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MODELING HIGHER ORDER THINKING: THE ALIGNMENT BETWEEN OBJECTIVES, CLASSROOM DISCOURSE, AND ASSESSMENTS

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Abstract

The purpose of this study was to describe the levels of cognition modeled and the alignment among the levels of cognition modeled via course objectives, instructional strategies, and assessments in preservice teacher preparation courses. The accessible sample consisted of seven teacher educators teaching courses for secondary and middle school-level education majors at the University of Missouri-Columbia. Higher levels of cognition (application, analysis, synthesis, and evaluation) were modeled in 88% of the preservice teacher preparation course objectives. Lower levels of cognition, were modeled in 61% of classroom discourse. Application, analysis, synthesis, and evaluation levels of cognition, represented 39% of the classroom discourse. Higher levels of cognition as a whole represented a mean of 90% of all classroom assessments, with the synthesis level of cognition representing a mean of 40% of the classroom assessments for all instructors. Hierarchical cluster analysis methods were employed to examine the alignment among the cognitive levels of instructional objectives, classroom discourse, and assessments, respectively.

Introduction/Theoretical Framework

One aim of education for the 21st Century is to cultivate the problem-solving, critical thinking, and higher order thinking skills necessary for students to adapt to the rapidly changing "Information Age" (Greenspan, 2001; Kerka, 1992; *Literacy: A Position Paper on Information Problem-Solving*, 1995). While developing higher level cognitive abilities has been marked as a goal for educational institutions for the past decade, a number of studies indicate that students possess limited abilities to think at higher levels of cognition (Gardiner, 1998; Kuhn, 1989; Tsui, 1998). Moreover, faculty members in colleges of education have been guilty of conducting classroom practices that exclusively emphasize lower levels of cognition. Cruickshank (1990), in an extensive analysis of research in teacher education, reported that teacher educators utilize traditional lecture and discussion methods of teaching versus the feedback approaches of microteaching, simulations, or protocol materials that can enhance preservice teachers' reflective thinking skills. Forbes (1984) reported that the teaching of thinking skills, in worst-case scenarios, was not even considered in the development of teacher preparation programs. Orata (1999) claimed that teacher education faculty members as a whole were poor *models* of the educational theories in which they *professed*. Further, Howsam, Corrigan, Denemark, and Nash (1976) asserted that teacher educators should "exemplify what they explicate" (p. 3). If teacher education programs are to adequately prepare future teachers to teach toward higher levels of cognition, they must model higher cognitive levels in their own classrooms.

The concept of higher order thinking is derived from the *Taxonomy of Educational Objectives, Handbook I: Cognitive Domain* (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). More popularly known as Bloom's Taxonomy, this system identifies a hierarchical progression in which to categorize lower to higher order levels of cognitive processing. The six levels of

Bloom's Taxonomy include: knowledge, comprehension, application, analysis, synthesis, and evaluation. The first two levels of Bloom's Taxonomy have generally been regarded as lower order thinking, while the remaining four levels have been classified as higher order thinking (Miller, 1990). The four levels of higher order thinking are the levels to which educators have been increasingly charged with teaching, thereby promoting students' higher-order thinking abilities.

The use of Bloom's Taxonomy as a conceptual framework for research in higher order thinking would be remiss without a discussion of the revised taxonomy. Anderson and Krathwohl's (2001) revision of Bloom's Taxonomy transforms the original classification system to a two-dimensional table that outlines a knowledge dimension as well as a cognitive process dimension. Within the cognitive process dimension of the taxonomy, lies the original hierarchical classification of *cognitive processes*. In the revised taxonomy, the cognitive processes of remember, understand, apply, analyze, evaluate, and create replace knowledge, comprehension, application, analysis, synthesis, and evaluation. Further, evaluation is classified as a lower cognitive process than creation in the revised taxonomy. Finally, the revision of Bloom's Taxonomy incorporates the importance of alignment as a critical concept for organizing instruction. Alignment refers to the "degree of correspondence" between instructors' educational objectives, methods of instruction, and forms of assessment (Anderson & Krathwohl, 2001, p. 10). As such, if instruction and assessments are *misaligned*, then it is likely that instruction will not influence student performance on assessments. Further, if assessments and objectives are misaligned, then the outcomes of assessments will not be reflected in the achievement of educational objectives (Anderson & Krothwohl, 2001). "Typically the degree of alignment, is determined by comparing objectives with assessment, objectives with instruction, and instruction with assessment." (Anderson & Krothwohl, 2001, p. 10). Given this conceptual framework, it stands to reason that for teacher educators to adequately prepare preservice teachers for teaching at higher cognitive levels, they must first emulate higher cognitive levels in their instructional practice, and secondly teacher educators must align instructional objectives, classroom discourse, and assessments in preservice teacher preparation courses.

The concept of modeling alignment of instructional objectives, classroom discourse, and assessment practices to create a classroom culture for thinking in preservice teacher preparation can be organized around Cruikshank's (1984) Model to Guide Inquiry in Preservice Teacher Education (Figure 1). Specifically, the theoretical framework for this study was derived from an adaptation of Cruikshank's Model to Guide Inquiry in Preservice Teacher Education, as presented in the *Journal of Teacher Education* (1984). This model illustrates five categories of variables: 1) teacher educators, 2) preservice teacher education students, 3) contexts where teacher preparation takes place, 4) content of the teacher preparation curriculum, and 5) instruction in the teacher preparation program. These five variables ultimately influence the sixth variable, student outcomes. This study attempts to investigate a basic tenant of Cruikshank's theoretical model which is: the higher the *level of cognition* and the *degree of alignment* among instructional objectives (category 4), classroom discourse (category 1), and assessments (category 4), the higher will be the level of cognition acquired by preservice teachers (category 6).

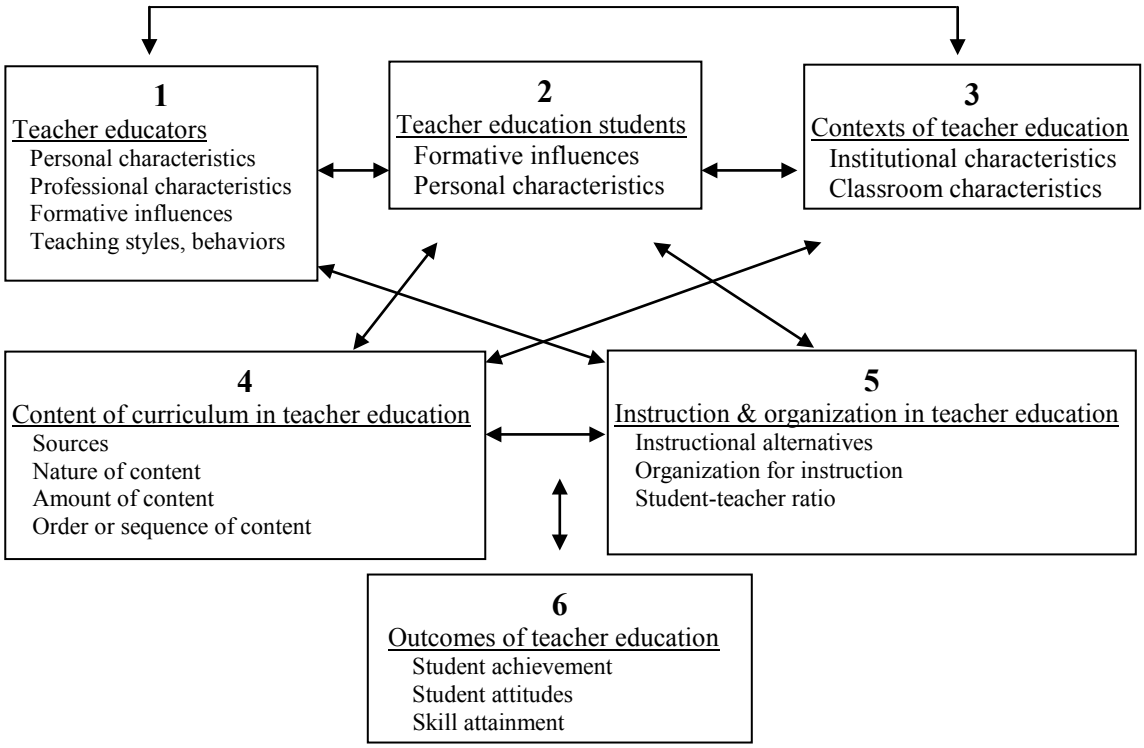

Figure 1. Model to Guide Inquiry in Preservice Teacher Education

The alignment among the cognitive levels of course objectives, classroom discourse, and assessment toward higher levels of cognition is essential to creating a culture of thinking in teacher preparation (Anderson & Krathwohl, 2001). A growing body of educational literature has challenged teacher educators to provide preservice teachers with the knowledge and skills necessary to develop thinking skills and problem-solving abilities in their respective students (Buriak, McNurlen, & Harper, 1996; Crunkilton, 1990; Newcomb & Trefz, 1987). "Teaching teachers to teach thinking must become one of the highest priorities of [teacher] education" (Underbakke, Borg, & Peterson, 1993, p. 145). Yet, the evidence suggests that teacher educators do not model this culture of thinking (Cruikshank, 1990; Howsam, Corrigan, Denemark, & Nash, 1976; Orata, 1999).

In addition, little is known about the specific practices of teacher educators regarding objectives, instruction, and assessment, as well as the influence of those practices on preservice teachers' attitude toward teaching to higher levels of cognition. Further, while research in higher education has been conducted on levels regarding the disparities between aspirations and classroom discourse at certain levels of cognition (Whittington, 1995), and between the cognitive levels to which college teachers construct classroom objectives and challenge students via assessment practices (Adkins, 1983; Miller & Newcomb, 1990), no studies have been conducted to examine the relationships between the levels of cognition modeled via instructional objectives, classroom discourse, and assessments specifically within university *teacher preparation* courses. The study could inform teacher educators regarding the cognitive levels of teaching and learning modeled to preservice teachers, and challenge university teacher educators to conceptualize and test curricular models that promote higher order thinking.

Purpose/Research Questions

The purpose of this study was to describe the levels of cognition modeled in the course objectives, classroom discourse, and assessments in preservice teacher preparation courses, and to examine the

alignment among the cognitive levels of course objectives, the cognitive levels of classroom discourse, and the cognitive levels of assessment activities. To guide the stated purpose of the study, the following research questions were examined: (1) To what cognitive levels were preservice teacher preparation course objectives written; (2) What cognitive levels were modeled via classroom discourse in preservice teacher preparation courses; (3) Toward what cognitive levels were students assessed in preservice teacher preparation courses; and (4) What was the degree of alignment among the cognitive levels of instructional objectives, the cognitive levels of classroom discourse, and the cognitive levels of assessment activities in preservice teacher preparation courses?

Methods/Procedures

This descriptive study utilized a convenience sample of seven teacher educators at the University of Missouri. The specific courses included in the sample were Phase II Inquiry into Curriculum and Pedagogy (ICP) courses in the Undergraduate Teacher Development Program. The Phase II portion of the Undergraduate Teacher Development Program includes Inquiry into Curriculum and Pedagogy (ICP) and Inquiry into Schools, Community, and Society (ISCS) courses. Commonly referred to as the "teaching methods" phase of a teacher preparation program, courses in Phase II shift their focus from a general knowledge of theories and principles of education (Phase I) to a more discipline specific inquiry into curriculum design and instructional planning. Courses in Phase II encompass the final traditional classroom learning experiences prior to the transition to Phase III, the student teaching internship. The participants in the study were a convenience sample of seven teacher educators teaching Phase II ICP courses for secondary and middle school-level education majors in the Winter/Spring, 2002 semester. One teacher educator from each of the following content areas participated in the study: Agricultural Education, Business and Marketing Education, Music Education, Mathematics Education (middle school), Mathematics Education (secondary school) Science Education, and Social Studies Education. While participants represented a variety of academic ranks including: two academic professionals, two assistant professors, one associate professor, one full professor, and one adjunct professor, all participants had a minimum of a Master's Degree as well as three years of successful teaching experience in the specific content area as required by the Undergraduate Teacher Development program.

For each instructor, the basic units analyzed were the cognitive levels of verbal behaviors (classroom discourse), course objectives (instructional objectives), and assessment items (assessments). The procedures for collecting the data and methods of analysis for each basic unit are subsequently outlined.

The basic unit of analysis to describe the cognitive levels modeled in teacher educators' instructional objectives was the *course objective*. A classification guide developed from an adaptation of *Toward Teaching at Higher Levels of Cognition* by Newcomb and Trefz (1987) was utilized to categorize course objectives across cognitive levels. To accomplish this, a course objective was classified according to the specific cognitive process which it intended to elicit in students. A panel of expert teacher educators, who had conducted research in the cognitive levels of teaching and learning, assessed the classification guide for appropriateness of content and relation to Bloom's Taxonomy. The intra-rater reliability was established by coding sample course objectives from four instructors not participating in the study. The intra-rater reliability for the ratings of course objectives was a .98 (Pearson correlation coefficient). The number of course objectives written at each cognitive level was summed and then divided by the total number of objectives on the syllabus to yield a percent of course objectives across each of the six levels of Bloom's Taxonomy.

Next, the basic unit of analysis to assess the cognitive levels toward which teacher

educators conducted classroom discourse was measured as a *verbal behavior*. The Florida Taxonomy of Cognitive Behavior (FTCB) was utilized to measure instructors' verbal behaviors (Brown, Ober, Soar, & Webb, 1968). With the FTCB, verbal discourse across cognitive levels is noted in five-minute intervals through the duration of a teaching session. Frequency counts of discourse are denoted for each cognitive level, and the percent of verbal discourse across a particular cognitive level is measured for a teaching session. The construct validity of the FTCB is based upon its association with Bloom's Taxonomy (Brown et. al., 1968). Thus, the FTCB is generally considered to be valid in light of the support given to Bloom's Taxonomy as a means to classify behaviors across levels of cognition (Miller, 1989; Whittington, 1991). The reliability of the FTCB is dependant upon the raters' use of the instrument (Whittington, 1991). In this study, participants were videotaped during the third, sixth, ninth, and twelfth weeks of the semester, and videotapes were analyzed according to the FTCB. The researcher served as the single rater of each participant; therefore, a random sample of five tapes were re-assessed three weeks after the initial scoring, yielding an intra-rater reliability of .99 (Pearson correlation coefficient).

Classroom discourse across each level of cognition was assessed as a percentage of the total behaviors indicated for the four videotapes. Frequencies of observed behaviors were totaled for each of the six levels of cognition, yielding a subtotal of teaching behaviors at each cognitive level for a given observation. Then, the subtotals for each cognitive level for the four observations were summed. The summed totals across each cognitive level for the four observations was then divided by the grand total of observed behaviors, revealing a percentage of classroom discourse at each level of cognition. Similar procedures were utilized for the ratings of course objectives. The number of instructional objectives written at each level of cognition was divided by the total number of instructional objectives indicated on the syllabus.

The final unit of analysis to measure the cognitive levels modeled by preservice teacher educators' assessments was the *assessment item*. An assessment item was considered to be a question or problem as written on any homework assignment, quiz, test, or project that was recorded for a grade in the course. Similar to the course objectives, each assessment item was categorized according to the adapted Newcomb and Trefz (1987) classification guide. To determine inter-rater reliability, the researcher coded assessment items from one sample test for four instructors not participating in the study. The intra-rater reliability for the ratings of assessments was a .99 (Pearson correlation coefficient). To calculate the percentages of assessment items for a given cognitive level, first, each item on a given test, quiz, assignment or project, was categorized. The item was then weighted according to the number of points attributed to the overall score on the test, quiz, project, or assignment. Subtotals were then calculated for each project, quiz, or test across the six levels of cognition. Finally, the subtotals were weighted according to the percentage each test, quiz, assignment, or project contributed to the overall grade for the course. The subtotals were then summed to determine a grand total of assessment items occurring across each level of cognition.

To create a single cognitive score for course objectives, classroom discourse, and course assessments, weighted values were assigned to each level of cognition, and a composite cognitive score was determined. Miller (1989) denoted several studies that justified the validity of a cognitive weighting system as consistent with the hierarchical nature of Bloom's Taxonomy. The hierarchy suggests that a subsequent level of cognition receive a higher cognitive weight than its preceding level. Miller (1989) indicated that the Synthesis and Evaluation levels of the taxonomy should receive equal weights due to the lack of empirical evidence to validate the Evaluation level as a higher than the Synthesis level on the hierarchy. The cognitive weighting values attributed to each level of cognition were: knowledge = .10;

comprehension = .20; application = .30; analysis = .40, synthesis = .50, evaluation = .50. Cognitive scores for each instructor for classroom discourse, course objective and assessments were calculated by multiplying the percent value of each cognitive level by its respective cognitive weight. The values were then summed across each of the six cognitive levels to attain a total cognitive weighted score. The maximum cognitive weighted score that could be attained for objectives, discourse, or assessments was a 50. For example, if an instructor were to conduct 100% of their total classroom discourse at either the synthesis or evaluation level of cognition his/her total cognitive value for classroom discourse would be 50 (100 x .5 = 50). As such, a cognitive weight of 20 or lower suggests performance mainly at the knowledge and comprehension levels of cognition, or lower-order thinking. Furthermore, cognitive weighted scores of 21-50 indicate performance mostly at the application, analysis, synthesis, and evaluation levels of cognition, or higher -order thinking.

Descriptive statistics including means and percentages were utilized to assess the cognitive levels toward which instructional objectives were written, classroom discourse was conducted, and assessments were written. Hierarchical cluster analysis procedures were employed to analyze the alignment between the cognitive levels of objectives, discourse, and assessments, respectively.

Results/Findings

Research question one was to describe the levels of cognition modeled in the objectives of university teacher preparation courses. None of the instructors in this study wrote objectives at the knowledge level of cognition (Table 1). Further, comprehension, analysis, and evaluation level objectives represented an average of 12%, 9%, and 3% of the objectives written by all instructors. On average, instructors wrote 38% of instructional objectives at the application level as well as 38% of instructional objectives at the synthesis level of cognition. The application level of cognition was represented in 63% of the instructional objectives for Instructor 1, 43% for Instructor 2, 55% of Instructor 3's objectives, 33% of the objectives written by Instructor 4, 27% of the instructional objectives written by Instructor 5, 50% of instructional objectives for Instructor 6, and 13% of objectives for Instructor 7.

Table 1
Cognitive Level of Instructional Objectives

Cognitive Level	Wt. Value	Instructor 1	2	3	4	5	6	7	M %
Knowledge	.10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Comprehension	.20	25.0	0.0	9.1	11.1	9.1	25.0	13.3	11.9
Application	.30	62.5	42.9	54.5	33.3	27.3	50.0	13.3	38.0
Analysis	.40	0.0	0.0	9.1	11.1	18.2	0.0	26.7	9.3
Synthesis	.50	12.5	57.1	27.3	33.3	36.4	25.0	46.7	37.9
Evaluation	.50	0.0	0.0	0.0	11.1	9.1	0.0	0.0	2.9
Cognitive Wt.		30.0	41.4	35.5	38.9	40.0	32.5	40.7	38.0

Research question two was to describe the levels of cognition modeled by university teacher educators via classroom discourse. The synthesis and evaluation levels of cognition were represented in an average of 6% and 3% of the classroom discourse of all the instructors (Table 2). Conversely, an average 35% and 26% of the classroom discourse occurred at the knowledge and comprehension levels of cognition for all instructors. The lower cognitive levels of knowledge and comprehension were indicated in a total of: 38% of the classroom discourse for Instructor 1, 81% for Instructor 2, 64% for Instructor 3, 64% for Instructor 4, 62% for Instructor 5, 38% for Instructor 6, and 81% for Instructor 7.

Table 2
Cognitive Level of Classroom Discourse

Cognitive Level	Wt. Value	Instructor 1	2	3	4	5	6	7	M %
Knowledge	.10	19.1	47.3	40.7	25.2	39.4	18.5	55.9	35.2
Comprehension	.20	19.1	33.9	23.6	38.8	22.1	19.2	25.4	26.0
Application	.30	8.2	10.9	13.6	15.5	11.0	26.9	8.5	13.5
Analysis	.40	32.7	6.7	10.0	17.4	16.5	23.9	6.8	16.3
Synthesis	.50	13.6	0.0	7.9	2.9	5.5	11.5	1.7	6.2
Evaluation	.50	7.3	1.2	4.3	0.0	5.5	0.0	1.7	2.9
Cognitive Wt.		31.7	18.1	22.9	23.4	23.8	29.1	17.6	23.8

Research question three was to describe the cognitive levels of assessments as required by teacher educators in university teacher preparation courses. The knowledge level of cognition was not represented in any of the of assessments for Instructors 1, 4, and 5, 7% for Instructor 2, 5% for Instructor 3, and 2% for Instructor 7 (Table 3). The remaining three instructors did not write assessments at the knowledge level of cognition. Conversely, an average of 39% of assessment items were written at the synthesis level, 24% were written at the analysis level, and 19% of all of the assessments were written at the application level of cognition.

Table 3
Cognitive Level of Assessments

Cognitive Level	Wt. Value	Instructor 1	2	3	4	5	6	7	M %
Knowledge	.10	0.0	6.9	5.4	0.0	0.0	4.7	1.7	2.7
Comprehension	.20	5.0	6.8	10.7	13.1	0.0	12.3	3.5	7.3
Application	.30	16.7	25.8	24.0	13.8	20.0	24.0	10.4	19.3
Analysis	.40	32.1	3.0	14.3	37.0	30.0	32.7	18.3	23.9
Synthesis	.50	37.4	55.0	35.1	16.6	50.0	17.8	61.7	39.1
Evaluation	.50	8.8	2.6	10.5	19.5	0.0	8.5	4.4	7.7
Cognitive Wt.		41.9	39.8	38.4	39.6	43.0	36.4	44.3	40.5

Research question four was to determine the alignment among the cognitive levels of course objectives, the cognitive levels of classroom discourse, and the cognitive levels of the assessments required in teacher preparation courses. Hierarchical cluster analyses procedures were employed to determine the nature of alignment between the composite cognitive levels of instructional objectives, discourse, and assessments (Table 4). The results of analyses utilizing complete linkages indicated the formation of 3 distinct clusters of instructors. The mean cognitive weighted scores for Instructors 1 and 6 in regard to instructional objectives was 31, in regard to classroom discourse was 30, and the mean cognitive weighted value of assessments was 39.

Further, Instructors 5 and 7 clustered regarding mean cognitive weighted values of the cognitive levels of instructional objectives of 40, for classroom discourse 21, and 44 for the mean cognitive weighted values of assessments. Finally, Instructors 2, 3, and 4 formed the third cluster with mean cognitive weighted values of 41 for instructional objectives, 22 for classroom discourse, and 39 for assessments.

Table 4
Hierarchical Cluster Analysis by Level of Cognition

Cluster	Objectives	Discourse	Assessment
Cluster A			
M	31.3	30.4	39.2
N	2	2	2
SD	1.8	1.8	3.9
Cluster B			
M	40.4	20.7	43.7
N	2	2	2
SD	.5	4.4	.9
Cluster C			
M	40.7	21.5	39.3
N	3	3	3
SD	1.6	2.9	.8

Cluster A: Instructors 1 & 6
Cluster B: Instructors 5 & 7
Cluster C: Instructors 2, 3, & 4

Conclusions/Recommendations/ Implications

First, it is important to note that this study was an exploratory investigation into the teaching practices of a very small group of instructors. While the limited sample size makes definitive conclusions tenuous at best, the conclusions reported provide a snapshot of the cognitive levels of teaching by a few teacher educators, and as such lead to important implications and questions for further research. From the findings, the conclusion can be drawn that the teacher educators in this study modeled course objectives at the Application and Synthesis levels of cognition (76%). It was also concluded that the knowledge level of cognition was not modeled in the preservice teacher preparation course objectives. The data revealed similarities in the evaluation-level objectives. Teacher educators in this study wrote three percent of their objectives at the evaluation level of cognition.

The findings imply that the teacher educators in this sample wrote instructional objectives at higher levels of cognition. Orata (1999), indicated that teacher educators charged with the task of preparing future teachers for the new challenges of an educational system aimed to cultivate thinking in students have been found to be lax in modeling such curricular practices. Yet, these findings imply that the teacher educators studied were adept at writing course objectives at higher cognitive levels.

It can be further concluded that teacher educators in the study modeled lower levels of thinking (61% knowledge and comprehension) in their verbal classroom discourse. This is consistent with previous research indicating that teacher discourse in college classrooms occurs primarily at the knowledge and comprehension levels of cognition. The knowledge and comprehension levels were represented in 73% (Whittington, Lopez, Schley, & Fisher, 2001), 80% (Whittington, Stup, Bish, & Allen, 1997), 85% (Miller & Newcomb, 1990), and 98% (Whittington, 1995) of instructor discourse in previous studies.

While teacher educators in this study were modeling classroom discourse primarily toward lower levels of cognition, it can be concluded that they model more high-level cognitive behaviors than college instructors in previous research. Higher-order thinking represented 39% of classroom discourse in this study, whereas in previous research higher-order thinking occurred in as little as two percent (Whittington, 1995) to as much as 27% (Whittington, Lopez, Schley, & Fisher, 2001) of instructors' verbal discourse in college classrooms.

The results imply that, true to Orata's (1999) assertions, the teacher educators in this study were not modeling high levels of thinking in their classroom teaching. Accepting the premise that teachers teach the way that they were taught (Eraut, 1997) implies that the teacher educators in this study are teaching their students to conduct classroom discourse at lower levels of cognition.

Teacher educators in this study modeled high levels of cognition in classroom assessment practices (90%). In particular, the synthesis level of cognition represented 40% of the assessment practices for all courses and is consistent with prior research (McCormick & Whittington, 2000). The findings would imply that teacher educators expect students to move beyond mere recall and recognition of information, and apply, analyze, synthesize, and evaluate the knowledge obtained in preservice teacher preparation courses.

From the results of the hierarchical cluster analysis, some interesting findings emerged. Three clusters of instructors emerged in regard to the alignment between the mean cognitive weight scores between objectives, discourse, and assessments. In the first cluster it was concluded that there was alignment between two instructors who wrote objectives and conducted classroom discourse at mean cognitive weight levels of approximately 30, while at the same time were misaligned with the cognitive weighted levels of assessments, which averaged roughly 10 points higher. The results from this finding imply that two of the instructors communicate instructional objectives and model classroom discourse at different cognitive levels, while at the same time, expecting students to perform at different cognitive levels through classroom assessments.

In the second and third clusters, it was concluded that there was alignment between five instructors' mean cognitive weighted scores for instructional objectives (40 in Cluster B and 41 in Cluster C) and assessments (44 in Cluster B and 39 in Cluster C) and a misalignment of the mean cognitive weighted scores for classroom discourse (21 in Cluster B and 22 in Cluster C). This conclusion implies that five of the seven instructors are aligned in the cognitive levels of what they anticipate students will learn, via instructional objectives and in the cognitive levels toward which they challenge students to learn, via assessments, however they deliver lower levels of cognition in their classroom teaching. As such, five of the seven teacher educators in this study appear not to "emulate what they explicate".

Further research should be conducted regarding the relationship between the cognitive levels of teaching and student performance at different levels of cognition. The results of this study indicated that teacher educators did not model higher levels of cognition in classroom discourse, however higher cognitive levels were represented in course objectives and assessment practices. This finding incites the following question: What are the relationships between the cognitive levels of course objectives, classroom discourse, and assessment practices, and student performance at those respective levels?

Additional research is also needed to identify the levels of cognition modeled in the objectives, classroom discourse, and assessments of the beginning teachers who were students in the teacher preparation courses. Research is warranted to determine the relationship between the levels of cognition modeled in preservice teacher preparation courses and the levels of cognition toward which the preservice students teach as beginning teachers themselves.

The current study was descriptive in nature, intended to describe, "what is". While the study attempted to answer the question of "what is" in regard to the levels of cognition modeled in objectives, classroom discourse and assessments, the study raises the following question: What is ideal? Further research is needed to determine the levels of cognition modeled in college courses that have the greatest impact on student learning or student performance at high cognitive level tasks.

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