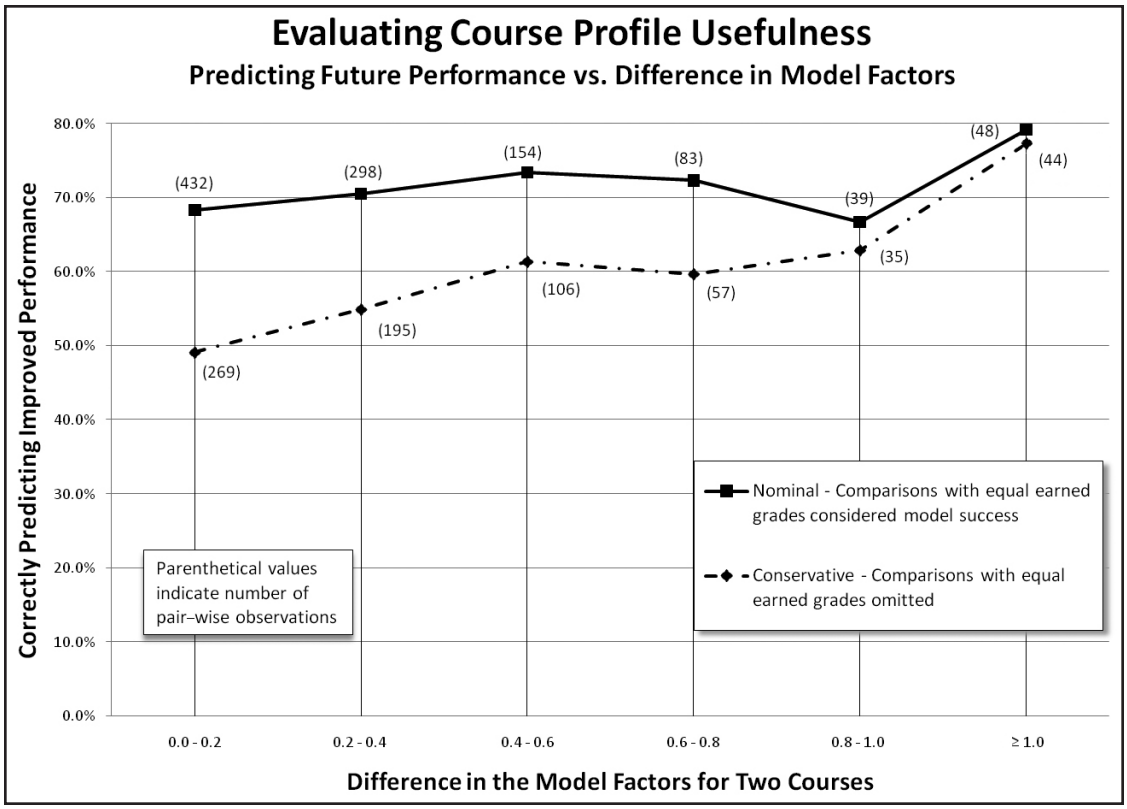
We also investigated the impact of the magnitude differences between the two predicted course grades. Figure 6 shows that the model performance improves as the difference in the course profiles increases. This result was most prominent when we used the conservative model, through which we did not consider courses with equal earned grades. For a given student, if the magnitude difference in the critical factor is small (i.e., less than 0.2), the ability to correctly predict relative performance was approximately 50%, which is equivalent to that of flipping a coin. However, as the magnitude difference increased, so did the ability to correctly predict student performance. Under the nominal model, the ability to correctly predict performance was approximately 70% at all magnitude differences.

Because of these results, we accepted the hypothesis that course profiles are useful in predicting student performance. In addition, we concluded that their usefulness was increased in cases where the profiles are more distinct.

Implications

Our study shows that course profiles based on CW and LL can be useful in predicting future student performance. The course profiles expose

Figure 6. Evaluating course profile usefulness



aspects of the course unavailable through other means and thereby provide information that can aid in the advising process. However, these profiles can also yield benefits to students, faculty members, and administrators; each of these stakeholders is involved in the academic advising process, curriculum development, and assessment. The profiling of courses in the curriculum provides a common metric by which to compare different courses and thus can provide stakeholders with additional information to assist in advising and reviewing the curriculum. Examining the CW component of the course profiles prior to registering students for courses may allow advisors and students to arrange for a more balanced CW schedule. When this is not possible due to program requirements, the course profiles can act as an advisory mechanism to help communicate course profiles and CW expectations to students.

In this study, our approach depended on availability of reliable data for accurate course profile development. Using in-class surveys similar to the traditional end-of-course student evaluations-of-teaching surveys, we gathered the CW and LL evaluations from the students' perspective. Other researchers may need to modify the profile design to incorporate local factors. For example, for some programs, the course delivery (e.g., traditional face-to-face, distance, or blended system), class size, or time of day the course is offered may play significant roles in student performance. Rather than using student surveys, an alternative approach would be to use a team of trained reviewers to assess course outcomes and objectives from syllabi and other related materials. While our work focused on courses offered in a college of hospitality, course profiling is applicable to other disciplines and student populations.

Improvement of student-course matching could impact student performance and retention. Researchers have found that the quality of advising is directly related to the likelihood of students staying in school and graduating. Publicizing course profiles would improve advising in general and possibly help with student self-advising, for which the added benefit includes reduced load on the advising staff. In an indirect benefit, profiles provide information for faculty and administration to

determine if curricular and pedagogical needs are being adequately addressed. For example, lower level courses typically focus on delivering content based on relatively low LL while more advanced courses typically emphasize the higher LL skills. Stakeholders can systematically review the curriculum to see if LL implementation matches targeted levels and that course developers meet programmatic objectives or learning outcomes, such as with the inclusion of group work or public speaking. Through a review of course profiles, they can determine if the curricular objectives are being adequately addressed and suggest areas for improvement.

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Authors' Notes

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