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A quantitative study of mastery learning instruction versus non-mastery instruction in an undergraduate social work class.

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ABSTRACT

Mastery learning is a behavioral instructional method utilizing additional learning time, and repeated testing opportunities to increase student learning. While successful in higher education, mastery learning has not been studied in social work.

A quasi-experimental group design with repeated measures was employed to contrast mastery learning and non-mastery learning instruction, using 137 undergraduates in four sections of an introductory social work course. One instructor taught two course sections with mastery learning, another instructor taught two sections with non-mastery instruction. Instruction and instructor were confounded. The sections had identical content, exams and texts. Dependent variables included achievement and retention of achievement, attitude toward course topic, instructional preference, and instructor hours spent. Both methods resulted in similar achievement, retention, instructor hours spent, and changes in attitude toward course topic. 100% of students preferred mastery instruction. Mastery learning should be considered a promising instructional method for social work education.

PROBLEM

It can be confusing for new social work educators to decide on which teaching method to employ in their classrooms. Novice social work instructors expecting to use "traditional instruction" will find the term poorly operationalized and defined differently (Guskey, 1988; Swanson, 1977). Adding to this confusion is that historically social work education has focused more on educational content than on instructional methods (Council on Social Work Education, Commission on Accreditation, 1994). In 1987 only seven of 46 American social work doctoral programs offered a concentration in teaching or education (Shore, 1987). A study of 261 social work doctoral graduates revealed that teaching was the second most cited reason for pursuing the Ph.D., but only 6.1% considered education a concentration area (Patchner, 1982; Valentine, 1997).

Novice social work educators can review the literature in social work education and educational psychology for ideas on what teaching methods to employ. Reviewing the encyclopedic Handbook of Research on Teaching (McKeachie, 1963; Dunkin & Barnes, 1986; Trent & Cohen, 1973) reveals that many teaching methods investigated in higher education also have been investigated by social work educators, including (a) the lecture and discussion methods (b) integrated learning and teaching, (c) team teaching, (d) andragogy, (e) audio taping, (f) the Keller personalized system of instruction, and (g) laboratory training (Butler & Elliot, 1985; Dolon, Blakely & Hendricks, 1988; Feldman, 1958; Katz, 1979; Kilpatrick, Thompson, Jarrett &

Anderson, 1984; Lee & Kenworthy, 1929; Lowry, Bloksberg & Walberg, 1971; McKeachie, 1963; Perlman, 1949, 1951; Tufts, 1923; Wright, 1954; Zastrow, 1979).

However, several teaching methods in the Handbook of Research on Teaching have not yet been investigated in social work education, including the teaching method called mastery learning. Mastery learning is a well articulated behavioral teaching method used successfully in higher education (Guskey & Pigott, 1988; Kulik, Kulik & Bangert-Drowns, 1990).

PURPOSE

The purpose of this study was to examine how mastery learning, compared to non-mastery learning instruction, performed in an undergraduate social work (BSW) course. Several areas of difference were investigated in order to offer social work education as full a picture as possible in this first study of mastery learning. The major research question investigated was: Do mastery learning and non-mastery instruction have different effects on social work students' academic achievement, attitude toward course topic, and preference for instructional method? Also investigated were (a) student course evaluations and (b) instructor hours spent.

Literature Review

Mastery learning is the group-based implementation of the Carroll model of school learning. The Carroll model suggests learning is dependent on the amount of time needed to learn and time allowed to learn (Carroll, 1963). Learning should

increase as time allowed increases. In other words, achievement is held constant and time allowed is varied, instead of holding time constant (e.g., one semester) and allowing student achievement to vary (Bloom, 1968, 1984; Carroll, 1963). Mastery learning involves using time flexibly to increase student learning and performance. For example, students are often given time to retake parallel versions of exams or rewrite projects until reaching mastery. The additional time allows students to clarify poorly understood material before retesting.

Distinguishing features of mastery learning include (a) curriculum alignment, (b) formative evaluations, (c) feedback and correctives, (d) retesting cycles, and (e) criterion referenced grading (Anderson, 1993; Bloom, 1968, 1984; Guskey, 1987; Kulik, Kulik & Bangert-Drowns, 1990). Each is briefly described to give readers a fuller picture of mastery learning. Vertical and horizontal curriculum alignment involves the similarity of course content taught and tested (Guskey, 1985; Cohen & Hyman, 1991). Horizontal curriculum alignment refers to the linear progression of course material from lesson planning through teaching and testing. Material is horizontally aligned when it is both taught and tested. This prevents testing material that is not taught and spending instructional time on material that will not be tested. Vertical curriculum alignment refers to the hierarchical nature of Bloom's (1956) taxonomy of six educational objectives (knowledge, comprehension, application, analysis, synthesis, and evaluation). Vertical curriculum alignment means course material is taught and tested according to the same knowledge level because understanding course content at lower levels does not guarantee

understanding at higher levels. For example, instruction should support whether an exam requires students to recognize the name "Mary Richmond" (knowledge) or critique her contribution to social work (evaluation).

Formative evaluations measure the "formation" of knowledge and commonly take the form of short ungraded quizzes. Formative evaluations will be referred to in this study simply as quizzes. Quizzes are intended to monitor learning progress and, therefore, often do not count toward final grades (Bloom, Hastings & Madaus, 1971). Additionally, quizzes are "self-scored" immediately so students see which questions they answered correctly or incorrectly. This helps the students and instructor to identify and correct learning errors. Summative evaluations are a normal part of higher education and are utilized in mastery learning. Summative evaluations measure the "summation" of learning and normally take the form of graded exams (objective or other format). Feedback refers to instructors' providing information on student learning progress. Commonly instructors give students the answer keys to quizzes and exams so they can "see" what was answered correctly or not.

Correctives refer to correcting student learning errors by re-teaching material, providing remedial material, or using other methods. Re-testing cycles usually refers to taking parallel forms of exams. The parallel forms are commonly called make-up exams and they often have the same number and type of questions as on an exam, but are phrased differently and with different response choices. In mastery learning, "make-up exams" are often open to all students who voluntarily wish to retake an exam to improve

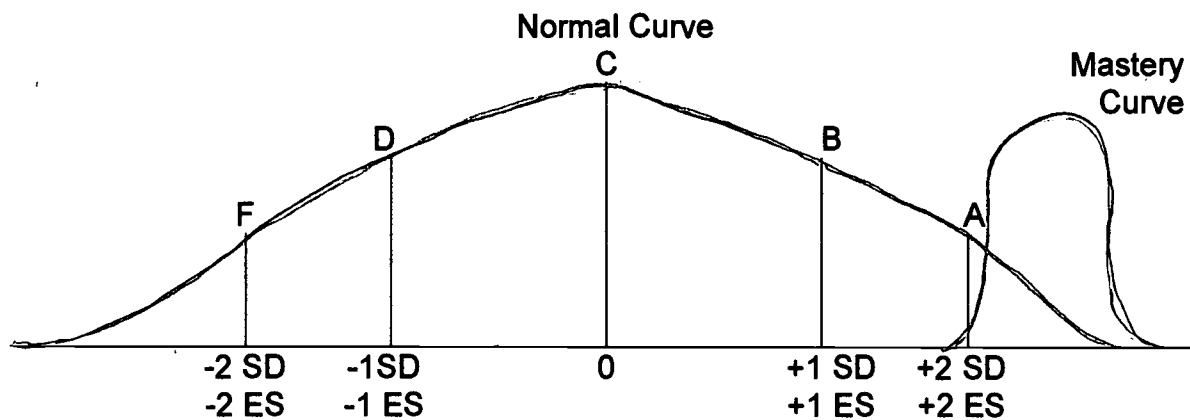
their grades and are not something students take when they failed to attend or "missed" an exam. Ideally, make-up exams should be as difficult, or more difficult, so any increased achievement is less likely the product of "easier" tests. Students commonly check the answer key after an exam to identify which questions were answered incorrectly so that they can restudy poorly understood material and then take a make-up exam that tests the same material.

Mastery learning uses criterion-referenced instead of norm referenced measurement to grade student performance (Bloom, Hastings & Madaus, 1971). Criterion referenced measurement compares performance to a standard, whereas, norm-referenced measurement (the normal curve) compares performance of other students. Criterion referenced measurement may produce score distributions that deviate from a normal curve because it is possible for all students to meet the criterion (Gronlund, 1981; Martuza, 1977). Criterion referenced measurement is consistent with a fundamental belief of mastery learning that all students are capable of achieving higher levels with clear learning goals and, if given enough time, feedback and correctives.

What does the research reveal about the effectiveness of mastery learning on achievement? Mastery learning has generated enough research to merit two syntheses of research that include 31 college level studies in the social sciences, hard sciences, health sciences, and languages, but not social work (Guskey & Pigott, 1988; Kulik, Kulik & Bangert-Drowns, 1990). A synthesis of research is useful for comparing many studies that report results in different ways by converting results to "effect sizes"

(Glass, McGraw & Smith, 1981). In education, an effect size is loosely translated as a standard deviation or a letter grade. As illustrated in figure one, an effect size of 2.0 means that the treatment group outscored the control group by about two letter grades. Figure one also shows a "normal curve" compared with a "mastery curve." Proponents of mastery learning claimed it could produce achievement gains of two standard deviations or an effect size of 2.0 (Bloom, 1977).

Figure 1 Effect Sizes (ES) for a Normal Curve and a Mastery Curve



Twenty-nine of the 31 college level mastery learning studies had positive effect sizes. The effect sizes ranged from a low of -0.37 (little effect on academic achievement) to a high of $+1.69$ (large effect on academic achievement) with an average effect size of $+0.50$ (mild positive effect). The average effect size of $+0.50$ for mastery learning was stronger than those found for peer tutoring ($+0.40$), computer-based teaching ($+0.35$), programmed instruction ($+0.15$), and open education (-0.1) (Kulik, Kulik & Bangert-Drowns, 1990). Mastery learning has had mainly positive results on

academic achievement.

Student attitudes toward mastery learning and course topic have been investigated to determine if college students react negatively to mastery learning and, subsequently, react negatively to the course topic. Students had mainly positive reactions to mastery learning and made positive changes regarding attitudes toward course topic (Bauman, 1980; Brown, 1977; Goldwater & Acker, 1975; Guskey & Pigott, 1988; Kulik, Kulik & Bangert-Drowns, 1990; Whiting & Render, 1984). Mastery learning had positive results in higher education, but would this be the case in social work education?

METHODOLOGY

Sample

The site for this study was a public, Northeastern, urban, commuter/resident college that enrolled approximately 12,000 students. The Social Work Department had 275 students and nine full-time faculty. A convenience sampling plan generated 137 students registered in four sections of a junior-level introductory social work course that addressed poverty, the poor, anti-poverty strategies, and attitudes toward poverty. Lack of random assignment negates internal validity but may strengthen ecological validity because this study occurred in an actual college classroom under normal conditions (Gentile, 1990). Sample demographics are reported so readers can decide if their classrooms are similar enough to generalize the results of this study (Cornfield &

Tukey, 1956). To decrease registration based on instructor preference or reputation, all course sections listed the instructor as "STAFF."

The four course sections were collapsed into two groups, mastery and non-mastery. Independent t-tests showed both groups had similar distributions of (a) age (Mean= 24 years; range: 18-45 yrs), (b) entry grade point average (Mean= 2.9 of 4.0), and (c) entry knowledge levels (37.7% of 100% on a knowledge pretest). A Chi-square showed both groups had similar distributions of (a) gender (Female: 77%, Male: 23%), (b) race, (White: 82%, Black: 11%, Hispanic: 4%, Asian: 2%, other: 1%) and (c) academic major (SW: 28%, Non-SW: 72%). As expected for an introductory level course, most students were non-social work majors. The sample was primarily white, female, with a mean age of 24 years.

Similarities between the course sections included course content, outlines, readings, texts, exams, enrollment, and meeting days. Differences included meeting times, instructional methods, and instructors. The mastery instructor was a Hispanic male with seven years of teaching experience, all with mastery learning. The non-mastery instructor was a white female with 21 years of teaching experience, none with mastery learning. Any instructor bias favored the non-mastery instructor because she had more teaching experience than the mastery instructor, had been recognized for teaching excellence, and her course content was used by the non-mastery instructor.

Independent Variable

The independent variable was the instructional method. Mastery learning and non-mastery learning instruction were contrasted. Mastery learning was implemented in this study using (a) curriculum alignment, (b) three written study guides distributed to students, (c) six ungraded quizzes, (d) three graded exams, (e) one make-up exam for each exam, and (f) instructor-led feedback and correctives, both in-class and outside class. Non-mastery instruction most resembled a combination of the lecture and discussion methods. The non-mastery instructor simply taught as she normally did, not using quizzes, study guides, make-up exams, or review sessions. Both instructional methods used the same exams and criterion-referenced grading.

Design

A quasi-experimental, repeated measures design using college classes as intact groups, was employed (Campbell & Stanley, 1963). Mastery and non-mastery instruction were contrasted, using four sections of the same 16-week, undergraduate social work course. One instructor taught two sections with mastery learning and the other instructor taught two sections with non-mastery learning instruction. A problem with each instructor using only one instructional method instead of both was that it was possible students might not be able to separate their reactions about the teaching method from the teacher (e.g., students might like the mastery instructor but report liking mastery learning, or the reverse). Having both instructors teach with mastery and

non-mastery instruction would have helped clarify this problem, but it was not feasible for the non-mastery instructor to learn a new teaching method to participate in this study. Student comments suggest that results were from instructional method and not the instructor.

It is always possible that any differences in results found between two groups were the result of threats to internal validity or factors other than instructional method. The design in this study helped control for several threats to internal validity. The internal validity threats of history and maturation mean, respectively, that students might respond differently from normal due to some external event, or age related or developmental changes (Campbell & Stanley, 1963). The threats of history and maturation were controlled in this study because both groups were equivalent and were studied at the same time (Campbell & Stanley, 1963). The internal validity threat of instrumentation means students might respond differently because they received different instructions about the surveys. To decrease the threat of instrumentation, the mastery instructor explained, distributed, and collected from both groups the consent forms, knowledge pre-test, measures of instructional preference, and attitudes toward course topic.

The internal validity threat of "testing" means students respond differently due to familiarization with testing, e.g., increasing their test taking skill as they take more tests. The threat of testing could not be controlled in this study because the mastery group had nine more testing opportunities than the non-mastery group, in the form of six

quizzes and three make-up exams (as shown in table one). However, frequent testing is considered a main effect of mastery learning and equalizing the testing between the groups would have made non-mastery instruction more like mastery learning, thus weakening the value of the contrast.

Table 1 Instrument Summary: Groups and Times Administered

Administered	Instrument	Groups
Pre-Instruction	Demographic survey	Both
	Entry knowledge level	Both
Post-Instruction	Instructional preference	Both
	Retention test	Both
	Mastery attitude survey: Quantitative	Mastery Only
	Qualitative	Mastery Only
Pre, Post Instruction	Attitudes toward: the poor	Both
	poverty	Both
	public assistance	Both
	socio-political concerns	Both
Three times During instruction	Three Exams	Both
	Three Make-up exams	Mastery Only
Six times During instruction	Six ungraded quizzes	Mastery Only

Dependent Variables

Several dependent variables were employed to generate a fuller picture of mastery learning for social work education. Academic achievement and retention of achievement were included because achievement is the “hard currency” of education and retention of achievement over time is a goal of all education. Achievement is defined in this study as performance on academic testing expressed as the percent of questions answered correctly of 100%. Retention generally refers to the recall or recognition of learned material after the passage of time. Retention is defined in this study as the recall, after 12 weeks, of material from exam one that was retested on exam three.

Negative student reactions to a teaching method should be cause for concern despite any positive achievement results. Therefore, student attitude toward mastery learning also was measured. If students disliked the teaching method, their dislike may have generalized to the course topic. To examine if this occurred, student attitudes toward the poor and several aspects of poverty were measured. Student course evaluations were included to examine if students responded negatively to the instructor teaching with mastery learning. Finally, instructor hours spent during the semester were included as a crude indicator of labor intensiveness.

Measures

All measures were instructor-created, except for the standard social work department course evaluation form and the measures of attitude toward the poor (Grimm & Orten, 1973; Howard & Flaitz, 1982; Moran, 1989; Rosenthal, 1993; Sharwell, 1974). The validity of the instructor-created instruments was checked with the "recognized experts" method, the doctoral committee guiding this research. The committee examined and modified the instruments to increase content and face validity.

Three 50-item instructor created exams measured academic achievement in both the mastery and non-mastery groups. Three 50-item make-up exams (one per exam) were created for the mastery group and tested the same content as the exams but with different questions. To increase exam reliability, all exams used the multiple choice, objective format (Green, 1970; Gronlund, 1981; Martuza, 1977; Roid, 1982). The validity of the exams was established in four ways. First, the mastery instructor "attended" the non-mastery instructor's course to match all course content. Second, the mastery instructor created or revised 421 test questions that matched the non-mastery course content. Third, a table of specifications was created to focus instruction and testing on essential content and to prevent testing material not taught (or the reverse) (Gentile, 1990; Harris, 1974). Fourth, the non-mastery instructor verified that the exams and make-up exams covered her course content although she did not utilize the make-up exams.

It was crucial to insure the exams and make-up exams were equivalent since they would be used to generate data on academic achievement and because a student's make-up exam score would replace what he/she scored on the exam. Any achievement gains would be suspect if a make-up exam was easier than the original exam. To test if the 50 item exams and 50 item make-up exams were equivalent, they were piloted by combining them into three, 100 item exams (exam 1 + make-up exam 1; exam 2 + make-up exam 2, exam 3 + make-up exam 3). Students took the combined 100 question exams and the 50 item "halves" were scored and compared to see if a student who scored at least 70% correct of 100% on an exam, scored similarly on the make-up exam. At least 76% of students who scored above or below 70% on an exam also scored the same on the make-up exam suggesting equivalence. The difficulty index also was examined to see if the exams and makeup exams had equivalent difficulty levels (Gronlund, 1981; Gentile, 1990; Martuza, 1977). The difficulty index shows how often test items were answered correctly and has a range from zero to 1.0 (item answered correctly by zero = everyone, by 1.0 = no one). The difficulty index of each exam and matching make-up exam was within .1, suggesting they were equally difficult.

Other academic achievement measures included (a) six 13-item quizzes, (b) one 12-item knowledge pre-test, and (c) one 26-item retention test. The ungraded quizzes were not pilot tested because they were not graded and not used in the non-mastery group. The knowledge pre-test included four questions taken from each exam, each

had a difficulty index of at least .6 in the pilot test. The retention test included 26 questions taken from exam one with a difficulty index of .3 or higher. To decrease chances students would restudy material from exam one, they were not told exam three had 26 extra questions taken from exam one that would not count toward the exam three grade.

As shown in table two, four instruments previously used with social work students measured student attitudes toward (a) the poor, (b) public assistance, (c) poverty, and (d) socio-political concerns (Grimm & Orten, 1973; Howard & Flaitz, 1982; Moran, 1989; Orten, 1979; Rosenthal, 1993; Sharwell, 1974). The original articles describe the validation of the instruments. Pilot testing in the host course revealed the instruments had adequate reliability and stability.

Table 2 **Measures of Attitudes Toward Course Topic**

Name of Measure	Source	Items	Measures attitude toward
Peterson's Poor Scale	Peterson, 1967	40	The poor
Attitude toward public assistance scale	Anderson, 1965, 1966	16	Public assistance
Attitude toward poverty scale	Rosenthal, 1993	21	Causes of poverty; internal, structural, antipathy
Social Humanistic Ideology Scale	Howard & Flaitz, 1982	20	Socio-political concerns, Subscales: social justice, human nature

Peterson's Poor Scale (Peterson, 1967) measures whether attitudes toward the poor are favorable or unfavorable. The Social Humanistic Ideology Scale (Howard & Flaitz, 1982) has subscales measuring agreement/disagreement with statements related to social justice and human nature. The attitude toward poverty scale has subscales measuring antipathy toward the poor and the belief poverty results from internal or external causes (Rosenthal, 1993). The attitude toward public assistance scale measures agreement/disagreement with statements about public assistance (Anderson, 1965, 1966).

Preference for instructional method was measured with one instructor-created, fixed-response question: Would you prefer mastery or non-mastery instruction if the semester were beginning again? Standard social work department course evaluations collected data from both groups regarding the instructor and the course. The course evaluation had 16 positively phrased questions with a five-point Likert scale and response choices from strongly agree to strongly disagree. An instructor-created weekly calendar collected self-reported data from both instructors about the number of hours spent with students outside class time.

RESULTS

Quantitative data were analyzed using SPSS and alpha levels of .05. Student comments suggest they were reacting to mastery learning and not the mastery instructor.

Achievement

It was simplest to examine the achievement data with a repeated measures MANOVA (Multiple Analysis of Variance) since the contrast involved two teaching methods (mastery, non-mastery) and three achievement tests (exam 1-3). The MANOVA was done twice on the achievement data because a student's make-up exam score replaced his/her original exam score in the mastery group. Doing the MANOVA twice would show how the mastery group performed before and after taking the make-up exams.

Table 3 Mean Exam Scores before Make-up Exams

	Mastery		Non-Mastery		Difference
	M	SD	M	SD	
Exam 1	81.12	10.44	82.10	11.50	0.98
Exam 2	84.44	10.01	83.90	10.80	0.54
Exam 3	75.09	10.85	79.00	11.70	3.91

The first MANOVA detected an interaction effect between instructional method and tests ($F(2,399)=4.19, p<.05$) (Glass & Stanley, 1970; Lubin, 1961). The interaction effect detected is called a disordinal or "crossed interaction" because the lines representing treatment effects "cross each other" when graphed. A crossed interaction makes it difficult to say if one group did better than another because the groups take

turns outscoring each other. As seen in table three, the mastery group had greater mean scores than the non-mastery group on exam two but not exams one or three.

Seventy-nine make-up exams were taken in the mastery group and a make-up exam score replaced a student's original exam score. Exam score gains were examined by paring a student's make-up exam score with what he/she scored on the exam. Table four includes mean exam and make-up exam scores only for students who took make-up exams. Paired t-tests showed significant make-up exam score gains over original exam scores and an average gain of 12.67 points.

Table 4 **Mean Make-up Exam Scores and Corresponding Exam Scores**

	Make-up Exams Taken		Original Exam Score	Make-up Exam Score	Change
Exam 1	29	M	74.70	90.80	+16.10**
		SD	10.00	7.30	
Exam 2	22	M	77.10	82.10	+5.00*
		SD	9.90	5.50	
Exam 3	27	M	66.00	83.00	+17.00**
		SD	8.90	8.70	
Total	N = 79				

Note. *p<.01 **p<.0001

Table 5 Mean Exam Scores after Make-up Exam Score Replacement

	Mastery		Non-Mastery		Difference
	M	SD	M	SD	
Exam 1	88.00	7.90	82.10	11.50	5.90*
Exam 2	86.40	7.90	83.90	10.80	2.50
Exam 3	81.70	7.80	79.00	11.70	2.70

Note. * $p < .05$

After the 79 make-up exam scores replaced the original 79 exam scores in the mastery group, the second repeated measures MANOVA detected an "ordinal" interaction effect between instructional method and tests ($F(2,399)=3.20, p < .05$). An ordinal interaction means one group outscores another group but not to the same degree (Glass & Stanley, 1970; Lubin, 1961). The lines representing treatment effects are not parallel when graphed, but do not cross each other, meaning one group outscored the other. As included in table five, the mastery group outscored the non-mastery group on all three exams, but the difference ranged from a low of 2.5 to a high of 5.9 points. Next, the second MANOVA revealed that the instruction variable was significant ($F(1,399)=6.49, p < .05$) indicating a difference between the mastery and non-mastery groups on achievement. Independent t-tests showed the 5.9 point difference between the exam one scores accounted for the difference on achievement between the groups ($t_{(132)}=-3.47, p=.001, \text{two-tailed}$).

In summary, the mastery group outscored the non-mastery group when make-up scores were considered (effect size = +.33) and both groups achieved similar results when make-up exam scores were not considered (effect size = -.12). The mean gain of 12.67 points on the make-up exams (the equivalent of more than one full grade level) raised the mean achievement scores of the whole mastery group.

Retention

Twenty-six test items included on exam one were included again on exam three to test retention. The scores the 26 items generated on exam three were subtracted from the scores they generated on exam one (Table 6). Having the same score twice (no difference) suggests high retention from exam one to exam three. The maximum score was 26.

Table 6 Mean Retention Scores: Exam One and Retention Test

	Mastery		Non-Mastery		Difference
	M	SD	M	SD	
Exam 1R ^a	18.85	3.59	19.39	3.93	0.54
Retention ^b	13.29	2.77	12.73	4.15	0.56
Difference	5.56	3.04	6.75	3.48	1.19*

Note. * $p < .05$, two-tailed. Max score possible = 26.00

a: 1R = scores the 26 items generated on exam one.

b: Retention = scores the same 26 items generated on exam three.

Independent t-tests showed both groups had similar scores for the 26 retention items on exam one ($t_{(131)}=.83$, $p=.40$, two-tailed), and similar scores for the same 26 items on exam three ($t_{(131)}=-.93$, $p=.36$, two-tailed). However, the mastery group had a smaller difference score than the non-mastery group suggesting greater retention over the 12-week interval from exam one to exam three ($t_{(131)}=2.11$, $p=.04$, two-tailed).

Attitudes Toward Course Topic

A MANOVA also was used to examine student attitudes toward the course topic, because there were seven attitude measures. The MANOVA showed no interaction effects and no differences between the mastery and non-mastery groups. However, the MANOVA showed that changes in attitude toward course topic did occur in both groups from pre- to post-testing ($F(7,123)=9.84$, $p=.0001$). Paired t-tests showed pre post changes on four of the seven measures, including attitude toward the poor, social justice, human nature, and individual causes of poverty. The direction of the scales suggests that positive changes occurred in both groups.

Table 7 Student Attitudes toward Course Topic

	Mastery		Non-mastery	
	Pre	Post	Pre	Post
The poor*	122.80 ^a 30.60 ^b	113.20 32.00	119.20 28.92	111.50 34.50
Public assistance	54.80 4.60	54.50 5.70	54.60 5.70	55.60 5.90
Socio-political concerns:				
Social justice*	27.43 5.00	24.30 4.90	24.80 6.10	23.20 6.40
Human nature*	31.50 6.60	34.70 6.30	34.50 6.40	36.40 6.20
Poverty:				
Antipathy	44.70 10.40	43.20 10.00	42.70 12.40	41.50 9.70
Structural causes	30.90 6.60	31.20 6.70	31.10 6.90	30.70 5.90
Individual causes*	9.80 7.60	8.50 7.60	9.00 7.40	6.20 6.50

Note. a: Mean scores

b: Standard deviations

* $p < .0001$

Instructional Preference

A chi-square showed a relationship existed between group and student preference for instructional method ($X^2_{(1)}=52.40, p=.01$). The entire mastery group (100%) preferred mastery to non-mastery instruction, while 43% of the non-mastery

group preferred mastery instruction based on a description. More students than expected preferred mastery learning.

Course Evaluations

Both instructors received similar positive ratings on the standard social work department course evaluation form ($t_{(123)}=-.85$, $p=.40$). The rating scale for the positively phrased questions ranged from 5.0 (strongly agree), to zero (strongly disagree). Both instructors received positive ratings (Mastery: Mean = 4.8 of 5.0, SD = .57; Non-mastery: Mean = 4.7, SD = .71).

Instructor Time Spent

Data collected from the instructor created calendars were examined for descriptive purposes only for an idea of how much time both instructors spent outside class time with students. The non-mastery instructor spent 14.25 hours outside class time over the semester and recorded 14 student contacts during office hours. The mastery instructor spent 21 hours outside class time and recorded 79 student contacts in both outside class correctives and make-up exams. The mastery instructor spent 6.75 more hours per semester with students outside class time but saw 65 more students compared to the non-mastery instructor. The mastery instructor would have spent 85 hours during office hours and make-up exams if he had worked with individual students as the non-mastery instructor had.

Supplementary Results

Although exam scores were examined in this study, grades are the “hard currency” of higher education and are reported for descriptive purposes only, using a mean score of the three exams. Exam scores were converted to letter grades with standard numerical cutoffs (A = 90-100%, B = 80-89%, etc.). Achievement in the mastery group reflected substitution of make-up exam scores for original exam scores (Table 8).

Table 8 Final Grade Distribution using Letter Grades

Letter grade	Mastery group		Non-mastery group	
	n	%	n	%
A (90-100%)	20	29%	17	25%
B (80-89%)	36	53%	26	38%
C (70-79%)	12	18%	17	25%
D (60-69%)	0	0	6	9%
F (50-59%)	0	0	2	3%

Letter grades of A or B were earned by 82% of the mastery group, and 63% of the non-mastery group. The whole mastery group (100%), and 88% of the non-mastery group earned a grade of C or better. Although both groups had similar mean exam scores, the mastery group had a greater percent of A, B, and C grades and no grades of D or F.

DISCUSSION

Was mastery learning effective in a BSW level social work course? Yes.

Mastery learning generated results that were at least similar, and in no instance worse, than non-mastery instruction on several measures of achievement and attitude toward course topic. Mastery learning involved reasonable amounts of instructor time spent, and students overwhelmingly preferred mastery learning.

Clearly, the make-up exams resulted in the mastery group outscoring the non-mastery group. The average make-up exam score gain of 12.67 points suggests that achievement can improve during the confines of a semester and that increased learning does depend on increased time allowed and increased learning error correction (Bloom, 1968; Carroll, 1963). Make-up exams also may have increased student motivation to achieve since 62% of make-up exams were taken voluntarily by students who had already scored at least 70% on the exams. The gains also suggest, quite rightly, that mastery learning is more effective with retesting cycles. Retesting cycles are an essential feature of mastery learning and are predicted to result in achievement gains, if learning errors are corrected (Bloom, Hastings & Madaus, 1971; Decker, 1976; Fehlen, 1976; Omelich & Covington, 1981). Without correctives, students could take a make-up exam and simply repeat the mistakes they made on the exam. As evidence of uncorrected learning errors, this instructor noted that with the quizzes, the mastery group asked few clarification questions before but many questions afterward. Social work educators will find that using quizzes and correctives helps in

detecting and remedying student learning errors.

It may be argued that "retesting" is already evident in advanced social work courses where students write and rewrite intervention plans or receive supervision and repeated opportunities to reach learning goals set in field work. Social work educators who utilize additional rounds of make-up exams or more correction of learning errors may obtain even greater achievement gains than found in this study. Greater achievement implies better preparation for future social work courses, especially in multi-part courses where early learning supports later learning. Although the mastery group had greater retention than the non-mastery group, the results amounted to a difference of one test item. However, retention is still an educational goal and may improve carry over to other social work courses.

An issue raised by some is if mastery learning is only appropriate for "fact" or knowledge based material and not appropriate for the values based material important in social work education. Both the mastery and non-mastery learning groups made similar positive changes in attitudes toward the host course topic of poverty suggesting that social work educators who use mastery learning will not sacrifice student attitude change for achievement, or the reverse.

The time required to set up mastery learning was not measured but the mastery instructor noted it as a negative because it was impossible to predict how much time would be needed. However, the time required for this implementation of mastery learning was not felt to be prohibitive and no time was spent on implementation once

materials were prepared. Mastery instruction required about seven more hours of instructor time than non-mastery instruction but instructor time required may be related to how the mastery elements are structured. For example, correcting students individually is more time intensive than correcting students together as a group (Arlin, 1984; Fitzpatrick, 1985; Lewis, 1984; Palardy, 1986; Slavin, 1987). Social work educators may find ways to decrease the time spent during the semester. For example, students could take make-up exams outside class together from different courses, thus reducing the time spent proctoring make-up exams. Similarly, review sessions for different courses could be held together or students could lead the correctives and help correct each other.

The 100% student preference for mastery learning suggests students experienced mastery learning more positively than expected. Course evaluations showed students rated both instructors similarly although the non-mastery instructor was more experienced than the mastery instructor and her course content was used for the contrast. Social work educators may obtain greater positive achievement results when using their own course content. Both students and the mastery instructor were clear about learning expectations and essential course content throughout the course. This is no small advantage for novice instructors or those preparing new materials for the first time. Social work instructors also may obtain greater achievement results as their experience with mastery learning increases. Mastery learning is a promising instructional method for social work education that provides a clear structure for both

students and instructors, and insures instruction focuses on essential material.

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