Michael Bishop

Implementing Gaming Technologies In Traditional K-12 Contexts

Case Analysis

Summer Winrotte
EDCI 672-006 Fall 2017

Key Stakeholder Roles

Stakeholder's Name	Stakeholder's Job Title or Affiliation within the Organization	Stakeholder's Role
Michael Bishop	▪ *Researcher at the University* ▪ *Director of Project Developing Games for Middle School Science Classes* (Ertmer, Quinn, & Glazewski, 2014, p. 29)	ID'er Project Manager Evaluator
Bailey Richards	▪ *Science Curriculum Specialist* for Weyman Independent School District (ISD) (Ertmer, Quinn, & Glazewski, 2014, p. 30)	Potential Client
Laura Kenner	▪ *Science Coordinator* for Neighboring District (Ertmer, Quinn, & Glazewski,2014, p. 32)	Potential Client
Daniel Brown	▪ *Science Coordinator* for Neighboring District (Ertmer, Quinn, & Glazewski, 2014, p. 32)	Potential Client
Jim Harrington	▪ *Assistant Superintendent for Curriculum* for Mason Independent School District (ISD) (Ertmer, Quinn, & Glazewski, 2014, p. 32)	Potential Client
Bob Blanchard	▪ *Game Designer* (Ertmer, Quinn, & Glazewski, 2014, p. 33)	SME – Game Design
Craig Dawson	▪ *Director of Science Education for the State Education Agency* (Ertmer, Quinn, & Glazewski, 2014, p. 33)	SME – Science Education & State Standardized Testing
Antonia Fisher	▪ *Professor of Science Education* (Ertmer, Quinn, & Glazewski, 2014, p. 33)	SME – Science Education
Not Identified by Name	▪ *Game Development Team (aka "Michael's Team")* (Ertmer, Quinn, & Glazewski, 2014, p. 33)	Developer
Not Identified by Name	▪ *Middle School Students*	Target Audience

Stakeholder's Name	Stakeholder's Job Title or Affiliation within the Organization	Stakeholder's Role
Not Identified by Name	▪ *Middle School Teachers*	Instructors

Key Stakeholder Primary Concerns

Stakeholder's Role	Stakeholder's Name	Stakeholder's Primary Concern(s)
ID'er **Project Manager** **Evaluator**	Michael Bishop	▪ Has to 'sell' games to skeptical audiences (potential clients) (p. 30) ▪ Restricting use of the games to gifted students, after-school programs, and science summer camps seemed like an admission that they weren't appropriate for regular kids in regular classes (p. 33) ▪ Would probably never achieve broad dissemination in middle schools under the current game design (p. 37) (Ertmer, Quinn, & Glazewski, 2014, p. 30-37)
Potential Client	Bailey Richards	▪ Too much time is required to utilize the game ▪ The students need to go deep (into the content) quickly, and cannot spend too much time figuring out what to do (in the game) ▪ This would not be an efficient use of time for the average learner (Ertmer, Quinn, & Glazewski, 2014, p. 32)
Potential Client	Laura Kenner	▪ The district is moving to a common curriculum in which lessons are implemented in every classroom on the same day (which many teachers are protesting) and it will be an issue to allow a few teachers to do something different (Ertmer, Quinn, & Glazewski, 2014, p. 32)
Potential Client	Daniel Brown	▪ The amount of computer lab time is limited so that the computer lab time can be saved for math and language arts teachers

Stakeholder's Role	Stakeholder's Name	Stakeholder's Primary Concern(s)
		▪ Teachers would complain if one or two science teachers were able to use the computer lab two weeks in a row (Ertmer, Quinn, & Glazewski, 2014, p. 32)
Potential Client	Jim Harrington	▪ The district needs to protect the students from spending too much time on that sort of thing [piloting educational games] ▪ Not all of them [materials associated with university research] are ready for prime time ▪ There were bugs in the game which could bring class to a screeching halt and end up wasting time ▪ Cannot spend that sort of time on research (Ertmer, Quinn, & Glazewski, 2014, p. 33)
SME ***Game Design***	Bob Blanchard	▪ It is difficult to pull data out of games and make it really usable for teachers, but it is the best kind of data ▪ Incorporating multiple-choice or short-answer questions in a game will break up gameplay, distract the player, and kill motivation ▪ As soon as teachers are the one implementing the game, there will be problems (Ertmer, Quinn, & Glazewski, 2014, p. 36)
SME ***Science Education***	Craig Dawson	▪ Standardized test performance impact (p.36) ▪ Teachers will need to hold students accountable for learning while they are playing [to combat off task behavior] (p. 37) ▪ Some students will get off-task when the room is full of diverse student needs and the teacher who is not entirely comfortable with the approach of game-based learning (p.37) ▪ There is a danger of a lot of wasted time (p. 37) (Ertmer, Quinn, & Glazewski, 2014, p. 36-37)
SME ***Science Education***	Antonia Fisher	▪ It is an unrealistic expectation to show game leads to increased performance on standardized tests (p. 35) ▪ Schools need alternatives [different types of learning materials] (p. 36) ▪ That's [critical thinking disappearing if extended into homework exercise] a real danger (p.36)

Stakeholder's Role	Stakeholder's Name	Stakeholder's Primary Concern(s)
		▪ Whether Craig supports the teachers in using the game well (p. 36) (Ertmer, Quinn, & Glazewski, 2014, p. 35-36)
Developer	*Game Development Team* *"Michael's Team"*	▪ The game development team's concerns were not specified in the case
Target Audience	*Middle School Students*	▪ Student (target audience) concerns were not specified in the case
Instructor	*Middle School Teachers*	▪ Teacher (Instructor) concerns were not specified in the case

ID Challenges & Case-specific Constraints

1 ID Challenge / Case-specific Constraint	2 Classification ID Challenge	 Case-specific Constraint	3 Priority	4 Rationale for Priority Indicator
A barrier to the implementation of Michael's project is felt/actual instructional time constraints (exacerbated by standardized test pressures) in the potential client districts. The project's potential clients "balked at the amount of time required" to fully implement the game, stating that it would not be "an efficient use of time for the average learning" nor could they "spend that sort of time on research" (Ertmer, Quinn, & Glazewski, 2014, p. 32-33).		X	1	If the school districts decide that instructional time constraints will cause the game to be unusable, then all other challenges or constraints are null or void; therefore, instructional time constraints must be addressed first.
The instructional/learning context in which the game is to be implemented must be more clearly defined. Referring to the ADDIE model, Michael is struggling in the *Analysis* phase, defining (or possibly	X		2	It will be difficult, or near impossible, to continue moving forward with the project design, development, and implementation phases of the project without clearly defining

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redefining) the instructional/learning context in which the game will be implemented. Without the outputs from the *Analysis* phase, it is impossible to begin the *Design* phase of the instructional design model.				the instructional/learning context in which it will be utilized. Since Michael will not be able to move forward, it is imperative that he prioritizes analyzing the instructional context after considering the case-specific constraint of available time for implementation, but before anything else. Potential outputs from an analysis of the instructional/learning context might include: number/nature of sites, compatibility with instructional needs, and compatibility with project needs.
Michael's project was funded based on the purpose of honing "an innovative model to use technology to increase the engagement of all students" in their middle school science classrooms (Ertmer, Quinn, & Glazewski, 2014, p. 33). When completing a project with high fidelity, it is assumed that the original purposes for the project have been met/achieved. In order for Michael continue utilizing the project funding, with high fidelity, he must adhere to the project's foundational purpose, honing a model that increases the engagement of *all* students. If Michael does not continue the project with high fidelity (of the original proposal), there might be negative consequences enforced upon the project, such as a negative impact to funded monies.		X	3	After the instructional/learning context is defined, Michael must verify that the potential redefinition of the instructional/learning context does not negatively impact the project funding. It is impossible to determine this impact if the potential (new) instructional/learning context has not be defined. Therefore, the question of funding must be asked following the above priority. If it is deemed that there will be changes in funding it must be determined if those changes will cause the project to cease. Michael must determine if the project can go on without some/all sources of funding. If it is determined that the project cannot go on without the funding, Michael must revisit the previously listed priority.

1 ID Challenge / Case-specific Constraint	2 Classification ID Challenge	 Case-specific Constraint	3 Priority	4 Rationale for Priority Indicator
Without provided strategies and tools to utilize during the implementation phase of the project, it will be very difficult for the teachers (instructors) to implement the game with high fidelity and impact. The project must be carefully created in order to support the teachers (instructors) in implementing the game. Potential implementation strategies and must be designed and available for the teachers (instructors to choose from. When referring to the *Development* phase of the ADDIE model of instructional design, the strategies of implementation (and supporting tools) must be created. Then, the strategies (and supporting tools) will be utilized during the ADDIE phase, *Implantation*.	X		4	The challenge of providing sufficient support can on be addressed after all other challenges and constraints. Without decisions on time constraints and instructional context, designing and developing implementation strategies and tools will potential lead to useless tools and wasted time.

Assigned Readings, Your Previous Experiences and Your Understanding of the Case Problem

I am a consultant for a company that supports a grant proposal process, curriculum design/creation, and implementation of NSA funded cybersecurity summer camps. Part of my role is to compare the actual camp instruction, activities, and environment with the proposed instruction, activities, and environment. I am required to note when the actual details/happenings of the camp do not line up with the stated objectives, details, and happenings noted in the proposal. It is expected that the camps who received the grant funding adhere to their proposals. After gaining knowledge about the workings of grant funding, I am now aware that at times there are catastrophic consequences to straying from grant proposal details. While the Michael Bishop case does not specifically address funding details, this issue could potentially make or break the future of the project. The case states that the purpose outlined when receiving the funding was to specifically "increase the engagement of all students", not just high-ability students or students attending after school programs (Ertmer, Quinn, & Glazewski, 2014, p. 33). This is opposite of potential 'fixes' noted in the readings. For example, Rice (2007) suggests that after school and programs during the summer "may prove to be better times for engaging" students in game-based learning environments (p. 255).

The issue of lost instructional time, that the potential clients brought up in the Michael Bishop case study, resonated with my personal experience. Early in my career I felt the pressure of teaching math, a heavily standardized tested subject. I knew that our school's overall grade (in turn every teachers' evaluation score) directly depended on my students' ability to pass a state standardized test. While I was, and am, confident in my teaching strategies and abilities (continually adding new strategies and tools to my 'teaching tool box'), I quickly came to realize that it is not just about strategies and tools, but also adequate time to implement those strategies and tools. Four years ago I was teaching of 8th grade math, in which each class period was allotted 54 minutes of instructional time per day. The following year, the class periods were cut down to 45 minutes. Utilizing the same teaching strategies and tools, my student test scores took a dive. While I recognize that I had different students, who had different abilities and starting points, the minutes cut from each class period was detrimental to my students' scores. Each week we lost a total of 45 minutes of instructional time, totaling 1,620 minutes a year. If speaking in terms of 45-minute class periods, *36 class periods* of instructional time were lost by the end of the school year. From personal experience, it is very difficult to maintain standardized test performance when instructional time is lessened.

In the Michael Bishop case, problem-based learning (PBL) was not emphasized in at least three of the four potential client districts. Two of the four districts were transitioning to a "common curriculum" with lessons "implemented in every classroom on the same day" and another district that wanted their students to have depth to their learning, but wanted them to "go deep quickly" so the students participated more in guided inquiry instead of PBL (Ertmer, Quinn, & Glazewski, 2014, p. 32). Pederson et al. (2009) conducted a study of how a computer-based PBL module was implemented and assessed. Without reading carefully, one could easily miss why this study does not fully support the Michael Bishop Case. According to Pederson et al. (2009), all ten teachers had been previously introduced to the game utilized in the study, worked in a school district that already "emphasized the use of PBL", and had previously been offered "stipends to attend workshops on PBL" (Pederson et al., 2009, p. 232). Because of the aforementioned information, it is no surprise that nine of ten teachers in the Pederson et al. (2009) study had exposure/experience in PBL.

Great teaching is great facilitating, in any instructional environment. According to Rice (2007), "advanced computer gaming products" produce "engaging products offering users multiple opportunities for higher order thinking" (p. 252). The word *opportunities* imply that it is possible, but not necessarily probable, that the students will engage in higher order thinking. This is where it is necessary for the teacher to facilitate the students' learning to actualize on the game-produced opportunities. The teachers in the Pederson et al. (2009) study mentioned previously were able to make "modifications to the program to adapt it to their classes as they deemed appropriate" due to their previous PBL experience/training and their prior knowledge of the implemented game (p. 233). The question then arises, what is in place to support the potential teachers (instructors) implementation of the game in the Michael Bishop case study? Personally, through a professional learning network (PLN) I am part of, Microsoft Innovative Educator Experts, I have had the opportunity to test out Minecraft: Educator Edition. Minecraft is an excellent example of a "complex role-playing, graphically dense, and cognitively viable modern game" (Rice, 2007, p. 251). While Minecraft can breed a cognitively rich experience, but this experience does not normally occur without the facilitation of an instructional unit or lesson. In order for educational games to have a "strong cognitive" benefit, teachers (instructors) must use scaffolding so that "students are guided carefully along select paths of instruction while exploring" the gaming environment and experience (Rice, 2007, p. 252).

Solutions, How They Address Challenges and Case-specific Constraints, Pros & Cons

1 Solution #	2 Possible Solution	3 ID Challenges and Case-specific Constraints	4 How Does It Address the Design Challenge(s) and Case-specific Constraint(s)	5 Pros	6 Cons
1	Michael and his team will ***design, develop, and implement a robust system of support materials for game implementation facilitation***. These materials will be designed so that they can be adapted to support implementation in an after-school program or implementation in a traditional general education classroom. The system of support materials will include (but will not be limited to): ▪ Template for daily journal game-play logs, ▪ Worksheets that coincide with various aspects of the holistic game scenario, ▪ Exit ticket checkpoints to support specific knowledge presented in various aspects of the game scenario, ▪ Various free-response questions that extend various aspects of the game scenario, and ▪ Three assessments (multiple choice and short answer) that are correlated with the state science content standards. Each district will have different needs. A robust system of support materials will allow districts to utilize the materials that best meet their needs. In addition to the system of support materials, teachers (instructors) who implement the game will receive ***in-person support of Michael or one of his team members (for year one of implementation)***.	**ID Challenge # 1:** The instructional/learning context in which the game is to be implemented must be more clearly defined.	With the knowledge that no two districts will implement identical game scenarios, variable support materials will address multiple instructional/learning contexts.	▪ Little change will need to be made to the actual game design ▪ Less time will need to be put in to game redesign ▪ More time can be spent designing and developing support materials ▪ Since teachers will have in-person support, there is less change of teachers implementing the game in a scenario that does not align with the intentions of the game design ▪ Broadening the instructional/learning affords flexibility to districts that cannot resolve instructional time constraints	▪ Michael and/or his team members will have additional in-person just-in-time support commitments for one year from the start of each district's game implementation ▪ Creating a system of support materials might be difficult if Michael and his team members do not have prior experience designing, developing, or using educational support materials ▪ If districts are given the option of traditional classroom or after-school game implementation, it is possible that no districts will choose a traditional classroom scenario, potentially causing: ▪ Negative impact on project funding ▪ Inability to determine if project was successful due to the absence of traditional classroom scenarios
		ID Challenge # 2: Without provided strategies and tools to utilize during the implementation phase of the project, it will be very difficult for the teachers (instructors) to implement the game with high fidelity and impact.	Strategies will be modeled by Michael (or one of his team members) during the in-person implementation support. Tools (support materials) will be provided for the teacher (instructor) to use as-is or alter as needed.		
		Case-specific Constraint # 1: A barrier to the implementation of Michael's project is felt/actual instructional time constraints (exacerbated by standardized test pressures) in the potential client districts.	Broadening the instructional/learning context choice allows for district's to implement the game in a scenario that adheres to their felt/actual instructional time constraints.		
		Case-specific Constraint # 2: If Michael does not continue the project with high fidelity (of the original proposal), there might be negative consequences enforced upon the project, such as a negative impact to funded monies.	The broadening of the instructional/learning context will be noted in Michael's funding report. He will also note that the change in instructional/learning context does not exclude traditional general education classrooms, instead it is adding the possible after-school instructional/learning context.		

1 Solution #	2 Possible Solution	3 ID Challenges and Case-specific Constraints	4 How Does It Address the Design Challenge(s) and Case-specific Constraint(s)	5 Pros	6 Cons
2	Michael and his team will ***alter the design of the game so that the "large and robust" virtual environment/scenario can be explored through a variety of independent "short learning objectives" or scenarios*** that can be completed within a 45-minute time constraint (Rice, 2007, p. 255). Additionally, in order to support teachers (instructors) who have not previously incorporated game-based learning into their classroom environments, Michael's team will ***design, develop, and implement a 2-year program in which a cohort of teachers will receive robust training prior to game facilitation and in-person support during game facilitation***. After the cohort has been trained, the teachers (instructors) will implement the game in an after-school scenario during year one, with in-person support of Michael or one of his team members. During the second year of the implementation program, the cohort will implement the game in a traditional general education classroom environment (with the option of additionally continuing the after-school scenario).	**ID Challenge # 1:** The instructional/learning context in which the game is to be implemented must be more clearly defined.	While the overall instruction/learning context is broadened to include both after school and traditional classroom scenarios, it is more clearly defined by the 2-year facilitator program cohort.	▪ Redesigning the game will allow for more varied learning contexts within the traditional general education classroom. ▪ Creating shorter independent instructional scenarios allows portions of the game to fit in to each district's time constraint needs ▪ Teachers (instructors) will have in-person support during year one, and then will have the opportunity to hone their skills independently during year two of implementation. ▪ Teachers (instructors) will have a peer group (cohort) that can collaborate and support one another through the implementation process. ▪ Michael will continue to support his original purpose of increasing engagement in science classes. ▪ Michael's team would have one year to work out bugs before the game is used in a traditional general education classroom.	▪ It will take time to redesign the game. ▪ The game will lose coherency of play by dividing the overall objectives into shorter/smaller learning objectives. ▪ Michael and/or his team members will have additional in-person just-in-time support commitments for one year from the start of each district's game implementation ▪ This solution requires a two year commitment from school districts versus a one year commitment.
		ID Challenge # 2: Without provided strategies and tools to utilize during the implementation phase of the project, it will be very difficult for the teachers (instructors) to implement the game with high fidelity and impact.	The 2-year program will provide game facilitation training, in-person SME facilitation support, and cohort member peer support.		
		Case-specific Constraint # 1: A barrier to the implementation of Michael's project is felt/actual instructional time constraints (exacerbated by standardized test pressures) in the potential client districts.	The 2-year program affords the districts one year to address how best to include the game in to their traditional classroom settings. This concern will be eased by the redesign of the game that supports scenarios that can be completed within a 45-minute class period.		
		Case-specific Constraint # 2: If Michael does not continue the project with high fidelity (of the original proposal), there might be negative consequences enforced upon the project, such as a negative impact to funded monies.	Year two of the 2-year problem will afford Michael the ability to document and prove that the original purpose of the project will still be achieved, just on a slightly altered timeline.		

Final Recommendation

Michael and his team will *alter the design of the game so that the "large and robust" virtual environment/scenario can be explored through a variety of independent "short learning objectives" or scenarios* that can be completed within a 45-minute time constraint (Rice, 2007, p. 255). This allows for more varied learning contexts within the traditional general education classroom. Creating shorter independent instructional scenarios allows portions of the game to fit in to each district's time constraint needs. Additionally, in order to support teachers (instructors) who have not previously incorporated game-based learning into their classroom environments, Michael's team will *design, develop, and implement a 2-year program in which a cohort of teachers will receive robust training prior to game facilitation and in-person support during game facilitation*. The in-person SME support will occur during the first year, with the second year affording each cohort participant the opportunity to hone his/her own skills for game facilitation. During year one, the teachers (instructors) will implement the game in an after-school scenario during year one, with in-person support of Michael or one of his team members. During the second year of the implementation program, the cohort will implement the game in a traditional general education classroom environment (with the option of additionally continuing the after-school scenario). The teachers (instructors) participating in the program will make up a peer group cohort that will serve as a collaborative think tank supporting one another through the implementation process.

Justification

Very few if any recommended solutions are perfect. Like most other cases, there are some negative aspects associated with the above recommendation. However, steps can be taken to alleviate some of the potential pit-falls. For example, even though a game redesign is in the best interest for educational markets, redesigning the game will take time. This is not an abnormal request and the team members were expecting some design changes to take place. While true 'gamers' might see a loose of game coherency due to embedded shorter/smaller learning objectives as a negative, Rice (2007) suggest that a "combination of traditional educational elements within" a game (entertainment medium) "may ease the divide" between the those who advocate for and those who argue against utilizing games in the classroom (p. 252). While the solution requires the district to commit to a two-year partnership with Michael's team, it allows for more potential impact while still maintain many aspects of district choice.

References

Ertmer, P. A., Quinn, J. A., & Glazewski, K. D. (2014). *The ID CaseBook: Case Studies in Instructional Design (4th ed.)*. Upper Saddle River, NJ: Pearson Education, Inc.

Pederson, S., Arslanyilmaz, A., & Williams, D. (2009). Teacher's assessment-related local adaptions of a problem-based learning module. *Education Tech Research Dev*, 57, 229-249.

Rice, J. W. (2007). New media resistance: Barriers to implementation of computer video games in the classroom. *Journal of Educational Multimedia and Hypermedia*, 16(3), 249-261.