

Transformative Play: Games as 21st Century Curriculum

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Abstract: In this presentation, we will discuss the design history, comparison studies, and scaling research focused on four units we have designed based on our theory of *transformational play*. The goal is to both discuss the power of these designs, but also the challenges of scaling such innovative learning experiences internationally. These four units (one focused on mathematics, science, language arts, and social studies) are situated in an online, multiplayer videogame called *Quest Atlantis*, supporting over 25,000 children worldwide. Each presented unit has gone through multiple iterations of implementation, analysis, and redesign, informed by empirical data and our evolving theoretical framework. In reviewing both results from comparison studies and differences in international engagement with the units, our accounts will illuminate the theory transformational play, how the theory has shaped design and interpretations of findings.

Introduction

We, as a society, are in the middle of a troubling transition in which teachers and schools are held increasingly accountable for students' acquisition of particular content but, at the same time, are facing a generation of students who view the curriculum as largely irrelevant to their own lives. This is, in part, because while much of the world is experiencing significant change in the ways we engage content, most K-12 classrooms continue to operate with an underlying cultural logic of "print-based" literacies and pedagogies in which the teacher dictates the learning process and textbooks determine what is true. Given this emphasis, it is not surprising that as students progress in the American educational system, their academic performance and engagement decreases when compared with other countries (UNESCO Institute for Statistics, 2007). This is especially true for students who are disenfranchised from classroom structures that focus on compliance without rationale, position content as facts to be memorized, and position students as objects to be changed as opposed to empowered change agents. In fact, a central argument of the papers in this symposium is that such positioning of person and content is pedagogically ineffective, personally disempowering, and conceptually inadequate if our goal is to prepare youth for meaningful participation.

The concern with students' meaningful participation is not new; Resnick (1987) stated that the fundamental challenge facing educators is to align the gap between how learning content occurs in schools and how it is used outside of schools. Specifically, she concluded that "schooling is coming to look increasingly isolated from the rest of what we do...the packages of knowledge and skills that schools provide seem unlikely to map directly ... from school to out-of-school use." While such a perspective inspires new visions of the possible, *realizing* those possibilities in the context of schools has proven to be a significant challenge. Our work attempts to realize some of these possibilities by leveraging the tools and technologies associated with online videogames (Gee, 2003; Squire & Jan, 2007). We believe that videogames have the potential to bridge this gap because they, unlike any other form of curriculum, can offer entire worlds in which learners are central, important participants; a place where the actions one takes has a significant impact on the world; and a place in which *what* you know is directly related to what you are able to do and, ultimately, who you become.

For the last decade, we have been working to understand the power of videogames for supporting learning, translating emergent insights into design work from which we have continued to evolve our insights as they are cycled back into subsequent designs and analyses (Barab et al., 2007; Barab, Gresalfi, Dodge, & Ingram-Goble, in press). In this symposium we simultaneously advance a theory and report on the curricula we have designed, with the goal of illuminating for others the possibilities of leveraging game-based technologies and methodologies to support content learning in actual schools. Building on this theory and our own experiences designing for and studying student learning, we have begun to build a theory of *Transformational play*, which describes a strategy for situating the learner and curricular content within a play context. The idea of transformational play highlights relations among the three interconnected elements of person, content, and context. Specifically, transformational play involves positioning students as empowered actors who must understand and enlist academic content in order to effectively transform problematic scenarios.

The purpose of this symposium is to overview a series of comparison studies that investigated the power of transformational play in terms of its instantiation in three designs (one focused on mathematics, science, and language arts) situated in an online, multiplayer videogame called *Quest Atlantis* (<http://QuestAtlantis.org>). Each unit that will be presented in the session has gone through multiple iterations of classroom implementation, analysis, and redesign, informed by empirical data and our evolving theoretical

framework about transformational play. In this presentation, we describe comparison study implementations of the designed units, first overviewing how the designs were intended to support learner intentionality, content legitimacy, and contextual consequentiality and then how they supported such positioning in practice. In building the latter characterizations, we looked through field notes, captured video, submitted work, interviews, and in-game log files from which to build implementation profiles. Using these data forms and the pre-determined focus on the elements of transformational play (person, content, and context), one researcher built initial claims and then worked with another researcher to form these into final arguments as presented below. The focus here is not to simply demonstrate that our designs scored significantly higher than the controls. Instead, our claims are theoretically motivated with the goal of shedding light on mechanism and further justifying the value of transformational play as a powerful theory for education.

Taiga Fishkill: Example 1 of Transformational Play

The Taiga Fishkill unit is an interactive narrative set within an aquatic habitat (Taiga National Park) where a serious ecological problem has resulted in many fish dying. Students are hired as environmental scientists whose job is to investigate the fish population decline, and propose solutions for the problem. To prepare the student for this role, the curriculum begins with an over-worked scientist, Abby, asking the visiting player to make several observations of and corrections to conditions of fish tanks she is using to run some experiments (see Figure 3). In one tank, the student identifies the dissolved oxygen in the tank as low, causing the fish to breath near the surface, and in another they observe that a significantly acidic pH has killed some fish. As the player is scaffolded through resolving each tank's problems, Abby becomes impressed by the player's growing sophistication at analyzing and solving the problems, and recommends that they may use this understanding to solve the fish population decline problem at the local national park where Abby used to work—thereby, *legitimizing* the disciplinary content.

Experiential *consequentiality* is supported by creating key decision points that require leveraging disciplinary formalisms, and enable the player to observe and interrogate the consequences of those decisions. For example, in investigating the problem, students are introduced to concepts such as erosion, eutrophication, water quality, and system dynamics. As they are introduced to what these concepts *mean*, they experience *how* these concepts *have meaning* by making decisions about how to improve water quality. Students, for example, may decide to target the role of nitrates in the water by asking the indigenous tribes, who are farming near the water, to stop their activity; they might focus on the role of erosion by asking the loggers to leave the area, or they might attribute the cause of the fish death to overfishing, and ask the commercial fishing company to close. After making this decision, students are able to see the consequences of their recommendation by traveling to a future world and considering the ramifications of their decision. *Intentionality* is supported by positioning students as expert helpers who can impact the situation by determining the cause of in the diminishing fish population. Players are asked to carry out various investigations into the health of the waterway and the impact of the nearby park activities—and non-player characters treat them as if they have the skills and dispositions to succeed. More specifically, they interview people with various perspectives on the problem, collect and analyze data to develop a hypothesis about the problem, propose an informed and practical solution, and examine the impact of their recommendation—all practices designed to position them in the role of a scientist. Because there is no clear “right answer,” students have to balance between what the data are telling them about the river, their own values about the park community, and their sympathies that might lie with some community groups. Thus, their decisions about *how* to improve the park, and their positioning as an environmental scientist (as opposed to a student) who makes scientifically knowledgeable decisions, becomes an opportunity to become a scientist.

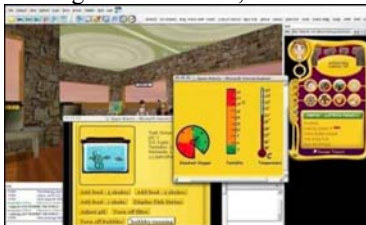


Figure 2. Screenshot from Taiga Fishkill showing a popup sequence associated with the fishtank

A comparison study was conducted with four equivalent classes in a suburban school (see Arici, 2008). The Traditional condition curriculum was text-based, and activities were teacher-led. The 3D MUVE condition was virtual-based, and placed the teacher in the role of resource, while students uncovered information within the larger structure of the Quest Atlantis virtual world. Both conditions were taught by the same teacher, presented with the same domain content, and assignments were aligned so that they were highly similar in their tasks. However, the traditional condition's lessons involved lecture, class discussion, and nicely organized notes, with micro-contexts serving as examples (a new exemplar for each new concept taught, as typically found

in textbooks). The 3D multiuser virtual environment (MUVE) condition's lessons were embedded within a macro-context, the story of Taiga, where all science content was distributed in the game, needing to be uncovered and solved, within the overarching narrative about the fish decline in a local river.

The posttest showed significant learning gains for both conditions. However, the QA group learned significantly more than the traditional group as indicated by a repeated measures analysis of variance [$F(1,115) = 6.53, p < .01$]. Further, the delayed posttest, administered at an 8 week delay, showed the 3D MUVE groups ($M = 23.65, SD = 5.85$) also scoring significantly higher than the traditional groups ($M = 18.4, SD = 6.52$) [$F(3,87) = 5.73, p < .001$]. Also, twice during the study, students were interrupted from their activities (both groups doing an equivalent assignment) to respond to a series of questions on their current state of engagement in the task at hand. Comparison between conditions showed that the 3D MUVE groups ($M = 6.50, SD = 2.10$) scored significantly higher engagement and enjoyment than the traditional groups ($M = 2.64, SD = 1.94$) when collapsing across group membership [$t(104) = 9.73, p < .001$]. Further, when asked why you were doing this activity, 98% of the traditional said because they were required while only 54% of the 3D MUVE students selected this reason with 46% selecting that they were doing the activity because "they wanted to be doing it," not because required. Additional measures of engagement included the degree to which students opted to participate in non-required activities. In the 3D group, 38 out of 51 (74.5%) opted to do the optional quests, while in the traditional group only 2 out of 54 (3.7%) did the 'extra credit.'

While these results demonstrated the power of the intervention for supporting important outcomes, it was also our goal to illuminate why transformational play was a powerful design pedagogy. Toward this end, our qualitative examination of both classrooms focused in on the positioning of person, content, and context. As a first example, we contrast two dialogues over similar scientific data to illuminate the power of positioning the data in terms of a fantastical problem.

| Traditional Curriculum | Intervention Curriculum |
|---|--|
| G1: What did you get for Site A? G2: good, ok, good, ok, good, ok. G3: that's what I got. G1: For site B, I got ok, ok, bad, bad, ok, bad. G2: For Site C, I got good, ok, good, ok, ok, bad. G1: Would 0.3 count as being good? G3: I got ok, ok, bad. This continues until they finish all of the list... G1: Good! So I only missed one! | G1: Okay, no Turbidity. That is good. G2: I think this one is really bad. I'm pretty sure. G1: Now I want to check water sample A. What do I do? G2: Just look at each of the chemical indicators, for A, B, and C. So, like with pH, look up the level at site C, and then look, it is in a range that is listed here as being 'very good' for aquatic life! Oh good! Okay, now you do it. The pH... |
| G2: Hey, he opened the blinds! G1: It's sunny! G3: I'm wearing shorts on Sunday to the thing. G1: What thing? G3: I have practice Sunday. G2: Hey, I got new volleyball shoes and they are awesome! I had basketball shoes earlier which is fine, but I didn't want to scuff them. And so I got new Asic shoes, and they are like... G3: Really grippy? G2: yeah, and I got new knee high socks too. G1: I don't get like the questions. G2: What are the main water quality concerns at sites A and C? (reads question) G1: It's like really cold in here. G2: Mr. Summers, (whining) we need help! G1: Why is he talking to Daniel when he knows we need help?? G2: My pupils are really big. They are a little smaller right now, but they are usually really big. G3: you have a freckle on your eye! G2: I love that freckle! | G1: It is very good for.... Wait... (reading aloud while typing) The chemical indicator for A, B and C is very good for 'aquatic life'. Okay, so then go on to the next one, Dissolved Oxygen. Okay, for the chemical indicator, D.O., the level is unhealthy in sample A. Okay, Location A, it is a very unhealthy level, but it is fine in the other places. (turning to friend) And the p is lower case in the 'pH'. G2: Hey, I know why everything is worse at C. Because that is where everything ends up... see (pointing to Y shaped river, with C at bottom)... see, this is where the rivers come together, so everything bad ends up going there! G1: Okay. I'm on phosphates, what are you on? Holy cow! The phosphates are like so frickin' high! Can I say they are 'bad'? That's like a kindergarten word, but okay. G2: Okay. Now, turbidity... Ohh! That's not very good. Look at the turbidity. G1: Talking aloud while typing... 'The aquatic life might be a little stressed, as shown in sample...' |

These contrasting cases illuminate the differences in both the kind of intention that students form as they work on a context that they are trying to transform, and in the legitimacy of the way content is taken up when it becomes a tool to be used to solve meaningful problems. This positioning changes the experience of learning from compliance to engaged participation where the feedback from the context frames participation as opposed to teacher reprimands.

The legitimacy of content was further substantiated because there is an object of refutation, grounding the conversation in terms of particulars that have substance, instead of what could conceivably be abstracted content. This is evident Chris and Jake's interaction as they analyze data.

Chris: "Whoa! Look at the temperature for B! That's WAY over. Way too high!

Let's go get the third one!"

Jake: "Okay!" (They each went to get the sample in Taiga).

Jake: "Now back to the lab. Let's compare it to the first two."

Just then the bell rang.

Chris: "Awww! I'll do the next one at home."

[while packing up their bags, they continued]

Jake: "But man, did you see that temperature? Twenty-two degrees CELCIUS!"

Chris: "No man, that's twenty-two POINT FIVE! Way too high."

Jake: "That can't be good for the fish."

Chris: "Yeah! I know!"

This grounding in particulars is bolstered when student choices impact the response of the world, creating an even stronger sense of situational agency.

J: At first I thought the Mulus were to blame, because the chief was mean to me, and I didn't like him.

S: That's because you were mean to him first! [referring to choices the other student made in game]

J: Yeah, yeah. I know. ... But you have to go more by the information that the charts give you, like the water samples and chemicals (indicators) in the water. You need to conduct tests on the water before you can really decide what is going on.

Because videogames provide a sense of consequentiality, intentionality involves more than simply caring, and legitimacy involves more than contextualizing, but instead the contextual responsiveness leads to a way of acting; leading to the development of what some have called *dispositions* towards engaging.

Ander City: Example 2 of Transformational Play

The Ander City unit positions students as political arbitrators when a child who lives in the city contacts them for help. Their current mayor is up for re-election, and he is running under a campaign of innovation. His opponent is challenging the mayor's innovative agenda, and claims that traditional methods of running the city are superior. The problem is that although both candidates completely disagree with each other, they BOTH claim that they have proof to support their claims. Is someone lying? Desperate for help, the children of Ander city hire Questers to become statistical consultants who can help them figure out who really is making the best decisions for kids. The unit targets three key ideas in statistics: different statistical tools can reveal different insights into data; statistical tools can be used opportunistically to support different perspectives; and beliefs can shape interpretations of results. In this way, students learn about both how to use statistical tools such as mean, median, and mode, and also learn *how they work* as mechanisms for making decisions about the world. In this unit, *intentionality* is supported as players are positioned as central decision makers in determining which candidate is making the best decisions for the town; as students learn more about the decisions the candidates are making, they can support one candidate or the other through the statistical tools that they choose to leverage. *Legitimacy* is supported by designing scenarios that allow for different recommendations based on the disciplinary tool that is leveraged. By designing the data so that students' choice of tool is directly linked to the outcomes, we serve to position students' disciplinary decisions as having legitimate impact on the decision that is made. Finally, *consequentiality* is supported by allowing students' decisions to impact the final outcome for the town as to whom is eventually elected mayor.

Ander City was part of a comparison study that involved comparing two matched curricular units about statistical data analysis. The units were parallel in that they both targeted the same key ideas (measures of center, distribution, sampling, graphing) and included "contexts" which situated students' mathematical engagement. The units differed, however, with respect to the *details* of the contexts (actual situations and duration of storyline); the *form* of the unit (paper-based activities vs. online videogame); and the *designed accountability* structures (teacher or unspecified external reviewer vs. fictional protagonists. Two 7th grade classes were included in the study, both taught by the same teacher. Students in these classes ranged from 12-14 years of age. Although the classes were not tracked, one class' achievement was generally lower than the other, and the students in the lower-scoring class were identified by the classroom teacher as "less motivated" than the higher-scoring class. The lower-scoring class used the immersive videogame (Quest Atlantis) for their statistics unit; the higher-scoring class used the comparison curriculum (comparison). Results of the comparison suggest that the Ander City class learned more. Specifically, a repeated measures ANOVA revealed a significant effect for curriculum, $F(1,23)=5.355$, $p=.03$. These results suggest that students using Quest Atlantis improved significantly more than the comparison class, despite their lower pre-test score.

The differences between these implementations can be understood in part by considering the extent to which students were positioned relative to the units. Seen clearly through their submitted work and in whole-

class discussions, students in the Quest Atlantis classroom appeared to be playing transformationally with content, while students in the comparison classroom were grounded more profoundly solely in the domain of mathematics. For example, one of the first decisions that students have to make concerns which brand of bike is safer—the innovative brand that Mayor Enoch supports, or the traditional brand that the city has always used, which Mr. Grant prefers. Students collect data on both brands of bikes, and then analyze the data however they choose. In the response that follows, we can see how the student was positioned relative to the activity, specifically, that the student was acting with intention, in order to take action on a legitimate context, the outcomes of which were consequential.

1 “I analyzed the data by making a bar graph then added each 10 skids up and came out with speedy
2 spokes for the answer as which is most reliable bike to stop soon enough before wrecking into
3 something. But I just noticed that the Speedy Spokes skid can be anywhere from 30 in. to 54 in. and the
4 Rollin steady skids were from 43 in. to 55 in. I would much rather be on a Rollin Steady bike because it
5 is more consistent to what we are looking for here in Ander City so you don't run into the cars at stop
6 sign. The reason why I chose range for the analysis is because I just thought that with a more consistent
7 stopping bike that you wouldn't be worrisome about you stopping before the traffic or in the traffic this is
8 why I chose the range for my analysis.”

Evidence that the student was positioned with intentionality can be seen first in the students' use of the first person in describing her decision: throughout the recommendation, the student positions herself as the agent, both in terms of describing what she did to analyze the data (lines 1-4), and in terms of her personal ideas about safety (lines 4-8). More specifically, the student was adopting an intention when she made a decision about the kind of statistical tool that she could use in order to best represent the potential outcomes of interest. It is clear that the situation also was legitimate for the purposes of using disciplinary tools to make sense of situations; specifically, the student was able to discuss what she understood about the two brands of bikes based on the tools that she used to analyze the data. For example, in considering the minimums and maximums of both data sets, she discovered something important about the situation that she hadn't previously noted. Likewise, it's clear that the student is aware of the potential consequence of her (disciplinary) decision on the context, when she considers what it means to be safe (being able to predict when you would be able to stop, a statistic that is revealed by her use of the mean).

Differences between the ways that students are positioned relative to the content and the context can also be seen in whole-class conversations that took place around core activities. When the students playing Ander City were asked to decide which brand of bike was better, they answered in terms of both the content *and* the context, thus revealing their positioning with intentionality as they act with legitimacy on designed contexts that are responsive to their decisions. Consider the following conversations that took place in two classrooms taught by the same teacher:

T: Somebody explain to me, how on earth, how we as Mayor Enoch people who LOVE him, could look at Mr. Grant and think ‘Gosh, he has some valid points.’ How on earth could Mr. Grant POSSIBLY have valid points when he agrees totally NOTHING with what Mayor Enoch is saying?

St: Well it is of course...it could work either way, because, um, Rollin' Steady, you have...I might be getting mixed up but you have a more likely that you're going to have a better braking distance, but on the other hand, it's also got the HIGHEST braking distance. So=

T: =you mean a more consistent braking distance?

St: But its also got a high braking distance, so you got, either way, you could be screwed either way, it depends on what you want.

This exchange, which took place in the Quest Atlantis classroom, highlights the teacher's consistent positioning of the students as active decision-makers who have the right and obligation to make sense of the designed context. The student's response to this query reinforces this positioning, as he is able to think about the consequences (being screwed—i.e. crashing the bike) of the decision that he might make depending on which element of his analysis he prioritizes—consistency or average stopping distance. In contrast, the conversation that unfolded in response to a similar activity in the comparison classroom reveals different positioning:

T: What cool thing did you notice that this data has in common?

St: They both have the same median and mean

T: Their mean and median is both the same. So, does that mean it doesn't matter which machine my factory has?

Sts: (five second pause)

T: So, if you were a factory owner, or someone who's looking at that, does it matter which machine you use? They're both the same, right? The mean and the median are the same.

St: Not the mean

T: well, it has the same average

St: It doesn't matter.

T: Oh, it doesn't matter which one you use?

This exchange refers to a very similar activity using quite similar data (two different candy bagging machines which bag the same average amount of candy, but are different in terms of consistency). However, the tone of the conversation, specifically with respect to the consequentiality of decisions, is quite different. The teacher's opening question lacks the emotional valence of the QA example, and, unsurprisingly, the students' response is likewise relatively context free. Indeed, the students initially conclude that because the data sets have the same average, they must be equivalent, suggesting that they had not considered the relationship between the context of the data, that is, the implications of offering for sale bags with dramatically inconsistent amounts of candy in them. In theory, this context should be of significant personal relevance to the students, as it relates to candy and getting what you pay for. In reality, however, the students were quite distanced from the context of the problem, and did not act with noticeable intentionality in solving the problem. Instead, they leveraged the first tool they had available to them (average), and left the implications of their decisions (consequentiality) unexamined.

Modern Prometheus: Example 3 of Transformational Play

Modern Prometheus is a relatively new addition to the Quest Atlantis project. Modern Prometheus was developed with the goal of better understanding the potential of converting a classic piece of literature, like Mary Shelley's *Frankenstein*, into a transformational play space (see Figure 4). The Modern Prometheus unit focuses on persuasive writing, as students are asked to convince others to share their perspective on particular ethical dilemmas. In particular, students grapple with the role that ethics play in science and technology, whether and when ends justify means in the battle with a plague, and the importance of companionship. The unit culminates with students making a decision about whether the Doctor Frank's creation is 'human,' and trying to persuade others about whether or not its life should be saved.

To support *intentionality*, players initially receive a letter from their mother, pleading with them to visit Doctor Frank and assist him with "anything he needs." Stepping off the train as they arrive in the plagued town, players make their way through the town square, meeting each of the major townspeople and gaining a sense of the desperation regarding the plague. They speak to people who have lost loved ones, family members, and friends. This establishes the player as an insider to the story, and also more generally as a citizen needing to care for the well being of others. Players are positioned as having a legitimate role, working as a writer where they engage and develop persuasive writing skills. The play space and motivation to help the doctor provides a *legitimate* reason for becoming proficient at writing persuasively. Players have to reflect on the town happenings and their own beliefs, and then use both evidence and their own opinions to craft an argument supporting or opposing the doctor's experiments that can convince even the most committed dissenters.

Experiential *consequentiality* is threaded throughout the unit. As an example, very quickly after making their way to the doctor's lab players engage the first ethical dilemma of the Unit: they decide whether or not to take a package from the crypt in the cemetery, a task that involves lying to the constable. It is in this moment that they experience their first sense of consequentiality with the philosophical notion of ends justifying means. Given the choice they make at this point, they begin to develop a stronger reputation with either the doctor or with the constable. Likewise, as students begin to write for the paper, they develop a reputation, which is recognized by characters in the space who refer to his or her skills and accomplishments.



Figure 3. Screenshot from Modern Prometheus World

We conducted the comparison study research in inner-city, 7th-grade classrooms with over 90% of the students in the implementation classrooms receiving free-and-reduced lunch. All data comes from the classrooms of one teacher. The Control classes went through a persuasive writing unit based off a novel that had been assigned to the class, called *The Clay Marble*. Students in the control group spent the first 45 minutes of the day, (period 1), listening to the teacher's audio recording of the book, while they read or followed along in their own copies. Later in the day, the students would complete their assignments in the computer lab, where they followed a worksheet with explicit instructions of what to write. Overall, both units took 10 classroom days. We initially compared the post-test learning gains of both groups. There were significant learning gains for the control group from pretest ($M=7.16$, $SD=3.72$) to posttest ($M=11.22$, $SD=4.98$), [$t(31) = 8.75$, $p < .001$], as well as for the experimental group from pretest ($M=8.55$, $SD=3.77$) to posttest ($M=14.67$, $SD=3.52$), [$t(32) = 14.85$, $p < .001$]. While both groups had large effect size gains (control=1.22, experimental=1.83), as would be expected from a two-week lesson with an experienced teacher, the repeated measures using Hotellings (1931)

T2 statistic showed the experimental condition had significantly more learning gains, $f(32,31)=11.03$, $p < .001$. In terms of student engagement, 86% of students in the experimental group enjoyed or strongly enjoyed the activity while only 22% did in the control group. Also, when asked if they wish they were doing something else, 71% of the experimental group said not at all while 70% of the control said definitely. Lastly, when asked about their main reason for completing the activity, 95% of the control students said they wanted to get a good grade or their teacher required them, while only 30% of the experimental condition that these were their reasons for doing the activity with most students saying that they did it because they wanted to be doing it. As further evidence of student engagement, one researcher recorded an average of 10 teacher reprimands to stay on task a day for the control while there were under three per day for students assigned the experimental condition.

Given these significant differences, similar to the above two discussions, we were also interested in better understanding the implementation experiences of the two units. Our goal was to gain insight into the ways that the classroom system itself is shaped by the two curricula, specifically so that we could understand the circumstances of this and future implementations. While not all students took up the role to the same extent, by in large students in the experimental condition were positioned as *change-agents* who were uniquely skilled to persuade and care for others in order to help resolve the deadly conflict in Ingolstadt. When interviewed, students described their intention and position in the curriculum as people who were on a mission to help change Ingolstadt. When explicitly asked, “What’s going on in Ingolstadt?” students often described the conflict or situation in terms of a first person role, one who found themselves as positioned within the narrative, as a protagonist, who is there to fulfill a mission and help a town get rid of the plague. Jose said, “I’m pretty much there to find a cure and stop people from dying.” Another student, Alexis, said: “Um there’s like this plague and people are getting sick and possibly dying and we’re trying to go and um like people to stop the plague.” Unlike the treatment condition where participants were positioned by the teacher and curriculum as *change-agents* in relation to the task, in the control group the teacher positioned students *agents-to-be-changed*.

In this case the teacher simply positioned students in their more common school role as agents who needed to change their ability to write robust persuasive articles in a short time. In her instruction to the whole class, the teacher tells students that they need to spend time *practicing* essay planning, drafting and revising because of an important upcoming standardized writing test (EOG). Below is an excerpt from an interview with Tianna, a motivated student who acknowledged her position as an *agent-to-be-changed*.

Researcher: Why are you doing this assignment in here?

Tianna: Because we have a big writing test coming up and they’re using them on computers and she (Teacher) wanted us to get use them on computers and not just writing like we normally do.

Researcher: Do you enjoy this assignment?

Tianna: I do because it helps me like; I know it’s going to help me do better on my writing test. I think I will be very prepared this time.

Importantly, it might be argued that this is a more legitimate use of the content than, say, to save a fictional village from a fictional page, even if in the fantastical scenario it is more consistent with the use of persuasive writing in the real world. More generally, in terms of the positioning of content of persuasive writing, in the treatment it was a tool that possessed necessary *use-value* for allowing a cure to be found. In contrast, the control group content uptake was *exchanged* good grades. The use value was evident in the following interview:

Kristena said: Right now in Ingolstadt there is a plague going on and it’s deadly! And right now our character is a person whose um whose she is immune to the plague and right now she is an *investigative reporter* ... there are some people who think he’s [the doctor] crazy and some people don’t and they still want to cure the plague like, she has to like find evidence for that [supporting the thesis of the argument].”

In an interaction the player has with the in-game doctor, we see in his submission the simultaneous legitimacy of content and the player’s belief that his previous actions on an in-game uniform issue had consequences:

Doctor frank, persuasive writing can change the world in many ways. The way people write persuasive writing makes it powerfull!! For example... when I wrote my persuasive argument about wearing school uniforms i wrote to CONVINCE people!! If you have good evidence supporting what your thesis is (your side you are on) then people will listen to you even if it a really bad idea.

Lastly, below is a transcript from an interview with a girl who had just completed the final mission in Plague. In the interview, she explains that from seeing all the people dead, a result from her choice of thesis, she was reconsidering what it would have been like if she would had allowed the doctor to continue his research.

Interviewer: What did you find out?

Girl: Well, I found the creation and Tina and Gene

Interviewer: do you feel that you made the right decision for doing that?

Girl: I don’t know. I talked to the Fabric Lady and she said that people aren’t caring about each other anymore, for the good of Ingolstadt. It’s kind-a sad because people are starting to die. Henry died and the Constable is coming down with it (the plague) I feel that a lot of people are dying.

Interviewer: Do you feel responsible for their death?

Girl: Kind-a, because of my paper, they went [thesis was to stop the doctor] I feel bad for the Doctor.

Interviewer: Really?

Girl: People kicked him out of his lab and his house and ... Because they wanted to stop him from putting in his experiments. And I think they were too extreme

What is interesting here is the expressed remorse at the consequences of her decision to write a persuasive essay that was printed and resulted in the doctor's being forced to discontinue his practice.

Conclusions

Games have become one of the most popular forms of entertainment in our society, recently surpassing Hollywood in annual sales. Games are popular in part because they are fun. However, it is not simply their entertainment value that should be gaining the interest of educators. Instead, we have argued that it is the way that games can draw players in, capturing their interests, time, commitment, and passions, which is the real value of the medium. Toward communicating the power of games, we have developed a theory of transformational play. Designing for transformational play involves establishing academically useful and meaningfully engaging situations where learners adopt goals, have legitimate roles, and develop increasingly sophisticated relations to disciplinary concepts and those situations in which they have value. In such contexts, there is a shift from dispensing facts and transmitting content to a commitment to supporting students as they enter into conceptually illuminating situations where they develop passions and apply content understandings.

Games allow us to do this in ways that heretofore were not possible. Even when there are appropriate resources to support a field trip to a local park, for example, it is unlikely for the experience to cleanly illuminate the need for particular content understandings, and even less likely that students will be able to meaningfully transform some problematic aspect of the context—most parks are unwilling to put the future of their park in the hands of a 10 year old. Indeed, most teachers would be challenged to arrange classroom materials in a manner that could truly immerse learners in a dramatic narrative in which they act as protagonist, find legitimate roles, and interact meaningfully and consequentially with the storyline. In contrast, because we are designers of virtual worlds, we can ensure that game play success requires learning disciplinary content and that the problems are approachable by young children, even embedding pedagogical scaffolds in the game world or cuing teachers when just-in-time lectures will likely have value.

More than a simulation, games support playing, allowing players to become someone and do things that we are unlikely to do in the “real world.” During play, one engages a space of possibility, negotiating rules and roles and discovering the potentialities for growth within and across the boundaries of fantasy and “reality.” Through play, we transcend the borders of reality, and it is this potential that, in our opinion, gives play the power to support meaningful learning. In the types of videogames we develop, the learner becomes a character that engages in storylines and takes on roles that the learner would not in real life. Ironically, it is the act of play and the affordances of the fictional world that legitimizes disciplinary content, providing learners with opportunities to engage authentic and consequential disciplinary tasks not usually available in schools.

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