

Gamification in Interior Design Curriculum
Appendix 3 – Gamified Classroom Example – Building Codes and Regulations

A Thesis
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by
Heidi Plumb
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Appendix 3 – Gamified Classroom Example – Building Codes and Regulations

To help educators understand how to implement gamified content, this paper is going to show an example of taking gamification and applying it to a specific course. Step-by-step instructions will be shown. Included will be an example of a level-up system for grading. A specific course storyline will be presented, including quests (homework assignments), mini bosses (quizzes) and final bosses (final project). Badges will be included that are specific to this course. A gamified activity will be presented. Examples of leaderboards will be referenced.

This document will allow educators see the application of gamified content specifically to interior design curriculum.

Information about the course

The course that will be gamified is a seven-week online building codes course titled “Building Codes and Regulations”. This course is a junior level class, and requires previous knowledge of architectural drafting and CAD. “This course examines the codes and regulations for the built environments with emphasis on their application to commercial interiors. Students are required to determine occupancy loads, means of egress, compartmentalization, and a variety of fire protection systems and their locations. Students become familiar with plumbing, electric, and communication system requirements. Students apply ADA regulations. Other major industry specific regulations are discussed” (Brenau University, 2016).

Course syllabus. The course syllabus consists of the course objectives and the course outline.

Objectives. Below are the lists of objectives for the course:

- Students will be able to design interiors with respect to fire, life safety and occupancy codes and International Building codes.

- Students will understand and be able to design around codes listed in the Americans with Disabilities Act.
- Students will be able to design interior with respect to building systems (mechanical, electrical and plumbing).
- Students will be able to develop a life safety plan and schedule in the form of construction documents.
- Students will be able to read, understand and apply the current International Building Codes to their particular design solution.

Course Outline. The below course outline is the current course assignment schedule, and the corresponding point value for each task (see Table 1).

Building Codes	
Side Quest #1a: Homework ADA– Review plans and find errors	25
Side Quest #1b: Lab Activity - Experience disability and write up	25
Mini-boss #1: ADA Codes Quiz	30
Side Quest #2a: Lab Homework – Occupancy Loads	25
Side Quest #2b: Occupancy Loads	25
Mini-boss #2: Occupancy Loads Quiz	30
Side Quest #3a: Lab Assignment– Egress Space Planning	25
Side Quest #3b: Homework Assignment - Construction Types/Means of Egress	25
Mini-boss #3: Construction Types/Means of Egress Quiz	30
Side Quest #4: Lab Homework – Finish/Furniture Selection	50
Mini-boss #4: Finish/Furniture Selection Quiz	30
Side Quest #5: Homework Assignment – Fire	25
Mini-boss #5: Fire Assemblies Quiz	30
Side Quest #6: Homework Assignment – Plumbing and Electrical	25
Mini-boss #6: Plumbing and Electrical Quiz	30
Final Boss: Codes Project	200
Final Boss: Final Codes Exam	200
Guild Wars - Discussion Questions (Questions 6@ 20 pts each)	120
Total Points for Building Codes	950
Other	
Attitude, Attendance and Participation	50
TOTAL COURSE POINTS	1000

Table 1. Course Outline

Conversion From Point System To Level System

This course has the potential to score 1000 points as part of the course assignments. The corresponding grading system for this course provides grades of A, B, C, D, and F. The student would begin the course at Level 1, and progress in an attempt to reach Level 10 (or an A grade).

The scoring would break down as follows:

Level	Point Scale	Grade
Level 1	0-99 points	F
Level 2	100-199 points	F
Level 3	200-299 points	F
Level 4	300-399 points	F
Level 5	400-499 points	F
Level 6	500-599 points	F
Level 7	600-699 points	D
Level 8	700-799 points	C
Level 9	800-899 points	B
Level 10	900-1000 points	A

Table 2. Score, Level and Grade Table

As students complete assignments they would level up. Once they hit level 7, they earn a D grade. As they continue to progress on levels they receive higher and higher grades until level 10 is reached and an A grade awarded.

Adding a Storyline Element

The next step in applying gamified content is by changing homework assignments, discussions, quizzes and projects into storyline elements. The first task would be creating an overarching story for the course. For purposes of this class the storyline will be consistent with the final project where students are required to prepare for designing a tenant improvement remodel for an existing building.

The next step is rephrasing what each of the categories of assignments is called. The homework assignments are going to be renamed quests. The discussion questions will be

renamed to guild posts. The lectures will be renamed to mission assignments, and the quizzes will be renamed mini-bosses.

To progress in the story, each week students must learn the mission assignment (lecture), and participate as a guild around discussion of this week's mission. Students are then assigned a quest (homework assignment) that will help students gain the information and skills needed to defeat the mini-boss (quiz).

The class storyline for this class is reflected in Table 3. In comparing this to the course outline it is important to note that some weeks there are two side quests in a week.

Building Codes Storyline Sequence
Week One
Mission Assignment #1: The Codes Guidebook ADA (Appendix A) Guild Wars: Discussion #1 Side Quest #1: Review ADA Plan, and experience a disability Mini-boss #1: ADA Codes Quiz
Week Two
Mission Assignment #2: The Codes Guidebook Chapters 1 & 2 Guild Wars: Discussion #2 Side Quest #2: Occupancy Homework, Complete occupancy load calculations Mini-boss #2: Occupancy Classifications and Loads Quiz
Week Three
Mission Assignment #3: The Codes Guidebook Chapters 3 & 4 Guild Wars: Discussion #3 Side Quest #3: Homework Worksheet and Rough Space Plans Mini-boss #3: Construction Types and Means of Egress Quiz
Week Four
Mission Assignment #4: The Codes Guidebook Chapter 9 Guild Wars: Discussion #4 Side Quest #4: Finish Selection Mini-boss #4: Finishes Quiz
Week Five
Mission Assignment #5: The Codes Guidebook Chapters 5 & 6 Guild Wars: Discussion #5 Side Quests #5: Continue Codes Project, Homework on Fire/Smoke Assemblies Mini-boss #5: Fire Assemblies Quiz
Week Six
Mission Assignment #6: The Codes Guidebook Chapters 7&8 Guild Wars: Discussion #6 Side Quests #6: Continue Codes Project Mini-boss #6: Plumbing and Electrical Quiz
Week Seven
Final Boss: Codes project Final Boss: Final Exam

Table 3. Storyline Sequence

Applying Badges

The next item that should be applied to gamified content is badges. Badges or achievements are visual icons signifying achievements. In this class there are lectures (mission assignments), discussions (guild wars), homework (side quests), quizzes (mini-bosses) and final projects (final bosses).

Using the same chart created for the storyline sequence, educators can then note which relevant badges can be earned at which level. This can serve as a reminder to both the educators and students for which badges are available (see Table 4).

Included badges in this course are assignment badges (both for completion and scores), discussion badges (participation and quality posts), quiz badges (both completion and scores), materials, reading, and elevations. Since this is a shorter seven week course the requirement levels for each badge will be lowered to allow students to progress through the star-ranks of the badges. Homework and Quiz badges will be awarded after one, three, five, and all homework/quizzes, earning students the one star, two star, three star and four star badges. Material submissions on the final project requires a total of ten unique finishes, therefore badges will be awarded at five, eight, ten, and above ten material submissions. And for the elevation badges, the badges will be awarded after one, three, five and above seven elevations.

Building Codes Storyline Sequence	
Week One	
Mission Assignment #1: The Codes Guidebook ADA (Appendix A) Guild Wars: Discussion #1 Side Quest #1: Review ADA Plan, and experience a disability Mini-boss #1: ADA Codes Quiz	Assignment #1 Badge Discussion Post #1 Badge Homework #1 Badge Quiz Badges
Week Two	
Mission Assignment #2: The Codes Guidebook Chapters 1 & 2 Guild Wars: Discussion #2 Side Quest #2: Occupancy Homework, Complete occupancy load calculations Mini-boss #2: Occupancy Classifications and Loads Quiz	
Week Three	
Mission Assignment #3: The Codes Guidebook Chapters 3 & 4 Guild Wars: Discussion #3 Side Quest #3: Homework Worksheet and Rough Space Plans Mini-boss #3: Construction Types and Means of Egress Quiz	Assignment #2 Badge Discussion Post #2 Badge Homework #2 Badge Quiz Badges
Week Four	
Mission Assignment #4: The Codes Guidebook Chapter 9 Guild Wars: Discussion #4 Side Quest #4: Finish Selection Mini-boss #4: Finishes Quiz	
Week Five	
Mission Assignment #5: The Codes Guidebook Chapters 5 & 6 Guild Wars: Discussion #5 Side Quests #5: Continue Codes Project, Homework on Fire/Smoke Assemblies Mini-boss #5: Fire Assemblies Quiz	Assignment #3 Badge Discussion Post #3 Badge Homework #3 Badge Quiz Badges
Week Six	
Mission Assignment #6: The Codes Guidebook Chapters 7&8 Guild Wars: Discussion #6 Side Quests #6: Continue Codes Project Mini-boss #6: Plumbing and Electrical Quiz	Assignment #4 Badge Discussion Post #4 Badge Quiz Badges
Week Seven	
Final Boss: Codes project Final Boss: Final Exam	Materials Badge (#1, #2, #3 or #4) Elevations Badge (#1, #2, #3 or #4)

Table 4. Badge Distribution Chart

By taking advantage of the free website ClassBadges (www.classbadges.com) educators can manage and distribute award badges to class members. Students will be required to create a login.

Once a login has been created, educators can then create classes, and modify badges (see Figure 1 for the home page view).

Badges							+ Add Badge	Show Archived Badges	Delete ▼
<input type="checkbox"/>	Badge Art	Badge Title	Badge Description	Students Awarded	Award Badge	Edit	Delete		
<input type="checkbox"/>		Complete Homework 1	Complete 1 Assignment	0	AwardBadge				
<input type="checkbox"/>		Reading - 1 Reading	Complete 1 of the assigned Readings.	0	AwardBadge				
<input type="checkbox"/>		Reading - 3 Reading	Complete 3 assigned Readings.	0	AwardBadge				
<input type="checkbox"/>		Reading - 5 Readings	Complete 5 assigned Readings	0	AwardBadge				
<input type="checkbox"/>		Reading - All Readings	Complete all assigned Reading	0	AwardBadge				

Figure 1. Class Badges Home View

As new badges are added, teachers can modify the art, badge title, award level and which class is associated with the badge (see Figure 2).

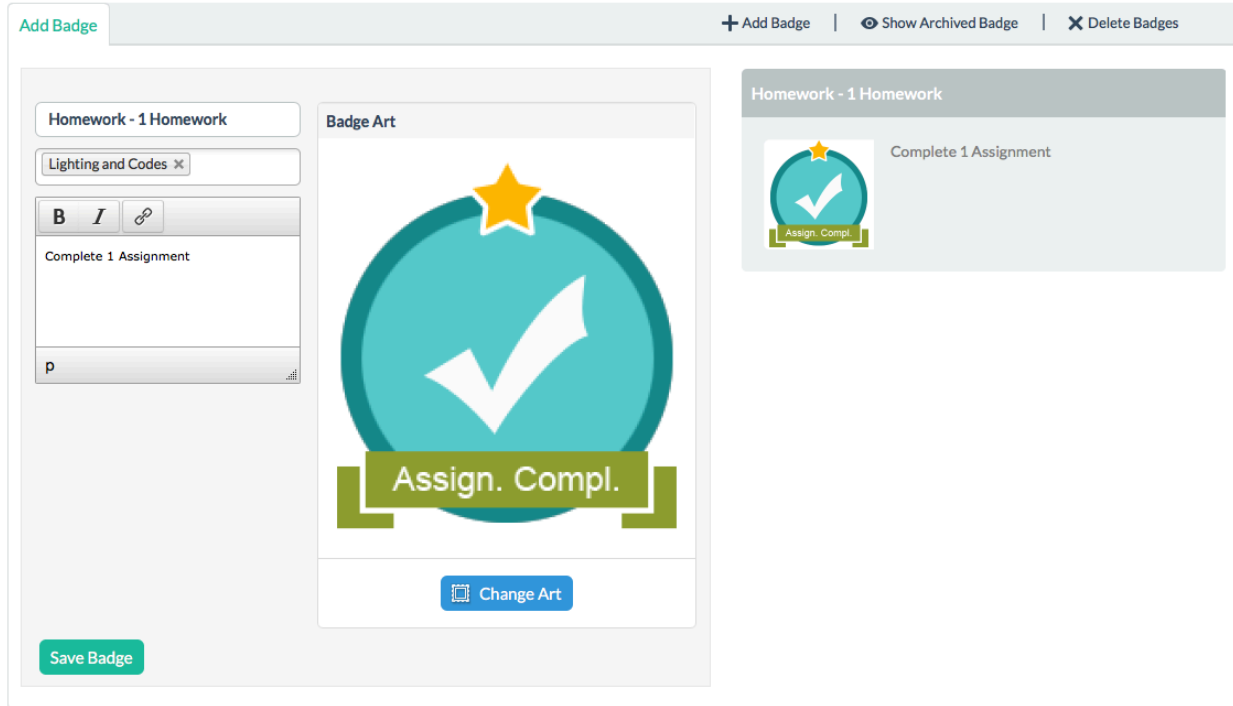


Figure 2. Adding or Modifying a Badge

At the start of a new class, educators will need to send their students an invite to join class badges. The students will then be provided with a registration code that they can use to join the class.

When it is time to award students the badges educators can select the “award badge” feature to award badges to students (see Figure 3).

Badges							
+ Add Badge Show Archived Badges Delete							
<input type="checkbox"/>	Badge Art	Badge Title	Badge Description	Students Awarded	Award Badge	Edit	Delete
<input type="checkbox"/>		Complete Homework 1	Complete 1 Assignment		AwardBadge		
<input type="checkbox"/>		Reading - 1 Reading	Complete 1 of the assigned Readings.	0	AwardBadge		
<input type="checkbox"/>		Reading - 3 Reading	Complete 3 assigned Readings.	0	AwardBadge		
<input type="checkbox"/>		Reading - 5 Readings	Complete 5 assigned Readings	0	AwardBadge		
<input type="checkbox"/>		Reading - All Readings	Complete all assigned Reading	0	AwardBadge		

Figure 3. Award Badge Button Location

Students who are logged into the system are able to view all available badges in the class, and at what level they may earn them (see Figure 4).

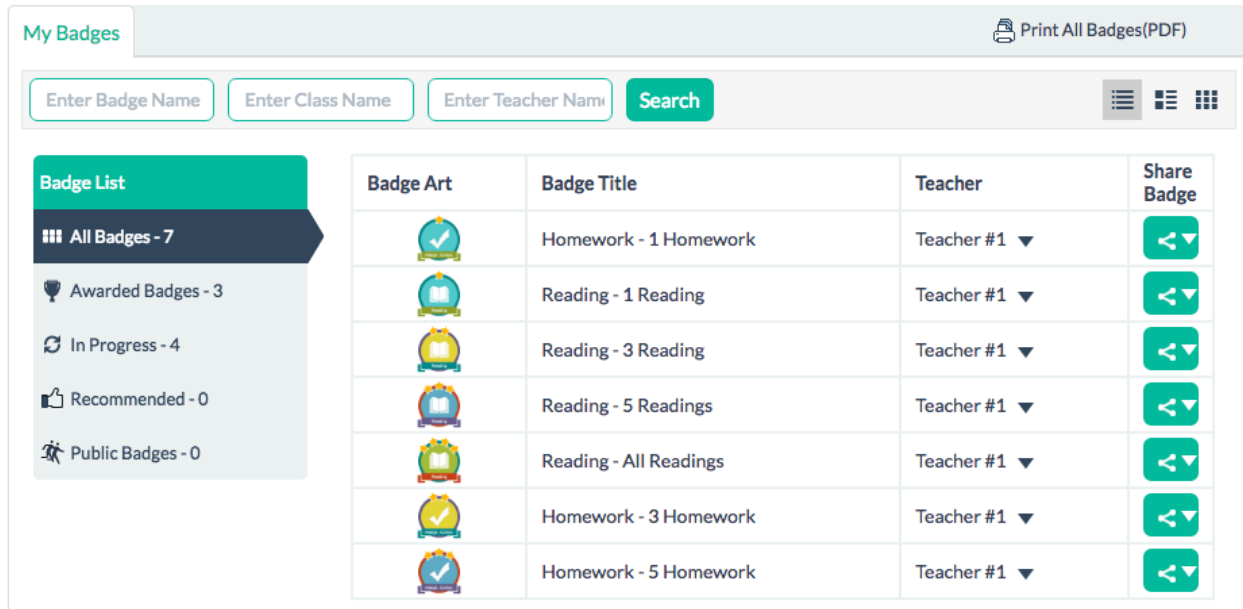


Figure 4. Student View - All Badges

They are also able to view what badges they have earned (see Figure 5).

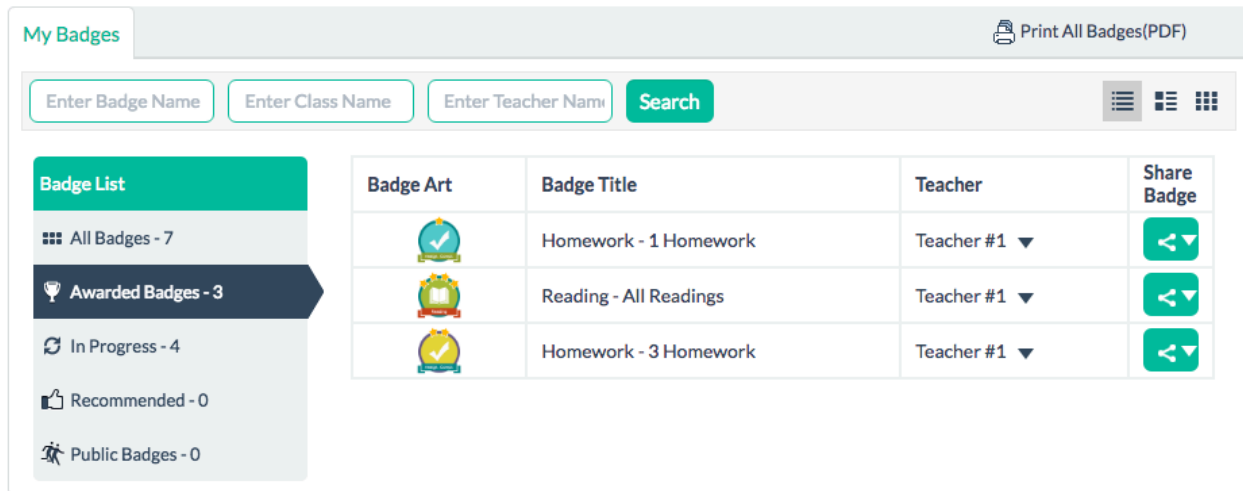


Figure 5. Student View - Earned Badges

Gamifying the Lectures

Now that the gamified elements are added to the course structure, the next step is to gamify the individual components. The lectures need to have game elements applied.

BINGO during lectures. Using the resources from BingoBaker.com words that will be discussed during the online video lecture are added to the BINGO game board. As students are listening to the lecture, they must cross off the words on the BINGO board as they are discussed. Bingo maker automatically generates up to eight random boards at a time, allowing each student a different BINGO board (see Figure 6).

ADA BINGO				
B	I	N	G	O
ADA Counter	Stair Risers	Toe Clearance	Sink Depth	Knee Clearance
Water Closet Locations	Side Reach	Stair Treads	4" Sphere	Push Side
T-Shaped Turning	Pull Side	FREE	Pass Through Kitchen	Sink Height
Handrails	Unobstructed Reach	Side Grab Bars	Rear Grab Bars	Protruding Objects
Ramp Slope	Clear Space	Signage Requirements	Change in Level	Circular Turning

Figure 6. ADA BINGO

Trivia games instead of quizzes. Another way to gamify the individual components is to change the quizzes to be trivia games. For this the website Sporcle.com will be used. Sporcle.com allows for free creation of quizzes, and automatically incorporates achievements into their system. By changing the questions from the traditional quiz elements, and allowing the game aspect of a trivia game to engage students, the students will feel free to fail and try again.

Specific example using FlipQuiz. Using the online program FlipQuiz (www.flipquiz.me) educators can create jeopardy games based on content they provide. This program will be used for the following example. This quiz can be accessed at the following web link: <http://flipquiz.me/review/85343>.

The first step is to create a login account. This is free (as of April 2016) and requires a valid e-mail address. Once a login is created, then a new board game can be created by selecting the “new board” option (see Figure 7).

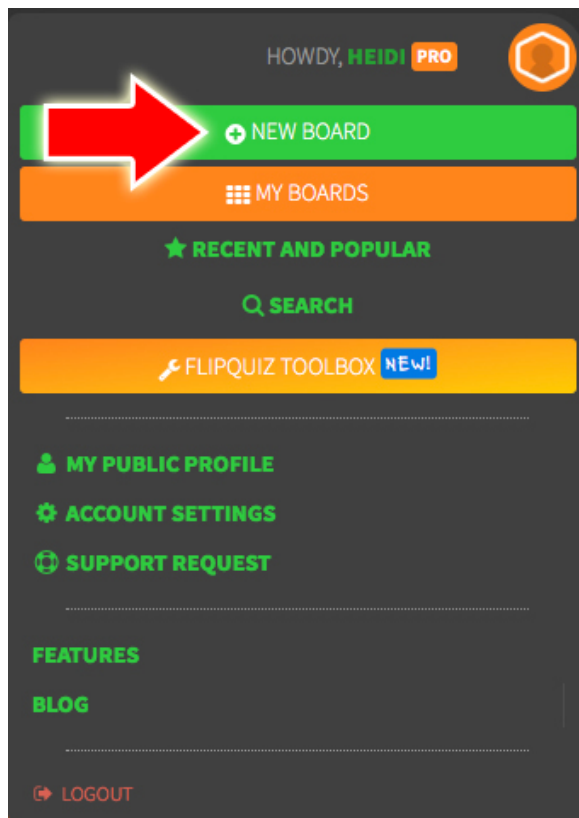


Figure 7. New Board Image

After selecting the “new board” option, users will be taken to a new page that allows input of six different categories, each with six questions (by default). The number of categories and questions can be modified at any time. Create a “board name” and begin to enter information about the various categories and questions. At any time users can select the “save and continue” button at the bottom of the screen (see Figure 8).

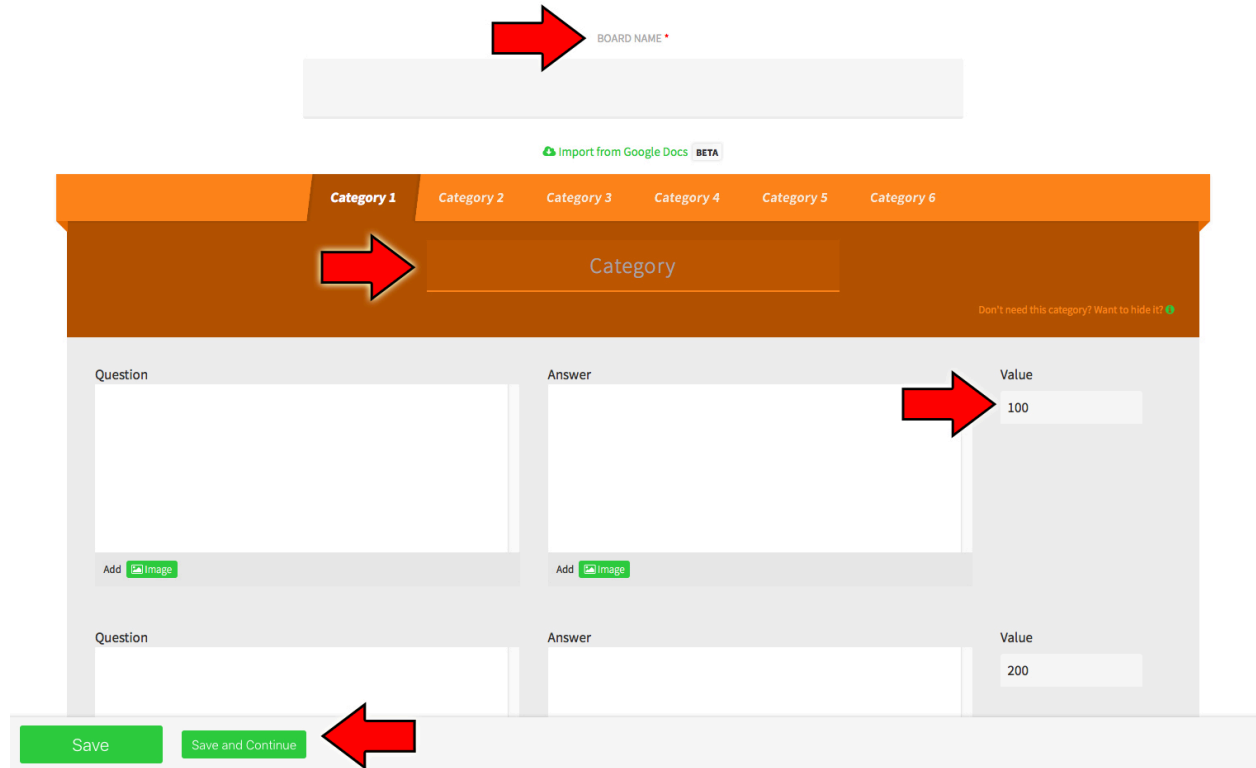


Figure 8. Creating a new game – screenshot

Once all categories and questions are filled in the user can select the final “save” option and allow the game to be played. The game can be accessed via a web link or by logging into the website. To allow students to play the web link can be provided, and accessed from any computer without a login.

When students or others begin play (this option is only available with the Pro version) the program will ask how many teams are playing (see Figure 9).



Figure 9. Number of teams playing

If educators are playing during class, this will allow tracking of points by team. Once the number of teams are selected the game will launch and allow users to begin answering questions and awarding points. Team names can be edited at the top by clicking on the names (see Figure 10).

Team A		Team B			
ADA	CHAPTER 1 & 2 - OCCUPANCY	CHAPTER 3&4 EGRESS	CHAPTER 5 & 6 - FIRE RATING	CHAPTER 7 & 8 - PLUMBING AND MECHANICAL	CHAPTER 9 - FINISHES
100	100	100	100	100	100
200	200	200	200	200	200
300	300	300	300	300	300
400	400	400	400	400	400
500	500	500	500	500	500

Figure 10. Game board example

To begin play, click on the point value in the category desired. This launches a screen where the question is revealed. In the bottom of the screen there is the option to reveal the answer or award points (see Figure 11). If an incorrect answer is provided, the reward points button can be selected, and users can select which team lost points. Once a correct answer is provided, users can reveal the answer and award points to the correct team (see Figure 12).

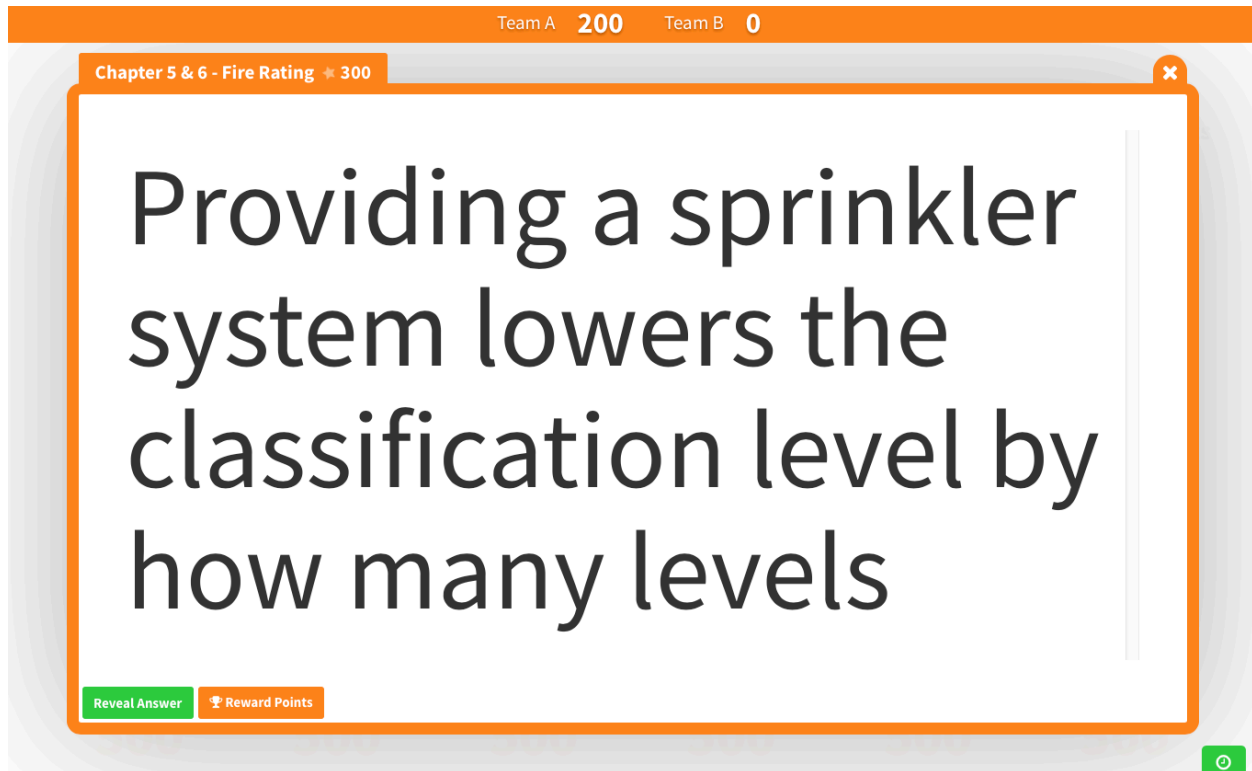


Figure 11. Example of question

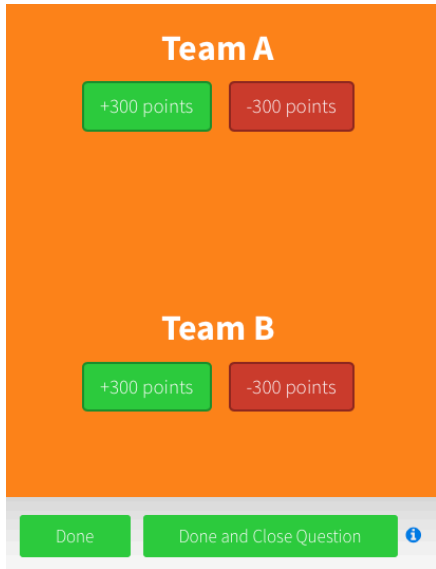


Figure 12. Example of awarding points

As the game progresses, the board becomes blacked out showing the answers that have been completed and which have not (see Figure 13).

Team A 4000 Team B 4000					
ADA	CHAPTER 1 & 2 - OCCUPANCY	CHAPTER 3&4 EGRESS	CHAPTER 5 & 6 - FIRE RATING	CHAPTER 7 & 8 - PLUMBING AND MECHANICAL	CHAPTER 9 - FINISHES
	100				
			400		
500					

Figure 13. Filled in game board

The game is completed when no more answers are available. The team with the most points will be declared the winner. Special items may be given out at the educators' discretion.

Conclusion

While the ideas provided in this paper are by no means comprehensive, the various components presented offer educators a hands-on and specific examples of gamified elements incorporated into an interior design specific class. Educators can use some, all, or none of the ideas presented to create gamified elements within their courses. Badges, games, level-up systems and leaderboards can all provide elements of gamified activities to interior design curriculum.

References

** Brenau University. (2016). Course Descriptions, Interior Design. Retrieved from:

<https://campus.brenau.edu/web.php>