# The Iterative Design of an Eight-Week Course Aimed at Developing a Community of Gameful High School Teachers

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**Abstract:** This paper overviews the design and results of a course intended to provide the theoretical understanding and practical application of games and game-making in the classroom. The course design included a combination of gamification, badging, peer review, and building one's own course by having assignment options. The paper shares the perspective of one of the students of the course, and explains the unique course design and approach to teaching teachers. Informal formative assessments are used to iteratively improve the quality of the course.

## Background

The project that is outlined in this paper is part of a Straight A grant (funded by the state of Ohio), which provided its participants access to the Zulama program - a series of courses focused on games and 21st century skills and standards. Miami University contributed to this project by providing additional assistance in order to take the knowledge and skills taught through the Zulama curriculum into the practice of the participants. More specifically, Miami offered a Semester course on Game Theory beginning in the September 2014, called Game-Based Learning, which was designed and taught by visiting instructor Michelle Aubrecht. The course brought together seven teachers from the Madison Local, Monroe Local and Talawanda Schools as its participants.

The primary purpose of this course was for practicing teachers to have a theoretical framework for the new courses they would be teaching using the Zulama curriculum. None of the participating teachers had any prior experience teaching game making or using games in the classroom. Through the course, the project aimed for the teachers to:

1. gain a working knowledge of games and game making as an educational activity and art form,

2. understand their value and cultural significance,

3. discuss related topics such as game violence, twenty first century skills, and finally,

4. examine how classroom configurations influence student behavior.

In addition, we wanted those participating to feel confident about using the Zulama curriculum, project-based grading, and to embrace a teacher's role as facilitator, guide, resource, and collaborator in their student's educational journey. Assignments, face-to-face meetings, and grading were designed to model this sort of teaching approach using: contract grading, gamification, badging, no lectures, lots of discussion, game playing, and hands-on, small group activities and discussions (described more fully below).

Overall, we wanted the teachers to form a community, being comfortable in sharing their experiences, difficulties, and successes in ways that would extend into the time when they use the Zulama curriculum. These teachers are in a position to become leaders and experts in understanding 21st century skills as well as modeling their teaching in ways that will likely influence and inform fellow teachers. In addition, many of the teachers in the course were already resource people for technical and digital skills within their schools.

## Course Design

To design the course, Michelle used a consulting, collaborative approach and formative assessment. She spoke with people involved with the grant, i.e., Miami University, the Butler County Educational Service Center, and Zulama representatives to understand what was promised in the grant as well as topics that teachers struggled with when new to games and game-making in the classroom. Once the class met, she also consulted with students, asking them what their goals were for the class and offering assignment options so that students could spend their time in meaningful ways. This resulted in the List of Learning Outcomes that is presented in Figure 1 below.

□ **Understanding and having resources to respond to the subject of Violence in the Classroom;**

□ **Understanding and be equipped to provide their students with assignments that support the development of 21st century skills;**

□ **Formative assessment - how to use it to improve and assess your teaching;**

□ **Understand project based learning and how to design and assess student work;**

□ **Understand the value of teacher as coach, facilitator, resource person, and guide;**

□ **Understand why and how classroom configurations can influence how students collaborate;**

□ **Understand the value and purpose of educational games and game making as a classroom activity;**

□ **Understand how game making is an art form;**

□ **Have access and knowledge about resources that will support classroom use of the Zulama Curriculum and game making.**

**Figure 1: List of learning outcomes for the course.**

The initial syllabus was adapted to reflect student input after the first face-to-face meeting. In addition, Michelle drew upon her understanding of the field to address topics that she thought would give the teachers in the course a solid foundation for why teachers would want to use games with students or teach game-design, and what students would be learning. Given their lack of experience, it was important for the participants to see the big picture of educational gaming, grounded in both theory and practice.

Given that teachers are very busy - working full time and managing family life among other activities - we wanted to ensure that the amount of work would not be overwhelming or overly academic. This was perceived as a good decision, considering that a few students commented that the academic articles were somewhat confusing. This is possible due to them using discipline-specific language, such as those from the field of Art Education. However, while a few of the articles were academic in nature, most were from newspapers, or blogs, white papers and reports from places such as the Cooney Center/Sesame Workshop.

The required texts were written for general audiences (such as *Theory of Fun* (Koster, 2014) and a few chapters from *Digital Natives* (Prensky, 2010)). Likewise, the videos were selected for single ideas or concepts such as TED talks, online broadcasts, and several videos created for a MOOC on game based learning offered through the University of Wisconsin. In addition, several links to online resources were provided, which included games and game-making software. More specifically, we used *Gamestar Mechanic*, a simple drag and drop (no coding required) game-making software to give teachers a sense of the complexity of game making and necessity of collaboration and iterative development.

During the course, there were no lectures. Michelle made this choice because she wanted to model the sort of teaching she hoped they would use with their students. Meaning that they would provide meaningful work, explorative group activities, feedback and facilitate discussions. Students discussed the readings and assignments that were chosen to encourage student reflection. For example, students were asked to read through lists and articles about 21st century skills and new media literacies and then to make their own charts, citing instances where they observed themselves, colleagues, or their students using such skills. During the second face-to-face class, the instructor asked them to combine these into a shared document. Similarly, she asked them to get into small groups and discuss their writings about violence in games so that they would all came away with information to draw upon during future discussions about violence in games with colleagues, students and student's parents.

The course was offered both synchronously and asynchronously. Students met face-to-face three times – for eight hours on Saturdays once month beginning in September and finishing right before Thanksgiving in November. In between face-to-face classes, the instructor posted assignments on a closed website and in the shared Google class folder. Students were to post comments in a shared Google folder and comment upon at least two other classmate's posts. Each of the asynchronous weekly assignments (see Figure 2 below) was intended to take about two hours to complete, but optional readings and videos were provided if a student wished to go deeper.

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**Week 4. Games & School (DUE November 1, Saturday)**

### *Read*

☐ **Assessment Drives Learning: How to Drive to a New Place, James Gee**

☐ **Jean Lave, Etienne Wenger & Communities of Practice**

☐ **Can Gaming Change Education?, *eSchool News*, Stansburyu**

### *Optional Readings*

☐ **Moving Learning Games Forward: Obstacles, Opportunities, and Openness, Klopfer, Osterweil, Salen**

☐ **The Instructional Power of Digital Games, Social Networking, Simulations and How Teachers Can Leverage Them, by Klopfer, Osterweil, Groff, Haas**

☐ **Game Changer: Investing in digital play to advance children's learning and health, Thai, Lowenstein, Ching, Rejeski**

### *Watch*

☐ **The Gamer's Edge, James Gee (3 min)**

☐ **Technology Inside vs. Outside of Classrooms, Halverson (5 min)**

☐ **Learning as Cheating the Game, Deb Fields & Jim Bower (4.5 min)**

☐ **Situated Learning & Place-Based Games, David Gagnon (5 min)**

☐ **Connected Learning: Playing, Creating, Making, Katie Salen (7 min)**

☐ **RSA Animate - Changing Education Paradigms, Sir Ken Robinson (11.5 min)**

### *Respond*

☐ **In the class folder, write your thoughts about school, learning, and games. Then respond to two other class members writing. NYT feature: Learning by Playing (Quest to Learn in NYC) September 2010**

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**Figure 2: Sample of weekly asynchronous class assignments.**

## Contract Grading, Gamification, and Badging

The instructor created the assignments and grading structure by borrowing from Davidson and Sheldon (https://gamingtheclassroom.wordpress.com/syllabus/). Davidson's blog post *Contract Grading* (source: http://www.hastac.org/blogs/cathy-davidson/contract-grading-peer-review-heres-how-it-works) and her book, *Now You See It*, describe her use of contract grading. The instructor copied Davidson's contract and adapted it for this class. Students were asked to choose the grade they wanted to earn and write it on the contract. They also signed it, as did the instructor and a witness from the class. To gamify the class, the instructor borrowed from Sheldon's system for awarding points for various assignments From conversations with Seann Dikkers (personal communication, 2014), she borrowed his idea of providing an assignment bank with the option for students to suggest alternatives. Using the assignment bank the instructor created for the course, students selected the things they wanted to do in order to earn the desired grade. Accompanying the contract the student listed all of the assignments they agreed to complete. If they completed the assignments agreed to, they would earn the grade stated on the contract.

The instructor provided a base-line of non-negotiable assignments that would constitute a C. To earn 1000 points for a C, students were required to attend class, complete the required readings from Koster (2014) and Prensky (2010), all the asynchronous assignments, and write a response and respond to one another's work using Google docs. (The points-chart and assignment bank will be shared during the presentation.) For these base-line assignments, students were asked to self-grade using a chart in the shared Google folder for the course.

To earn a B or an A, students could "build" their own course by choosing from among the options in the assignment bank, each with a specific number of points. For example, they could choose to write a game review for 25 points or explore a game-making software, earning anywhere from 100 to 500 points depending upon the depth they choose. Exploring a Zulama course offering, thinking through how they would implement it in their classroom and then presenting their findings to the class was worth 500 points. Most students did this which both allowed them to gain a letter grade and prepare to teach a Zulama course: something they would have to do anyway.

To incorporate some of Davidson's ideas about peer review, the instructor added badges as a way to up-vote one another and to increase one's grade to a plus or minus (see Figure 3). Students were asked to assign badges to fellow students each time they met face-to-face using a chart provided in the class Google folder. The purpose of the badges was to contribute to creating community and give feedback to students about how they were perceived by their peers. In addition, the badges indicate the sort of classroom behavior that the instructor considered valuable for creating an atmosphere conducive to peer-to-peer instruction and collaborative work. In a typical classroom where students gather regularly, it might be more useful. While everyone up-voted peers and the instructor a few times, it was not done after every face-to-face class.



**Figure 3: Peer-awarded badges. From left to right: leadership/group facilitation, collaborator, congeniality, helpfulness, innovation, and going above and beyond.**

## Summary of the Pre/Post Formative Assessment

The project used formative assessment to fine-tune the course as it was being held. In addition, using the pre-post tests was another way for Michelle to model the approach to teaching that she thought would most help the students be successful in implementing the Zulama curriculum. They also had an assignment to write and use pre/post tests with the current students. It is not uncommon for a designer to make less than ideal or even entirely wrong decisions in the conceptual phase. However, while a designer often has the option to perform user tests and iteratively adjust her work (e.g., Vanden Abeele et al., 2012), a course designer cannot test or "rehearse" her work before implementing it. It is therefore not uncommon for experimental course designers to make adjustments to their work while the course is in progress (e.g., De Schutter & Papa, 2015). The formative assessments that are described below were held to accommodate this, and should not be interpreted as a formal evaluation of the learning outcomes of the course. The formative assessment used five questions that would help gauge the student's preconceptions and how these would change after the session. Below we explain how the tests were adminis-

tered, and we provide an evaluation of questions one and four in order to assess how well the course objectives were communicated.

## Administration of the pre/post assessment

The students answered these questions on the first all-day class on a Saturday morning. Students were given a pre-class reading assignment to read two chapters *Digital Natives* (Prensky, 2010), and bring a drawing of how their classroom was arranged. The post-test was given during the last 30 minutes of class on the final all-day Saturday class. The first time they were given paper and pens with the questions and the second time they were offered paper or digital "paper"; four responded digitally, typing, two choose to hand-write, and one didn't do the post test. The ability to use the medium they were most comfortable with combined with their increased knowledge of the learning objectives contributed to more thoughtful and extended responses in the post-test.

The following five questions were used to assess the student's understanding of the topics (1), and are as follows:

1. Why would games or game-making be used in schools?

2. What is the role of teachers in a classroom?

3. Given the technologies available, how can these transform, support, enhance, facilitate student learning? How does this apply to game design and game-making?

4. What is the difference between space that is designed well and designed poorly to facilitate students in collaborative work and research?

5. What elements are essential or must be including when making any kind of game?

## Evaluation of the student's pre/post responses

We include a discussion of Q1 (i.e., "Why would games or game-making be used in schools") and Q4 (i.e., "What is the difference between space that is designed well and designed poorly to facilitate students in collaborative work and research"). However, the other questions followed a similar pattern.

## Q1: Why would games or game-making be used in schools?

"Engagement" was the most frequent word used in describing the value of games in the pretest; it was given as a reason for why games would be used in schools. However, they were not able to explain what engagement would look like, how it would occur or how it would benefit the student. In the post assessment, students touched on some of the benefits of using games in classrooms and were more articulate and specific. The obvious conclusion is that they were synthesizing the readings and videos they had watched and had gained in understanding.

One student who teaches art responded as follows:

> Student A Pre:
>
> Make learning exciting. Take what kids know & like & use it in the classroom. Visual learners get to use visual skills to learn.
>
> Student A Post:
>
> An interactive way to create interest in learning with students in which they learn without always being conscious of that learning.

Her pre-assessment response is typical of many who hear about the idea of using games in the classroom. Many assume that all kids play and like video games, which actually is not the case. There are various degrees of ways kids play games and nuanced ways they understand themselves as gamers. Furthermore, while 97% of people under 18 play games, informally, outside the classroom (Lenhart et al., 2008), playing games for an educational purpose, as a required classroom activity is not the same. It is the way in which students identify themselves as game players that contributes to their willingness to play games selected for classroom use. In addition, how the game is presented and connected to learning activities makes a difference in student's eagerness to play games in school.

While we would have liked to see the student's post assessment response more developed, it is noticeable how the emphasis has moved from the idea of games as potentially more exciting or novel ways of teaching, to the idea of games as a more interactive method that has other benefits for learning than simply their motivational value. At this early point in the course, a seed towards a better understanding of game-based learning is starting to develop for Student A. Student B, however, takes a much bigger leap in his perception towards games in class:

Student B Pre:

- Increases engagement

- Excellent opportunity for collaboration/PBL (project based learning)/21st century

- Teaches troubleshooting/improvement

- Can be easily integrated into a variety of subject areas

Student B Post:

My participation in the class has dramatically reshaped my opinion on the usage of games and game-making in school. Games and game-making have numerous applications to a wide variety of careers and professions that the skills developed in courses like those that are provided by Zulama would be beneficial. The whole concept of iteration, and the fact that gaming allows players to problem solve, suffer setbacks and then figure out ways to work through them, experience failure and ultimately that "epic win" experience all have applications that can benefit student growth. The collaborative aspect of gaming was one that I completely underestimated. The whole 21st Century skill sets of critical thinking, using technology, and collaboration, to name a few fit into the model that will help students.

## Q4: What Is The Difference Between Space That Is Designed Well And Designed Poorly To Facilitate Students In Collaborative Work And Research?
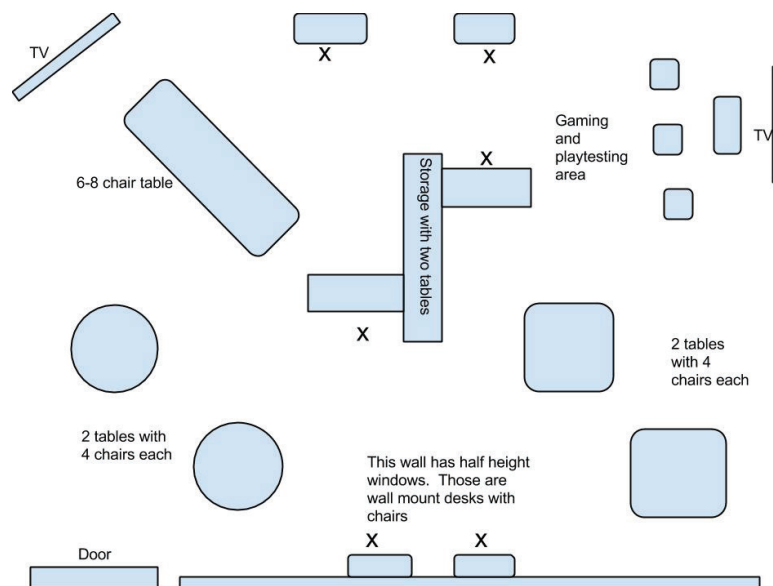


**Figure 4: One student's ideal classroom layout.**

In the pre-assessments there was a lack of depth in the responses and in the post assessment, students clearly grasped the need for movable furniture and providing a variety of spaces in which students may collaborate such as tables and access to a white board or projector to facilitate sharing computer screens with a group. One of the reasons this concept was clearly communicated was likely because of the assignment to make a graph of one's existing classroom and then redesign it (see Figure 4, above). Most people worked in pairs. In addition, the classroom space where the class met at Miami University is designed to facilitate all of the activities associated with game design, thus they also experienced how the classroom space can support and facilitate various student activities.

Student A Pre:

One enhances learning

One distracts from learning process

Student A Post:

One enhances learning, aids learning and creates an environment in step with learning, while the other interferes or dictates how learning will take place.

Student B Pre:

Space guides application

Student B Post:

Learning spaces guide learning, plain and simple.  Spaces that are created with comfortable and optimized areas for collaborative work will foster collaboration instead of impeding it.  Learning spaces should also have other areas such as; play-testing, individual work, rapid prototyping, and even relaxing/informal areas.

## Conclusion

The pre/post assessment responses confirmed for Michelle that her approach to teaching the course was successful. The pre-tests served to inform her selection of readings and viewings for the asynchronous portion of the class. From the pre-tests, one can see that most students had good ideas about the key concepts for the class, but lacked depth. Pre-assessment responses included very superficial, bulleted lists while the post-assessment responses had complete sentences in some cases and synthesized responses.  It was clearly noticeable how their thinking progressed, and we noticed how some of our participants started to look at games as tools for critical and analytical thinking, systems thinking, problem-solving, and evidence based reasoning (as opposed to simply motivation). This was also evident to Michelle from classroom discussions; these were not formally documented. Finally, the most striking difference between pre and post assessments is the level of specific detail and thoughtful responses.

Thinking about games in education and game making as part of an academic curriculum can be something that evolves as one learns more about the subject. Games are multi-disciplinary and teaching with games or game-making has implications for teaching and learning that shifts the paradigm of school. Many consider playing games to be all about fun and school all about work. By bringing games into the classroom the shift that occurs can result in more freedom for student exploration and agency, even becoming intrinsically motivated to participate in learning. In essence, when one is drawn-in to a subject it is highly satisfying. One looses track of time, getting into a "flow" (Csikszentmihalyi, 1990). Such learning and skill building could be described as fun.

This course was important because it contextualized games within academia and classroom practices. It helped the teachers to embrace the idea that they would be learners along side their students and in this way the course helped them to overcome their anxiety regarding their limited knowledge in the filed of game design. Many teachers assume they have to have all the answers; however, the approach we advocated was for the teacher to encourage asking questions and finding answers together. In addition, with teacher guidance, students may see how to transfer the skills they exhibit in game play to other academic endeavors. As these concepts are implemented in classrooms, researchers may collaborate with teachers to better understand how learning environments can be restructured to address the needs of 21st century learners.

## Endnotes

(1) For replications of the assessment, we recommend to change the order of the questions to Q2 (first), Q4, Q3, Q1, Q5 (last). We also advise to add the following sentence to Q5: "Explain how these elements combine to create the desired user experience."

# References

Csikszentmihalyi, M. (1990). *Flow: the psychology of optimal experience*. New York: Harper and Row.

Davidson, K. Contract grading + peer review: here's how it works. *HASTAC* 2015. Web. 7 July 2014.

Davidson, K. (2011). *Now you see it: How the brain science of attention will transform the way we live, work, and learn*. New York: Viking,

De Schutter, B., & Papa, S. (2015). Return of Gradequest: Evaluating the third iteration of a gameful course (p. 4). Presented at *Foundations of Digital Games*, Pacific Grove, CA.

Koster, R. (2014). *A theory of fun for game design*, 2nd edition. Sebastopol, CA: O'Reilly Media, Inc.

Lenhart, A., Kahne, J., Middaugh, E., Macgill, A.R., Evans, C, Vitak, J. (2008) *Teens, Video Games and Civics. Teens' gaming experiences are diverse and include significant social interaction and civic engagement*. Pew Internet & American Life Project. Washington, D.C. Retrieved from: http://www.pewinternet.org/2008/09/16/teens-video-games-and-civics/

Prensky, M. (2010). *Teaching digital natives: Partnering for real learning*. Thousand Oaks, CA: Sage.

Sheldon, L. 'Syllabus, T366: Multiplayer Game Design'. *Gaming the Classroom*. N.p., 2010. Web. 8 July 2014.

Vanden Abeele, V., De Schutter, B., Geurts, L., Desmet, S., Wauters, J., Husson, J., … Geerts, D. (2012). P-III: A player-centered, iterative, interdisciplinary and integrated framework for serious game design and development. *Communications in Computer and Information Science*, 1(280), 82–86. http://doi.org/10.1007/978-3-642-33814-4_14