

Classroom Jeopardy: A Winning Approach for Improving Student Assessment, Performance, and Satisfaction

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Classroom instruction has changed dramatically in the past decade with the increasing integration of technology and pedagogy. Instructors today continuously seek effective teaching strategies that capitalize on technology while utilizing both proven and innovative teaching strategies. Research has shown team-work, game playing, and focused feedback are successful pedagogical approaches (Angelo & Cross, 1993; Thiagarajan & Parker, 1999; Lieberman & Wehlberg, 2001; Yumuk, 2002). Based on this research, an innovative team-based game-oriented exam was created with the goal of invoking student interest and involvement while improving student assessment, performance, and satisfaction. Research suggests that students who achieve a higher level of learning can effectively relate course material to other areas of their life (Lieberman 2001). Higher learning can be achieved through action-based knowledge and team assignments. Action-based knowledge develops capable students who can internalize and then widely apply course constructs. It enables students to make meaningful connections between what is learned in the classroom and what is experienced outside of the classroom (Yumuk, 2002). Students who attain higher learning, with more meaningful connections in-and-out of the classroom, may be expected to feel more personal achievement and more course satisfaction than students who make no in-and-out connections.

Research Objective

The objective of this research was to develop an innovative teaching method that incorporated the historical successes of action-based team assignments for classroom instruction. An educational technique that facilitated classroom assessment and inte-

grated team-based learning with game play was sought. Research has shown action-based knowledge results in capable students who can internalize and then widely apply course constructs. Pedagogical literature suggests team evaluations encourage peer mentoring, a process that results in new meaning and improved understanding for all participants. Mentoring creates a transaction process resulting in new meaning and improved understanding for all participations (Donoahue et al., 1996). Team evaluations not only motivate mentors, but also motivate peers to accept mentoring—they too make an effort to receive a higher evaluation. Synergistic team participation is likely to enhance course satisfaction for all students. Historical reports on effective classroom assessment recommend frequent and focused feedback. Despite the widely-known successes of these classroom techniques, there are few, if any, reported pedagogical approaches which effectively integrate these constructs.

About the Exam

The team-based game exam uses Microsoft Powerpoint and the Jeopardy® game show format. Self-selected student teams compete to answer a defined number of exam questions and all members of the team receive the same exam score. Exam questions are both short-answer and computational. To ensure complete team participation, each team member is required to correctly respond to one short-answer question before another member of the team may answer a second question. Computational questions are collectively determined by the entire team.

The team-based Jeopardy exam provides focused student feedback, improves student performance, and enhances course experience. The interactive testing ap-

proach allows the instructor to immediately review missed questions and clarify misunderstood concepts. The grading scheme provides the impetus for team studying and peer mentoring; teams benefit by ensuring that all members attain the same level of knowledge. The game play atmosphere replaces the typical test-taking anxiety with charged excitement. As teams began accumulating points, a feeling of individual and team accomplishment is apparent.

Format

The team-based Jeopardy game exam uses a format similar to the popular game show Jeopardy®. In Statistics, there are six content categories: 'Probably Descriptive' (descriptive statistics), 'For the Discrete only' (discrete distributions), 'Continue Please' (continuous distribution), 'Sample your confidence' (confidence intervals), 'What can we infer' (statistical inferences about one population), and 'Two is better than one' (statistical inferences about two populations). Each category has between 9 and 12 short answer and multiple-choice questions in addition to one computational question. Each question is worth one point and self-selected student teams, made up of four to six individuals, compete for a total of 15 points. Individual team members answer the short answer or multiple-choice questions with only one team receiving a point. Team members work collectively to answer the computational questions, and all of the teams may turn in an answer. Every team with the correct answer receives one point. There are a total of 120 points (including points obtained from computational questions) available for eight groups.

A category is randomly selected to begin the game and all questions within the category are asked and answered prior to moving to another category. As short-answer or multiple-choice questions appear, individual students knowing the answer raise their hands. The first student to raise their hand is the primary respondent while the second student is the stealing respondent. If the first student does not give the correct answer, the second student is allowed to answer. If the second student also misses the question, it is eliminated from competition, thus removing an eligible point. Missed questions or concepts

are further explained by the instructor. To ensure complete group participation, each team member is required to answer one question correctly before another team member may answer a second question.

Effectiveness and Benefits

The team-based Jeopardy exam provides students with immediate, focused feedback. Incorrectly answered questions are reviewed by the instructor, and student assessment is on-going throughout the exam as students realize their mistakes and tally their points. Thus, at a minimum, the team-based Jeopardy exam successfully meets the goals of propitious classroom assessment.

The team-based Jeopardy exam also creates an action-based knowledge environment that encourages teamwork. For this research, two undergraduate statistics classes were used for analysis, with both classes taking the same individual exam one. The control class (non-Jeopardy) received an individual exam two while the experimental class (Jeopardy) received a team-based Jeopardy exam two. Paired *t*-tests comparing exam one and exam two scores within each class showed significant improvement in exam scores for both classes at the $p < 0.05$ level (Table 1). (The non-Jeopardy class did not show significant improvement at the $p < 0.001$ level.) However, it should be noted that the mean improvement was much greater for the Jeopardy class (2.13 out of 15) than the non-Jeopardy class (1.01 out of 15). This represents a 14.3 percent improvement for the Jeopardy students and a 6.7 percent improvement for the non-Jeopardy students. (The difference in mean improvement between classes is significant at $p < 0.10$.) The non-Jeopardy class improved likely due to greater savvy about the course and exam-taking for the course, but the Jeopardy class improved well above that. The higher score in the Jeopardy class may be due to a higher level of learning residing within the team or residing with the team as a whole. Thus, the team-based Jeopardy exam had a positive impact on student performance. Additionally, analysis of variance showed interaction between exam one score and exam two format, suggesting a team-based game contributes positively to student performance and may be the result of peer mentoring (Table 2).

Post-exam surveys were used to evaluate the effect of the team-based Jeopardy game on self-reported learning enhancement and course satisfaction. Correlation analyses suggested preparing for and taking the team-based Jeopardy exam increased self-reported exam preparedness and contributed to a positive exam experience. Furthermore, the Jeopardy class reported a stronger positive relationship between self-reported understanding gained through exam completion and overall exam experience when compared to the non-Jeopardy class (Table 3).

Conclusions

Pedagogy literature suggests that team-based activities which promote active student involvement can improve student course experience, learning, and assessment. Given this suggestion, a team-based Jeopardy exam that integrated the proven successes of teamwork and action learning was developed, and its impact on student course experience, learning, and assessment was evaluated. The results of this research provide initial insight into the success of this innovative game-based approach.

The findings of this research suggest a team-based Jeopardy exam can improve classroom assessment by promoting an interactive feedback loop among students and instructors. The team-based Jeopardy format increased student performance. Students in the Jeopardy class performed higher on the game exam than they did on the traditional exam. Furthermore, students within the Jeopardy showed greater exam improvements than students in the non-Jeopardy class, after controlling for prior student exam performance. Preparing for and taking the team-based Jeopardy exam appeared to increase self-reported exam preparedness and contribute to a positive exam experience. Students who reported that preparing for the team-based Jeopardy exam enhanced their understanding also reported the exam format enhanced their understanding. The more positive view of exam-taking reported by the Jeopardy class demonstrates the favorable nature of a game approach whereby students learn through active involvement. This is unlike the nature of a traditional exam that only requires students to demonstrate knowledge.

The results of this research certainly suggest a promising future for team-based game exams and provide encouragement for instructors developing innovative methods to actively engage students in higher learning. Although a few courses may not be suited to the team-based Jeopardy exam, (due to class size or subjective material), the exam can be delivered with any course content because it is the exam format that improves student assessment, performance, and satisfaction—not the content. Thus, instructors motivated to implement the team-based Jeopardy can invariably find ways successfully do so.

References

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	Mean Exam Score Differences With Each Class	
	Non-Jeopardy AM Class	Jeopardy PM Class
Exam 2 – Exam 1 (paired <i>t</i> -test value)	1.02 (2.44)*	2.13 (4.04)**
Exam 2 – Final Exam (paired <i>t</i> -test value)	1.93 (3.67)**	3.31 (5.74)**
Exam 1 - Final Exam (paired <i>t</i> -test value)	(0.91) 1.19	1.19 (2.10)*

Exam 1 and Exam 2 were out of a total of 15 points.

* $p \leq 0.05$, ** $p \leq 0.001$

Table 1: T-tests showing mean exam score differences within a class.

Model Variables	Beta	(SE beta)	T
Intercept	12.28	(1.20)	10.25**
Class (am)	-6.14	(1.98)	-3.10*
Exam 1	-0.05	(0.11)	0.43
Class (am)* Exam 1	0.49	(0.18)	2.78*

Exam 1 and Exam 2 were out of a total of 15 points.

* $p < 0.01$, ** $p < 0.001$

Table 2: Analysis of covariance for Exam 2 scores.

Post Exam Questions	Non Jeopardy AM Class			Jeopardy PM Class		
	Q1	Q2	Q3	Q1	Q2	Q3
Q2 (taking exam)	0.19	1.00		0.46**	1.00	
Q3 (positive experience)	0.29*	0.48**	1.00	0.32*	0.68**	1.00
Q4 (preparedness)	0.21	0.06	0.32*	0.56**	0.31*	0.16

* $p < .05$, ** $p < .01$

Table 3: Correlation analysis of post Exam 2 student questionnaires, by class.

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such, he suggests that more business schools should revise their curricula to include the education of AIDC technologies given the widespread adoption of these technologies.

In the Deans' Perspective column, Professor R. Charles Moyer, dean of the College of Business and Public Administration, The University of Louisville, discusses the lessons he learned while serving as dean over the past seven years. His experience

should be quite helpful to faculty members aspiring to be academic administrators. He believes that a dean is not a chief executive officer but rather a managing partner of a professional partnership and that new leadership is needed every six to ten years.

Finally, Professor Susan E. Pariseau, Merrimack College, reviews three textbooks suitable for an introductory business statistics course: *Statistics for Business and Economics* (9th ed.) by David R. Anderson,

Dennis J. Sweeney, and Thomas A. Williams; *Basic Business Statistics* (9th ed.) by Mark L. Berenson, David M. Levine, and Timothy C. Krehbiel; and *Statistical Techniques in Business and Economics* (12th ed.) by Douglas A. Lind, William G. Marchal, and Samuel A. Wathen. All three texts are well established as evidenced by the number of editions the books have been in print.

Hope you have a great summer. ■