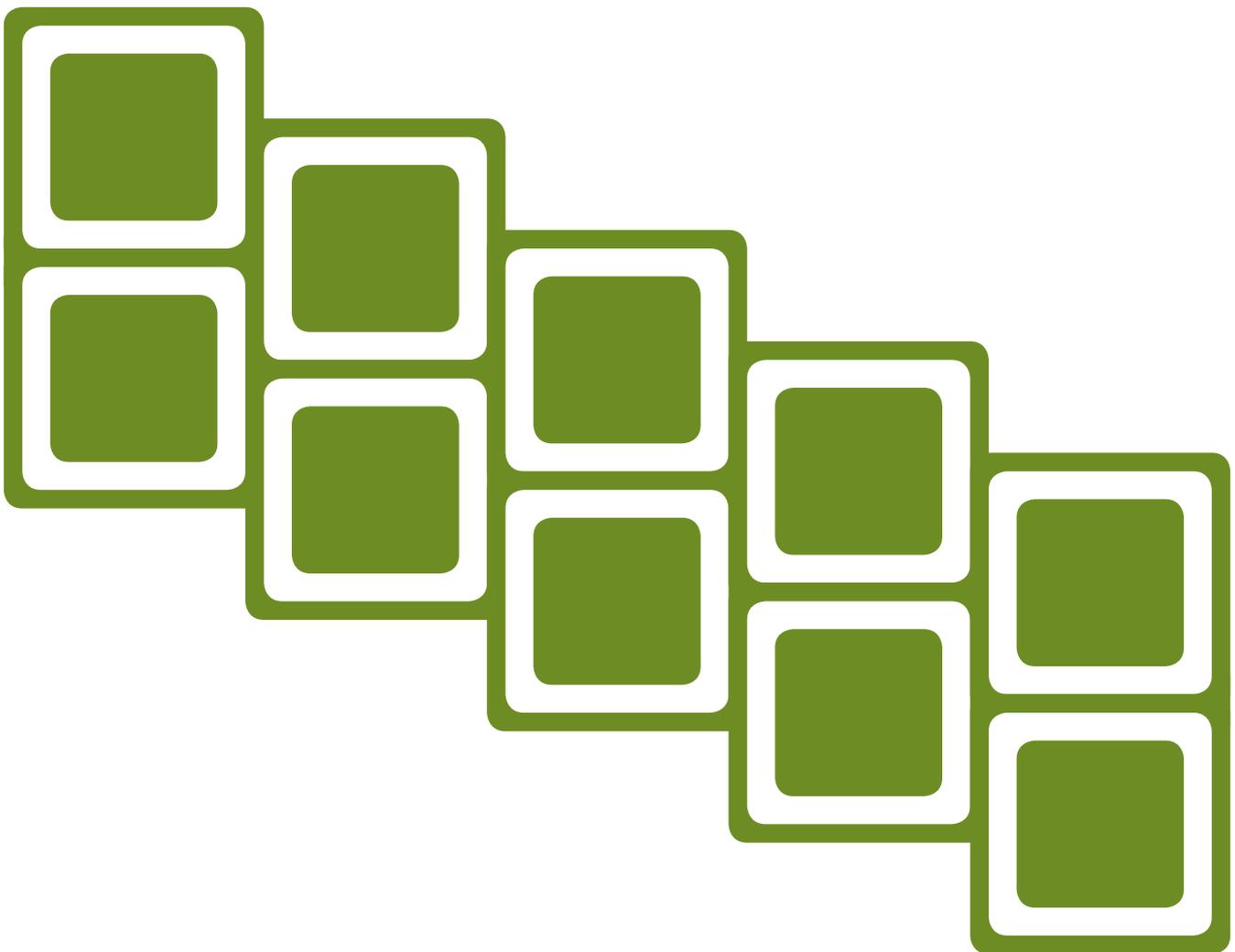


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Comparison of Motivation and Learning Outcome Achievement in Shortened, Online Summer Courses versus Their Full-Term Counterparts

Bethany Simunich
Kent State University

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Abstract

This study examined student motivation and learning outcome achievement in shortened summer online courses when compared to their full-term online counterparts. Two courses were examined—a science course and a humanities course—each of which was taught as a full semester (15-week), fall term asynchronous online course and a shortened (5-week) summer term asynchronous online course. Both courses were designed with the assistance of an instructional designer and met design standards through an informal Quality Matters review. Further, both versions of each course were taught by the same professors who had both participated in online teacher training. The two versions of each course was identical in terms of content, assignments, layout, and rigor. In sum, this study held constant the variables of instructional design, instructor, and course content, and only course length was isolated as an independent variable. Student achievement of learning outcomes was measured by final course grades, single grades on a major project, and a post-course knowledge test. Motivation was measured using standard questions selected from the Motivated Strategies for Learning Questionnaire. Results from 133 students in the full semester fall offerings and 66 students in the shortened summer offerings reveal that learning outcome achievement and motivation have no statistically significant difference when comparing course length or course term.

Review of Literature

Criticism of shortened (also referred to as intensive or accelerated) courses is often based on the claim that the shortened format compromises the effectiveness of the course and hinders learning (Kucsera & Zimmaro, 2010). Research, however, seems to indicate otherwise. For example, past studies, including Scott and Conrad's (1992) meta-review, have found intensive courses to have equal learning outcome achievement when compared to their traditional counterparts. Notably, Daniel's (2000) findings also suggest that the parity in outcomes may be because students in shortened courses have higher levels of motivation than those in full-length courses. Research has also found that a majority of students in intensive courses report an increase in focus, stamina, and retention, and a decrease in their procrastinating behavior (Scott, 2003).

However, studies have also shown that teaching strategies and rigor can vary between regular semester courses and their compressed counterparts, which could impact findings of parity. For example, numerous studies (Allen, Miller, Fisher, & Moriarty, 1982; Daniel, 2000; Kretovics, Crowe, & Hyun, 2005) have found that shortened courses often include more discussion, including more *in-depth* discussion, and more opportunities for experiential learning. Past research has also found that rigor, in terms of the number of hours students spend on learning activities both in and out of class, is not always equal between a regular semester course and its shortened version. For example, Lutes and Davies (2013) found that students self-reported spending 17 to 23 more minutes per credit per week in full semester courses versus the shortened counterpart. Faculty have also reported covering less material in intensive courses (Allen et al., 1982). However, according to equivalency theory (Simonson, Schlosser, & Hanson, 1999), course-learning experiences should be consistent, regardless of how the course is delivered.

Much of the research comparing the effectiveness of shortened versus full-term courses faces some methodological limitations, specifically, a lack of control for confounding variables (Scott & Conrad, 1992). These can include looking at courses from only one discipline, and not accounting for potentially different rigor or different teaching strategies or different instructors. Perhaps more importantly, there is a lack of research comparing online shortened courses to their full-term counterparts. For example, if teaching strategies such as including more in-depth discussions influence learning in classroom-based shortened courses, would it be possible to replicate those same differences in teaching strategies in the online classroom, where synchronous discussions are largely absent? In one study, students identified both classroom interaction and discussion, and classroom relationships (between students, and between students and instructors) as important attributes of a high-quality shortened course (Scott, 2003). However, discussions and interaction happen differently online and are impacted by several issues, including transactional distance (Moore, 1993), social presence, teaching presence (Garrison, Anderson, & Archer, 2000), instructional design choices, and online teaching effectiveness. Considering that the online classroom is a unique classroom where interaction must be designed and carried out in a different way, would shortened online courses report the same or greater learning if those findings are based on the amplifying effect of face-to-face interaction?

While motivation, as previously noted, was shown to be a factor in learning achievement in shortened courses, the impact of student motivation has not been fully explored in shortened online versus full-term online courses. Motivation has been found to have an impact on learning achievement (Zusho, Pintrich, & Coppola, 2003) and to be related to success in the online classroom (Miltiadou & Savenye, 2003). However, anecdotal evidence from faculty suggests that students taking summer courses, in particular, often have less interest and less time to devote to their classes, which could result in a reduced level of motivation. Increases in the number of students taking at least one online course underscore the importance of examining the effectiveness of online courses in terms of course duration and term. For example, between fall 2012 and fall 2014, enrollment in distance education courses in the USA grew by 7%, even though campus-based enrollments are declining (Allen, Seaman, Poulin, & Straut, 2016, p. 13). Although many studies have examined the effectiveness of traditional versus intensive courses, nearly every relevant study

- did not examine online courses, and
- did not examine whether or not the term (summer) impacted effectiveness.

Therefore, it is important for several reasons (including marketing and retention) to examine whether or not learning outcome achievement and motivation are impacted in shortened courses by the modality (online) or term offering (summer).

Past research on grades found similar or greater learning took place in shortened courses, and that higher motivation of students in shortened courses might positively impact learning achievement. This study attempted to investigate whether or not these results could be replicated in the online environment through the following research questions:

- R1: Is student learning outcome achievement the same in shortened, online summer courses versus their traditional full-length, fall term counterparts?
- R2: Is student motivation the same in shortened, online summer courses versus their traditional full-length, fall term counterparts?

Methodology

For the purposes of this study, two asynchronous, fully online courses were chosen that had both a full-term (15-week) and shortened (7-week) format. For both of the classes, the shortened version was held in the summer, and the full-term course was held in the fall. In an effort to increase generalizability, the two courses were chosen from different disciplines: one was a physics course and the other an English course. Traditionally, non-majors have taken both courses as electives to fulfill a general education or core requirement.

In order to better isolate the effect of format (full term versus shortened), two factors were held constant: course design and teaching. First, the courses were designed with the help of the same instructional designer, and both full-term courses were reviewed with the Quality Matters rubric

for instructional design in online and hybrid courses. Quality Matters (QM) is both a rubric and a faculty-centered peer review process that focuses on the design of online and hybrid courses and is intended to certify course design quality. The process uses an extensive rubric, organized under eight general standards and 41 specific standards, and a certified team of three QM peer reviewers who conduct the review. Quality Matters was used as a baseline indication of course design quality, as it is a nationally recognized standard for the design of online and hybrid courses. Both full-term courses met QM standards through an informal review with a certified QM peer reviewer.

Second, both courses used a common template for good navigation and consistent structure, which is also part of the design of a quality online course. The shortened versions of the courses were *exactly* the same as the full-term versions, with the exception of the length of the learning units and due dates of assignments. Rigor was examined for both versions of each course to ensure that learning units were spaced to accurately reflect credit-hour requirements. No content or assignments were removed or changed in restructuring the course to the shortened format.

In addition, in order to help control for possible differences in course delivery, the same professor taught both the full-term version and the shortened version. In both the science and the humanities course, the professors had taken faculty development training in online teaching, and both were experienced online instructors, having taught online for five or more years. The professors issued the same class announcements in each course and provided the same opportunities for live office hours, email Q & A, and other course help.

Sample

A convenience sample of students who enrolled in one of the four courses was used. In order to increase validity as much as possible, elective courses taken by non-majors were purposely used in order to avoid having a large group of participants from a single discipline. Students in the sample broadly represented all disciplines, including the physical sciences, social sciences, and humanities. The two fall term courses were combined into one group, as were the two summer term courses. This was done for two reasons: first, students already represented a broad range of majors, allowing for aggregation of the sample. Second, the summer term humanities course had too few students to be analyzed as a separate group; combining the two courses created a sample size consistent with the a priori power analysis (assuming power = .8, effect size = 0.5, allocation ratio $n_2/n_1 = .66$, alpha = .025). The a priori power analysis revealed a minimum sample size of 98 for the fall term courses and 64 for the summer term courses, for a total minimum sample size of 162. The allocation ratio was set to 0.66 due to the fact that the summer term courses used in the study always had lower enrollment; α was set to a conservative .025 to accommodate the inflation of Type I error due to multiple testing.

Measures

The dependent variable of learning outcome achievement was triangulated through final course grade, the grade achieved on a key, large assignment that was directly aligned with course learning outcomes, and results of a post-course knowledge exam. In the science course, the post-course knowledge exam, which consisted of 20 multiple-choice questions, already existed and was required by the department. In the humanities course, a comparable post-course, 20 multiple-choice-question exam was created by the instructor, who was also the course developer. Grades for all three measures of learning were reported on a 1 to 5 grade scale (1 = “F,” 5 = “A”) to reflect standard grade ranges. In order to combine these three items into a single learning achievement variable, correlation coefficients were run between the three measures of learning achievement. Correlation was strong and significant between all three measures: final grade and post-course exam, $r = .51$, $p = .000$, project grade and final grade, $r = .61$, $p = .000$, and project grade and post-course exam, $r = .80$, $p = .000$. Consequently, all three measures of learning achievement were aggregated into a single measure.

Student motivation was measured using items from a standard scale—Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991). The MSLQ consists of two sections: a motivation section and a learning-strategies section. The motivation section consists of 31 items that assess students’ level of test anxiety and self-efficacy to do well, and their academic goals and value beliefs. Because students would be voluntarily completing the MSLQ questions as well as demographic questions before they began their online course, only certain questions were chosen to be administered from the MSLQ, rather than including the entire section of 31 items, in order to keep the survey brief and encourage students’ voluntary participation. Questions chosen reflected the value components of intrinsic goal orientation, extrinsic goal orientation, task value, and self-efficacy for learning and performance. Responses used a 5-point Likert-type scale (1 = *Not True at All* to 5 = *Very True*). A reliability analysis was conducted for the items chosen, showing high internal consistency, with a Cronbach’s alpha coefficient of .725.

Pre-course and post-course student surveys also included general and demographic questions that allowed for the subsequent control of gender, age, previous experience with online courses, GPA, outside responsibilities (job, family, etc.), incoming interest in subject matter, incoming knowledge in subject matter, major, and technology skill level. In addition, students responded to questions related to their attitudes and beliefs about shortened courses and summer courses. Student participation in the survey addressing motivation, course attitudes, and demographics was completely voluntary and adhered to Institutional Review Board requirements. Students were not awarded extra credit or any type of compensation for their participation, and they were fully informed that they were not required to complete the survey, nor would there be consequences for not completing it.

At the end of the course, after receiving their project grade, final grade, and post-course knowledge test grade, students were asked to report the grade received on each, along with their feedback about the course and their experience. As with the pre-course survey addressing motivation,

course attitudes, and demographics, students were neither rewarded nor penalized for submitting their grade information in the post-course survey, and they were informed that their participation was voluntary. Both the pre-course and post-course surveys were administered through the survey tool within the online course, and responses from each were downloaded from the learning management system. Individual responses were matched based on a unique identifier provided to each student to assure anonymity. Students were informed that their responses were being used to investigate student attitudes and learning in online courses, and that neither their professor nor the researcher would be able to associate their responses with their name.

Results

Participants were undergraduate students from a midsize, Midwestern university, and data were collected from 199 participants—133 combined total for the two full-term courses, and 66 combined total for the two shortened courses. Most respondents (58%) were female, and most students (73%) were enrolled in one of the versions of the science course. Sixty-one percent of participants were either juniors (33%) or seniors (28%), while sophomores accounted for 25%, freshman for 8%. Graduate students and non-degree students (6%) constituted the remaining numbers. Most (72%) were between 18 and 22 years old, although older adult students were also represented. Most (65%) had a GPA above 3.0, and the mean GPA of respondents ($n = 174$) was 3.1 ($SD = 0.70$). Approximately 77% of students had taken a previous online class: 32% of the students had taken three or more online classes, and 76% had used the university's learning management system prior to this course. Thirty-five percent of respondents felt that online classes are more difficult than face-to-face classes, and about half (48%) had previously taken a shortened course, either online or face-to-face.

The majority of those who had never taken a shortened course (62%) did not feel that a shortened course would be more difficult, while only 33% of students who had taken at least one shortened course felt the same. However, the majority of all respondents (85%) disagreed that shortened courses were less work than full-term courses, and 73% of all respondents disagreed that shortened courses had less content than their full-term counterpart. Additionally, most students (68%) disagreed that they had less time to work on coursework in the summer, and 91% disagreed that they take courses that are less important to their academic career in the summer. Together, these responses suggest that the respondents do not feel that shortened courses mean they are “short-changed” on learning (i.e., the courses do not have reduced coursework or are only appropriate for subjects that are outside their major or are “less important”). Further, most respondents did not see the amount of effort in summer term classes as different from other terms, and they believe they have the time to devote to serious classwork for summer courses.

Research Questions

R1: Is student learning outcome achievement the same in shortened, online summer courses versus their traditional-length counterparts?

To address this research question, learning achievement (as aggregated from student final course grades, grades on a major course project, and grades from the post-course knowledge survey) was examined for both groups. Levene's test indicated equal variances ($F = 0.384, p = .536$) between the full-term and the shortened summer term course groups. An independent-samples t -test indicated that learning achievement scores did not significantly differ between the full-term group ($M = 13.39, SD = 2.70$) and the shortened, summer term group ($M = 13.05, SD = 2.74$), $t(196) = .853, p = .395, d = 0.125$.

However, the sample was highly skewed toward higher grades: For example, 72% of all students earning a final course grade of "A" had similar high scores on the other two measures of learning achievement. Because of this, the sample distribution was negatively skewed, with the distribution concentrated to the right, due to a greater number of higher grades, and as such, violated assumptions of normality. A Kolmogorov-Smirnov test was used to test for normality on the dependent variable of learning achievement. The learning achievement scores, $D(198) = 0.283, p = .000$, significantly deviated from normality, demonstrating that the data were not normally distributed.

Therefore, a non-parametric analysis was run to determine if learning achievement differed significantly between the two groups. A Mann-Whitney U test revealed no significant difference in learning achievement between students in the full-term, 15-week courses ($Mdn = 15, n = 133$) and the shortened summer 7-week courses ($Mdn = 15, n = 66$), $U = 3988, z = -1.06, p = .289, r = .08$. Hence, no statistically significant difference in learning outcome achievement was found between students in the full-term online classes and those in the shortened summer classes, even when addressing skewed issues.¹

R2: Is student motivation the same in shortened, online summer courses versus their traditional-length counterparts?

To compare student motivation among groups, an aggregated motivation score was created from the selected six MSLQ questions and was examined for both groups. Levene's test indicated equal variances ($F = 1.89, p = .171$) between the full-term and the shortened summer term course groups. An independent-samples t -test indicated that motivation scores did not significantly differ between the full-term group ($M = 24.87, SD = 2.77$) and the shortened summer term group ($M = 24.41, SD = 3.36$), $t(190) = 1.01, p = .312, d = 0.149$.

¹ Although the summer enrollment for the humanities course had too few student respondents to meet minimum sample-size requirements for an independent analysis, learning outcome achievement in the full-term versus shortened summer term science course was examined, and no statistical difference was found between the full-term science course ($Mdn = 15, n = 101$) and the shortened, summer 7-week science course ($Mdn = 14, n = 46$), $U = 1882, z = -1.598, p = .09, r = .13$.

Similar to learning achievement, however, the sample was highly skewed toward motivated students, with a score of 25 (out of a possible 30) being both the mean and median. Because of this, the sample distribution was positively skewed and violated assumptions of normality. A Kolmogorov-Smirnov test was used to test for normality on the dependent variable of motivation. The motivation scores, $D(192) = 0.112$, $p < .001$, demonstrated that the data were not normally distributed.

A Mann-Whitney U test revealed no significant difference in motivation between students in the full-term, 15-week courses ($Mdn = 25$, $n = 129$) and the shortened summer, 7-week courses ($Mdn = 25$, $n = 63$), $U = 3849$, $z = -0.597$, $p = .550$, $r = .04$. Thus, no statistically significant difference in motivation was found between students in the full-term online classes and those in the shortened summer classes.

Discussion

This study added new knowledge to the body of literature on shortened courses. Of the courses examined, shortened summer online classes did not show a statistically significant difference in learning achievement or motivation, as compared to their full-term fall counterparts. This supports findings of past research that examined similar variables in face-to-face courses.

One strength of the study was that several confounding variables were controlled to a high degree. Specifically:

- The same instructor taught each course during its summer and fall term offerings, and both instructors were highly motivated, experienced, and knowledgeable in teaching in the online classroom. Each instructor had also completed the same professional development in online teaching.
- The shortened course was identical in both content and structure to the full-term course.
- Both courses were designed with the help of an instructional designer and also met QM design standards through an informal review by a certified QM peer reviewer. This helped to ensure that both courses demonstrated quality in online course design.

Regarding motivation, given factors such as the high GPA of students, their familiarity with the learning management system and taking online classes, and their belief that shortened classes were not easier and summer classes were worth as much of their effort as full-term classes, the study sample consisted of highly motivated, high-achieving students from the outset. Because of these factors, it is foreseeable that motivated students with a high GPA would earn high grades in a course. Completion of the pre-course and post-course survey was optional, but the total response rate (64%) was high, and individual course response rates were similar. As discussed by the two instructors in an informal post-study interview, all grades in general in the four courses were high, which possibly mitigates or eliminates the concern that only highly motivated, high-achieving students completed the pre-course and post-course survey.

Furthermore, while the sample sizes of both sections of the science course were potentially large enough for analysis on their own, the same did not hold true for the humanities course, which had lower summer enrollment. Therefore, it is possible that there is a difference among course disciplines that was not revealed, as the small sample size of the summer humanities course did not allow separate statistical analyses. However, because non-majors were enrolled in both the science and humanities courses, the a priori power analysis combined the courses by term for analysis, and the results have some degree of generalizability for students in various majors and disciplines. Future studies would greatly add to this knowledge by comparing courses of different disciplines to see if that is a factor for learning achievement or motivation in full versus shortened versions of the course.

In addition, this study specifically looked at shortened summer courses, whose student profile might differ from shortened courses during other terms when students are taking more classes at a time. While past research on face-to-face shortened courses does not support this idea, it still is worthy of examination. Future studies would do well to maintain quality control on course design and teaching in order to isolate the variable of term length. Additionally, replication of this study using courses that, as reported by the instructor or by student data, traditionally have a normal distribution of final grades would be a logical and important next step in adding to our knowledge of learning achievement and motivation in shortened online courses.

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Biography

Bethany Simunich is the director of Online Pedagogy and Research at Kent State University and has worked in online education for nearly 15 years. She teaches both online and face-to-face classes and has held positions in educational technology, instructional design, and faculty development. She has also worked in research and evaluation of online course quality and effectiveness. At Kent State, she works with the online learning team of Kent State Online and oversees faculty development offerings, provides consultations on online course design, collaborates with faculty in online learning research, and engages with faculty in peer evaluation of online teaching and design. She also works closely with Quality Matters as a master reviewer, trainer, and senior research colleague. Bethany Simunich is passionate about helping instructors design and teach high-quality, engaging online and hybrid courses, and she enjoys presenting workshops on instructional design, online teaching, and online learning research at conferences and universities both nationally and internationally. Her research interests include presence in the online classroom, online student and instructor satisfaction, and rigor and outcome achievement in online courses.