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Are Your Students Flipping Prepared?

Amanda A. Anderson

Iowa State University, amarens@iastate.edu

Libby Franke

Iowa State University, libbyf@iastate.edu

Warren Franke

Iowa State University, wfranke@iastate.edu

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Are Your Students Flipping Prepared?

Abstract

The flipped classroom design is becoming a popular trend among college courses. In order for this design to be successful, students must come to class prepared. The purpose of the current study was to evaluate the effectiveness of a class prepared assignment (CPA) in a senior undergraduate Kinesiology laboratory with a flipped design. All participants were required to watch weekly videos prior to coming to a 2-hour lab, once a week. Participants were either in a laboratory section where no CPAs were assigned (control, n = 49) or in a laboratory section where CPAs were assigned (experimental, n = 49). Laboratory quiz scores, percentage of weekly videos watched, multiple video views, and reported student preparedness were compared between groups. The results showed statistically significant differences in laboratory quizzes, percentage of weekly videos watched, and multiple video views. No statistically significant difference was found between reported student preparedness. Class prepared assignments appear to increase participation in pre-class assignments in flipped classrooms and CPAs may encourage students to interact with the content multiple times.

Disciplines

Educational Assessment, Evaluation, and Research | Educational Methods

ARE YOUR STUDENTS FLIPPING PREPARED?

Amanda Anderson, M.S., Libby Franke, M.S., Warren Franke, PhD.

ABSTRACT

The flipped classroom design is becoming a popular trend among college courses. In order for this design to be successful, students must come to class prepared. The purpose of the current study was to evaluate the effectiveness of a class prepared assignment (CPA) in a senior undergraduate Kinesiology laboratory with a flipped design. All participants were required to watch lab videos prior to coming to a 2-hour lab, once a week. Participants were either in a laboratory section where no CPAs were assigned (control, $n = 49$) or in a laboratory section where CPAs were assigned (experimental, $n = 49$). Laboratory quiz scores, percentage of lab videos viewed, multiple video views, and reported student preparedness were compared between groups. The results showed statistically significant differences in laboratory quizzes, percentage of lab videos viewed, and multiple video views. No statistically significant difference was found between reported student preparedness. Class prepared assignments appear to increase participation in pre-class assignments in flipped classrooms and CPAs may encourage students to interact with the content multiple times.

BACKGROUND

A flipped (or inverted) classroom is “a re-ordering of classroom and at-home activities, meaning the traditional events (i.e., lecture) occurring within the classroom now take place outside the classroom and vice versa” (Lage, Platt, & Treglia, 2000, p. 32). The flipped classroom is often found in the traditional lecture based course, but is now becoming more prominent in laboratory courses. Regardless of the classroom setting, an integral component of this design is student preparedness. Instructors expect students to watch or read assigned content prior to class then come prepared to apply the material or participate in classroom discussion. Unfortunately, research indicates that students only finish about one-third of assigned content (Clump, Bauer, and Bradley, 2004).

Developing adequate techniques to encourage student preparedness is a high priority for flipped classrooms. One technique that has been used are Class Prepared Assignments (CPAs) which are “low stakes writing assignments that lead students to engage with the primary sources that constitute the assigned readings” (Ewell & Rodgers, 2014, p. 204). This technique has been successfully utilized in traditional lecture courses who have adopted the flipped design and in discussion based courses (Ewell & Rogers, 2014; Yamane, 2006). However, CPAs have not been used in laboratory courses with a flipped design. Therefore, the purpose of this study was to evaluate the effectiveness of CPA’s in preparing students for laboratory activities.

METHODS

Participants were senior undergraduates in a 400-level Kinesiology laboratory course with a flipped design. Participants were expected to view lab videos demonstrating laboratory activities to be performed during lab. Participants were divided into either the experimental group (CPA group; $n = 49$) or the control group (no CPA; $n = 49$). The experimental group completed low stakes writing assignments that accompanied the lab videos. The CPAs were turned in at the beginning of each laboratory period. The control group viewed the lab videos with no CPA.

Individual, two-way repeated measures ANOVA were used to compare laboratory monthly quiz scores and percentage of lab videos viewed. Post-hoc comparisons were made using Holmes-Sidak test. Student preparedness scores (0-100) were compared using an unpaired t-test and an individual chi-square tests of independence were conducted to examine the relationship between multiple video views and any % of lab video viewed (*define as greater than 0%*). Level of significance was set at $p < 0.05$.

RESULTS

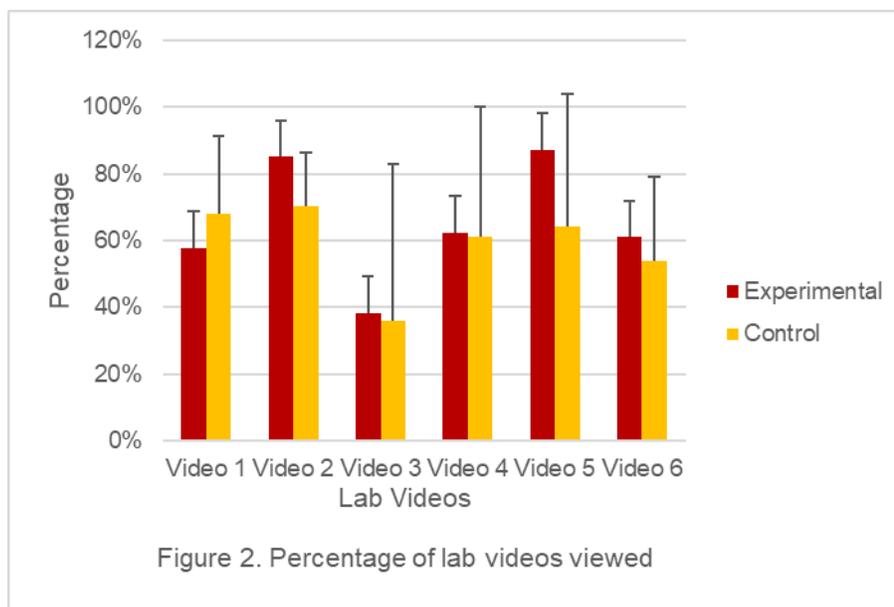
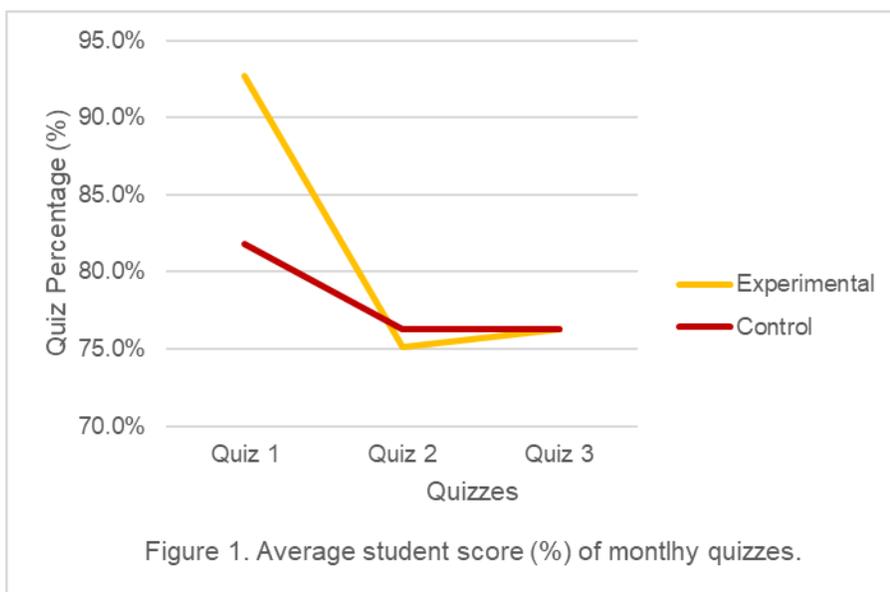
Student reported preparedness was trending towards statistical significance ($p = 0.057$) (Table 1).

Table 1. Preparedness Questionnaire

Question 9	Experimental (M ± SD)	Control (M ± SD)	p-value
On a scale of 100 (Extremely Prepared) to 0 (Unprepared), how prepared do you feel for today's lab?	88.4 ± 12.4	83.3 ± 13.2	0.057

Level of significance $p < 0.05$.

A two-way ANOVA was conducted that examined the effect of group and time on quiz score. There was a statistically significant interaction between the effects of group and time on quiz score, $F(2, 96) = 5.242, p = .007$ (Figure 1). A second two-way ANOVA was conducted to evaluate the effect of group and time on the percentage of lab videos viewed. There was a statistically significant interaction between the effects of group and time on percentage of lab videos viewed, $F(5, 384) = 5.232, p < .001$ (Figure 2).



A chi-square test of independence was performed to examine the relationship between group and multiple video views. The relationship between these variables was significant, $\chi^2(4, N = 589) = 650.66, p < .001$. The proportion of participants who viewed the videos multiple times was greater in the experimental group (63%) compared to the control group (36%) (Table 2). A second chi-square test of independence was performed to examine the relationship between group and any % of lab video viewed. The relationship between these variables was significant, $\chi^2(1, N = 588) = 57.16, p < .001$. The proportion of participants who viewed any % of the lab video was greater in the experimental group (98%) compared to control group (78%) (Table 3).

Table 2. Chi-square results of multiple video views

	Multiple Video Views*			X ²
	No	Yes	Totals	
Control	202 (69%)	92 (31%)	294	p < 0.0001
Experimental	107 (36%)	187 (63%)	294	
Totals	309 (100%)	279 (100%)	588	

*Note. Multiple video views defined as more than one view.

Level of significance $p < 0.05$.

Table 3. Chi-square results of any percentage of videos viewed

	Any Percentage of Videos Viewed			X ²
	No	Yes	Totals	
Control	64 (22%)	230 (78%)	294	p < 0.0001
Experimental	5 (2%)	289 (98%)	294	
Totals	69 (100%)	519 (100%)	588	

*Note. Any percentage of video views defined as more than 0%.

Level of significance $p < 0.05$.

Finally, the experimental group was provided an optional, open-ended question on the questionnaire to provide feedback on the CPAs: “Please state any positive or negative feedback about the CPAs.” According to the students, the CPAs were beneficial in preparing them for lab. “I feel the CPA’s are a great tool and help to motivate me to actually watch and pay attention to the videos.” Another student commented, “It made me prepared for lab. They were worth it.”

DISCUSSION

The current study revealed that CPAs increased the total percentage of lab videos viewed and increased the likelihood that participants viewed the videos multiple times compared to no CPA assigned. These results are promising for laboratory courses with a flipped design as coming ready to participate in the laboratory activities allows students to spend more time enhancing their skills and techniques. Subjective reporting of student preparedness was borderline statistically significant ($p = 0.057$) indicating students may feel more prepared when completing a CPA prior to class. In addition, the CPA group was more likely to watch any % ($> 0\%$) of the lab video. Again, this supports the notion that students given a CPA may be more likely to complete pre-class assignments compared to no CPA given. The results of the current study support the use of CPAs for laboratory courses with a flipped design.

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- Email: amarens@iastate.edu