Comparing Student Research Competencies in Online and Traditional Face-to-Face Learning Environments

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ABSTRACT

This research compares a completely asynchronous Master of Social Work (MSW) online research methods class with its traditional face-to-face counterpart using standardized measures of practice evaluation knowledge and research self-efficacy. Results indicate that students’ knowledge and research self-efficacy improved between pretest and posttest, with no significant difference between online learners and traditional face-to-face students.

INTRODUCTION

Online learning/distance education continues to grow in popularity, and the field of social work is no exception. Despite skeptics criticizing online education in social work as not providing sufficient practice, engagement, and interaction time (Knowles, 2001), the number of online MSW degree granting programs continues to grow. As online learning/distance education instructional offerings expand, social work literature examining differences between online and traditional classroom teaching continues to develop. Previous research has explored different types of classes/teaching methods, with the majority of published articles detailing practice and research methods classes (Dennison, Gruber, & Vrbsky, 2010). The bulk of literature has developed around the idea of comparing web-based or online classes with traditional face-to-face courses (Dalton, 2001; Harrington, 1999; Hisle-Gorman & Zuravin, 2006; Kleinpeter & Potts, 2003; Royse, 2000; Seabury, 2005; Stocks & Freddolino, 2000; Westhuis, Ouellette, & Pfahler, 2006) but failed to use a design controlling for pretest scores (e.g. Harrington 1999; Hisle-Gorman & Zuravin, 2006; Kleinpeter & Potts, 2003), or use standardized measures of learning outcomes (e.g. Harrington, 1999; Royse, 2000; Westhuis, Ouellette, & Pfahler, 2006).

Previous social work literature specifically comparing online vs. traditional classroom experiences with research methods learning has examined differences in student satisfaction (Faul, Frey, & Barber, 2004; Ligon, Markward, & Yegidis, 1999; Westhuis, Ouellette, & Pfahler, 2006; York, 2008) showing mixed results ranging from higher overall satisfaction with web-assisted courses, to no difference in satisfaction levels by learning platforms, to higher satisfaction in the traditional face-to-face classroom. In previous literature, learning outcomes have been operationalized by course grades (Harrington, 1999; Hisle-Gorman & Zuravin, 2006; Kleinpeter & Potts, 2003) and/or exam scores (Westhuis, Ouellette, & Pfahler, 2006), but previous research has rarely used standardized measures to examine learning outcomes. Evaluating educational outcomes is the current focus of program assessment in social work education (Garcia & Floyd, 2002). Indeed, few studies comparing online with traditional face-to-face learning practices have used standardized measures with demonstrated reliability and validity, and those that have examined comfort with technology (Stocks & Freddolino, 2000), classroom environment (Stocks & Freddolino, 2000), and critical thinking skills in a policy class (Huff, 2000) rather than learning outcomes; it’s time social work researchers heed the call for more rigorous study designs and measures in order to further the field (Dennison, Gruber, & Vrbsky, 2010).

Master of Social Work (MSW) students are required to successfully complete at least two research courses to receive their degree. Previous literature regarding social work research methods instruction has explored how to effectively teach statistics (Elliott, Eunhee, & Friedline, 2013; Wells, 2006), the importance of teaching and using evidence-based practice methods (Drake, Johnson-Reid, Hovrmand, & Zayas, 2007; Rosen, 2003; Rubin & Parrish, 2007), and using single-subject designs to evaluate practice (Wong & Vakharia, 2012). While these aspects of learning are critical to student success, it is important to examine student achievement of research competency using standardized measures and rigorous research designs across online and traditional face-to-face courses.
THE CURRENT STUDY

This study compares practice evaluation knowledge and research self-efficacy learning outcomes between a completely asynchronous online MSW research methods class and its traditional face-to-face classroom counterpart using a quasi-experimental non-equivalent comparison groups design. Using standardized measures of student’s perception and confidence, as well as assessing student competency in “engaging in research-informed practice and practice-informed research” (CSWE, 2008, EP 2.1.6) this project builds on previous social work literature and adds to the ongoing online vs. traditional face-to-face classroom debate.

Program/Class Description

In fall 2012, California State University, Northridge introduced the first two-year, degree-granting, fully asynchronous online Master in Social Work (MSW) program in the United States. Building on a successful traditional face-to-face program, students in the online program and traditional face-to-face program follow a cohort model meaning that students enter and exit the program together and take classes in a prescribed order. Online students complete the program in two years. Traditional students have the option of completing the program in either two or three years. All students in the current study were part of a two-year cohort. Online students and traditional face-to-face students differ in that online students follow a quarter system; taking two eight week classes per quarter totaling four classes per semester. Traditional face-to-face students take four classes over 16 weeks each semester.

In order to graduate, all students must take and successfully complete three semesters of research methods: beginning research methods, advanced research methods, and a Capstone project. The current study utilizes only the beginning research methods course. The beginning research methods class focuses on problem formulation, operationalization, conceptualization, design, and measurement concepts, and students complete a single subject design over the course of the semester. Students in all cohorts receive the same content, and classes happen in the same semester for students in a two-year cohort, i.e. everyone has beginning research methods in their second semester, advanced research methods in their third semester and Capstone occurs in the semester before graduation.

METHODS

Sample

The study population includes adult MSW students enrolled in one of three master’s level beginning research methods sections. Instructor B taught one section online (n=21). Instructor B and Instructor P each taught one traditional face-to-face section (n=13 for Instructor B; n=23 for Instructor P) for a total of 57 participants. Five students (1 from Instructor B’s face-to-face class; 2 from Instructor B’s online class; 2 from Instructor P’s face-to-face class) did not complete the pretest; three different students (1 from Instructor B’s online class; 2 from Instructor P’s face-to-face class) did not complete the posttest for a valid N of 49 participants.

Design

This exploratory study used a non-equivalent comparison groups design with two groups: online instruction only and traditional face-to-face instruction, with pretest and posttest measures of student competency for both groups. Pretest and posttest scores were compared for all three sections. No significant differences were found between Instructor B’s traditional face-to-face students and Instructor P’s traditional face-to-face students, so those traditional face-to-face sections were combined and compared to the online student competencies.

Measurement

Two standardized measures were used to assess student achievement of research competency: the Practice Evaluation Knowledge Scale (PEKS) and the Research Self-Efficacy Scale (RSES). The PEKS was “developed to measure social work practitioners’ beliefs about their knowledge of practice evaluation competencies” (Baker, Pollio, & Hudson, 2011, p. 558) and has demonstrated internal consistency ($\alpha=.925$) and validity. The 8-item PEKS is measured on a scale from 1-5 where 1 = strongly disagree and 5 = strongly agree. Items include:

1. I have been adequately trained to conduct practice evaluation
2. I am comfortable with my knowledge of evaluation designs
3. If I had to design and evaluation plan I would know where to begin
4. I am able to identify an evaluation outcome
5. I am familiar with issues of reliability and validity
6. I am able to locate measures and scales to assist in evaluation
7. I am comfortable with data analysis techniques
8. The statistics I am required to keep are useful in evaluating outcomes

The RSES, developed by Holden et al. (1999) has demonstrated internal consistency reliability (α=.94), evidence of construct validity, and sufficient sensitivity “to detect change in students’ research self-efficacy from the beginning to the end of their participation in a single-semester research course” (p. 472). The 9-item RSES is measured on a scale from 0 – 10 where 0 = cannot do at all, 5 = moderately certain can do, and 10 = certain can do. Items begin with the statement “how confident are you that you can…” and include:

1. do effective electronic searching of the scholarly literature?
2. use various technological advances effectively in carrying out research (e.g. the Internet)?
3. review a particular area of social science theory and research, and write a balanced and comprehensive literature review?
4. formulate a clear research question or testable hypothesis?
5. choose a research design that will answer a set of research questions and/or test a set of hypotheses about some aspect of practice?
6. design and implement the best sampling strategy possible for your study of some aspect of practice?
7. design and implement the best measurement approach possible for your study of some aspect of practice?
8. design and implement the best data analysis strategy possible for your study of some aspect of practice?
9. effectively present your study and its implications?

**Data Collection**

Combined, the PEKS and RSES total 17 questions. For the purpose of this study, each measure was collapsed into an easily readable online chart where respondents were asked to click the button next to their response for each question. In addition, during the pretreatment, respondents were asked to provide their age, gender, ethnicity, and previous experience with research to comprise a 6-question survey with 21 total items.

After receiving approval from the California State University, Northridge Institutional Review Board, data were collected online via the class Moodle page. Students were directed to a link to the survey prior to the first class session via an email message from the other instructor. Students were assured that their instructor would not see their survey results until after the class ended, and then only in aggregate. Each student has a unique login, so matching pretest with posttest data occurred seamlessly. There were no duplicate entries, meaning it was unlikely that students logged in under another students’ ID to complete either the pretest or posttest.

**RESULTS**

Results from paired samples t-tests indicate a statistically significant increase in PEKS scores from pretest (M = 18.20, SD = 5.34) to posttest (M = 29.12, SD = 4.53), t (48) = 12.48, p < .001 (two-tailed). The mean increase in PEKS scores was 10.91 with a 95% confidence interval ranging from 9.11 to 12.72. The eta squared statistic (.75) indicated a large effect size. Results indicate a statistically significant increase in RSES scores from pretest (M = 486.95, SD = 165.38) to posttest (M = 698.16, SD = 126.73), t (48) = 8.06, p < .001 (two-tailed). The mean increase in RSES scores was 211.24 with a 95% confidence interval ranging from 158.56 to 263.84. The eta squared statistic (.57) indicated a large effect size. There was a substantial difference in program evaluation knowledge (as measured by the PEKS) and research self-efficacy (as measured by the RSES) for both online and traditional face-to-face students after taking the foundation research methods class.

**ONLINE Group**

Wilcoxon Signed Rank Test (the non-parametric alternative to the paired samples t-test) was performed due to the small sample size (n=18). PEKS and RSES scores revealed a statistically significant increase in practice knowledge, z = -3.27, p < .001 and research self-efficacy, z = -3.52, p < .001, with large effect sizes (PEKS r = .53; RSES r = .57). Since results were the same for the Wilcoxon and the paired samples t-test, and because paired samples t-test results are inherently more understandable to the average research consumer, paired samples t-test results for the
online group are reported in Table 1.

Table 1. Online Student Responses by Item, Pretest, and Posttest

<table>
<thead>
<tr>
<th>Item</th>
<th>PreTest (n=18)</th>
<th>Posttest (n=18)</th>
<th>t-score</th>
<th>Sig. Level</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
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<tr>
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<td>.83</td>
<td>3.78</td>
<td>.80</td>
<td>-7.79</td>
</tr>
<tr>
<td>PEKS 4</td>
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<td>-6.23</td>
</tr>
<tr>
<td>PEKS 5</td>
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<td>1.09</td>
<td>3.78</td>
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</tr>
<tr>
<td>PEKS 6</td>
<td>2.06</td>
<td>.72</td>
<td>3.67</td>
<td>.76</td>
<td>-6.98</td>
</tr>
<tr>
<td>PEKS 7</td>
<td>2.11</td>
<td>.83</td>
<td>3.22</td>
<td>.80</td>
<td>-4.16</td>
</tr>
<tr>
<td>PEKS 8</td>
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<td>1.18</td>
<td>3.83</td>
<td>.70</td>
<td>-2.48</td>
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<td>-2.55</td>
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<td>18.96</td>
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</tr>
<tr>
<td>RSES 4</td>
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<td>24.22</td>
<td>80.00</td>
<td>16.80</td>
<td>-4.03</td>
</tr>
<tr>
<td>RSES 5</td>
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<td>18.22</td>
<td>-4.29</td>
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<td>RSES 9</td>
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<td>82.22</td>
<td>16.64</td>
<td>-4.20</td>
</tr>
</tbody>
</table>

Note. PEKS = Practice Evaluation Knowledge Scale
RSES = Research Self-Efficacy Scale
* p<.05

FACE-TO-FACE Group

Paired-samples t-tests were conducted to evaluate the impact of the class on students’ scores on the PEKS and RSES surveys. There was a statistically significant increase in all items of the PEKS and RSES surveys between time 1 and time 2 for traditional face-to-face students (see Table 2).

Table 2. Face-to-Face Student Responses by Item, Pretest, and Posttest

<table>
<thead>
<tr>
<th>Item</th>
<th>PreTest (n=31)</th>
<th>Posttest (n=31)</th>
<th>t-score</th>
<th>Sig. Level</th>
<th>Effect Size</th>
</tr>
</thead>
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<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
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<td>PEKS 1</td>
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<tr>
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<td>.63</td>
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<td>-10.01</td>
</tr>
<tr>
<td>PEKS 3</td>
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<td>-9.08</td>
</tr>
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<td>.93</td>
<td>3.74</td>
<td>.82</td>
<td>-8.91</td>
</tr>
<tr>
<td>PEKS 5</td>
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<td>1.12</td>
<td>4.13</td>
<td>.56</td>
<td>-6.42</td>
</tr>
<tr>
<td>PEKS 6</td>
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<td>1.02</td>
<td>3.90</td>
<td>.75</td>
<td>-8.67</td>
</tr>
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<td>.65</td>
<td>3.06</td>
<td>.77</td>
<td>-6.44</td>
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<tr>
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<td>77.42</td>
<td>16.32</td>
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<td>RSES 4</td>
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<td>72.26</td>
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<td>20.08</td>
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<td>37.42</td>
<td>19.14</td>
<td>67.10</td>
<td>22.98</td>
<td>-5.78</td>
</tr>
</tbody>
</table>
COMPARING Online vs. Face-to-Face Learners

One-way between groups analysis of covariance (ANCOVA) was conducted to compare differences in learning platforms for research methods instruction for MSW students. The independent variable was the type of learning platform (online vs. traditional face-to-face classroom), and the dependent variable consisted of scores on the PEKS and RSES surveys administered at the end of the first research class. Participants’ scores on the PEKS and RSES pretest surveys were used as the covariate in the analysis.

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. After adjusting for pre-test scores, there was no significant difference between online and traditional face-to-face classroom students on posttest PEKS scores $F(1, 46) = .01, p = .91$, partial eta squared = .00, and posttest RSES scores, $F(1, 46) = .36, p = .55$, partial eta squared = .01. There was no relationship between the pretest and posttest scores on the PEKS and RSES surveys, as indicated by partial eta squared values of .04 and .05 respectively.

DISCUSSION

The CSUN MSW program implemented the first two-year, completely asynchronous, online MSW program in the United States. The standards for the online program are the same as those for the traditional classroom, and the same distinguished faculty teaches in both programs. As such, and based on previous literature, the investigators expected to find no difference in learning outcomes between the online and traditional face-to-face classroom students. Meta-analyses comparing distance education and classroom instruction reveal somewhat mixed results with support leaning toward distance education being similar to traditional classroom instruction. Allen, Mabry, Mattrey, Bourhis, Titsworth, and Burrell (2004) and Sitzman, Kraiger, Stewart and Wisher (2006) found no differences in educational effectiveness for distance learners whereas Bernard et al. (2004) found wide variability and low effect sizes on various outcomes. Creating subsets of synchronous and asynchronous applications resulted in effect sizes for asynchronous applications favoring distance education (Bernard et al., 2004) and Sitzman et al (2006) found web-based instruction 6% more effective than classroom instruction for teaching declarative knowledge. The current study examined an asynchronous, web-based distance-learning classroom compared to a traditional face-to-face classroom for research methods (declarative knowledge), finding no differences in the learning outcomes between the two learning platforms, thereby providing additional evidence in support of the effectiveness of distance education. Finding differences in learning outcomes would have resulted in adjustments being made to either course, depending on the nature and direction of those differences.

Despite a growing body of evidence that online learning or distance education is just as effective as traditional face-to-face classroom instruction, the various types of online education make comparisons difficult. Online learning or distance education ranges from in-service training on-demand via television and satellite to PC systems (Williams, Nichols, & Gunter, 2005) to asynchronous electronic software content (Harrington, 1999) to hybrid models combining face-to-face instruction with distance learning applications (Ayala, 2009; Osguthorpe & Graham, 2003). The current study adds to the developing body of literature by using standardized measures of learning outcomes, a pre/post quasi-experimental design, and controlling for instructor and content differences in that the same instructor taught both the asynchronous online and face-to-face classes.

As online learning and distance education continues to develop, the CSUN MSW program is on the cutting edge of this growth in the social work field. Remaining on the cutting edge involves conducting research that goes beyond student satisfaction or course evaluations. Our results indicate that students gain confidence in research methods and evaluation regardless of the learning platform utilized. Increased student self-efficacy in research methods may translate into greater comfort recognizing and employing evidence-based practices in the field, but results should be interpreted with caution considering the study used self-reports of a nonrandom, convenience sample of graduate social work students from a single university. Although there were no statistically significant differences between the face-to-face and online students at pretest, participants were not randomized into experimental and control groups and it is...
possible that there are inherent differences between the two groups that account for the knowledge and self-efficacy gained. Selection bias remains a threat to internal validity with this non-randomized design.

Despite the limitations of the current study, our results add to the growing body of literature showing that successful student education may occur through a variety of learning platforms. A major strength of this study is the use of pre/post standardized learning outcome measures for two groups of students: online and traditional face-to-face learners, with findings suggesting that the modality of content delivery is less important than the content itself.

Future research should explore long-term retention of knowledge (e.g. Baker et al, 2011). Since the timing of content delivery in this sample differed by seven weeks (15 week semester for face-to-face students; 8 week course for online students), it is possible that the shorter learning time could negatively affect long-term retention of knowledge. Furthermore, research about the quality of programs from the perspective of learning outcomes triangulated with faculty-measured student competency could provide useful knowledge for informed practice and policy. Implications for social work education include effectively utilizing a broad range of information and communication technologies and increasing accessibility to social work students in traditionally underserved areas.

REFERENCES


