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Article 30

Learning Outcome Based Assessment With Counseling Courses: In Pursuit of Active Assessment

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Linda. D. Taylor and Steven Harlow

Taylor, Linda, D., is an Associate Professor at the University of Idaho in Moscow, Idaho. During her tenure in higher education, she has been a faculty member in a Counseling and School Psychology graduate program, an adjunct faculty member in Theatre and Dance, an academic advisor for undecided students, and a career counselor, where she has been responsible for developing dance minors along with an advising center for undecided students. Her research interests include creative thinking, memory, learning outcomes-based assessment, emotional intelligence, values, academic success, motivation, and career development.

Harlow, Steven, is a Professor and the Coordinator of School Psychology Interns at the University of Nevada, Reno. Dr. Harlow has been in university teaching for over three decades and has been associated with six clinics. He is interested in models of learning and cognitive diagnosis (among other matters).

How is knowledge developed and distributed across time with Counseling graduate students? Learning outcome-based assessment can help identify how learning occurs within and across time in counselors and school psychologists in training.

Increasingly, accreditation in higher education is moving toward learning outcome measures to assess the effectiveness of courses and graduate programs. It provides measurements for accountability and quality assurance for each class taught and ultimately for the whole program's accountability. Currently many counseling programs are using portfolios and video recordings as learning outcome measures to identify the effectiveness of their programs. These are institutional and program-outcome assessments. They do not take into consideration the variability of individual levels of each student in the course. Nor does it address the effectiveness of each class.

Outcome-based teaching and learning emerges from the questions: What are the students able to do after the course that they couldn't do before, and to what level? How is the course structured to supply learning activities that will help students achieve those outcomes? How are students assessed to see how well they have achieved the learning outcomes? (Biggs & Tang, 2007). Learning outcome-based assessment believes that by effectively applying new information one has learned, one develops at a deeper level of

cognition. This presupposes that by applying new information, one has encoded the new information into long-term memory.

Intended learning outcomes and corresponding aligned assessment tasks and teaching activities are increasingly being used in order for students to achieve deeper levels of learning and understanding. It is a convenient and practical way of maintaining standards and of improving teaching (Biggs & Tang, 2007). Shuell (1986) indicates that it is the teacher's fundamental task to get students to engage in learning activities that are likely to result in achieving learning outcomes, recognizing that what the student does is more important than what the teacher does. As cognitive science has revealed again and again, active involvement by students enhances long-term retention (Martinez, 2010). Accordingly, assessment that calls for active engagement should contribute to long term memory and deeper processing. The goal of teaching is to encourage students to adopt a deep approach to learning (Biggs, 1989). The deep approach to learning reflects that students have the intention to understand the material not just requirements, interact with the content instead of rote memorization, relate new ideas and concepts to previous knowledge and experience, relate evidence to the conclusion, and analyze the logic of the argument (Entwistle & Waterston, 1988). Deep learning can be facilitated and measured through learning outcome-based teaching and assessment.

Purpose

The purpose of this study was to identify how using learning outcome-based assessment throughout a counseling and school psychology curriculum help promote a higher capacity of knowledge and increased competence in developing counselors and school psychologists. This study was developed using Dearing's (1997) definition of learning outcome-based assessment where outcomes are defined solely to enhance teaching and assessment. This explores different assessment approaches that encourage learning and compare the effectiveness of the different active assessment methods. As Willingham (2009) states, "how the student thinks of the experience completely determines what will end up in long-term memory" (p. 49).

Various methods of learning outcome measurements were used throughout the curriculum in a M.Ed. School Counseling and Rehabilitation Counseling program. This began heuristically. Each course utilized a different assessment procedure. The methods consisted of pre- and post-testing, cumulative regular assessment of new and previously learned information, teacher-generated review assessments, and student-generated review assessments. This provided immediate feedback on the efficacy of instruction, information needing more review and/or clarification, and solidification of new information into long-term memory. A professor-generated criterion measurement was administered periodically throughout the following semester for each course.

This research was designed to identify effective learning outcome-based assessments that have minimal impact on the classes' and professors' time. Using effective learning outcome-based assessments will promote the competence of counselors and school psychologists in training by creating a higher level and deeper capacity of learning that will expand professional opportunities.

Method

Participants

Participants were students enrolled in a Rehabilitation Counseling cohort or a School Counseling cohort in a northwestern university. There was attrition of one Rehabilitation Counseling student and one School Counseling student from the fall to the spring semester. While this was basically a cohort, there was variability of student enrollment in each class due to part-time students. The number of students in each class was as follows: Counseling Theories and Techniques I had 16 students of which 14 were female (87.5%) and two were male (12.5%); Introduction to School Counseling and Cognitive Assessment both had nine students all female; Psychometrics had 15 students of which 14 were female and one was male (6.67%); Assessment I had 15 students of which 14 were female and one was male (6.67%); Assessment II: had seven female students. The Ethnicity of the participants in each course were predominantly Caucasian while Counseling Theories I had 6.25% Hispanic (n=1); Introduction to School Counseling and Cognitive Assessment had 11% Taiwanese (n=1); Psychometrics and Assessment I had 6.67% Hispanic (n=1); and Assessment II had 14% Taiwanese (n=1). The majors of the participants in Counseling Theories I included 56.25% in the M.Ed. Rehabilitation Counseling (n=9) program and 43.75% were in CASP (n=7). The Psychometrics and Assessment I courses were comprised of 60% Rehabilitation Counseling majors (n=9) and 40% CASP majors (n=6). All the students (100%) in Introduction to School Counseling (n=9), Assessment II (n=7), and Cognitive Assessment (n=9) were students in the M.Ed in School Counseling program. It must be noted that in the Cognitive Assessment class, there was one female student who had not taken any of the previous courses using active assessment and one female student who had only been in the Introduction to School Counseling course using active assessment.

Design and Procedure

This study was conducted over a full academic school year. In the fall semester four different counseling and school psychology courses (Counseling Theories and Techniques, Introduction to School Counseling, Psychometrics, and Assessment I) participated in this study. In two of the classes (Counseling Theories and Techniques, Introduction to School Counseling) assessments were administered at the conclusion of each class concerning that day's topic and also integrating previously learned material in the course. This strategy was used to help encode new information.

The Psychometrics course only met the first five weeks of the fall semester. A pre- and post-test to measure the effectiveness of the course and its teaching were administered. Non-binding assessments (i.e., does not affect a student's grade) were also administered at the conclusion of each class concerning that day's topic and integrating previously learned material in the course. This strategy of a non-binding test helped a number of students in the class decrease math and math-test anxiety issues. This culminated in a final examination for a grade. The same students continued the semester in Assessment I, for the next 10 weeks of the semester. The students continued to be administered alternate form assessments and periodically a re-test to assess the student's retention of the information previously learning in Psychometrics. During this time the

students were actively engaged in assignments requiring application and analysis using the information learned in the Psychometrics course. Results were analyzed and adjustments were made the following semester.

The spring semester pre- and post-tests were also given in two new courses: Assessment II and Cognitive Assessment. However, the daily quizzes were designed and scored by the students, which included review of the four previous courses. This required the student to be more actively engaged in reviewing past material. This was considered to be the most active of the assessments. A professor-designed assessment was administered as a pre-test, mid-term, and post-test throughout the semester. A professor-generated criterion measurement was administered periodically throughout the spring semester for each previously completed course.

Results

Introduction to School Counseling

In this class, the assessments were predominantly fill-in-the-blank for the first part of the semester and then multiple-choice questions at the end of the semester. A standard univariate statistic was applied (Field, 2005) due to the small sample size (n<a+10), and Mauchly's Test (W=.289) indicating sphericity. The ANOVA was significant (SS for model = 2480.169; SS for error =1052.598; $F(2,16) = 18.85$, $p<.001$). Post hoc tests revealed that there was a significant decrease from the fill-in-the-blank assessment review test and the two subsequent multiple choice assessments at the end of the semester. There was no significant difference between the two multiple choice assessments at the end of the semester. Effect size was measured using partial eta squared (.702) which reflects a large effect size.

The following semester most of the students continued to receive assessment of the material learned the semester before. To identify if continued assessment the following semester was beneficial, a standard univariate statistical approach was used (Field, 2005) due to the small sample size (n<a+10), and Mauchly's Test (W=.382) indicating sphericity. The ANOVA was significant (SS for model = 671.684; SS for error =136.889; $F(2,10) = 24.534$, $p<.001$). Post hoc tests reveal that all pairs differ significantly with the test scores increasing at each test time throughout the following semester. Effect size was measured using partial eta squared (.831) which reflects a large effect size.

Psychometrics/Assessment I

Because of the small sample size for this class (n<a+10), and Mauchly's Test (W=.303) revealed there was sphericity, a standard univariate statistical approach was used (Field, 2005). The ANOVA was significant (SS for model = 35919.96; SS for error =3337.402; $F(3,33) = 118.39$, $p<.001$). Post hoc tests revealed that there was a significant increase from the pre-test to all the subsequent tests. However, there was a significant decrease from the post-test in the Psychometrics class to the equivalent form retest and the subsequent post-test during the following Assessment I course. There was no significant difference between the re-test and the last post-test at the end of the semester. Effect size was measured using partial eta squared (.915) which reflects a large effect size.

The following semester part of the class continued to receive assessment of the material learned the semester before. To identify if continued assessment the following semester was beneficial a standard univariate statistical approach was used (Field, 2005) due to the small sample size (n<a+10), and Mauchly's Test (W=.485) indicating sphericity. The ANOVA was significant (SS for model = 726.073; SS for error =598.469; $F(2,12) = 7.279$, $p=.009$). Post hoc tests revealed that there was a significant increase from the review test at the beginning of the following semester and the review test at the end of the semester. There was no significant difference from the test administered at the midterm. Effect size was measured using partial eta squared (.548) which reflects a large effect size. There was also a significant difference between the students who had received continuous assessment and students who had the Psychometrics & Assessment class previously but not received continuous assessment ($p<.001$).

Counseling Theories and Techniques I

The weekly assessments for the Counseling Theories course were so widely variable, no accurate conclusion could be based on the assessment results. The following semester part of the class continued to receive assessment of the material learned the semester previously. To identify if continued assessment the following semester was beneficial, a standard univariate statistical approach was used (Field, 2005) due to the small sample size (n<a+10), and Mauchly's Test (W=.724) indicating sphericity. The ANOVA was significant (SS for model = 1425.557; SS for error =715.16; $F(3,15) = 9.967$, $p=.001$). Post hoc tests revealed that there was a significant increase from the review test at the beginning of the following semester, the review test at the end of the semester, and the review test administered during the summer. There was no significant difference from the test administered at the mid-term. Effect size was measured using partial eta squared (.666) which reflects a large effect size.

Assessment II

A standard univariate statistical approach was used (Field, 2005) to assess the data due to the small sample size for this class (n<a+10), and Mauchly's Test (W=.784) revealing sphericity. The ANOVA was significant (SS for model = 5740.778; SS for error =910.22; $F(2,10) = 31.535$, $p<.001$). Post hoc tests revealed that all pairs differ significantly from the pre-test with the test scores increasing at each test time. Effect size was measured using partial eta squared (.863) which reflects a large effect size. This suggests that having students develop and score the review assessments significantly increases their retention of information.

Cognitive Assessment

A standard univariate statistical approach was used (Field, 2005) to assess the data from the Cognitive Assessment course due to the small sample size for this class (n<a+10), and Mauchly's Test (W=.093) revealing sphericity. The ANOVA was significant (SS for model = 8320.102; SS for error =1069.158; $F(4,20) = 38.91$, $p<.001$). Post hoc tests revealed that all pairs differ significantly from the pretest with the test scores increasing at each test time. Effect size was measured using partial eta squared (.886) which reflects a large effect size. This suggests that having students develop and score the review assessments significantly increases their retention of information.

Study Process Questionnaire

A T-test was administered to analyze the students' study motives and strategy. Means and standard deviations were calculated for Deep Approach and Surface Approach to studying. There was a significant difference ($t(12)=2.655$, $p=.021$) between the student's deep and surface strategy ($M=16.69$, $SD=2.95$; $M=13.23$, $SD=3.37$). A significant difference ($t(12)=7.48$, $p<.001$) was also found between the student's deep and surface motive ($M=17.23$, $SD=2.77$; $M=9.307$, $SD=2.496$) for studying. Analysis of the Study Process Questionnaire reveals that the students are significantly higher ($t(12)=5.57$, $p<.001$) in their Deep Approach ($M=33.92$, $SD=5.188$) than Surface Approach ($M=22.54$, $SD=5.04$). All have a large effect size (study strategy $d=.766$; study motive $d=2.16$; study approach $d=1.61$). These results indicate that students in the class, with this professor, encourage a deep learning approach. This motivates the students to use deep strategies to learning new information.

Discussion

The results of this study for Psychometrics/Assessment I suggest that within three weeks of formal assessment, there is a significant decrease in the information retained in each student's memory. This was also noted when using the information in application assignments. This correlates with the Marton and Saljö (1976a & 1976b) research indicating that students learn not what teachers think they should learn, but what they perceive the task demands of them. The Psychometric final demanded that the student be successful if they wanted a good grade in the class. The weekly non-binding assessments were not for a grade and, therefore, the students did not perceive the task as demanding as much from them. Even knowing that there would be a national exam over the material learned in order to be licensed into their field was not a motivating factor into encoding the information into long-term memory. As a result, information was not encoded into their long-term memory and atrophy of previously learned material occurred.

However, the significant increase from the review tests at the beginning and at the end of the spring semester reveals that students developing, administering, and scoring their own review tests increase encoding and retention of information. This indicates that when students are actively engaged in developing a review assessment and regularly assessed, the previously learned material is remembered and retained throughout the semester. The fact that learned information was lost when learning tasks required application of new material (attempt at deeper learning) contradicts Biggs and Tang's (2007) research. However, requiring students to develop, administer, and score a review assessment (repetition and review) enabled the students to significantly increase their memory of the learned information.

The results of the Assessment II and Cognitive Assessment courses revealed that the students significantly improved their knowledge throughout the semester when they were required to develop, administer, and score an assessment reviewing the material presented throughout the semester. This was also confirmed with the significant increase in the second semester review assessments for the Counseling Theories and Techniques course.

The fact that there was a significant difference between students who were actively assessed and students who took the same classes previously suggest that

continued assessment helps students encode new information into long-term memory. Active assessment enables each student to keep information fresh in the memory. This is especially important given that the students self identified themselves significantly as having a Deep Approach preference in their learning style.

The significance of this research suggests that one high-stakes exam at the end of the semester does not accurately reflect the knowledge that is retained. That is, knowledge dissipates soon after the conclusion of the exam. It also suggests that application of newly learned information does not help encode information into long-term memory. However, engaging students in developing review assessments aids in encoding new information into long-term memory. Review of previously learned information in subsequent semesters is also beneficial in encoding new information into long-term memory.

Active assessments were most notable in student-generated exams. The advantage is seen in that background knowledge is being referred to in the present learning assessment. This background knowledge is seen as demanding and pertinent to the student. In itself the student-generated review encourages an active response. Thus, depth of processing is encouraged in that background knowledge is related to present learning. Active assessment has minimal impact on the classes' and professors' time and promotes the competence of counselors and school psychologists in training by creating a higher level and deeper capacity of learning that will expand professional opportunities.

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