Leveling Up Grades: A Pilot Study of Student Motivation when an Entry-Level Geography Course Uses Point-Accrual Class Assessment

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Yearbook of the Association of Pacific Coast Geographers, Volume 82, 2020, pp. 145-159 (Article)

Published by University of Hawai'i Press
DOI: *https://doi.org/10.1353/pcg.2020.0008*

Leveling Up Grades: A Pilot Study of Student Motivation when an Entry-Level Geography Course Uses Point-Accrual Class Assessment

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ABSTRACT

With the success of many geography units dependent on majors "discovering" the discipline through taking lower-division courses that meet general education requirements, and with COVID-19 shifting these courses to an online setting, discovering ways to motivate students in an online course becomes an imperative concern. This paper analyzes an introductory geography course and the motivational impact of gamifying the class grading scale. In particular, this research examines student responses to questions related to a point-accrual approach, concluding that a gamified course-assessment approach positively impacts online and on-ground student success and motivation.

Keywords: *geography education, assessments, gamification, motivational impact, student success*

Introduction

COVID-19 has changed the way higher education is conducted around the globe. Universities have been forced to modify the ways students interact with their courses, which brings to light the need for education-based research into online courses. The hot ideas in education tend to swing like a pendulum, switching directions based on current trends. Government-mandated testing in K–12 classrooms is an example that is still going strong in the United States despite clear negative consequences (Amrein and Berliner 2003), but has retrenched itself somewhat in places such as the United Kingdom (House of Commons 2017). An example of a possible ongoing swing in an educational pendulum explored here involves classroom assessment and its link to student motivation. Susan Brookhart, in a study cited by nearly three-hundred published papers, proposed a theoretical framework that links assessment strategies (CAS) to student motivation and learn-

ing (Brookhart 1997). With the shift to online classes during COVID-19, understanding student motivations can be of critical concern to geography departments dependent on recruiting students through the lens of general education requirements.

Traditional university classroom assessments have generally not considered their effect on student motivation, and have been slow to change from pencil and paper tests and academic assignments such as writing term papers (Reeves 2000). However, three trends in the past decade seem to have accelerated the pendulum of change in college classes. First, online education has grown in scope (Hamm et al. 2019). Second, and more profoundly, the COVID-19 crisis forced almost all university-level education into an online environment, forcing faculty to confront the deficiencies of traditional assessments in an online framework (Gewin 2020). Third, video games and their impact on motivation has led some to rethink overall classroom assessment in university courses. For example, Sebastian Deterding advocated the motivation employed in video games as a way to design course assessments (Deterding 2013).

This research links some of the course-assessment strategies suggested by Brookhart (1997) and Deterding (2013) to the redesign of a lower-division course called Cities in Cinema that provided an ideal setting to assess point accrual as a replacement for a percentage-based course assessment. Percentage-based course assessments are the main type of traditional grading systems used in undergraduate courses. Courses have been traditionally developed with a set number of assignments, and a student's grade is based on the percentage of points earned from those assignments. Point accrual, on the other hand, allows students to accrue points for what is correctly completed in an assignment, and does not negatively impact their grade when points are lost. At the end of a point-accrual course, the student receives a grade based on the total number of points accrued during the course. Unlike in a percentage-based course, the point accrual course has more than the required number of assignments, allowing students to continue to earn points even after they have obtained feedback based on mistakes or lost points on previous assignments. This allows students to try again until they have mastered a topic or objective within the course.

Sadler (1989, 110) emphasized that students must have rapid feedback to "develop a store of tactics or moves which can be drawn upon" to motivate their learning. In particular, assignments that were somewhere between lower-level formative assessments, but required the application

of lower-level knowledge, could help students "transition from feedback to self-monitoring" (Sadler 1989, 122). Butler and Winne (1995) studied how feedback on formative assessments impacted students' knowledge construction, and they clearly established that feedback is crucial for student self-regulation of learning, as long as additional assessment options exist for grade improvement; if no such options exist, students perceive a discrepancy between their current state (poor grade) and the desired goal (better grade). This type of grading system allows students to self-regulate their learning, with a built-in safety net (the instructor) in case they become lost, allowing for a higher level of student motivation.

For this study, the Cities in Cinema course selected is one of the largest courses within the School of Geographical Sciences and Urban Planning (SGSUP), in The College of Liberal Arts and Sciences at Arizona State University (ASU). It fulfills several general education requirements such as "historical awareness" and "global awareness" of different cultures, showcasing lectures from multiple urban planning and geography faculty who link urban issues to movies and relevant readings. When the grading switch from percentage-based to point accrual occurred, enrollments were exceeding four-hundred students (spring 2018), and SGSUP now continues to see enrollment growth, reaching more than seven-hundred-fifty students (spring 2020).

Deterding (2013, 62) explained the basic idea behind point accrual as an assessment strategy to promote student motivation for an entire course:

> [i]n typical grading, students either score the average grade of their performances or start out with an A and then see their grade degrade from there with every suboptimal performance. Motivationally, this is madness. Either you receive continued punishment for any glitch at the beginning, no matter how much progress you make after that, or you are put into constant fear of loss right from the get-go. In contrast, everything you do in games only gets you further. Challenge by challenge, you accrue 'experience points' that add up to 'levels'.

Van Roy and others (2019) note that different game design elements (e.g., badges and tokens) can become functions of motivation. However, they note that "potential motivational functions depend on how users interpret and use them" (van Roy, Deterding, and Zaman 2019).

Prior to Brookhart (1997), Crooks (1988, 442) emphasized that students who see their grade degraded from the start by low scores on exams

and quizzes will see their motivation decrease or be eliminated before the course even fully starts, if they are faced with the same forms of exams and quizzes. There is no question that an assessment approach involving choice and gamification requires careful development of more chances to succeed through more assessments. Implementing sequenced learner objectives that move between different knowledge topics to the next knowledge topic, and so forth, requires even more faculty work to develop extra assessments for each knowledge bin to enable student mastery. Large publishing companies maintain extensive online homework and quiz banks for such courses as math and statistics, but geography rarely has access to such large banks of robust assessments. Thus, the burden to develop more assessments falls to the faculty member.

In light of the importance of a CAS on student motivation detailed above, this paper explores the simple idea of gamifying the classroom assessment structure of a large-enrollment, online, lower-division geography course. In the second semester of teaching the large-enrollment online version of Cities in Cinema, the instructor deployed a survey to assess three hypotheses that are in line with the prior literature on CAS: that a point-accrual assessment approach would (1) help students focus on learning by reducing their worries over grades; (2) motivate students to perform better because it is possible to "level up" their grade, like a video game, through accumulation of points; and (3) boost enrollment in a course. The next two sections detail the data, methods, and results of the survey.

Data and Methods

A five-question survey was made available at the end of the course in the fall semester of 2018. Fifty-eight percent (266 out of 458) of the enrolled students completed the survey; all answers were anonymous and were not viewed until the course was complete and grades were submitted. The questions themselves are presented in the results section, along with the answers.

Students were awarded one extra point for completing the survey, where 160 points were required to reach the top grade. In addition to this survey, several students emailed a written response to the instructor about their opinion of the point-accrual grading system. This was not a requirement, nor was it asked for in the survey or course work; it was done by the students' own volition. A few of the written comments by students who self-identified as having disabilities, and who were registered with ASU's disabled student resource services, are incorporated into the findings here.

This course goes against the grain of standard undergraduate courses that are normally designed in a lecture and test format. Cities in Cinema is completely online, and is designed to have only one due date; all work must be completed by midnight on the last day of the session the course is offered. A pacing guide is offered, but no assignments are considered late during the session. Assignments that are offered within this course are one of two types: the first is a standard, multiple-choice quiz with a study guide for questions related to lectures, academic readings, and the movies themselves. Second, students have the option of earning additional points through scavenger-hunt assignments that use Google Street View to promote virtual exploration of the city where the movie was set. The scavenger hunts pertain to the historical, urban design, and cultural awareness course learner objectives.

The key aspect of this research is considering the point-accrual assessment approach. Grades are determined by the total number of accumulated points at the end of the course. The grading scale (Table 1) is designed to be comparable to levels in a video game, and is purposefully designed not to match students' prior experiences. At ASU a three-hour credit course demands forty-five contact hours (an hour is defined as fifty minutes plus a ten-minute break) and a suggested additional two hours for every contact hour in studying and homework; for a course such as Cities in Cinema, this would be equal to 112.5 hours total. Before the class went live, volunteer Urban Planning students with high GPAs piloted the course. They self-reported an average of 110 hours to achieve the highest-level grade of A+ in the course.

Although some students were confused by and worried about the percentage of their scores, and emailed the instructor their worries and concerns, they eventually came to understand that points are not lost if they get something wrong on a quiz or scavenger hunt. By halfway through the class, almost all the students understood that they only obtain the points they earned during the assignment. As students complete other quizzes or scavenger hunts, their grade continues to "level-up" and increase their chances of earning a better grade. The next section details the survey questions and the survey results.

Table 1. Grading scale of point accrual for the Cities in Cinema class.

Grade	Point Range
A+	160 or more
A	148–159
A-	144–147
B+	140–143
B	132–139
B-	128–131
C+	120–129
C	104–119
D	80–103
E*	Less than 80

*An E in the ASU grading system is equivalent to an F in other colleges.

Survey Questions and Results

One survey question addressed student comprehension of the grading system (Table 2), with eighty-six percent indicating that they understood the point-accrual system from the start. At the same time, twenty-three percent of the students ended up contacting the instructor when the course was close to completion, asking for manual verification of a student's grade. Thus, while eighty-six percent of the respondents understood, they may not have fully trusted its implementation.

Table 2. Answers to the question, "Was the grading system used in this course easy to understand from day one (e.g., in the faculty presentation explaining the course, or by reading the syllabus)? If you were confused at first, please indicate no as your answer."

Choices	Number of answers	Percent
Yes. I understood the grading system from day 1.	228	86
No. I was confused about the grading system at the start of this class and am still not quite sure.	5	2
No, I was confused about the grading system at the start of class, but I asked a question on the discussion board that was answered to my satisfaction.	2	1
No. I was confused about the grading system at the start of class, but now I understand it.	24	9

With the survey being administered near the end of the class, ninety percent agreed or strongly agreed to a related question focused on the ability of students to know the status of their grade using a point-accrual system (Table 3).

Table 3. Answers to the question: by using the point-based system did you find it easier to know the current status of your grade while enrolled in this course?

Choices	Number of answers	Percent
Strongly agree	195	73
Agree	45	17
Neither agree nor disagree	16	6
Disagree	8	3
Strongly disagree	2	1

One of the reasons for trying a point-accrual system was the hope that it would help students focus on learning content by reducing their worries over grades. Eighty-six percent of the survey respondents either agreed or strongly agreed that a point-accrual assessment approach allowed them to focus on learning content (Table 4).

Table 4. Answers to the question, "Did the point-based grading scale allow you to focus more during the course on content learning while completing assignments?"

Choices	Number of answers	Percent
Strongly agree	166	62
Agree	64	24
Neither agree nor disagree	28	11
Disagree	6	2
Strongly disagree	2	1

The first time this course was taught in an online format using this point-accrual system was in the spring of 2018. During this session, the instructor observed something unusual: 37 percent of the students earned 165 points or more, well beyond the threshold for an A+ grade. In fall 2018, this percentage dropped to 31 percent. The following semester, in spring 2019, the percent was again 31 percent, and in the fall of 2019, it dropped to 219 out of 805 enrolled students, or 27 percent. However, in the spring of 2020, the percentage of students who went well beyond an A+ jumped back up to 32 percent of the 840 students. A natural follow-up question asked about student motivation associated with point accrual. As presented in Table 5, 83 percent of the respondents in the fall of 2018 agreed or strongly agreed that their motivation behind the completion of assignments, and their final grade, felt equivalent to "leveling up" in a video game. However, when you leveled up in the course, you simply reached a new grade level.

Table 5. Answers to the question, "Does a point-based system encourage you to end up doing more work than you originally wanted to do for this class? In other words, some call a point-based system equivalent to 'leveling up' in a video game, where when you reach a new grade level, you are motivated to move to the next grade level. Do you think that a point-based system works like this for you as a student?

Choices	Number of answers*	Percent
Strongly agree	147	55
Agree	73	28
Neither agree nor disagree	30	11
Disagree	12	5
Strongly Disagree	3	1

*One respondent did not answer this question.

Enrollment in a class is often a major issue in colleges and universities, especially for administrators and unit-level budgets. With this in mind, students were asked if a point-accrual grading system would be sufficient motivation to sign up for another class with this assessment approach—with the assumption that this other class met a needed graduation requirement. An overwhelming ninety-five percent of respondents indicated they would be somewhat or very interested (Table 6).

Table 6. Answers to the question, "If given the opportunity to enroll in another class with a similar point-based grading system, how likely would you be to sign up for that class (assuming that it met a needed graduation requirement)?"

Choices	Number of answers*	Percent
Very interested	197	74
Somewhat interested	55	21
Neutral	11	4
Not very interested	3	1
Not at all interested	0	0

*One respondent did not answer this question.

Some of the most enthusiastic proponents of a point-accrual system are students with learning disabilities who are registered with ASU's Disabled

Student Resources Center. Several went out of their way to explain why point accrual helped them succeed in learning and how this assessment approach worked well for their accommodations (Table 7).

The survey results (Tables 2–6), along with disabled student feedback (Table 7), reveal a very positive attitude toward a gamified classroom assessment system. Available data reveal no clear downsides to this assessment approach. The next section of this paper links these results back to prior scholarship on student motivation, assisting students with disabilities, and attempts to place this research in the context of geography education research in higher education.

Table 7. Emailed input on the point-accrual system, self-provided by students who had an accommodation from Disabled Student Resources.

Student disability	**Student explanation**
Obsessive-Compulsive Disorder	I personally have a little bit of self-diagnosed OCD and I hate having uncompleted tasks. So when it came to your class, once I received my required points I still had a large percent of the quizzes incomplete and that bothered me. So I chose to just complete the quizzes using my general knowledge from everyday life and from high school to complete the quizzes. […] Once again, I felt the need to complete the course and check it off my things to do. I loved the ability to take it at my pace. The point accumulation is very refreshing as well. Nothing is more frustrating than starting out a class well and then your grade slowly gets worse and worse even though you are still doing well.
Anxiety and Depression	I'm in your […] class this half of the semester and I just wanted to say thank you for how you set up this class based off the welcome video. I was freaking out over it with some of my friends because I've literally never had a class before that lends so much help to disabled students. I personally have severe anxiety and depression amongst other things and this format of grading and of turning in assignments is the absolute best way to support students like me. You're giving us so much opportunity to succeed even if we happen to get hit with periods of not being able to do things and it's honestly refreshing. I've only had one class like this before and it was way back in my freshman year of high school and I know firsthand how much this format helps students like me succeed over the traditional format and I just really wanted to say thank you for structuring it like this.

Discussion Section

Student Motivation

Every course ends with a final grade. Table 3 in our study revealed that ninety percent of the students surveyed agreed or strongly agreed that they could comprehend their grades from the beginning. If a course is set up to allow students to easily keep track of their grades, students will have a better understanding of how they are doing within that course. This understanding and easy tracking of their grades can lead to a stronger motivation when completing classroom assessments.

Brookhart's (1997) conclusion of student motivation being impacted by classroom assessments can partially explain the results in Tables 4 and 5 related to student focus and motivation, respectively. Students expressed a feeling of being able to focus more while exploring new content, rather than being distracted or demotivated by their grade. Grades for students instead act as a motivator, pushing students to complete classroom assessments. This was most telling when twenty-five percent of the enrolled students earned a grade higher than what is needed for an A+ over four semesters of analysis.

In the spring of 2018, when Cities and Cinema were taught this way for the first time, many students initially went above and beyond the required points for an A+. According to question 2 on our survey, eighty-seven percent of the students agreed that they understood the new implementation of this point-accrual grading system. However, thirty-seven percent of students earned 165 points or more, which is well beyond an A+ grade. Could this be based on a trust issue of a new grading system, or is this from the lack of understanding how scores and overall grades are calculated, despite the survey saying the students understood? In subsequent course offerings after the spring of 2018, the instructor observed that the number of students surpassing an A+ was slowly declining. However, more than one-fifth of the students continued to complete more assignments and explore material, even after they had reached the highest level possible.

Assisting Students with Disabilities

In multiple semesters, several students with different disabilities proactively emailed the instructor to highlight the benefits of the point-accrual system for their individual learning disability. Two students volunteered detailed insight into these benefits (Table 7). One student who has OCD maintained that the course structure of every assignment being open from the start

linked well with his desire to finish all of the assignments, accruing more than the needed points. Another student expressed relief in knowing that assignments could be finished at a self-determined pace. In a research study about workflow, Withington and Schroeder (2017) articulate concerns of students with disabilities. They suggest that many plans in place at the high-school level are not continued at the college level, and that students are unaware of how to obtain these resources. Simply put, they state, "[f]or these students, a class that allows them more control over their workload can be life-changing. Giving them the control to choose their own assignment deadlines means they can choose a timeline that will allow them to showcase their abilities rather than limiting them…" (Withington and Schroeder 2017, 18–19). Students with learning disabilities who contacted the course instructor expressed appreciation for being able to complete assignments on their own timeline and at their own pace, and also that point accrual gave them a feeling of control; it is possible this change to the structure of the course could be the change that students with disabilities at the college level need to be successful.

Research in Geography Education

At a time when universities saw declining enrollments in the fall semester of 2019, ASU experienced a ten percent increase in students attending college for the first time (Rincon 2019). Long before the COVID-19 crisis, ASU dedicated itself to make all on-ground degrees available to online students, at an unprecedented scale. This goal has not yet been reached, but more than half of the on-campus majors have fully online counterparts that teach the exact same courses.

In terms of geography education, for example, as of the spring of 2019, ASU's SGSUP had more than double the number of online geography majors compared to on-campus majors. SGSUP's new online undergraduate GIS degree has more than triple the number of majors than in-person GIS degree-seeking students. ASU's experiment in online education also extends well beyond the number of online majors. The existence of online courses framed in a 7.5-week session, as opposed to the traditional 15-week classroom session, has led to a cultural shift whereby many on-campus students now prefer to take courses in their major in person, but display a strong preference for taking their lower-division general education courses online.

A large, visible gap currently exists in research on university geography education. With ongoing changes in how the next generation learns and

experiences and views the world, research needs to keep pace with how the tools of modern technology (e.g., online CAS frameworks, Google Earth, YouTube videos) might be benefiting or harming student learning. Higher education institutions are continuously shifting their methods of teaching, such as the recent emphasis on lower-paid lecturers and online courses (Mirrlees and Alvi 2014). Without research to analyze these changes, universities will always question whether these new approaches are valid ways to teach geographical content. Lack of insight potentially places the validity of the educational institutions into question, and this is most especially true for the larger ongoing experiment of online education.

Downs (1994) urged geographers to conduct research on geography in higher education and especially to gather data. This call did not fall on deaf ears, and journals such as *RIGEO* (Review of International Geographical Education Online) and the *Journal of Geography in Higher Education* are populated with research and data. These journals and other outlets typically carry research on such topics as K–12 geography education (e.g., Demirci 2008), the freshman-year experience (e.g., Wilson et al. 2011), and other topics such as the difference between online and field learning (Stumpf, Douglass, and Dorn 2008). None of these journals, however, carry research on the grading system or assessment approach used in geography higher education, and thus none analyze the importance of an assessment strategy in geography online university education. Yet, despite this deficit, there exists a growing awareness of the importance of a need for research on classroom assessment (Jabbarifar 2009).

Conclusion

In a COVID-19 and post-COVID-19 world of higher education, students who are struggling with the standard way of learning, assessments, and course layouts will be exposed to nontraditional approaches as faculty are forced to change long-lived traditions. This gives geography faculty a chance to rethink how courses are developed and taught. By researching geography education and, specifically, the analysis of how pedagogical approaches used in online instruction influence student learning of course objectives, the larger academy of geography educators can make more-informed decisions on future directions. Instead of simply focusing on the mode of delivery (online), this pilot study reveals that geography faculty should consider rethinking the entire assessment system of a course.

A fully online, lower-level course taken by 458 students titled "Cities in Cinema" was the focus of a pilot study on an assessment system that had no strict due dates and used a point-accrual system for assigning grades. Simply put, students felt empowered by this online class-assessment approach. A large number of students so empowered went on to take courses from the same instructor, at least in part due to the point-accrual system. Many students also asked about other instructors using this same CAS. If more courses are designed with a motivational course-assessment pattern, it appears students would be inclined to enroll in those courses. Not only would that be helping the student body that the university serves, but it would also help the academic unit clue in to patterns of student motivation. In the end, students like a "level-up" gaming approach to learning because they are able to focus more and learn content without the fear of losing points. Since geography is notoriously a "found major," offering more introductory courses—both online and in person—along these lines might encourage students to find geography sooner, and in greater numbers.

Acknowledgments

Thank you to Ron Dorn and Ian Walker for their suggestions in this research, as well as Dorn for his IRB-approved survey data on his PUP 200 courses.

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