ABSTRACT

The development of new technologies is found inevitable and children interests toward online platforms and virtual worlds are rapidly growing. In addition, there is a consensus that use of technology for primary or secondary school education is effective for achievement and motivation. In research and practice there are many educational implementations of technology in classrooms that were found useful.

Similar to most qualitative studies, the purpose of this study also cannot be narrowed down to a single sentence but the overarching aim of the study is to explore the nature of using virtual worlds as a learning platform during. The theoretical background of this study is rooted from the constructivism and constructionism learning approaches. Consisted with its theoretical framework, this study has followed a qualitative case study research method to explore the nature of the construct. The case is a bounded system that is narrowed to a single case (Merriam, 1988; Stake, 1995; Yin, 2003). There are various types of data collected within this system. Based on the data collected and the research-suggested case study data analysis approaches, the following themes were emerged; realty, learning by discovering, learning by design, scaffolding and chunking information, and real life desires.

After using Whyville virtual platform, the aim of this study was expected to start new discussion on young children using more complex virtual worlds such as Second Life. Thus, the results of this study could be guidance for transmission process of children toward Second Life type of virtual worlds. Even though a further discussion may need about the nature of using the virtual worlds, the primary findings of these case studies suggest some practical implications for children’s education.

Keywords: Virtual worlds; Whyville; second life; children’s learning; education technology.

INTRODUCTION

There is no discussion against the fact that the last century is the digital era where technology becomes part of the everyday life. From communication to entertainment, and from business to education, almost all activities and fields are now involving some sort of technologies. Especially the use of the Internet in the last decades has set all activities be done on air. In Turkey, for example, statistics show that most of the households connect the Internet (TUIK, 2010). Another recent report shows that people in Turkey spent around 30 hours a month on Internet and with that it is over Europe average and third mostly using country in Europe (Uygun, 2010). Education, worldwide, is one of the main areas that have also integrating technology into the lessons. After use of television and simple computers, new educational programs have changed the structure of classrooms.
The use of the Internet for the delivery of course material has burgeoned since the early 1990s. Starting from a simple one-page to multiple-page web sites there were sites for almost all schools. The early version of this delivery was one-way where the content is provided and learners were passive readers. However, with the web 2.0 applications, schools have started to adapt course management systems technologies for educational uses. It is inevitable that the changes will continue when new technologies keep developed.

There are virtual schools everywhere in the world. After the virtual universities, primary and secondary schools started to implement this new educational system in their schools. St. Marks Primary School in North London is one of the first started online education at primary level and later there were Thomas Telford School in England and some in Canada that are successfully delivering courses over the internet (Haughey, 2009). In the United States, the state of Florida has initiated and the most progress in virtual schooling. There are more than 25 states in USA has also passed the policy that allows school or organizations to open virtual schools. However, the schools mentioned there are not using virtual worlds but the Internet websites or course management systems as learning platform. Thus, this is has to be distinguished (Glick, 2009).

In Turkey, the distance education initiative started with Anadolu University where students from distance started to take courses and watched lessons from TV. Thus, there is an intensive review of the literature on the Open Education Faculty of Anadolu University (Demiray, 2002). Later on, there were several institutions have started to provide two-year university degree over distance education programs (Demiray, 2011). Turkish Higher Education Council (YÖK) has promoted distance education by recently giving accreditation to some distance education programs. At primary and secondary education level, the Ministry of National Education is providing courses for students who cannot attend classroom instructions. The development of computers and the Internet have brought a new perspective to distance education (Haliloglu-Tatli, 2009).

There is a consensus that use of technology for primary or secondary school education is effective (Baytak, Tarman & Ayas, 2011). In research and practice there are many educational implementations of technology in classrooms that were found useful. For example, in a literature class researchers have observed how children use a computer program to study Shakespeare plays (Birmingham, Davies, and Greiffenhagen, 2002). The results of this study show that the children were able to construct virtual plays and manipulate characters with their own dialogue. In another study, Istifci found that children had positive attitude toward learning English with blog application and the students wanted to keep writing on that digital dairy with educational manners (2011).

As a further step of technology-based lesson, internet-based courses offer variety, flexibility, and convenience that the traditional classroom cannot match and therefore these courses have potentials to provide equal educational opportunities for all students (Lazarus, 2009). The educational advantages that the Internet brings for school communities have been discussed to be available for all. Thus, Jesness thinks that discussion over the online courses should be turned from whether or not they should take online courses to whether any student graduated from school without taken any online course (2009). Dorniden also argues that the argument whether K-12 students should take online courses is over and the discussion should be on how to implement successful online programs (2009). However, the researchers also warned the educators that online learning environments might not be ideal for every student (Dorniden, 2009).
Virtual Worlds
Before starting the discussion about virtual worlds in primary education level, it is important to clear that how virtual learning and learning in virtual worlds can be used interchangeably. However, they are different some ways. Most research name Internet-based platforms as virtual and any kind of Internet-based learning becomes virtual learning. After the use of virtual worlds, the term ‘virtual’ must be used separately. Virtual learning must be used where learning take place over virtual worlds. When looking at the brief history of the virtual worlds, most of the developments in this field are recent. Started with Habitat, released in 1985, there were then The Sims, There, Active Worlds, and Second Life as the popular virtual worlds that was developed. Besides those virtual worlds, most people may be familiar with multi-user dungeons (MUDs) and massively multiplayer online role-playing games (MORPGs) which are 2D and 3D gaming environments for different players at various age levels. Some of these popular game platforms are World of Warcraft, METIN 2 Ultima Online, Knight Online Civilization, Age of Empires, Alpha Centaur The Sims, Zeus, Pharaoh, and Cezar.

According to a recent market report there are more than 1 billion users of virtual worlds, online communities where users have avatars (Derived from an Asian philosophy, avatar, in computing, means a graphical representation of a user or a character. It may take either a three-dimensional form, as in games or virtual worlds, or a two-dimensional form as an icon in Internet forums and other online communities (wikipedia.com).) and participate in various simulated environments. (Watters, 2011). Even though it is a relatively new, there is rapidly growing market in the kids virtual worlds. It is expected that more than half of kids online will belong to a virtual world in 2011(Olsen, 2007a). For example, Club Penguin, one of the popular virtual game environment has increased its users up 147 percent from a year ago (Olsen, 2007a). Another virtual game platform, Nickelodeon, was launched January of 2007, and 10 months later, the site has nearly 5.5 million users who spend an average of 55 minutes per visit (Olsen, 2007a). Some of the most popular worlds for children are Webkinz, Habbo Hotel, Neopets, and Whyville. Overall, it is found that around half of the virtual world users are age 15 and there are some children violating age appropriateness of the site to get into the virtual world (Watters, 2011). Among those virtual worlds and virtual game platforms, whyville has been chosen as the context of this study since it has both activities and games that is more close to the Second Life environment.

Theoretical Background of the Study
The theoretical background of this study is rooted from the constructivism and constructionism learning approaches that are popular in many recent educational settings. Within the perspective of Jean Piaget, Constructivism students build new knowledge based on his or her prior knowledge and he or she is not the receptor of knowledge supplied by the teacher (Han & Bhattacharya, 2001). Constructionism, raised by Seymour Papert, is a more the practical materialization of constructivism. In addition to following constructivist idea, Papert, the students of Jean Piaget, also add that, in a constructionist idea, building knowledge structures (”in the head“) goes especially well when the subject is engaged in building material structures (”in the world”) as children do with construction sets” (Papert, 1991).

After organizing MIT LOGO project and Samba school projects, Papert comes to conclusion that a constructionist learning environment, different from the traditional learning environment, aims to design a learning setting where students construct “objects to think with” and collaborate and share artifacts (1993). As one of the first utilization of computers in education, Papert encouraged educators to use computers as a tool for students’ learning process.
Thus, he describes computers as children’s machines and wrote a book with that title (1993). Within that description, computers are not only a vehicle to transfer information but a tool to help students manipulate information and design concrete constructs. Following that perspective, there are several studies conducted and learning strategies implemented for children’s education (Baytak & Land, 2010; Kafai, 1996; Kimber & Wyatt-Smith, 2006, Papert, 1991).

Baytak argues that with a constructionist perspective, online learning can become an effective learning environment for students (2010). Virtual worlds extend the capability of constructionist approach by providing various design tools for users. According to Doug Thomas virtual worlds, specifically Whyville, is found effective for learning subjects that can be difficult to be taught (e.g. ethics) in the classroom (quoted in Olsen, 2007b). Prensky (2003) claims that students who are active members of virtual worlds are highly motivated because they are learning in profound ways, including decision-making, synthesis of information, and understanding complex systems (cited in Jarmon, 2009). These students also learn how to socialize, how to be technologically savvy, and how to be good little consumers (Olsen, 2007b).

Researchers such as Gergely and Gergely brought up that sharing and development of culture is possible through observation and mimicry within virtual worlds since they are graphics based, and allow other users to observe and imitate a certain culture (2005). Thus, Wanless-Sobel stated that "The more the learning environment involves real-time, and emotional and intellectual decisions of real people, the richer and more complex the learning experience, as opposed to computer simulations that process only a finite number of variables." (Wanless-Sobel, 2009 p. 747)

Research done by Yasmin Kafai, a leading researcher for Papert’s LOGO project and Whyville virtual platform, and her colleagues shows that children who were involved in Whyville adopted different roles depends on the activity they try out (Olsen, 2007a; Subrahmanyam, 2009). Running an experimental research on Whyville researchers found that there were significant advances in their understanding of the topic covered (Neulight, et. al. 2006).

Nevertheless, researchers also found that children take their offline behaviors to their online spaces within Whyville; this includes both positive behaviors, such as rehearsing real-life social roles, and negative behaviors, such as cheating and bullying (Fields & Kafai, 2007; Olsen, 2007b; Subrahmanyam, 2009). Another issue that comes out in the research is that educational institutions which have space on virtual worlds have intentions to replicate reality so that buildings and other school content is almost same on the virtual world (Jarmon, 2009). These replications has been done with pedagogy and course design as well.

The discussion that Clark (1994) started years ago about whether or not technology is just a vehicle for delivering information has been brought up for learning on virtual worlds too (Jarmon, 2009). She states that, “The construct of the self, that which experiences its own embodiment, can be both persistent and mutable. For example, humans regularly "attach" tools to ourselves to extend our abilities beyond normal human-scalereach; a hammer attached to a hand leverages greater force, and a user "attached to" the Internet connects virtually with an online course” (2009, p. 1613).

However, Goksel-Canbek and her colleagues have a hope that second life and all other virtual worlds should not be just a extra tool for education but also should be utilized in best possible way and arranged with pedagogical dimensions (2010).
As it was mentioned above, the previous literature has focus on whether students learn or not with technology, on the interest and later on virtual worlds. However, as Jarmon indicated, these researchers were looking with the lens of the traditional pedagogies (2009). Because of the different setting of virtual worlds, additional research is needed to understand how students may learn and how they act within these worlds. In addition, these studies are scoped with formal educational settings. However, children are spending hours and hours (Olsen, 2007a) on virtual worlds. Thus, this current study is based on students use of a virtual world, Whyville, at a leisure time. Similar to most qualitative studies, the purpose of this study also cannot be narrowed down to a single sentence but the overarching aim of the study is to explore the nature of using virtual worlds as an learning platform during free time.

**METHOD**

**The Context of the Study**
Consisted with its theoretical framework, Constructivism, this study has followed a qualitative approach to explore the nature of construct. A case study is a bounded system which is narrowed to a single case. There are various types of data to be collected within this system. This bounding of this study was parallel to well known case study designs (Merriam, 1988; Stake, 1995; Yin, 2003).

Following Yin's description of a case design, this study can be considered as a single case with embedded design since it starts with an examination of subunits and allow detailed perspectives. Since this study is a qualitative case study, it describes and interprets the nature of using virtual worlds by a girl.

As Stake have described, a case is sometimes a person or a event and the person or event has to be described in detail (Stake, 1995). Different from most quantitative research, a case study is not sampling study. There is no need to make control or experimental group. The goal is to understand the selected case in depth. Thus, it may be useful to try to select cases that were typical or representative of other cases but this is not a requirement to conduct the study.

Smartkiz, has been selected to be the case of this study. The child who hold Smartkiz as the avatar name on the virtual world, was ten years old girl.

![A view from Whyville platform](Figure: 1)
Based on the document reviews, she had good language and social studies scores at school but not that much higher scores in mathematics. She was over average for academic achievement in school work. She plays computer games often and mostly Internet games.

The virtual platform used as part of this study was Whyville, a free registered virtual world that specifically designed for children between age of 5 and 15. As figure 1 shows, the site has multiple functions that makes Whyville a transition platform from simple game site to a complex Second Life platform.

The main reason to choose Whyville was that students at young ages can freely register to the site which is not possible for Second Life and Second Life Teen. In addition, this virtual world provide both games that users can play and virtual space that users can roam around. In addition, the security and safeness are tied in site. Because of that, Whyville provide flexibility for both parents and children to safely use.

Data Collection
There was not a specific process of time to collect data in a case study. Data collection may start with the commitment to the study or during the study. In addition, The context of a case study is wide. Researchers may look historical, political, and cultural, social, behavioral and spatial characteristics (Stake, 1995).

The data collection for this study was done through interviews, observations, material and document views. There were semi-structured interviews done with Smartkiz. Interviews were done while she was on Whyville and after sessions. For the observations, researcher, sometime sit next to the Smartkiz and watched all the steps she did on the virtual world and sometimes off the table but watching her physical actions while playing on the site. Document review was mainly reviewing her available school records in last few years and see related comment from the teacher. This records allow lead the study findings. Materials were what she developed on the virtual world. During the material development, how, why, and what she developed was reviewed.

Data Analysis
Similar to data collection, data analysis of a case study does not require a certain time or event to start with. From the first impressions to final piece of data, analysis is the process to give meaning to each act, observation, material, and word.

The analysis of this study is rich in the context of the case which presents itself (Merriam, 1988; Stake, 1995). Through the analysis of of the study a description of the cases emerges and themes were presented.

Based on Stake's method (1995), for analysis, this study also followed these two aspects; categorical aggregation, seeking a collection of instances from the data for issue-relevant meanings, and assertions, making sense of the data and emerging themes based on interpretations.

FINDINGS

The main purpose of this case study was to investigate the nature of a child using a virtual world. The investigation was based on educational lenses. Based on the data collected and the research-suggested case study data analysis approaches, the following themes were emerged; reality, learning by discovering, learning by design, scaffolding and chunking information, and real life desires.
Reality
It was observed that the activities that were simulated from the real world cases were effective way that she learned from. For example the virus center was visited and she easily follows the steps of the simulation about virus. When she was asked what she understood from there, she mentioned where viruses can be moved from and how they get more. She also added that she never learned about that at school or out of school.

In addition, during an interview she pointed that “comparing other computer games I have played, I like this one (whyville game). Because this is like real. You kind of know what to do.” She meant that the environment and structure was realistic instead of fantasy world in some internet games that require extra instructions to understand the rules.

Learning by Discovering
It was found that Whyville was opportunities for Smartkiz to discover different spaces without safety issues. Comparing with real life danger, the virtual world policies allow her to roam in the world freely. The feeling of curiosity has moved her to check spaces that she did not know what could be about. By this discoveries, she mentioned what the content could be about based on her prior knowledge.

![Figure: 2](image)

Food activity that students had to follow some regulations

During the discovery of the new spaces and activities, learning by trial and error appeared. For example, at the food replacing activity, Smartkiz was warned by the game to wear hairnet. She did that for the first part of the game and for the second room of the game, it was the first things she did wearing the hairnet. When she was asked whether she has to do that in the real world. She mentioned how these regulations could be helpful for safety and cleanness in the real world.

Nevertheless, when she was observed during different play sessions, the student were not reading instructions and trying to close instruction pages as soon as possible. Whyville, unfortunately, have some many instruction pages either as an external link or internal page. These instructions may turn the virtual learning environments to traditional learning approach. Without reading inside the page, she found it out of the virtual world since it does not have the same visual environment and has more text to read.
Learning by Design

Virtual worlds such as Whyville gives opportunities to users to develop new things based on the given toolbox. For this case, developing new things was found more productive. Creating their own pets can be seen as constructions of the knowledge that Smartkiz enjoyed. For this activity, she decided to have a snake with legs. Based on her desire she started to add body parts one by one that fits with her aimed pet.

![Create Your Pet activity](image)

**Figure: 3**

The Create Your Pet activity was an example of learning by design task.

During the drawing the snake activity, she was observed that enjoying the task. She had high motivation that she wanted to have her own skilled pet. She has high focus on details (Figure: 3). This same motivation was observed also for the home building activity as well. After the each activity, when she was asked whether she like the activity, she mentioned that she like to have more of these activities. These learning by design activities were found a way for children to express their feelings and thoughts.

Scaffolding and Chunking Information

It is common for the real world cases that kids can get lost. Similarly, it is possible for children to get lost in overloaded information and tasks. It was found from this case study, pedagogically, the tasks are needed to be divided in parts. It was observed that she get lost in complex tasks and decided to leave this activities as soon as possible. The student might start with small steps to not get lost in the bigger complex environment. For example the topic coral and ocean life, the students' lack of prior knowledge about the topic and not reading the instructions turned the activity as matching activity with trial and error activity.

This, of course, may cause the users leaving the activity without acquiring any new information. An computer-based scaffolding that will guide the children at certain level may help them involve more effectively.
It was found that the available content areas were either too specific or too broad. Overall there are limited activities and games in this virtual world. Among these activities and games, there are some that the Smartkiz was losing her way and not understanding the whole content.

**Real Life Desires**
Giving pearls and other types of instant feedbacks and rewards were found motivational for Smartkiz. In addition, real life desires such as having money to spend also increase this motivation. For example among activities on the map she decided to choose SpinLab shape without reading and knowing what the center was about. When she was asked why she selected that she mentioned that the shape has some candies on it and it must be fun. This showed that candies and similar real word attractions still attract children even on virtual worlds.

![SpinLab view](image)

**Figure: 4**
SpinLab view

On the other hand, for the sport shape (the map has soccer field for sportplatz activity) she moved over but decided to not visit this center, when she was asked why; she said that this is probably about soccer and she does not like soccer.

Moreover, as real life desire to play sometimes by yourself it was issue for this case as well. For example, during Smartkiz’s experiences on Whyville, there were times that she wanted to play by herself without computing or matching someone kids on Whyville. There are, of course, some activities for individuals and there are some for players more than one or more. Especially groups based activities and games are opportunities for most students to interacts with someone children may know or may not know. However, it was also found that some activities required more than one player and Smartkiz had to wait for someone to show up for this game to start playing. Thus, more solo games and entertainments are needed.

**DISCUSSION AND CONCLUSION**

The current study aimed to investigate how the experience of a child using a virtual world, Whyville is. This aim was expected to start new discussion on Second Life and kids using it.
Since children fewer than 13 are not allowed to go on Second life and Second Life Teen, this study was found important for young children’s experiences and views about virtual world. Thus, the results of this study could be guidance for transmission process of children toward Second Life type of virtual worlds.

As it was explained above in details, the finding of the study was based on a single case study. When the findings were analyzed by Stake’s approach for case study analysis, the following themes were emerged: reality, learning by discovering, learning by design, scaffolding and chunking information, and real life desires.

This study showed that the structure of virtual worlds that simulates real world spaces and additions, provide opportunities for children to learn the content more easily. As Smartkiz, the case participant of this study, indicated, being like real help her to understand content area that she was not familiar with.

As educational approaches, learning by discovering and learning by design was found to be part of the nature of Whyville virtual environment. Comparing with Second life and other professional virtual environment, Whyville has limited space for discovering and designing new things but for a child age users, provided spaces were found as opportunity to learn new things while enjoying the task. Allowing children to design new virtual world items by themselves or providing more sandboxes to be redesigning by them could increase the learning since that provides more discovery and design. However, As Jarmon described, moving a new pedagogical concept is always difficult because of “habits of mind” (2009).

Different slightly than Second Life and other virtual worlds, Whyville has mission to not only entertain its users but also educate them in certain topic. Even though, this mission is important and useful, it also comes with some pedagogical problems. It was found that for proper learning, students might need scaffolding, which is rarely implicated on the site. Similarly, some content areas are too broad to be understood with one activity. Thus, with help of educators, some content area must be divided in different sections or students may started with small portion of the content in the first level of the activity and move in to broader content when passed to upper levels. Based on their experimental research on Whyville, Neulight and colleagues found that the students conceptualized enough the content areas (2006).

Whether it is real life activity or a simulation, there are things that capture kids’ attention and they like to have those. Candies and games are common desires for most kids. It was found in this study that Smartkiz visited candy type of space shape but not sport type space shapes. Even though, Smartkiz knew and experienced that the candy shape SpinLab was not giving any candy, she kept visiting this space for other logins.

Some Implications of Virtual Worlds for Children’s Education

Even though a further discussion may needed about the nature of using the virtual worlds, the primary findings of these case study suggest some practical implications for children’s education. It is always found an issue with most of primary and secondary schools is that schools either do not have enough budget to provide advance laboratory equipments to conduct science experiments or there are safety issues for certain types of experiments. With virtual world environments school can manage systems to conduct various experiments. As Bartle, (2003) has suggested schools may build a platform on the virtual world that has different gravity and settings like moon has and the avatar of the students can experience this environment to understand the living differences of Earth and Moon. However, this could be done only with Second Life type of more complex virtual environments.
Most of the project-based learning and problem–based learning activities can be transferred to virtual platforms. In traditional educational systems role-playing has been promoted often especially for social study lesson in elementary school level (Mello, 2001). In some cases students take a role of city representatives and try to solve city problems. In a common scenario, students become city governor, city mayor, city doctor, and so on. And they started a discuss city problems like water cleanness. Every aspect from the representatives has to be searched before the city meeting. So, with virtual environments, it is possible and important to bring children from different nations to bring solution for international problems such as global warming. As it has suggested, this type of virtual activities could be solution to students’ antisocial (Zielinska & Chambers, 1995).

The content area of social studies and languages can be wisely used over virtual worlds. As Istifci (2011) has implemented with online platform, students may use virtual platform to learn new languages. With the virtual world disabled students may find more space for them to learn and express themselves with any prejudice. Museum learning is highly suggested in literature. Ulusoy (2010) found that there was a increase in students’ achievement when they use a virtual platform. The same strategies can be implemented for similar subject areas.

In their study Askar and Kocak-Usleul (2009) suggest that virtual world could be a new learning environment or as a support work for students within the current schooling and educational system. However, when the policy makers and researchers come together to change schooling from a formal of teachers’ administration to more border-free zone, virtual learning environments can be considered as a way of teaching. As the school standards have modified based on online learning environments, it is possible to add new standards for virtual environments as well. Meantime one may bring up online schooling as way of for that, but the problem with most of these online schooling is that these schools are mainly use the similar learning and teaching strategies and the teachers just replication the same pedagogies from traditional learning environments. As it was stated in Olsen’s article, it can be predicted and expected for the near future that the form of knowledge is getting change (2007). The future research may look cognitively how the knowledge that were acquire during the virtual platform. Even though it is not issue with Whyville, but complex virtual worlds such as Second Life may require advance-computing skills to develop avatars or places. However, different from the current online learning platforms, virtual worlds may prevent students from copying and paste. In other words, there are concerns with the computer-based learning environments and online learning platforms that students may just copy someone else’s ideas or writings and turn in to teachers as his or her own work. To prevent that there are some computer programs but still not adequate enough. Thus, virtual worlds are adequate platforms for learning based on students’ actions and developments. Their redesigns of designed materials are also a new design work (Papert, 1993) and students may still learn from that.

On the other side, there could be some misconception about social and scientific activities. For example, a student may go to on a virtual world a find a part of Istanbul is built with its historical places (there are similar replicated spaces available on Second Life). As mentioned above, it is great opportunity for the students to experience these historical places but when the drawings and the design of places done correctly (which is not possible to replicate exactly on the web), the students may have some misconceptions and misleading about the place. In order to prevent from that, the students can be informed about what is missing or what is different from the real place. This could be done by either at the beginning of the students visit to the destination or a note appears when the avatar get close the missing part.
BIODATA and CONTACT ADDRESSES of AUTHOR

Ahmet BAYTAK is a researchers and educators focusing on technology integration into education. He completed his B.S at Ege University. His Master and PhD are from Learning and Performance Technology department of Penn State University. He has teacher experiences a primary education level. After working at Erciyes University he has been at Harran University since 2010.

Ahmet BAYTAK, PhD
Harran University, Osmanbey Kampusu, Müh Fak. Şanlıurfa, Turkey
Tel: +90 414 318 3000 ext: 1088
Emails: abaytak@harran.edu.tr or ahmet_baytak@yahoo.com

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