

SECTION THREE

Methodology

Setting and Participants

I conducted this quasi-experimental study with between-group comparative design at my place of employment, a suburban high school in Central Ohio. The school is one of three high schools, four middle schools, 14 elementary schools, and one Early Learning Center that inhabit a district that sprawls across 50 square miles and encompasses over 14,800 students. My school contains four grade levels (ninth, tenth, eleventh, and twelfth) and serves nearly 1,500 students. The course American History is a requirement for all ninth graders and is broken into two semesters that must be taken chronologically as American History 1 (Reconstruction through the Great Depression) and American History 2 (World War II to the present). Additionally, the course can be taken in an accelerated honors format (Honors American History 1 and Honors American History 2). For the purpose of this study, which was conducted during the first semester of the 2015-2016 school year, any student enrolled to take either American History 1 or Honors American History 1 as a ninth grader was eligible to participate ($N = 327$). Through the standard enrollment process, these students were divided among the three teachers that teach American History, which includes Mr. E, Mr. O, and myself. Union contract stipulates that no section (honors or otherwise) is permitted to have more than 30 students. Students that requested to be in Honors American History 1 were scheduled in one of the three sections taught by Mr. E or one of the two that I teach. Mr. O does not teach any sections of Honors American History 1.

Protection of Participants and Role of the Researcher

Risks to the student and teacher participants associated with my study were minimal and no greater than those faced on a daily basis. *A Parent/Guardian's Consent for Child and Student*

Assent form (Appendix A) and a *Letter of Cooperation* (Appendix B) from the school's principal approving the use of the school and its students for this study were collected. The Letter of Cooperation with the principal was transitioned into a *Data Use Agreement* (Appendix C) in order to provide me with access to a Limited Data Set (LDS) for use in this study in accordance with HIPAA and FERPA regulations. Concerning the data, and per the Data Use Agreement, no direct identifiers (such as names) were included in the LDS outside their initial role in pairing up Start of Course Assessment (SOCA) and End of Course Assessment (EOCA) scores to ensure that only the scores of the students that took both assessments were included in the study. The data released to me for this study was no different than the data reported to the school's administration and the district's curriculum coordinator. However, individual scores were not permitted for release; only SOCA and EOCA data categorized by period, level (honors or non-honors), and teacher were permissible for this study. In addition, I acknowledged and agreed not to disclose or discuss, divulge, copy, release, sell, or make unauthorized transmittals of confidential information. I acknowledged the legal implications of violating any and all terms. All data will be maintained in a locked file cabinet in the school for a period of three years following the completion of the study.

Hypotheses

Three null hypotheses and three alternative hypotheses were statistically analyzed. In the context of an experiment, a null hypothesis (H_{01}) predicts that the independent variable (the treatment) has *no effect* on the dependent variable (the population). The alternative hypothesis (H_{a1}) is the opposite of the null hypothesis and predicts that the treatment *does* have an effect on the population (Gravetter & Wallnau, 2008, p. 192).

The research questions that I investigated in this study were:

1. Does being taught in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum have a *metacognitive* effect on how 9th grade students perceive their learning?

H_{01} = There is no statistically significant difference in the metacognitive effect of how 9th grade students perceive their learning in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

H_{a1} = There is a statistically significant difference in the metacognitive effect of how 9th grade students perceive their learning in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

2. Does being taught in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum have a *motivational* effect on how 9th grade students perceive their learning?

H_{02} = There is no statistically significant difference in the motivational effect of how 9th grade students perceive their learning in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

H_{a2} = There is a statistically significant difference in the motivational effect of how 9th grade students perceive their learning in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

3. Does Mastery Teaching have an impact on the mastery of the material by 9th grade students when compared to students assessed in more traditional classrooms that do not offer reassessment?

H_{03} = There is no statistically significant difference in the improvement between SOCA and EOCA scores of students in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

H_{a3} = There is a statistically significant difference in the improvement between SOCA and EOCA scores of students in a social studies classroom that utilizes differentiated reassessment within a standards-based curriculum and students in traditional classrooms.

Treatment

The treatment came in the form of Mastery Learning (differentiated reassessment) and Mastery Teaching (Standards-Based Grading, or SBG), both of which are used in my American History 1 and Honors American History 1 courses. I adopted these approaches at the start of the 2008-2009 school year in the hopes of overhauling my grading practices and as a way to provide grades that better reflect the mastery of content material. To do so, I used state Grade Level Indicators (or GLIs) to assess mastery and provided struggling students with differentiated reassessment opportunities. It was my goal that in switching to such a classroom, I could boost motivation among students and get them to *want* to do better in history, to *believe* they could do better, and to *actually* do better. In theory, if I could get my students to become more motivated and metacognitively aware of their abilities, then their retention (and mastery) of state-mandated material would be demonstrated by significant gains between the SOCA and EOCA. As discussed in Section Two, differentiation refers to modifying instruction to meet the needs of all

learners (Northey, 2005; Tomlinson, 2008; Tomlinson & McTighe, 2006). This theory suggests that highly effective teaching means doing what is fair for students, including making grading practices conducive to maximizing the students' learning while truly reflecting what a student has (or has not) mastered. My SBG classroom serves as the vehicle for delivering this differentiated reassessment. After the initial assessment, my students have an abundance of options by which to correct their mistakes and demonstrate a new understanding of the material. These include essays, informal discussions (oral reassessment), projects, or other forms of performance-based assessment. Differentiated reassessment, like Mastery Learning, provides teachers with the ideal quantitative and qualitative reflection of what a student has mastered (Cummins & Davesne, 2009). As part of its functionality, a SBG classroom allows for reassessment throughout the semester to bring up a student's mastery and retention of course material.

Therefore, the treatment in my study was the use of differentiated reassessment in my five sections of American History 1. If Mastery Teaching (in the form of a SBG classroom) is truly able to produce students who master the material better than their peers, then my students should show greater growth between the SOCA and EOCA than the students in the non-SBG classrooms. If Mastery Learning (in the form of differentiated reassessment) actually has a metacognitive and motivational effect on how 9th graders perceive their own learning, then students in my classroom should score higher on the nine factors (F1-F9, discussed later in this section) created by the two questionnaires than their counterparts in classrooms that do not use differentiated reassessment.

Instrumentation and Materials

Data came from district test scores and two anonymous questionnaires. The tests used were the district-created, district-approved, and district-mandated SOCA and EOCA for the American History 1 classes. The first survey, called *The American History Motivation Questionnaire*, was adapted from Shawn M. Glynn's (2006) *The Science Motivation Questionnaire II*, or SMQII. *The Personal Responsibility Orientation to Self-Direction in Learning Scale* (or PRO-SDLS), created by Susan Stockdale in 2003, was the second survey administered. These surveys were given consecutively at the conclusion of the American History 1 EOCA, which occurred during the district's Final Exam Week (December 16-18, 2015).

All American History 1 and Honors American History 1 students in Mr. O, Mr. E, and my classes took a common American History 1 SOCA (Appendix D) during the second week of school. This provided basic data to draw an average score to use in this research study. The test was identical for both honors and non-honors classes and consisted of 35 multiple choice questions each linked to a state standard. Similarly, both classes took a common American History 1 EOCA at the end of the semester during the eighteenth week. This test consisted of the same 35 multiple choice questions that appeared on the SOCA. As part of the EOCA, students were given two short answer questions, which were excluded from analysis. Students' individual scores from both classes were recorded to show whether individual and class-wide improvement was made between the SOCA and the EOCA.

The first of the two anonymous surveys, modified from *The Science Motivation Questionnaire* by Glynn (2006), asked students about their perceptions of learning as well as the role history may (or may not) play in their lives. Glynn's original questionnaire was created to

help college professors identify students that lack motivation at the start of their science courses. The survey was found to have good “content validity” and “criterion-related validity,” meaning its questions accurately assess what the person is answering and is predictive of later behavior (Glynn et al., 2011). The 25 questions evaluated five motivation components: intrinsic motivation, self-determination, self-efficacy, career motivation, and grade motivation (Table 1).

Table 1

SMQII Definitions

1. **Intrinsic motivation** – *The inherent satisfaction in learning science for its own sake* (Eccles, Simpkins, & Davis-Kean, 2006 – as cited by Glynn et al., 2011, p. 1161).
2. **Self-determination** – *The control students believe they have over their learning of science* (Black & Deci, 2000 – as cited by Glynn et al., 2011, p. 1161).
3. **Self-efficacy** – *The students’ belief that they can achieve well in science* (Lawson, Banks, & Logvin, 2007 – as cited by Glynn et al., 2011, p. 1161).
4. **Career motivation** – *Important long-term goals that are the primary reason for pursuing a college degree* (Humphreys & Davenport, 2005 – as cited by Glynn et al., 2011, p. 1162).
5. **Grade motivation** – *Important short-term goals that measure college success and are part of the entry criteria for many careers* (Lin, McKeachie, & Kim, 2003 – as cited by Glynn et al., 2011, p. 1162).

Answers were measured along a five-point scale (“never,” “rarely,” “sometimes,” “usually,” “always”) to questions like “*The science I learn is relevant to my life.*” Glynn’s five motivation categories were used to code the data (F1-F5) gathered from my version of the SMQII. In my survey, the word “science” was replaced by “history,” and the survey was renamed *The American History Motivation Questionnaire* (Appendix E). This was permitted via fair-use and contingent upon the proper citation of Glynn et al. (2011), per the University of Georgia’s guidelines.

The Personal Responsibility Orientation to Self-Direction in Learning Scale (or PRO-SDLS), created by Stockdale (2003), was the second survey administered (Appendix E). This questionnaire contained 25 items designed to measure a college student’s self-directedness in learning. This self-directedness examines whether students take the “primary responsibility or initiative in the learning experience” (Stockdale & Brockett, 2011, p. 162). Answers were measured along a five-point scale (“strongly disagree,” “disagree,” “sometimes,” “agree,” “strongly agree”) to questions like *“I am confident in my ability to consistently motivate myself.”* The survey’s four variables (initiative, control, self-efficacy, and motivation; Table 2) were used to code data (F6-F9) gathered from my version of the PRO-SDLS. In my survey, the word “college” was substituted by “high school.” The words “professor” and “instructor” were replaced by “teacher.” The PRO-SDLS was used with author permission.

Table 2

PRO-SDLS Definitions

<p>1. Initiative – <i>Where people take the primary responsibility in the learning experience</i> (Stockdale & Brockett, 2011, p. 162).</p> <p>2. Control – <i>When individuals assume ownership for their thoughts and actions</i> (Brockett & Hiemstra, 1991, p. 26 – as cited by Stockdale & Brockett, 2011, p. 163).</p> <p>3. Self-efficacy – <i>The beliefs in one’s capacities to organize and execute the courses of action required to produce given attainments</i> (Bandura, 1997, p. 3 – as cited by Stockdale & Brockett, 2011, p. 166).</p> <p>4. Motivation – <i>The desire or willingness to do something, as broken into four types: a. external – behavior prompted by external contingencies such as rewards; b. introjected – behavior prompted by internal pressures such as avoidance of guilt; c. identification – behavior prompted by identification with the value of the activity; d. intrinsic – behaviors prompted out of enjoyment and interest in the activity</i> (Reeve, Deci, & Ryan, 2004 – as cited by Stockdale & Brockett, 2011, p. 166).</p>

Statistical Analyses

My study looked to determine if there was a connection between my classroom and higher metacognitive and motivational scores on the SMQII and PRO-SDLS surveys. I also hoped to find that EOCA scores were better for my classes when compared to Mr. E and Mr. O's classes. Principal Component Analysis (PCA) sought to confirm that my students' answers corresponded to the factor structures described by Glynn et al. and Stockdale and Brockett (discussed in detail in Section Four). Analyses run using the Statistical Program for the Social Sciences, version 23.0 (or SPSS 23), included PCA, two nonparametric tests (the Mann-Whitney U test and the Kruskal-Wallis H test), and two parametric tests (one-way ANOVA and independent samples *t* tests).

PCA takes a large set of variables and condenses them down into a smaller set of variables (the "principal components") that are strong enough to account for the discrepancy (or "variance") in the original data set (Lund & Lund, 2016). The Mann-Whitney U test is a nonparametric test used to find differences between two groups with a dependent variable along a continuous scale, producing data that is mathematically similar to an independent samples *t* test (Statistics Solutions, 2016). While the *t* test is preferred, my data turned out to be non-normally distributed, which resulted in the need to use Mann-Whitney for some tests. This test was run to see if improvement between the American History 1 SOCA and EOCA (measured using a continuous scale) differed based upon classroom.

The one-way analysis of variance (or ANOVA) and its nonparametric equivalent, the Kruskal-Wallis H test, are hypothesis-testing procedures used to compare two or more populations. It offers a tremendous advantage over *t* tests, which can only be used for two

populations (Gravetter & Wallnau, 2008). I examined two populations when I compared classrooms that use differentiated reassessment (my class) with classrooms that do not use differentiated reassessment (Mr. E and Mr. O's sections combined). I looked at three populations when I separated Mr. E and Mr. O's non-SBG classrooms and compared them individually against one another and against my classrooms. The outcome in all of these analyses was to test whether the treatments (Mastery Teaching and Mastery Learning) produced "statistically significant" changes in the populations. When something is "statistically significant," it means there is no more than a 0.05 chance that the difference between groups results from sampling error.

Data Collection

Data collection began after receiving permission by the Institutional Review Board (IRB) at Otterbein University. A quasi-experimental, between-group comparative design was implemented to allow for those in the SBG classroom and those in the traditional settings to be studied and compared. Intervention during this experiment came in the form of Mastery Teaching and Mastery Learning, with a heavy emphasis on differentiated reassessment.

In the end, 232 of 327 survey responses were gathered (71% participation rate), with 116 in my SBG classroom and 116 in non-SBG classrooms (80 from Mr. E; 36 from Mr. O). All 327 student SOCA and EOCA scores were reported to school's administration and the district's curriculum coordinator. Of the 327 students, 124 were in my SBG classroom and 203 were in the non-SBG classrooms (127 in Mr. E; 76 in Mr. O). Section Four provides a summary of the findings as well as all data analysis undertaken.