

Consejo de Educación de Puerto Rico

**The benefits and meanings of educating with
videogames in a Puerto Rican sixth grade public
school classroom**



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The authors of this study declare no conflict of interest.

Resumen Ejecutivo

El proyecto *The benefits and meanings of educating with videogames in a Puerto Rican sixth grade public school classroom* fue una investigación mixta cuyo propósito fue explorar los beneficios y significados de implementar videojuegos en el salón de clases para el aprendizaje de inglés en un salón de sexto grado de escuela pública. El proyecto consistió en implementar el uso de videojuegos como parte de la clase de inglés de un grupo de sexto grado por un periodo de 4 semanas y la medición de datos cuantitativos antes y después de la intervención, así como de realizar observaciones y entrevistas cualitativas antes, durante y después de la implementación. Se llevaron a cabo estadísticas descriptivas e inferenciales para medir el cambio en vocabulario en inglés y actitudes hacia los videojuegos en el contexto educativo. También se llevó a cabo un análisis de contenido para los datos cualitativos. Los resultados fueron beneficiosos y demostraron el impacto que tuvo la intervención en la adquisición de vocabulario de inglés así como el esclarecimiento del sentido que tiene el uso de videojuegos como herramientas de aprendizaje para los participantes involucrados. El proyecto surge como necesidad de proveer datos, por primera vez, de la utilización de videojuegos como herramienta de aprendizaje para el inglés en los salones de clase de las escuelas públicas de Puerto Rico.

Antecedentes

El Proyecto *The benefits and meanings of educating with videogames in a Puerto Rican sixth grade public school classroom* surge a raíz de la convocatoria del año 2013 del Consejo de Educación de Puerto Rico (CEPR), bajo el tema: *¿Qué efecto tienen los videojuegos electrónicos en la interacción maestro/alumno?* El proyecto fue subvencionado con fondos del CEPR.

Este proyecto es primero en su tipo, pues no se han realizado estudios en Puerto Rico para explorar los beneficios y significados de la implementación de videojuegos en el salón de

clases de las escuelas públicas. Se llevó a cabo con la colaboración del Seminario Permanente de Métodos de Investigación (SPMI) de la Facultad de Ciencias Sociales de la Universidad de Puerto Rico, Recinto de Río Piedras.

Proceso

El proyecto fue de metodología mixta con un diseño multidimensional. La muestra consistió en tres grupos de sexto grado, de aproximadamente 25 estudiantes. Dos grupos pertenecían a la escuela experimental: Escuela Gaspar Vila Mayans y un grupo en una escuela control: Escuela Manuel A. Pérez. En la escuela experimental, un grupo participó de la intervención, mientras que otro fue un grupo control interno. La primera fase consistió en una parte cuantitativa con la administración de pre-pruebas de vocabulario, así como de una encuesta de actitudes a los tres grupos. También consistió en una parte cualitativa donde se entrevistaron dos maestros previo a la intervención del grupo experimental. La segunda fase consistió en la intervención en el grupo experimental, donde se le proveyó el uso de un videojuego de vocabulario en inglés a los estudiantes de sexto grado en su clase de inglés por un periodo de 20 minutos durante 4 semanas. El equipo utilizado fue la consola Nintendo DS y el juego: *My English Coach Spanish Edition*. Luego de la intervención se le administraron las post-pruebas a los tres grupos y se realizaron entrevistas a la maestra y directora de la escuela intervenida. Se llevaron a cabo análisis estadísticos para la parte cuantitativa y análisis de contenido para la parte cualitativa.

El proyecto tuvo una duración de año y medio. Durante el primer año se realizaron los contactos con las escuelas y se recogieron los datos. Durante los últimos seis meses se realizaron los análisis de datos y la redacción del informe.

Resultados y Conclusiones

Nuestros hallazgos muestran que la implementación de videojuegos para el aprendizaje de inglés en los salones de las escuelas públicas es beneficioso y significativo para los

estudiantes. Los resultados cuantitativos demuestran un cambio estadísticamente significativo en la prueba de vocabulario antes y después de la intervención en los grupos de la escuela experimental, en comparación con la escuela de grupo control. También demostraron cambios estadísticamente significativos en los datos que provee el videojuego, cantidad de palabras dominadas y nivel de juego alcanzado antes y después de la intervención. Por otro lado, de los datos cualitativos emergieron varios temas que indican la receptividad y el beneficio de utilizar los videojuegos como herramientas de aprendizaje en los salones para aprender inglés. Entre ellos, las dinámicas entre los estudiantes que favorecieron la colaboración y la competencia en el aprendizaje. También, la receptividad y recomendaciones de la maestra y la directora para que se viabilice dicha implementación en las escuelas públicas de Puerto Rico.

La investigación provee beneficios para el CEPR y la política pública en educación de Puerto Rico. Nuestro proyecto provee información clara sobre los retos y beneficios de implementar videojuegos en los salones de clase y los recursos necesarios para el mismo. También provee, por primera vez en Puerto Rico, evidencia científica sobre la experiencia de dicha implementación y la receptividad de las partes impactadas. Entendemos que los resultados evidencian una práctica innovadora y beneficiosa para el resto de las escuelas del país.

Recomendaciones Futuras:

Debido a que el proyecto fue un estudio exploratorio, hace falta más investigación para poder generalizar los resultados y contar con evidencia sólida de los beneficios de la intervención. Se sugiere continuar con una segunda fase del proyecto dónde se impacten una cantidad mayor de escuelas y se investigue de manera comparable, distintos tiempos de uso de videojuegos y distintos tipos de juegos educativos. También se necesita un mayor número de entrevistas para conocer la perspectiva de los/as administradores/as, directores/as, maestros/as sobre la implementación de videojuegos en las escuelas. Además, se recomendaría

investigaciones que culminen en el diseño de videojuegos alineados a los currículos escolares del Departamento de Educación de Puerto Rico (DE), así como el estudio de videojuegos existentes que sean congruentes con dichos currículos.

La investigación necesitaría de nuevas inversiones en tecnología, tales como un mayor equipo para ser utilizado en las escuelas, además de la colaboración del DE y la revisión de sus políticas en cuanto al uso de tecnologías durante el periodo lectivo de los/as estudiantes. También necesitaría de su colaboración en el entrenamiento de los/as maestros en estas tecnologías y su uso en el salón de clases.

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Summary

Implementation of videogames in school classrooms has gained attention in recent years because of increase of videogame use among children and youth. This has led researches to inquire about the educational benefits of videogames. Regardless of this fact, the implementation of videogames in classrooms can present a challenge to policy makers. In Puerto Rico, there is no data on evaluating the implementation of videogames in classrooms. As part of a first step towards this goal, and guided by the framework of evaluating new technologies proposed by Margolis and colleagues (2006) and Vygotsky' socio-cultural perspective, this study explored the benefits and meanings of implementing videogames in a public school classroom using mixed-methods with a multidimensional approach. Both, quantitative and qualitative approaches were used to study the implementation of an educational videogame in a group of sixth-grade school students as part of an English class. Students were assessed quantitatively for learning outcomes, as well as in attitudes towards learning with videogames. The teachers and school director were also part of a qualitative inquiry that explored meanings of implementing videogames in classrooms. Quantitative results showed significant increase in recognized vocabulary meanings in the EG and in the ICG after intervention. They also showed significant increase in mastered game words and game levels achieved in the EG. Attitudes towards learning with videogames and English were not significant. Qualitative findings showed a positive impact in learning and motivation as well as recommendations for the implementation of videogames in Puerto Rican public school classrooms.

Introduction

The idea of implementing videogames in school classrooms has gained attention in recent years. Among the reasons, is the increase of videogame use among school age children and youth. In the United States, 49% of households own a dedicated game console and videogame use of players under 18 years old is 32% (Entertainment Software Association, 2012). Also recently, there has been an increase in videogames research in children and youth, not only regarding violence, but its positive effects on learning. This has led to studies exploring and documenting the benefits of videogames as learning tools, on implementation of videogames in classrooms, on designing videogames in accordance to school curriculum and thus, incorporating videogames in educational public policy.

Educational research on videogames has demonstrated benefits of using videogames as instructional tools in classrooms. Videogames make learning meaningful and interesting for students, while providing alternative methods of teaching in accordance to the student's needs (Rosas, Nusbaum, Cumsille, Marianov, Correa, Flores & Salinas, 2003; Gelman, 2010). Regardless, the implementation of videogames in classrooms can present a challenge because of the ratio of computers per student, teachers' resistance towards computer technology, poor teacher training, educational games lacking the entertainment to make them attractive to students, general lack of institutional infrastructure and overly-complicated technologies (Rosas et al., 2003; Kenny & McDaniel, 2011). In Latin America, there is also the additional problem of having little software translated to local language or in accordance with the school curriculum (Rosas et al., 2003). Rosas and colleagues suggests the creation of easy to use, portable hardware with instructional and entertaining software, aligned with the school curriculum that children can use regularly in the classroom (Rosas et al., 2003). While ideally, this would be the better option, researchers have demonstrated benefits of incorporating existing handheld videogames consoles and commercially available educational software in classrooms. The Entertainment Software Association (2012) states

that 35% of players own a handheld system and 25% of games are played in using them. Still, benefits analysis by themselves cannot shape public policy effectively because cost and feasibility analysis are needed in order to evaluate new technologies in classrooms implementation (Margolis, Nussbaum, Rodríguez & Rosas, 2006).

In Puerto Rico, there is no data on evaluating the implementation of videogames in classrooms. As part of a first step towards this goal, and guided by the framework of evaluating new technologies proposed by Margolis and colleagues (2006) and Vygotsky's socio-cultural perspective, this study explored the benefits and meanings of implementing videogames in a public school classroom using mixed-methods with a multidimensional approach. Both quantitative and qualitative approaches were used to study the implementation of an educational videogame in a group of sixth-grade school students as part of an English class. Students were assessed quantitatively for learning outcomes, as well as in attitudes towards learning with videogames. The teachers and school director were also part of a qualitative inquiry to explore meanings of implementing videogames in classrooms.

English subject was selected because, even though the intentions of the local education system are to promote a bilingual fluency, most of the academic results of the student population have consistently fallen behind expectations. According to the Department of Education of Puerto Rico (2012), 35% of public school students perform at a basic level in English in the Puerto Rican Tests of Academic Achievements. Therefore, the need to develop new strategies to strengthen and reinforce the teaching of English in Puerto Rico, such as implementing new technologies in classrooms, could contribute to academic achievement. Another reason for selecting English class was that available educational game software is largely in this language (Rosas et al., 2003).

Goal

The aim of this study was to explore the benefits and meanings of implementing videogames in a Puerto Rican public school classroom.

Specific Aims

A mixed-method with a multi-dimensional logic was used, where a quantitative component had the following objectives:

1. Measure English vocabulary words known to public school six-grade students before and after using the videogame *My English Coach (Spanish Edition)* in classroom for twenty minutes in four weeks.
2. Explore six-grade students' attitudes towards videogames and using games for learning English, before and after videogames implementation in classroom.

Whilst the qualitative component had the following objective:

3. Explore the meanings of implementing the use of videogames in a public school's classroom from the teachers, students and school's director perspectives.

Literature Review

Recent research has reassessed the use of video games as a pedagogical tool. There is, however, a need for new discourses, approaches, and development in this area that will eventually illustrate the cultural relevance of videogames, and the educational possibilities it provides. For some, videogames as educational tools pose a paradox, whenever there are underused technology resources in a classroom and a population that considers videogames part of their cultural context (Williamson, Squire, Halverson & Gee, 2005). For these authors the games provide an experience of pedagogical importance as immersion in a virtual world links the players to current social practices and cultural products. For many students, it is difficult to see the relevance of the contents presented in the classroom, in contrast to the ease of integrating skills of competition and cooperation in the activity of the game. For example, in the study of Khatib, et. al. (2011) researchers developed a three-dimensional "game" online

allowing the gamers to decode a specific coding patterns and participants showed advanced skills working with three-dimensional problems of visual-spatial complexity, and eventually managed to resolve encoding a protease enzyme monomer associated with the HIV virus (Agence France-Presse, 2011).

Squire (2006) takes up the defense of videogames as a pedagogical tool in several of his writings. Much of the progress that can be made in this direction is clouded by an overwhelming amount of false claims and fallacies about the use of videogames, ultimately lacking the support of academic research. There are specific social exchanges which are carried out through massive multiplayer games online (MMO) where a high strategic level of competition and cooperation is necessary to play. Several articles have advocated to the use *Civilization V* as a tool for history classes. Some researchers found in the game a great tool for teaching diplomatic relations, negotiations between countries, economic exchanges, the establishment of a militia, and partnerships of peace (Baranowski & Weir, 2011).

Empirical Research on Videogames in Classrooms

Although there is notable absence of more empirical researches in the area of educational videogames in classrooms, a few key studies have been conducted (Miller & Robertson, 2010; Mifsud, Vella & Camilleri, 2013). Miller and Robertson (2010) conducted an elaborate experiment with 71 primary school children in Scotland. After using the handheld videogame *Brain Gym*, a commercial off-the-shelf (COTS) game that had an educational orientation for 10 weeks, the researchers found significant pre-post gains in accuracy and speed calculations in math. However the authors point out that the study was conducted in a way in which it was difficult to draw conclusive data given the fact that they were working with a small sample, and there were several other variables, like teachers interventions, that precluded better results. A more recent study was conducted in 2011, where the researchers corrected methodological problems of the earlier experiment (Miller &

Robertson, 2011). This time, they had 634 primary school students using the games 20 minutes each day for nine weeks. Finding suggested a statistically significant improvement in accuracy and speed calculations, with gains 50% greater in the given skills of the experimental group over the control group.

Mifsud, Vella and Camilleri (2013) conducted an experimental study on literacy attainment using a videogame in the classroom in Malta. They compared an experimental group using the game to a control group following their regular programme. Significant gains on a number of English as a Second Language items were obtained compare to the control group. Attitudes towards learning with videogames in this study were found positive also.

Another study was conducted in Turkey by Tüzün, Yılmaz-Soylu, Karakuş, İnal and Kızılkaya (2009), investigated 24 fourth and fifth graders attitudes and motivations towards the subject of geography with the videogame *Quest Atlantis* (another COTS game). Through pre and post testing the researchers were able to conclude that there were statistically significant gains in the game-based learning environments, given substantial shifts in terms of attitudes towards the learning processes. The study confirmed that contemporary students see videogames as a current cultural product, and are willing to consider it a valuable learning tool. The researchers reported that the students had significant learning gains according to the pre and post testing ($t(12) = 4.09, p < .01$), and, after analysis of the intrinsic learner's motivation, they found statistically significant difference in this area as well ($t(12) = 2.63, p < .05$).

The study conducted in Montreal Canada by Cobb and Horst (2011), became a significant reference for the present research. Researchers investigated Canadian students who learn English as a second language (ESL) in terms of improvements on developing and expanding English vocabulary, as well as promoted a lexical production and meaning recognition using the Nintendo DS game *My Word Coach*. A sample of 50 students used the

game over a 4 month period in quasi experiment, within subjects design. The researchers found significant results in word meanings recognition. The experiment also revealed a positive reception of the technology. Students expressed satisfaction after the experience. In some Japanese junior high schools, students have improved English vocabulary through drills with similar software (Kennerly, 2009). Another study in Japan, Hitosugi, Schmidt and Hayashi (2014), using mixed-methods evaluated the use of a videogame on learner affect and vocabulary learning and retention in Japanese as a second/foreign language classroom. Two studies were performed and results indicated positive impact on learner affects and a preference for game-mediated activities. Vocabulary retention was also at the same rate at five weeks later after intervention.

There are a few studies of videogames in classrooms in the United States. Gillispie, Martin and Parker (2010) investigated the influence of an interactive 3D videogame, *Dimension-M*, in middle school children's achievement in math, as well as their attitudes towards videogames and learning math with videogames. The findings demonstrated an increase in achievement, but there wasn't any statistical evidence indicating a significant impact on student attitudes towards, either math or video games, resulting from the treatment. Interviews conducted to course tutor, school principal and math coach indicated positive observations about students' math performance and an impact in students' enthusiasm. Another study by Barker and Sadler (2013), investigated the effectiveness of a biotechnology-themed video game, *Mission Biotech*, in public high school students understanding of related biology content knowledge and attitudes towards science and scientific careers. While no significant difference was found in the latter study, students from two of the classes analyzed showed gains on a standard-aligned test of content and thus, supporting the idea that videogames can be useful in classroom contexts (Barker & Sadler, 2013).

Educational research on handheld games has been done in the United States also.

Gelman (2010) investigated the impact of the videogame *Brain Age 2* for the Nintendo DS on seventh grade achievement in math and on student attitude towards school in seventh graders using the game over nine weeks. Even though, no significant difference was found in math achievement after using the game, students reported a more positive attitude towards their teachers, classes, and school (Gelman, 2010). Another research, conducted by Ke (2008) in Pennsylvania used a series of games designed to reinforce specific math skills which are part of the regional standards. Fifteen students were pre-classified through the use of the Pennsylvania System of School Assessment test and according to their classification; the development of math skills was assessed through a 30 item Game Skills Arithmetic test, an instrument developed specifically to assess the intervention in accordance to the PSSA. After the detailed evaluation of each one of the participants, it was determined that there was no significant effect on the posttests; however the student did report more positive attitudes towards math learning. One of the most relevant aspects of this study was the comprehensive qualitative model used which included observation and think-aloud protocols where students were encouraged to verbalize their actions and decisions while they were playing. This qualitative component led to a unique insight in terms of specific context learning, where “dynamics of peer interaction, the active guidance of an instructor or facilitator, the access to additional technological tools, and the arrangement of physical classroom environment have all influenced game-based learning experiences” (Ke, 2008, p. 1619).

In terms of scope, the most ambitious study that evaluates implementation of videogames in classrooms was done in Chile by Rosas and colleagues (2003). Researchers worked with a sample of 1274 students from private and public schools in an experimental design research, where participants used the game for an average of 30 hours over a 3 month period. Researchers used a game design in accordance to Chilean curriculum and also

produced a videogame console modeled after the Nintendo Gameboy. The Sugoi (game) was designed to develop skills in the area of math and reading comprehension. Students were assessed in reading comprehension and math skills, as well as preference regarding videogames. Teachers' expectations of learning outcomes were also measured. The study concluded there were significant gains in achievements and changes in teachers' expectations. This study was later part of a comprehensive assessment of benefits, cost effectiveness, and feasibility analysis of videogames implementation in Chilean classrooms which concluded that ultimately it was not feasible (Margolis et al., 2006). Many of the challenges point out about the educational system in Chile become referential to the situation in Puerto Rico. In 2012, Rivas reported the positive effects of computer games as instructional tools but in the end videogames become easily associated with a leisure culture, and social practices of alienation.

In Puerto Rico, few studies have been conducted regarding videogames. Amongst them are the a study about the effect of violent videogames on middle school students by Rodríguez-Meléndez(2009), the therapeutic benefits of videogames in children's physical development by Rojas-Ortiz, (2011) and the effect of video games on cognitive development and behavior of children by Morales -Cardona (2009). In addition to this Rivas (2012) conducted an experiment on voluntary attention and videogames. Regardless no empirical research has been done in implementing videogames in classrooms, and thus, this evidence is needed in order to further public policy in Puerto Rican education.

Theoretical or Conceptual Framework

The socio-cultural perspective, founded by Lev Vygotsky, is the most appropriate and pertinent theoretical model for this study, given the fact that it has been one of the most popular approaches for the research of human-computer interaction. Vygotsky (1933/1995) validates the development and evolution of cognitive and reasoning processes in a given

cultural context, which operates as a semiotic environment that shapes human consciousness. The socio-cultural perspective was revised by Alexei Leontiev (1977) who based on Vygotsky's work developed the Activity Theory to concentrate on the relationship between the acting subject and his/her motives to act.

Vygotsky (1933/1995) stated the importance of the role of game activity in the development of the infant. This activity will be the product of an image construction of satisfaction they will aspire to acquire, and which can be accessed in a contextualized form during the game. In this sense, there is a correlation between the symbolic dimension of the game and the emotional stimulation. Vygotsky confirms that this affective component is the catalytic agent of the imagination of the infant, and that it largely drives all semiotic exchanges that involve the activity. The game does not necessarily express a need to handle symbols, but of an unfulfilled desire, "the realization of the aspirations that cannot be met at the time" (p.118). The game provides the infant with a symbolic scene, which has been stimulated by an emotional dimension, and is therefore incorporated to the evolution of the child's imagination. But, since the activity takes place in a specific context, the inclusion of a set of rules is required to control the scope of the activity, and which in turn inserts the player into a dimension where the symbolic exchange becomes a priority. This symbolic exchange demands from the infant a development of several complex cognitive processes, including voluntary attention, and accordingly these behavioral processes will evolve as they become crucial to the execution of other tasks. Following Vygotsky's theoretical line, Alexander Luria (1974) points out the importance of the game activity in the development of a high level of selectivity and focus.

Following Vygotsky and Luria, Alexei Leontiev developed the Activity Theory. Activity is a key factor in the constitution of the human consciousness, "a process of traffic between opposite poles, subject and object" (Leontiev, 1977, p. 3). Therefore, it is a unit with

a specific social context, whose exteriorized form will unleash internal mental processes. The object in the activity theory is actually the motive to act, the cause (object) that will distinguish one activity from another (Leontiev, 1977; Kaptelinin & Nardi, 2006). Recent technological advances have led to serious studies on the design of instruments, and, correspondingly, are in need of a theoretical framework that takes into account the specific situation in which the use of the object occurs, and the reason for the use of a tool. The Activity Theory demands knowledge of the culture, social practices, and situations of the tool's development, implementation and use (Isroff & Scanlon, 2002).

In a special analysis of the epistemological development of the Activity Theory, Engeström (1987) discusses the similarities between the subject-tool-object triangulation, and the analogous concepts of signifier-signified-object describing the sign as the unit of representation in semiotics. The author updated the Activity Theory, privileging the reading of the signs, and the process of signification as the primary activity of the cultural exchange. As a result, the main tool for humans will be signs he/she faces in his/her historical line and the ability to internalize the conceptual value that is assigned by him/her to a signifier.

Several researchers in the field of videogames have followed the Vygotskian paradigm (Gee, 2007; Miller & Robertson, 2010) describing a common set of values, norms, and expectations shared by game players, as the *semiotic domain*. Videogames are often associated with a culture of leisure and entertainment, and therefore, not directly associated with orthodox teaching practices. The concept of *incidental learning* (Rosas, et. al., 2003) was central in the development of the Chilean project, which is mentioned above, and it coincides with the Vygotskian approach of this study. Because the students associate the videogame with the culture of entertainment, they are prone to adopt it as learning tool, precisely because it is not commonly associated with that task. Learning becomes incidental,

but not trivial, since knowledge is required and used by the gamer, so that he/she can continue playing the game.

The present study capitalizes in this aspect of the theoretical framework. From the Vygotskian standpoint, the insertion of videogames in the classroom is not simply the introduction of an extra learning tool, but a significant object that hopes to reshape the learning environment. Video Games are an integral component of the social and cultural context of today's students, and, therefore, as a tool they should be easy to integrate into the learning processes. To follow the concept of incidental learning, the students will be "playing" a game in which they'll have to acquire and assimilate knowledge, because it is the only way in which they can continue "playing". Rivas (2012) states that video gamers internalize concepts and rules as part of a rhetorical process of persuasion when they are playing, because the gamer seeks to engage in a signifying process that will help him/her advance in the game.

As it is stated before, such transformations in the student's environment are needed to achieve the current expectations of English proficiency in the elementary grades. Video games can help transcend the common problem that arise from the approaches that are inherent to educational systems where English is treated as a second language, because it adds the ludic element to the learning scenario. In this sense, games clarify the motives of an activity, by providing a specific set of rules and parameters; and the knowledge acquired through gaming is derived from a pragmatic use of it in a given context.

Public Policy Framework

This study is a first step of three in suggested by Margolis and colleagues (2006) framework of evaluating new technologies. Benefits analysis is when educational benefits of the new technology that are quantified. In the second step a *cost analysis* incorporates the cost of the technology to measure against the benefit. The final step is a *feasibility analysis*

that helps policy makers to determine if and how the technology can be implemented given their current financial reality.

Research questions

The following research questions guided this study:

Quantitative Research Questions:

- a. How many English word meanings are known receptively before and after the use of the game by public school six-grade students in the classroom?
- b. What are the public school six-grade students' attitudes towards video games and using them for learning English before and after videogames implementation in classroom?

Qualitative research question:

- c. What does the implementation of video games in Puerto Rico public school classrooms signifies for public school teachers, six-grade students and director?

Mixed-Method Research question:

- d. How do the quantitative and qualitative components help us explore the benefits of implementing videogames in classrooms of Puerto Rico's public schools?

Justification

There is a need to explore the benefits and meanings of implementing videogames in Puerto Rico public school classrooms and to evaluate new technologies in classrooms from a more comprehensive framework. This study is a first step towards incorporating the suggested framework by Margolis and colleagues (2006) by exploring the benefits of implementation of videogames in classrooms. It also incorporates the perspectives of key stakeholders, such as teachers and school directors who also have an impact on implementation. Lastly, this study is the first in using the mix-method with a multi-dimensional logic design for evaluating video games implementation in classrooms. Researchers agree that mixed-methods should be employed for investigating instructional

technology to produce the most convincing body of evidence (Ke, 2008, Van Gog & Paas, 2008). Therefore it is also be a methodological contribution.

In terms of learning outcome, this study provided the participants with a unique opportunity to interact with technological tools that could potentially help improve their language skills.

Methods

Design

A mixed methods research design with a multi-dimensional approach was used in this study. When using mixed-methods with a multi-dimensional approach, different methods and approaches are assumed to be in dialogue between them, resulting in a creative tension of the dynamic relation of more than one way of seeing and researching (Mason, 2004). In the proposed study, quantitative data will be used to answer a question in a quasi-experimental design and the qualitative approach will answer other questions related to the experiment and its implications (see Table 1). The rationales for using this mixed-method approach are the our positions regarding quantitative and qualitative inquiries coming from different conflicting research paradigms (post-positivism and constructivism respectively), a position defined by Creswell & Plano Clark(2007) as *mixed worldviews*. Also, it takes into consideration that quantitative studies revised earlier, such as Rosas and colleagues (2003), documented incidental but relevant qualitative findings.

The **quantitative component** was a small scale, pre-post test, quasi-experimental design study using purposive sampling. This component was intended to serve as a pilot design for a future up-scale controlled trial benefits analysis. The benefits analysis is part of the three steps (benefits, cost-effectiveness and feasibility analysis) in the framework for evaluating new technologies proposed by Margolis and colleagues (2006).

The **qualitative component** consisted of a triangulation of qualitative data collection techniques, which are participant observation and semi-structured interviews. The qualitative data analysis technique used was a conventional content analysis. Qualitative inquiry is usually multi-method and thus incorporates different data collection and analyzing techniques that allow for more rigor and benefit from the strengths of each technique. Participant Observations offer the advantages of a richly detail description, different types of data and giving the researcher a better understanding of what is happening in the culture, among others (Kawulich, 2005). In the other hand, semi-structured interviews have a flexible and fluid structure that is usually organized around an inquiry guide with open ended questions from which other queries can emerge from the dialogue between the interviewer and interviewee (Mason, 2004; DiCicco-Bloom & Crabtree, 2006). Lastly, conventional content analysis is a flexible method for analyzing texts that allows categories and categories names flow from the data (Hsieh & Shannon, 2005).

Table 1
Diagram of Research Design

	Data Collection	Implementation	Data Collection	Data Analysis
Quantitative Component	Pre-tests VST: EG, ICG & ECG AS: EG	Quasi-experiment EG	Post-tests VST: EG, ICG & ECG AS: EG	Statistical Analysis
Qualitative Component	Semi-structured interviews EG Teachers	Participant Observation EG	Semi-structured interviews EG Teachers, EG Director	Conventional Content Analysis

Note: Abbreviations: VST: Vocabulary Size Test, AT: Attitudes Survey, EG: Experimental Group, ICG: Internal Control Group, ECG: External Control Group.

Sample

Purposely sampling was used to select three groups of six-grade students from two public schools in the Metro Area of Puerto Rico with similar socioeconomic backgrounds. Sixth grade level was chosen based on Cobb and Horst (2011) study of sixth grade Second Language English students using similar game software. Students were divided according to educational group and placed in either an experimental group (EG), or an internal control

group (IC)—groups in the same school and at the same educational level—or in an external control groups (EC)—groups in different schools where the tool was not introduced, but at the same educational level as the EG (see Table 1). This division was constructed to minimize Hawthorn’s effect or to control for the alteration of behaviors because the subjects were aware of being studied (Rosas et al., 2003). The average classroom size in Puerto Rico is 30 students. A sample of at least 25 students in the EG, with one subject missing post-test, 22 students in the ICG and 30 students in the ECG was tested for a total of students ($n = 77$). The students were between the ages of 10-12.

Game and Instruments

The videogame used in this study was *My English Coach- Spanish Edition*. *My English Coach (Spanish Edition)* is an educational game, developed and published by Ubisoft and released in 2009. The game is intended for use on the Nintendo DS, a handheld videogame console. The videogame teaches the basics of word use, grammar, and construction of phrases through mini-games, and evaluates your progress. The game starts with an initial placement test to determine starting English level and advances through a series of lessons plans, which include information for first-time English speakers about USA. The game also teaches pronunciation by using a voice recording and playback feature of the DS that allows the player to compare his or her accent (words and phrases) to a native English speaker's. Eight mini-games reinforce lesson plans and the ability to read and speak in English (Ubisoft® Entertainment, 2013). The game has 10,000 English words and a built-in Spanish-English Dictionary and phrase book with 400 phrases (Ubisoft® Entertainment, 2013). Cobb and Horst (2011) state that the learning content of *My Word Coach* is effectively (revising) the entire contemporary, non-specialist lexicon of the English language, represented by 14,000 most frequent word families, linked to a specially adapted version of the *Cambridge Advanced Learner’s Dictionary*. Since *My English Coach (Spanish Edition)* is

from the same game developer, the English content is somewhat similar to *My Word Coach*. Furthermore, the game can be used as an assessment tool because it provides detailed tracking of words mastered, as well as a rank based on an approximation of words known compare with a native speaker of the language and number of lessons learned.

A shortened version of The *Vocabulary Size Test* (bilingual Spanish version) was used to assess student's learning outcomes in the experiment. This version is similar to the version used in Cobb and Horst's research (2011) of *My Word Coach*, but bilingual. The Vocabulary Size Test is designed to measure both first language and second language. In addition I will also measure the learners' written receptive vocabulary size in English (Nation, 2010). The test also measures knowledge of written word form, the form-meaning connection, and, to a smaller degree, concept knowledge (Nation, 2010). Similar to *My Word Coach*, the test glosses (revising) are not exactly the same as the glosses encountered playing *My English Coach (Spanish Edition)*. Cobb & Horst (2011) find this an advantage because a test based on the exact words played would have been difficult to construct and would not have provided a pre-test measure. The Size Test has ten questions at each 1,000-family level, such that the score multiplied by 100 gives an estimate of the number of word families known at that level (8 out of 10 = 800 families known) (Cobb & Horst, 2011). The psychometric properties of the test can be found on Nation (2010). Nation (2010) suggests that enough time should be given to complete the test and allow learners to ponder over each item, which typically takes around 40 minutes (140 item test). Using Cobb and Horst's research (2011) as reference, we will only administer the first ten levels of the test because of possible time constraints. An online version of the instrument is free of use and can be found in Vocabularysize.com© (2010-2013).

Attitudes Survey: Students attitudes towards video games and their use for learning English was assessed with the survey constructed by Gillispie, Martins and Parker (2010), but

translated to Spanish and modified for the English course. The survey consists of 10 Likert-type questions that were rated from strongly agree (scored as 4) to strongly disagree (scored as 1). No psychometric properties have been evaluated for this survey. Sociodemographic data such as age and sex was collected also in the survey.

The directors and teachers of the Experimental Group were interviewed because they are key stakeholders in the implementation of videogames in classrooms. To explore teachers' meanings and expectations on the learning outcomes and feasibility of incorporating video games in the classroom semi-structured interviews were conducted prior and post-implementation. To explore the school director meanings and expectations of the feasibility of incorporating videogames a semi-structure interview was conducted post-implementation. The interview guides are in Appendix A.

Procedures

Prior to initiate data collection the proposed protocol was submitted to the Institutional Review Board of the University of Puerto Rico, Río Piedras Campus and approved. The study was carried out in the following phases: 1) Pre- Implementation, 2) Implementation, 3) Post-Implementation and 4) Data Analysis.

Phase I: Pre- Implementation.

Initial contact was established with the school directors of schools within the inclusion criteria to schedule an initial meeting where the proposed study was explained and voluntary agreement to participate was explored. Meetings were scheduled with four school directors from schools that met inclusion criteria and were willing to participate. Permission was granted for two of those schools. We presented the study's aim and plan, first to school directors then to the six-grade English teachers. Informed consent was distributed to voluntary school directors and teachers that decided to participate in the study. The school made contact with parents of English six-grade teachers' students in a written letterform

where the study was explained. Interested parents of participants were given a written informed consent form to discuss and sign with students. Assent forms were given to students prior testing. Consent was given for all groups. The teacher's training on the game was done by one of us. In their initial approach we conducted a semi-structured interview to two teachers, one was the EG English teacher and the other one was a teacher from an earlier considered school for the study.

Phase II: Implementation.

Pre-test of Vocabulary Size Test (Spanish Edition) was done to students in both EG and ICG, as well as students in ECG. Then a pre-test of the Attitudes Survey was done to the EG students only. The training of the students in the EG in the use and instructions of the game was done by the us and the EG teachers on the following day. The EG students played for twenty minutes, every day of the week for four weeks (1 month approximately).

Coordination with the teachers in the EG was done in order to ensure compliance with the intervention. We (PI and Co-PI), three research assistants, and a few voluntary students from our university participated in the observation of the EG during every game-playing session. A maximum of three observers were present each day during observations. Observations were recorded in field notes. Participants' game-playing logs, indicating their time gaming scores, were archived and analyzed every week, as in the Ke (2008) study.

Participant Observation: Participant observation was done in the EG group only from an *observer as participant* stance: this perspective let the researchers participate in the group activities as desired, their role was to collect data taking into account that the group being studied was aware of the researcher's observation activities (Kawulich, 2005). The researcher closely observed participants verbal and nonverbal expressions when they interact with the videogames, peers, teachers and the external environment.

Document analysis: the videogame records participants' level in lessons learned and the numbers of words mastered. These records were collected every week and coded.

Students in the IG and ECG continued normal classroom lessons without any intervention until the four weeks passed.

Phase III: Post-Implementation.

The post-test on the Vocabulary Size Test (bilingual edition in Spanish) was administered to students in EG, IGC and ECG during an hour, the day after completion of the study. Post-tests on the Attitudes Survey was done to EG students only. In addition, post semi-structured interviews to the teacher involved in the EG group was conducted for the purpose of exploring the changes, if any, in expectations of videogames learning outcomes and feasibility. As a final step, we conducted a semi-structured interview to the school director of the experimental school. All interviews were recorded digitally and transcribed.

Phase IV: Data analysis.

Quantitative Analysis: Data was analyzed using the statistical software SPSS version 22. **Qualitative Analysis:** Conventional content analysis as described by (Hsieh & Shannon, 2005) was used to identify themes and patterns in notes and interview transcripts. We, the researchers, both did the analysis steps describe below and later had a discussion for agreements on categories. First, data was read repeatedly to achieve immersion and obtain a sense of the whole. Then, data was read line by line to derive codes, by first highlighting the exact words from the text that appear to capture key thoughts or concepts. Next, we made notes of their impressions, thoughts, and initial analysis. As this process continued, labels for codes emerged that are reflective of more than one key thought and became the initial coding scheme. Codes then were sorted into categories based on how different codes were related and linked. These emergent categories were used to organize and group codes into meaningful clusters. Then, we combined the relationships between subcategories, and

organized a larger number of subcategories into a smaller number of categories. A tree diagram was developed to help organize these categories into a hierarchical structure. Next, we developed definitions for each category, subcategory, and code. Lastly, we compared findings with relevant theories. To ensure credibility in analysis, we did peer debriefing and an audit trail recording our decisions on data analysis.

Results

Our findings show that implementation of video games for the learning of English in public school classrooms is beneficial and meaningful for students. Quantitative and qualitative findings show favorable outcomes and provide evidence to support this. Following our mixed-methods paradigm, results from quantitative findings and qualitative findings will be reported separately from discussion.

Quantitative Findings

Receptive word meanings known

The three groups took the first ten levels of the Vocabulary Size Test (bilingual Spanish version) of meaning recognition (100 items) at all two testing points (T1 and T2). The differences of meaning recognition between groups at pre-test were similar, with a slight advantage for the internal control group (see Table 2). At post-test (T2), the results show significant and extensive growth of words known for the EG and ICG.

Table 2

Comparison of receptive word meanings known pre-post intervention of EG, ICG and ECG

	EG		ICG		ECG	
	Pre	Post	Pre	Post	Pre	Post
Mean of receptive word meanings known	1664	2513	2211	3252	1807	1953
SD	827.1	880.9	1092.7	908.1	811.4	1014

Notes: Abbreviations: EG: Experimental Group, ICG: Internal Control Group, ECG: External Control Group.

A paired-samples t-test was conducted to compare words known at T1 and words known at T2 for all groups. Missing data was not accounted for in data analysis. In the EG, there was a significant difference in words known at T1 ($M = 1664$; $SD = 827.1$) and words known at T2 ($M = 2513$; $SD = 880.9$); $t(23) = 4.346$, $p = 0.000$. For the ICG, there was significant difference in words known at T1 ($M = 2211$; $SD = 1092.7$) and words known at T2 ($M = 3252$; $SD = 908.1$); $t(16) = 4.877$, $p = 0.000$. For the ECG, there was not a significant difference in words known at T1 ($M = 1807$; $SD = 811.4$) and words known at T2 ($M = 1954$; $SD = 1014$); $t(24) = 1.102$, $p = 0.281$. The results of the EG and ICG could be explained by the Hawthorne Effect. Both groups shared the same English teacher.

Mastered game words per week

The EG was measured at four times (T1, T2, T3 and T4), at the end of every week, for words mastered on the game (see Table 3).

Table 3

Comparison of mastered game words per week

	T1	T2	T3	T4
Mean of Mastered game words per week	57.4	87	121.9	138.8
SD	31	42.7	51.8	56.4

A paired-samples t-test was conducted to compare mastered game words known at T1 and mastered game words known at T2, T3 and T4. There was a significant difference in

mastered game words at T1 (M= 57.4; SD= 31) and mastered game words at T2 (M= 87; SD= 42.7); $t(24)= 7.527$, $p=000$; in mastered game words at T1 and T3 (M= 121.9; SD= 51.8); $t(23)= 9.785$, $p=000$; and mastered game words at T1 and T4 (M= 138.8; SD = 56.4); $t(23)= 11.345$, $p=000$.

A paired-samples t-test was conducted to compare mastered game words known at T2 and mastered game words known at T3 and T4. There was a significant difference in mastered words at T2 and T3; $t(23) = 8.807$, $p=000$, and mastered words at T2 and T4; $t(23) = 10.786$, $p=000$.

A paired-samples t-test was conducted to compare mastered game words known at T3 and mastered game words known at T4. There was a significant difference in mastered words at T3 and T4; $t(23) = 7.223$, $p= 000$.

The results show a significant increase of words mastered at T4 compared with T1. It also shows significant increase at every other times compared to T1, T2 and T3.

Advanced Game Levels

The EG was measured at four times (T1, T2, T3 and T4), at the end of every week, for advanced game levels. See Table 4.

Table 4

Comparison of Advanced Game Levels

	T1	T2	T3	T4
Mean of Advanced Game Levels	6.68	9.6	12.25	14
SD	2.7	3.89	4.67	5.14

A paired-samples t-test was conducted to compare advanced game levels at T1 and advanced game levels at T2, T3 and T4. There was a significant difference in advanced game levels at T1 (M= 6.68; SD= 2.7) and advanced game levels at T2 (M= 9.6; SD= 3.89); $t(24)=$

5.085, $p=000$; advanced game levels at T1 and T3 ($M= 12.25$; $SD= 4.67$); $t(23)= 9.003$, $p=000$; and advanced game levels at T1 and T4 ($M= 14$; $SD = 5.14$); $t(23)= 10.496$, $p=000$.

A paired-samples t-test was conducted to compare advanced game levels at T2 and advanced game levels at T3 and T4. There was a significant difference in mastered words at T2 and T3; $t(23) = 4.074$, $p=000$, and advanced game levels at T2 and T4; $t(23) = 5.980$, $p=000$.

A paired-samples t-test was conducted to compare advanced game levels at T3 and advanced game levels at T4. There was a significant difference in advanced game levels at T3 and T4; $t(23) = 8.307$, $p= 000$.

The results show a significant increase in advanced game levels at T4 compared with T1. It also shows significant increase at every other time compared to T1, T2 and T3.

Attitudes towards video games and their use for learning English

The EG was measured in attitudes towards video games and their use for learning English using an Attitudes Survey pre and post intervention. A Wilcoxon Signed-ranks test was conducted to compare pre-intervention attitudes and post-intervention attitudes in every item on the survey. A Wilcoxon Signed-ranks test indicated that “I like playing video games” ($Z = 2.26$, $p = 0.024$) and “I would play a video game about English at school” ($Z = 2.35$, $p = 0.019$) was statistically significantly lower post-intervention. No other items showed statistically significant differences. See Table 5 for the items and percentages in the attitudes survey pre and post-intervention.

The items 2 and 10 were statistically significantly lower post-intervention, but students answers remained mostly on the “agree” and “strongly agree” categories on each item post-intervention. Also, even though it was not statistically significant, students reported higher results on the item 5 “English is easy to learn” post-intervention.

Percentages per item in the Attitudes Survey Pre and Post Intervention

<u>Survey Item</u>	Pre (%)				Post (%)			
	SD	D	A	SA	SD	D	A	SA
1. I like English.	4	8	28	60	8.7	26.1	26.1	39.1
2. I like playing video games.	8	0	8	84	17.4	4.3	26.1	52.2
3. I am good at English.	12	44	32	12	17.4	30.4	47.8	4.3
4. I am good at video games.	4	4	40	52	13	8.7	34.8	43.5
5. English is easy to learn.	8	44	24	24	8.7	21.7	43.5	26.1
6. Video games are easy to learn.	0	12	28	60	17.4	0	34.8	47.8
7. A video game about English would be fun.	4	0	44	52	17.4	13	21.7	47.8
8. A video game can help me learn English.*	12	4	8	72	17.4	4.3	26.1	52.2
9. I would play a video game about English at home.*	8	28	60	96	17.4	13	13	56.5
10. I would play a video game about English at school.*	4	0	12	80	13	13	21.7	52.2

* *Note:* Abbreviations: SD =Strongly Disagree, D= Disagree, A=Agree, SA= Strongly Agree. *One missing answer in pre-test.

Qualitative Findings

A conventional content analysis was done for our participant observations that generated the following main categories: (1) Group game dynamics, (2) Gamers' style and (3) Class dynamics. From each category emerged various subcategories (see Table 6). Other categories emerged for our interviews with teachers and director (see Table 7 and Table 8).

Table 6

Qualitative Categories and Subcategories of Observations

Game's group dynamics

Comments about the game

Competition

Support between peers

Gamers' style and dynamics

Posture

Focus and Concentration

Nonverbal expressions

Class dynamics

Teacher's Interaction

Class Assignments

Daily interruptions

Class Environment

Group Game Dynamics

The main category in our observations was game's group dynamics. Game's group dynamics was divided in the following sub-categories: comments about the game, competition and peer support. During gaming time in class, students made a lot of comments about the game and process. Some of the comments were made without prompting, as part of the gaming experience. They were directed to themselves or to their peers. Comments were related to aspects of the game, sharing levels completed, giving instructions, feelings about the game and the class, as well questions about the game. Students also commented about the intervention and words learned when prompted by us. For example, one girl said: "I have 130 words mastered"; indicating her progress on the game. Similar verbalizations were stated by other students also:

"Look, 100"

"I am going too fast, cool"

"Wait, I have two more (words) left".

Students gave information about what kind of words they were learning. When asked, a girl responded: “I learn two forms of saying *él*, him or he”. Another girl said she learned the word “maybe”. Students also asked about the meaning of some words and about how to reach certain levels or mastered some of the games. Two students commented that the memory game was hard. Comments about the intervention were made when prompting. During the first week, some students expressed interest and enthusiasm about learning with games in the classroom. During the course of the investigation, some maintained interest, while some found the game boring after a while. But when asked if they liked learning while playing they said yes. Reasons given about the game being boring was: “this game is easy”. A particular student showed the most interest in the game and intervention. Without being prompted he commented about the game and the levels he is advancing. He said he also played the game in his house and practiced the words he didn’t know.

Competition was observed during the intervention. Students compete against themselves and against their classmates. Even though the game is to be played individually, students made it a competition, challenging each other to finish a game or level. For example, a girl showed her screen to another, and the other student said: “Ok, you’ll see”, as if challenging her. On the other hand, collaboration or peer support was also observed between students. Some students help other students giving instructions on the game or indicating how they completed certain mini-games. Sometimes this was done showing the console screen to another student. Therefore, the game, even if it was intended to be played individually, fomented positive interaction between students.

Gamer’s style and dynamics

Students differed in the way they played during the intervention. Game posture varied between sitting, standing up, inclining the head, holding the console up or sitting it up in the chair. During playtime, the most striking aspect was the concentration and focus on the

game. Sometimes long periods of silence were observed during gaming. This demonstrates careful attention to the game or immersion. Students also expressed themselves nonverbally. Some of the gestures were shrugging shoulders, looking constantly to the sides, or gestures expressing surprise, difficulty and interest.

Class Dynamics

During our observations, class dynamics were analyzed. This category is divided in (1) interaction with the teacher, (2) class assignments, (3) daily interruptions and (4) class physical environment. Our intervention was approximately 20 minutes of the student's English class. On the rest of the time students follow the required curriculum. Students' interaction with the teacher was observed during non-gaming periods of the class. The teacher taught the class mostly in English. Everyday students were asked to state the date in English. Assignments included a diagnostic test, quizzes, repeating vocabulary words and looking words in the dictionary. Some assignments were given to take home. Some students could follow the teacher's instructions easily, while others struggle to understand her. The teacher was very supportive of the students. One of the days, the teacher made a competition about looking words in the dictionary. Students were motivated by the competition and express similar interest as the gaming experience. The teacher also commented about the intervention to incentive students to do the learning.

During the four weeks of intervention, there were a lot of class interruptions. One day a dog entered the classroom and distracted the students. The main interruptions were teachers' absences. When some teachers were absent, the English teacher had to reschedule the students' classes or reprogram the day to shorten it. Also, the lunch lady always interrupted the class in order to ask which students will be eating lunch. This are consider normal class interruptions, but affected the intervention, because time was shorten because of them.

The intervention took place in the English classroom. Chairs were aligned vertically. The classroom was full of materials and not enough space to comfortably walk in. Most of the classrooms in the school were organized the same way. Some days the intervention took place in another classroom where students were sitting various tables. This contributed to student's interaction with peers. This indicates that classroom organization may be related to the gaming experience.

Table 7

Qualitative Categories and Subcategories of Interviews with teachers Pre-Intervention

Expected Learning Outcomes

Positive impact on learning

More attention to learning

Vocabulary acquisition

Predicted Limitations

Not everything is a game

Teacher's Training

Available resources

Teachers' interviews pre-intervention

Two interviews were conducted to teachers pre-intervention. Three main categories emerged from the interviews: (1) Expected learning outcomes and (2) predicted limitations.

Expected learning outcomes.

Both teachers expected a positive impact on learning from integrating videogames in classroom. They predicted students would be more motivated and pay more attention to class. Among the reasons provided one teacher said: "when you give something novel to a child, something of his/her interest, I understand, he/she will pay more attention, be more receptive and more positive towards learning. What he/she wants to do." One of the teachers indicated that videogames will help in vocabulary acquisition.

Predicted Limitations.

Among the predicted limitations to the intervention, teachers indicated that not everything should be about the game. Technology should be integrated to the class. They recommended needed free training for the teachers and availability for resources to impact the whole school.

Table 8

Qualitative Categories and Subcategories of Interviews with teachers and director Post-Intervention

Positive impact of the study's intervention
 Recommendations for implementing videogames in classroom
 Limitations of the Intervention
 Administrative role in implementing videogames in classroom

Teacher and director interviews Post-Intervention

The following main categories emerged from the teacher's and director's interviews post-intervention: (1) positive impact of the study's intervention, (2) recommendations for implementing videogames in classroom, (3) limitations of the intervention and (4) administrative role in implementing videogames.

Positive impact of the study's intervention.

Overall, both teacher and director coincided that the intervention brought a positive impact in learning. The teacher indicated that students were more motivated to learn, pay more attention to class and express interest in learning vocabulary words. For example, she indicated that students asked to use the dictionary more. Students were more interested in learning specific vocabulary that they encountered on the game. She also indicated seeing "a few changes, but favorable". She also noticed that students that weren't interested in English before were now after the intervention. Among the benefits pointed out by the director were: more empowerment of the students, acquisition of motor skills, visual and hearing, otherwise not acquired in school and the use of videogames in a positive way.

Recommendations for implementing videogames in classroom.

Among the recommendations given by the teacher and director for implementing videogames in classrooms are: (1) research that culminates in a pilot plan that could impact the Puerto Rico Department of Education, (2) a company that can adopt schools and provide resources and (3) teacher's training in videogames for learning process. The teacher indicated that integration of videogames and classwork should be tried during different times or days. She also suggested an extended schedule for playing the games.

Limitations of the Intervention.

The first limitation of the intervention stated by the teacher and the director was time duration. The understood the intervention was too brief (4 weeks). The teacher also had difficulties maintaining both groups, the EG and the ICG, which are the only sixth grade classrooms in the school on a par with curriculum. Although, she indicated that she could do it. Better integration with the curriculum is needed, matching game content with lesson plans. Other limitations were resources; both agree they will like all school to be impacted by the intervention.

Administrative role in implementing videogames in classroom.

The director expressed that administrative roles should be providing access to resources and interventions, evaluative of the interventions and obtaining results. She stated the importance of a liaison with the Puerto Rico Department of Education for this kind of interventions to work.

Discussion

We conducted this multi-dimensional mixed-methods study with two main goals divided in a quantitative and a qualitative component. Our main goal with the quantitative

phase was to prove that implementing videogames in a public school classroom for learning English was beneficial for students. Our findings on the main measures showed improvement in students learning of vocabulary words in English. Our main goal with the qualitative phase was to explore the meanings of implementing videogames for the learning of English in a sixth grade public classroom. Our findings show that learning with videogames means a mainly a more motivated classroom experience for students and teachers involved. It also means more attention to the learning of vocabulary words in English.

Regarding the effects of video games over learning, significant differences were found between the EG and ICG groups in relation to the ECG group in vocabulary known words. The results show greater words known in the EG and the ICG compared to the ECG. This may be explained by the Hawthorne Effect, the fact that behaviors may be altered when people know they are being studied. Both groups had the same teacher and both groups knew about the intervention. Also, the ICG had a slight advantage on the pre-test. This could mean that the ICG group may have known more words than the EG group before the intervention.

The EG mastered a significant amount of words at post-intervention as indicated by the data in the game. Each week presented with significant difference in comparison to the first week. This could mean that students were successfully accomplishing the games and tasks presented by the game and learning the words. Students also advance level significantly each week of the intervention. This could mean that 20 minutes of time a day using the game is sufficient time to master the words at a significant rate.

These findings can be compared to Chile's study (Rosas et al., 2003) where significant results were also obtained on measures in the ECG and ICG. The Hawthorne Effect was also observed in Chile's study. This could mean that implementing videogames has the indirect effect of motivating other teachers and students to outperform the groups using videogames. Our findings also compare to other studies that implemented videogames in classroom and

obtained significant results in measuring specific learning outcomes, including vocabulary words (Miller & Robertson, 2010; Tüzün, Yılmaz-Soylu, Karakuş, İnal & Kızılkaya, 2009; Kennerly, 2009; Hitosugi, Schmidt & Hayashi, 2014; Cobb & Horst, 2011 & Ke, 2008).

Learning was also confirmed by qualitative data in observations and interviews. Student's expressions of words learned and known indicated learning and encountering new vocabulary words through the game. The teacher also indicated a few changes in learning after the intervention.

Students Attitude towards Videogames and Learning English

Results from the attitudes survey were not favorable for our study and they present a sharp contrast with our qualitative findings on similar themes. There were also similar to Gillispie, Martins and Parker (2010), which reported no statistical differences in student's attitudes towards math or videogames with a similar instrument. In contrast, Gelman (2010) found significant results on attitudes towards their teachers, classes and school post-intervention. Mifsud, Vella and Camilleri (2013) also found positive attitudes towards learning with videogames, as stated before. We believed findings from the survey are explained by test conditions and not do not accurately represent students attitudes in the study. This demonstrates the importance of taking and comparing different data (quantitative and qualitative) and not relying solely on quantitative instruments.

Qualitative findings demonstrate students' motivation on learning with videogames, as wells an increase in interest in knowing vocabulary words and more interest in the English class. This is confirmed not only by our observations, but teacher and director as well.

Impact on students' motivation to learn

Our qualitative findings show an increase in motivation towards the English class and learning new vocabulary words in English. This is a significant contribution of our study because few qualitative studies have been conducted to compare with our findings. Rosas and

colleagues (2003) reported similar results from classroom observations and a preference survey. They reported that students were visibly happy by the intervention and arrived punctual to class. Cobb & Horst (2011) found similar results in their semi-structured written reports of students after the intervention. Students indicated feeling satisfaction with the intervention as stated before. Quantitative studies like Tüzün et al. (2009) reported significant results in intrinsic learner's motivation after the intervention.

From a Vygotskian perspective, motivation is important for learning. Specifically, extrinsic motivation may help with the child's activity as seen through the concept of the Zone of Proximal Development. The ZPD states that there is a wide gap between what a child can do alone and what a child can do with the assistance. The extrinsic motivators, like videogames, can facilitate the narrowing of the gap. Incidental learning was also observed throughout the intervention. Students approached videogames as a form of entertainment and foster competition without the association of it being an educational task or assignment. Ke (2008) found that students felt differently between learning within gameplay and learning outside gameplay. They found learning outside of gameplay was more boring (Ke, 2008). Therefore specific qualities of videogames contribute to the motivation in learning by making learning as incidental.

Attention, Focus and Concentration

Our qualitative findings show that students pay more attention to learning through the use of videogames. Our observations and interviews with the teacher and director indicated that students seem engaged in the activity most of the time during the intervention. Similar findings are shown in the Rosas and colleagues (2003) study where teachers attributed an improvement and concentration of their students during and following the intervention.

Peer collaboration and communication

Our qualitative findings showed students engaging in competition and supporting each other during the intervention. Similar to our study, game players were very active in exchanging game scores, expressing feelings about the games, and doing social talk during the intervention in Ke (2008)'s study. These activities and discussions are important for learning, because learning is socially constructed. Peers also form part of the ZDP discussed earlier and contribute to the learning of others.

Benefits for Public Policy

Even though policy makers frequently evaluate new educational technologies and decide whether to implement them in the schools they oversee (Margolis, et al., 2006), their practices to increase the effective use of technologies in the classroom more often than not conflict with implementation (Kenny & McDaniel, 2011). Policy makers carry the burden of correcting the infrastructural issues for practical and costs reasons, but teachers' adoption of any instructional strategy is directly correlated with his or her views, ideas, and expectations about what is possible, feasible, and useful (Kenny & McDaniel, 2011). This study contributed by incorporating the evaluation of new technologies framework suggested by Margolis and colleagues (2006), and serving as a first step (benefits analysis) of three that has proven to be useful to both educational policy makers choosing between various improvement initiatives and to educational technology producers seeking to evaluate their own technology. Teacher and school director's perspectives were taken into account to evaluate feasibility, in order to gain knowledge of resistance, if any, towards new technology implementations in classrooms and alternatives. Lastly, because new educational technology initiative is frequently expected to justify its costs based on its contribution to improve children's learning of traditional subjects (Margolis, Nussbaum, Rodríguez & Rosas, 2006), this study also contributed in evaluating if the use of an educational videogame in students learning of English vocabulary was beneficial.

Aside from the recommendations given in our qualitative findings sections, we proposed further studies similar to this one with a wide sample of schools. We also suggest alternating game time and game periods. We also suggest evaluating available educational games looking for compatibility with the Puerto Rico Department of Education curriculum. We recommend also that the Puerto Rico DE foment research that culminates in the development of game software and, if possible, game consoles, addressing the curriculum.

Limitations

This study was a pilot generating data that was non-existent in Puerto Rico. It lacked the rigor of true experimental designs and had a small purposely obtained sample. Because of this, findings cannot be generalized. Also, during the implementation, participant observation may have introduced potential bias that affected the outcomes of the quasi experiment. No attempts were made to control other variables, such as teacher's preparation or if some students were known to possess their own Nintendo DS consoles with the *My Spanish Coach* game. This game is available commercially at the time, and no attempt was made to assure that learners had no contact with the game in their non-game periods. Limitations were also found because the game software is not based on state or national sixth grade English school curriculum (unlike Rosas et al., 2003 and Tüzün et al., 2009), and assessment tools aren't also based on it. The qualitative component had typical qualitative research limitations; some were addressed by doing an audit trail and triangulation of observations. No member-checking was done to corroborate our findings with research subjects.

Conclusion

The present study evaluated whether learning with videogames in a sixth grade English classroom was beneficial and meaningful for students and stakeholders involved. Our findings support that videogames are beneficial, but implementation will require further

studies. There is a need to know what will be the best periods for gaming intervention, what would be the best time allocated to the activity and what types of games are better for obtaining significant results. There is also a need to find congruence between games and school curriculum. Even though our findings showed a positive outcome of our intervention, the study's scope is too small to generalize results. More studies should be done to further evaluate integration of videogames in Puerto Rican public school classrooms.

References

Agence France-Presse (2011, September 18). *Online gamers crack AIDS enzyme puzzle.*

Rescatado de

http://www.google.com/hostednews/afp/article/ALeqM5jgiBedHht_qrvZ00TXjFXLGJMmvg?docId=CNG.7001ab714ded53f51052f4eb1a124a15.351

- Baranowski, M., & Weir, K. (2011). Simulating history to understand international politics. *Simulation Gaming*, 42 (4), 441-461.
- Barker, T. & Sadler, T. D. (2013). Learning Outcomes Associated with Classroom Implementation of a Biotechnology-Themed Video Game. *The American Biology Teacher*, 75(1), Retrieved from: <http://www.jstor.org/stable/10.1525/abt.2013.75.1.7>
- Cobb, T. & Horst, M. (2011). Does *Word Coach* Coach Word? *CALICO Journal*, 28(3), 639-661.
- Creswell, J.W. , & Plano Clark, V.L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.
- DiCicco-Bloom, B. and Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314–321. doi: 10.1111/j.1365-2929.2006.02418.x
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit
- Entertainment Software Association. (2012). The 2012 Essential Facts About the Computer and Video Game Industry. Retrieved from: http://www.igea.net/wp-content/uploads/2012/06/ESA_EF_2012.pdf
- Gee, J.P. (2007). What videogames have to teach us about learning and literacy (revised and updated edition). New York: Palgrave Macmillan.
- Gelman, A. (2010). Mario Math with Millennials: The Impact of Playing the Nintendo DS on Student Achievement. (Doctoral Dissertation). University of Denver. 3411899
- Gillispie, L. & Martin, F. & Parker, M. A. (2010). Effects of a 3-D Video Game on Middle School Student Achievement and Attitude in Mathematics. *The Electronic Journal of Mathematics and Technology*, 4(1), 68-80.

- Hitosugi, C. I., Schmidt, M. & Hayashi, K. (2014). Digital Game-Based Learning (DGBL) in the L2 Classroom: The Impact of the UN's Off-the-Shelf Videogame, Food Force, on Learner Affect and Vocabulary Retention. *CALICO Journal* 31(1), p. 19-39.
- Hsieh, H. F. & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, 15(9), 1277-1288. doi: 10.1177/1049732305276687
- Isroff, K., Scanlon, E. (2002). Using technology in higher education: An activity theory perspective. *Journal of Computer Assited Learning*,10, 77-83.
- Kaptelinin, V., & Nardi, B. (2006). *Acting with technology: Activity theory and interaction design*. Massachusetts: The MIT Press.
- Khatib, F., DiMaio, F., Cooper, S., Gilski, M., Zabranska, H., Pichova, I. ...Baker, D. (2011). Crystal structure of a monomeric retroviral protease solved by protein folding game players. *Nature Structural & Molecular Biology*, 18, 1175-1177.
- Kawulich, B. (2005). Participant Observation as a Data Collection Method. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 6(2). Retrieved from <http://www.qualitative-research.net/index.php/fqs/article/view/466/996>
- Ke, F. (2008). A case study of computer gaming for math: engaged learning from gameplay? *Computers & Education*, 51(4), 1609–1620. doi:10.1016/j.compedu.2008.03.003
- Kennerly, E. (2009). RUNESINGER: A DEMONSTRATION OF COUPLING KOREAN PHONICS AND SPELLING TO A VIDEOGAME. (Master's Thesis). University of Southern California.
- Kenny, R. F. & McDaniel, R. (2011). The role teachers' expectations and value assessments of video games play in their adopting and integrating them into their classrooms. *British Journal of Educational Technology*, 42(2), 197-213. doi:10.1111/j.1467-8535.2009.01007.x

- Leontiev, A. (1977). *Activity and consciousness*. Philosophy in the USSR, Problems of Dialectical Materialism. Moscú: Progress Publishers. Rescatado de <http://www.marxists.org/archive/leontev/works/1977/leon1977.htm>
- Luria, A.R. (1974). *El cerebro en acción*. La Habana: Edición Revolucionaria.
- Margolis, J. L., Nussbaum, M., Rodriguez, P. & Rosas, R. (2006). Methodology for evaluating a novel education technology: a case study of handheld video games in Chile. *Computers and Education*, 46(2), 174-191.
- Mason, J. (2004). Semistructured interview. In M. Lewis-Beck, A. Bryman & T. Futing (Eds.), *The SAGE Encyclopedia of Social Science Research Methods*. Thousand Oaks, California: SAGE Publications.
- Mason, J. (2006). Mixing methods in a qualitative driven way. *Qualitative Research*, 6(1), 9-25. DOI: 10.1177/1468794106058866
- Mifsud, C. L., Vella, R., Camilleri, L. (2013). Attitudes towards and effects of the use of videogames in classroom learning with specific reference to literacy attainment. *Research in Education* 90, p.32-52. DOI: 10.7227/RIE.90.1.3
- Miller, D. J. & Robertson, D. P. (2010). Using a games console in the primary classroom: Effects of 'Brain Training' programme on computation and self-esteem. *British Journal of Educational Technology*, 41(2), 242-255. doi:10.1111/j.1467-8535.2008.00918.x
- Miller, D. J. & Robertson, D. P. (2011). Educational benefits of using game consoles in a primary classroom: A randomised controlled trial. *British Journal of Educational Technology*, 42(5), 850-864. doi:10.1111/j.1467-8535.2010.01114.x
- Morales-Cardona, C. (2009). Los videojuegos y sus efectos sobre el desarrollo cognitivo y conductual de los niños. (Master's Thesis). Metropolitan University, San Juan, PR.

- Nation, P. (2010). The Vocabulary Size Test: Information and Specifications. Retrieved from: <http://www.victoria.ac.nz/lals/about/staff/publications/paul-nation/Vocabulary-Size-Test-information-and-specifications.pdf>
- Government of Puerto Rico - Department of Education. (2012). PUERTO RICO FIVE YEAR LSTA PLAN2013-2017. Retrieved from <http://www.imls.gov/assets/1/AssetManager/PRplan2012.pdf>
- Rivas, A. (2012). Cyborg óptimo: una mirada al proceso cognitivo de la atención voluntaria en la era poshumana. (Doctoral Dissertation). University of Puerto Rico Rio Piedras, San Juan, PR.
- Rodríguez-Meléndez, C. (2009). Efectos de los juegos interactivos violentos en la conducta de los estudiantes de escuela elemental nivel de cuarto a sexto grado: Implicaciones para el proceso educativo. (Master's Thesis). Metropolitan University, San Juan, PR.
- Rojas-Ortiz, J. (2011). Beneficios terapéuticos de los videojuegos para el desarrollo físico en niños. (Master's Thesis). Metropolitan University, San Juan, PR.
- Rosas, R., Nusbaum, M., Cumsille, P., Marianov, V., Correa, M., Flores, P., Salinas, M. (2003). Beyond Nintendo: design and assessment of educational video games for first and second grade students. *Computers and Education*, 40(1), 71-94.
- Tüzün, H., Yılmaz-Soylu, M., Karakus, T., Inal, Y. & Kızılkaya, G. (2009). The effects of computer games on primary school students' achievement and motivation in geography learning. *Computers & Education*, 52(1), 68-77.
doi:10.1016/j.compedu.2008.06.008
- Squire, K. (2006). From content to context: Videogames as designed experience. *Educational Researcher*, 35 (8), 19-29.
- Vocabularysize.com©. (2010-2013). *The Vocabulary Size Test* (bilingual Spanish version). Retrieved from: <http://my.vocabularysize.com>.

- Ubisoft® Entertainment. (2013). *My English Coach (Spanish Edition)*. Retrieved from:
<http://www.ubi.com/US/Games/Info.aspx?pId=7588>
- Van Gog, T., & Paas, F. (2008). Data collection and analysis: Introduction. In J. M. Spector, M. D. Merrill, J. J. G. Van Merriënboer, & M. P. Driscoll (Eds.), *Handbook of Research on Educational Communications and Technology* (3rd rev. ed.) (pp. 763-767). London: Routledge.
- Vygotsky, L.S. (1931/1995). *Historia del desarrollo de las funciones psíquicas superiores*. En *L. S. Vygotsky: Obras Escogidas, Tomo III* (págs. 11-325). Madrid. Aprendizaje Visor.
- Vygotsky, L.S. (1933/1995). El juego y su papel en el desarrollo psíquico del niño. En A. Alvarez & P. del Río (Eds.) *Escritos sobre el arte y la educación creativa de Lev. S. Vygotsky* (págs. 115-132). Madrid: Fundación Infancia y Aprendizaje.
- Williamson, D., Squire, K., Halverson, R. & Gee, J.P. (2005). Videogames and the future of learning. *WCER working paper*, 2005-4. Retrieved from
http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80_29/8e/8_5.pdf

Appendix A

Preguntas Guías de Entrevista Semi-Estructurada al/la directora/a Post-Intervención

1. Luego de la intervención, ¿cuál es su sentir respecto al uso de videojuegos en la enseñanza?
2. ¿Qué impacto cree que ha tenido la implementación de los videojuegos en el salón de clases para enseñar inglés?
3. ¿Qué beneficios cree que tuvo el uso de videojuegos para la enseñanza de inglés en el salón?
4. ¿Qué limitaciones encontró?
5. ¿Qué recomendaciones propone para atender estas limitaciones?
6. ¿Cuál cree que es la contribución del rol administrativo en la implementación de videojuegos en el salón de clase?
7. ¿Cuán viable cree la implementación de videojuegos en las aulas de las escuelas públicas del país?
8. ¿Cuál cree que es la contribución del gobierno en la implementación de videojuegos en las escuelas públicas del país?
9. ¿Cuáles son los retos más importantes de implementar videojuegos en la enseñanza del inglés en el salón de clase?
10. ¿Cuáles son las fortalezas más importantes de implementar videojuegos en la enseñanza del inglés en el salón de clase?

Preguntas Guías de Entrevista Semi-Estructurada a los/as Maestros/as Pre-Intervención

Código: _____

Datos Demográficos:

Género: _____ **Femenino** _____ **Masculino** _____ **Otro**

Preparación Académica (Grado y Título): _____

Años enseñando: _____

Años enseñando en escuela pública: _____

Años o tiempo que lleva enseñando inglés: _____

Grados que enseña: _____

1. ¿Cuál es tu sentir respecto al uso de videojuegos en la enseñanza?
2. ¿Haz utilizado videojuegos para la enseñanza anteriormente?
3. ¿Qué impacto cree que pueda tener la implementación de los videojuegos en el salón de clases para enseñar inglés en las escuelas públicas?

Otras preguntas exploratorias:

¿Qué impacto cree que pueda tener a nivel administrativo?

¿Qué impacto cree que pueda tener en el salón de clase?

¿**Cómo cambiaría** la implementación de los videojuegos el día a día en las escuelas y el salón?

4. ¿Qué beneficios cree que tendrá el uso de videojuegos para la enseñanza de inglés en el salón?
5. ¿Qué limitaciones cree que tiene?
6. ¿Qué recomendaciones propones para atender estas limitaciones?
7. ¿Qué estrategias de enseñanzas encuentras serían necesarias para utilizar videojuegos en el salón?

Otras preguntas exploratorias:

¿Cómo cree que se puedan incorporar los videojuegos a las actividades en el salón?

8. ¿Cree que haría falta un entrenamiento adicional para que los/as maestros/as incorporen videojuegos en el salón?
9. ¿Cómo cree que respondan los estudiantes al uso de videojuegos en el salón de clases?

10. ¿Cuáles son los retos más importantes de implementar videojuegos en la enseñanza del inglés en el salón de clase?

Preguntas Guías de Entrevista Semi-Estructurada a los/as Maestros/as Post-Intervención

Pregunta Introductoria

1. Luego de la intervención, ¿ha cambiado su sentir respecto al uso de videojuegos en la enseñanza?
2. ¿Qué impacto cree que ha tenido la implementación de los videojuegos en el salón de clases para enseñar inglés?
3. ¿Qué beneficios cree que tuvo el uso de videojuegos para la enseñanza de inglés en el salón?
4. ¿Qué limitaciones encontró?
5. ¿Considera que el videojuego *My English Coach Spanish Version* es adecuado para enseñar el contenido de la clase?
6. ¿Qué recomendaciones propones para atender estas limitaciones?
7. ¿Qué estrategias de enseñanzas utilizó para implementar los videojuegos en el salón?
8. ¿Cuán receptivos encontró a los estudiantes ante el uso de videojuegos en el salón de clases?
9. ¿Crees que hubo una mejoría en el aprendizaje de los estudiantes debido al uso de videojuegos en el salón?
10. ¿Cuáles son los retos más importantes de implementar videojuegos en la enseñanza del inglés en el salón de clase luego de esta experiencia?
11. ¿Cuáles son las fortalezas más importantes de implementar videojuegos en la enseñanza del inglés en el salón de clase?