Teaching Practices that Predict Performance in Undergraduate Psychology Courses

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Background and Purpose

In undergraduate psychology courses, a wide variety of course requirements is used to assess learning, such as attendance, quizzes, written assignments, and exams. There has been a wealth of research related to the pedagogy of teaching. For example, Bain (2004) examined the practices of effective teachers and found that some common teaching principles were supporting students' learning outside of the classroom and helping students to engage in disciplinary thinking. When thinking about the "best" practices to promote student learning, Giordano (2006) emphasized that the grading criteria should reflect what instructors want students to learn and include frequent, graded assessments that measure a variety of skills. Furthermore, research has demonstrated that an attendance policy can encourage students to come to class (Golding, 2011) and that practice (rather than graded) quizzes with corrective feedback can improve exam performance (Wickline & Spektor, 2011). Although it should be noted that while practice testing can lead to direct and indirect benefits of learning (i.e., test-enhanced learning), careful consideration must be given to the questions used to avoid negative consequences of quizzing (Nguyen & McDaniel, 2014). The purpose of this study was to explore which of the practices are the best predictors of students' learning in large (i.e., 200- or 400-person) sections of an introductory psychology course.

Method

Participants

Undergraduate students from Northern Arizona University (N = 1,506) enrolled in one of the six sections of the Introduction to Psychology (PSY101) course offered during the Fall 2013 semester. PSY101 was taught by five instructors:

- Section 1 (n = 193): Instructor A
- Section 2 (n = 375): Instructors B and C (team-taught)
- Section 3 (n = 375): Instructors B and C (team-taught)
- Section 4 (n = 192): Instructor D
- Section 5 (n = 178): Instructor E
- Section 6 (n = 193): Instructor A

Materials and Procedure

The materials consisted of the classroom lectures, assignments, and exams that were normally used by each instructor. There was also standardization across sections for most of the course requirements and the grading criteria used, which included:

- *Attendance*: Students were required to scan their student ID during each class meeting.
- *LearnSmart Assignments*: Adaptive learning assignments were completed online, due prior to each chapter being covered in class, and graded based on completion.
- *Practical Application Assignments (PAAs)*: Students read a primary research article and then completed a written assignment to apply what they learned. These assignments corresponded to the course content and were graded using a standard rubric.
- *Research Component*: Students completed a pre- and post-survey to assess knowledge about psychological concepts, research screening, and research participation.
- *Exams*: Consisted solely (or primarily) of multiple-choice questions completed in-class.

The only requirements that differed among the sections was in Section 5 (see Table 1), which included an additional assignment (i.e., a reflection assignment where students had to reflect on ten things they learned about themselves throughout the semester) and cumulative exams that included multiple-choice, matching, and short answer questions. It should also be noted that all sections offered some form of extra credit throughout the semester (e.g., participating in additional research).

Table 1

Percentage of the Final Grade for Each Course Requirement by Section

Requirement	Sections 1-4 & 6	Section 5
Attendance	10%	5%
LearnSmart Assignments	16%	15%
PAAs	20%	20%
Research Component	6%	10%
Exams*	48%	45%
Reflection Assignment	Not Included	5%
Extra Credit	+1.5-2%	+2.2%

**Note*. All exams are non-cumulative, except for Section 5.

At the end of the semester, the PSY101 Coordinator exported all gradebooks from the Blackboard Learn Management System, removed all identifying student and instructor information, and provided the data to the researchers.

Analyses

Students who completed 60% or fewer of the course requirements were excluded (n = 70 across all six sections) to remove outliers, resulting in a total of 1,436 students for the analyses.

Multiple linear regressions, using a forced entry method, were conducted to determine which of the course requirements best predicted students' grade performance in this course.

Results and Discussion

All multiple linear regression models were statistically significant (all p-values < .001), showing that many of the predictors had an influence on final and exam grades as the criteria.

All course requirements predicted how well students performed on their final grade, except for instructor (R^2 = .997; see Table 2). This finding suggests that instructors (β = .001) had similar teaching methods probably due to department and university requirements. Additionally, exams (β = .503) predicted the strongest relationship relative to the other course requirements and thus, were further explored in subsequent analyses.

Table 2

Predictors of Final Grade for All Course Sections

Variable	*B*	*SE B*	β	
Constant	-0.003	0.002		
Attendance	0.095	0.001	0.113	*
LearnSmart Assignments	0.166	0.002	0.212	*
PAAs	0.199	0.001	0.389	*
Research Component	0.065	0.001	0.144	*
Exams	0.479	0.002	0.503	*
Extra Credit	0.997	0.031	0.055	*
Instructor	0.000	0.000	0.001	

Note. R^2 = .997. PAAs = Practical Application Assignments.
* p < .001.

With exam grade (i.e., the combined score for all four exams) as the criterion, 14% of the variance was accounted for by the predictors (see Table 3). Although most of the predictors showed a positive relationship, extra credit (β = -.076) showed an inverse relationship. Specifically, as students performed poorly on exams, they were more likely to complete extra credit assignments. Also, the outcome of overall exam grade may be predicted by how instructors (β = .107) give their tests to students; this finding was explored in additional analyses.

Table 3

Predictors of Exam Grade for All Course Sections

Variable	*B*	*SE B*	β	
Constant	0.420	0.025		
Attendance	0.113	0.024	0.128	*
LearnSmart Assignments	0.066	0.027	0.080	***
PAAs	0.069	0.019	0.129	*
Research Component	0.084	0.014	0.177	*
Extra Credit	-1.462	0.524	-0.076	**
Instructor	0.014	0.003	0.107	*

Note. R^2 = .140. PAAs = Practical Application Assignments.
* p < .001. ** p < .01. *** p < .05.

Multiple linear regressions were conducted by using combined scores on all exams (i.e., non-cumulative exam grade) or final exam score (i.e., cumulative exam grade) as the criteria. For the non-cumulative exam grade (Sections 1-4 and 6; see Table 4), the course requirement patterns were similar to the model for exam grade for all course sections (R^2 = .121). However, differences in instructor (β = .013) did not predict the outcome of non-cumulative exam grade.

Table 4

Predictors of Non-cumulative Exam Grade for Sections 1-4 & 6

Variable	*B*	*SE B*	β	
Constant	0.431	0.027		
Attendance	0.133	0.026	0.149	*
LearnSmart Assignments	0.073	0.031	0.087	***
PAAs	0.051	0.020	0.097	**
Research Component	0.081	0.015	0.172	*
Extra Credit	-1.477	0.573	-0.076	**
Instructor	0.002	0.005	0.013	

Note. R^2 = .121. PAAs = Practical Application Assignments.
* p < .001. ** p < .01. *** p < .05.

For the cumulative final exam grade (see Table 5), only Section 5 used cumulative exams and the patterns differed (R^2 = .638). Unlike the non-cumulative exam sections, the LearnSmart assignments (β = -.150) in Section 5 showed a negative relationship, indicating that doing well on practice quizzes did not improve their cumulative exam grade. Although LearnSmart assignments may be useful, the questions given and how meaningfully students are processing the materials over time should be given more attention. The reflection assignment (β = .248) showed a positive relationship, suggesting that this activity helped students to prepare for their cumulative final. Lastly, the previous cumulative exams (β = .718) increased the likelihood of doing well on their final cumulative exam, supporting the notion of test-enhanced learning.

Table 5

Predictors of Cumulative Final Exam Grade for Section 5

Variable	*B*	*SE B*	β	
Constant	0.075	0.054		
Attendance	-0.043	0.052	-0.047	
LearnSmart Assignments	-0.119	0.056	-0.150	***
PAAs	0.081	0.051	0.117	
Research Component	0.010	0.041	0.015	
Reflection Assignment	0.106	0.026	0.248	*
Extra Credit	-0.407	1.052	-0.020	
Previous Exams	0.877	0.067	0.718	*

Note. R^2 = .638. PAAs = Practical Application Assignments.
* p < .001. ** p < .01. *** p < .05.

Conclusion

There are many teaching practices that are helpful for students to perform well in their psychology courses. In this study, several multiple linear regression analyses were conducted to predict student learning (i.e., final and exam grades) using various course requirements.

Although many course requirements have learning benefits, the degree of student success may be dependent on how instructors initiate these activities in their classes. For instance, students may approach learning differently (e.g., with practice quizzes) when instructors offer non-cumulative vs. cumulative exams to assess what they know. When given practice quizzes, students may not necessarily retain the information over time if they are not tested on the same topic later. As a result, they may be storing the information temporarily in their memory and not giving deeper meaning to the details that they were asked to learn. The use of extra credit should be used sparingly as this predictor showed that students are most likely to do it when their exam grades are low. Such opportunities may not represent the current knowledge that instructors would want their students to understand.

Future research should also examine class size and the teaching styles of instructors to determine whether they contribute to students' learning. For example, with large class sizes, students may not receive the quality attention they need to learn the concepts in comparison to smaller class sizes. The teaching styles of instructors may also be important as they may provide different forms of motivation for student learning. With the different teaching practices available, there are many opportunities to enhance student learning. However, instructors should take careful consideration in the details of their methods.

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Acknowledgement

We would like to thank Emily Craddock and the instructors for their assistance in obtaining the classroom data.