

# Bringing Educational Games to the Afterschool: Collaborative Design-Based Research Approach to “Think like a 10 Year Old”

**Jacob Dayan**

University of Haifa, Israel;  
Technion – Israel Institute of Technology  
jacob@dayan.org.il

**Yael Kali**

University of Haifa, Israel;  
Technion – Israel Institute of Technology  
yael.kali@edtech.haifa.ac.il

## Abstract

In our ever-ending quest to promote science education, can we take educational games to the afterschool? Following the modus-operandi of the Israeli Scouts, two motivated teens (whom we call Cyberscouts) volunteered to join a collaborative design-based research (which we entitle as ‘co-DBR’). Our shared objective is to design an effective model to bring educational games to the afterschool. This article reports the findings of the first iteration of the Cyberscouts model, in which the Cyberscout leaders designed and implemented the process of bringing the Quest-Atlantis educational game to an afterschool setting. We find that the teens’ ability to view the process “like a 10 year old” had a strong impact on the refinement of the model. We conclude that the novel co-DBR approach has the potential to serve as both a productive pedagogical approach and as an added value to DBR methodology.

**Keywords:** Informal learning, Afterschool, Educational games, MUVE games, Design-based research.

## Introduction

In recent years, a small, but important trajectory in the online gaming arena can be seen, in which educational games, which use the latest state-of-the-art technologies are developed in order to keep par with commercial games, and create environments that are both engaging and can enhance in-depth learning in general (Ketelhut, Dede, Clarke, & Nelson, 2006; Shelton & Wiley, 2007).

The motivation for this research is driven by a strong personal experience. For the past eight years the first author of this paper has served voluntarily as a Scoutmaster in the Israel Scouts (The Zofim), and have studied the unique educational enterprise based on youth counselors guiding younger children. We are inspired by the possibility of using a similar model to attract teens to divert “afterschool” time to play virtual educational games.

## The Current Research

Our overreaching goal in this research is to promote science learning in informal settings. To do this we decided to develop a model that brings educational MUVE games to afterschool game communities. This model, which we call the Cyberscouts model, engages teens in mentoring younger kids who play virtual educational games. The teens, which we call Cyberscout leaders, receive guidance from a more experienced mentor, who was the first author of this paper.

Since no similar model that we could build on was previously developed, we decided to design the model using a Design-Based-Research (DBR) approach (Collins, Joseph, & Bielaczyc,

2004; Kali, 2008; The Design-Based Research Collective, 2003), which would enable us to refine our model based on multiple iterations in real-world settings. We decided to design the model in a collaborative design process with two teens that we recruited for the Cyberscout leaders role. This approach, in which researchers collaborate with practitioners who have much experience in the field, but less experience in designing technology-enhanced innovation is similar to what Penuel, Roschelle, and Shechtman (2007) defined as ‘co-design’. In our study, the cooperation between the researcher and the Cyberscout leaders goes beyond what Penuel et al. (2007) define as co-design. We decided to expand the collaboration to include not only the design-process, but also to involve the Cyberscout leaders (we will refer to them as ‘leaders’) in the iterative design process of DBR. We suggest identifying this design process as ‘co-DBR’. Our research objectives were three-fold: (a) Design an effective model for Cyberscouts and explore its effectiveness, (b) Explore the learning processes of the leaders from being involved in such a process, and (c) Examine the potential of the co-DBR approach.

This article reports the findings of the first phase of the co-design, in which the leaders implemented the model with a group of players. The research questions we sought to answer were:

- What elements are required in a model that seeks to bring educational contents into afterschool play?
- What are the benefits and challenges for the Cyberscout leaders?

## Methods

### Context and Design Process

This research is built on top of two existing, well-established educational models. The first is the Quest-Atlantis game, with its comprehensive Teacher Toolkit and educational quests (Figure 1). The second model is the Zofim’s operational and pedagogical methods to build and mentor groups of youngsters ("Israeli Scouts Web Site," 2009).

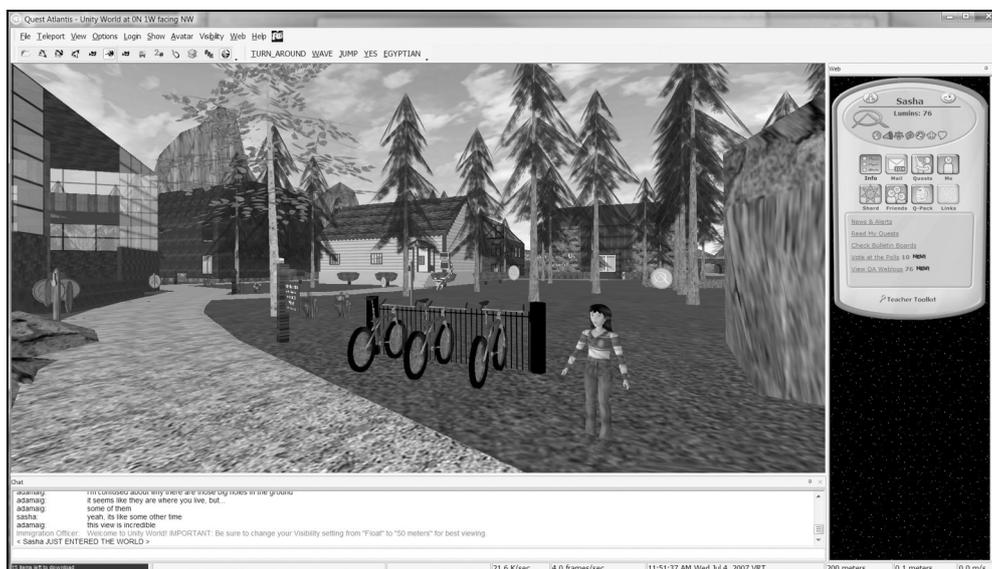


Figure 1. The Quest-Atlantis game

While the Quest-Atlantis MUVE game is primarily used to run in classrooms or computer-clubs (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Dieterle & Clarke, 2007), the Zofim methods are focused solely on physical, real-world settings with no cyberspace activity. It is the motivation and experience of the researches that connects the two worlds together.

Consequently, the researcher invited experienced scout-leaders to volunteer for this research not only as experienced practitioners, but also as collaborators in design and research of the Cyberscouts model. This is consistent with the Zofim paradigm, in which Scout Leaders assume leadership roles and design their course of action.

For the duration of the project (Nov-2009 till April-2010) the leaders and the researcher met for eight co-design meetings, 60-90 minutes each. It was the leaders who actually enacted, while being guided by the researcher-mentor. In these meetings they designed the entire process of creating game groups and guiding them through the game process. The researcher, as part of the 'co-DBR team' assumed the role of an expert to bring a systematic approach and reflective methods to enrich the decision-making process.

## Participants

1. **Cyberscout leaders:** Dave and Jack (pseudonyms) two male students, 17 year old, 11<sup>th</sup> graders from the same high-school. Both of them have prior experience in guiding younger kids, and can be characterized as highly motivated, high-achieving and very busy students.
2. **Game players :** ten younger students, grades 5<sup>th</sup>-7<sup>th</sup> (three girls and seven boys) from a school in a high socio-demographic area. The specific school was selected primarily due to the support of the principal. The players volunteered to sign up to this afterschool activity, and no screening was done.

## Data Sources

Data includes transcripts of meetings and interviews with the leaders. (about 70% of the design-meetings), two semi-structured interviews (mid-term and end-term), and two reflective meetings which were followed by generating a Final Recommendations document. More qualitative data was collected via observations and a researcher journal.

Figure 2. The Quest-Atlantis Israel Facebook page

In addition, artifacts created by the leaders were collected, including electronic data of a Facebook-page (Figure 2), website (Google-sites), presentations, invitation-cards, YouTube movie, and on-line docs (Google Docs). Finally, the Quest-Atlantis log data served to follow the work of the players.

## Findings and Discussion

The co-DBR team, namely the researcher-mentor and the two leaders, made several decisions about the initial conditions and ground rules for this iteration of the design. Some of these decisions (1-3) were made in advance, with full awareness, and some (4-5) were realized as decisions only during the enactment. According to the transcripts of the first two meetings, and the end-term reflective document, this includes:

1. To use Quest Atlantis “as is”, with no modifications to its game units, introductory unit, and norms.
2. To use the game in its native language, English, with no localization or translation.
3. To cooperate with the school and build the game group only from its members.
4. To accept all players that want to sign up, without any screening.
5. To use mainly virtual social networking tools, alongside the Quest Atlantis virtual community, as means of communication and bonding.

## Design-Related Outcomes

Out of 23 potential players that expressed an interest to sign up for the game, ten players completed the sign-up process. Out of the ten players, only four players passed the introductory unit, and two players played more than two game sessions. Following Ronen-Fuhrmann and Kali's (2008) DBR analysis approach, these findings were interpreted as “challenging design outcomes” which needed to be explained and resolved for the next iteration as follows:

1. **Cumbersome sign-up process.** The formal sign-up process required that players would ask their parents to sign multi-page paper consent forms. Additionally, user names were generated only by the administrator. Prior to the enactment, the leaders identified this process as an obstacle: “It’s very different from other games, where you just create a user name and password and you are immediately in the game” says Jack (End-term interview). In order to reduce this barrier, the design team made a design decision, which was applied already in the first enactment, to frame this activity in a kind of sign-up ceremony at the end of a group meeting with the leaders. However, evidence shows that this workaround was insufficient, and nearly 60% of the players gave up and didn’t complete the sign-up process.
2. **Inadequate introductory unit.** The original introductory unit was designed for classroom use, and requires over 60 minutes to complete. The co-DBR team accepted this as a given, although both Dave & Jack expressed concerns about the length of this unit (Transcripts of meetings 1 and 2). Eventually, only 2 players (20%) passed this stage and continued to play the game. “Kids are the most impatient human beings” says Jack, “an intro unit that takes lots of time to complete, with long reading parts, it is daunting” (end-term interview). Dave and Jack shared the same feeling that the introductory unit is the number one obstacle of the game (end-term interview, final recommendation document).
3. **Communication difficulties.** The artifacts and electronic data show that the leaders used all popular means of communication. A website for announcements, a Facebook group, IM and Skype, emails, and sms’s. However, the leaders reported about difficulties in communicating with the players. Most players ignored emails and messages and log in when they chose to, and not when leaders were available for online support purpose. Being in a free-choice, informal settings, the players ignored requests to sign in at specific times.

### Cyberscout Leaders' Related Outcomes

We find that the two leaders assumed a double role, as educational leaders as well as design “researchers”, and intentionally navigated between these roles to rationalize their decisions in the following manners:

1. **Identifying educational potential.** As educational leaders, they made critical remarks about the game and how it can be most effective in afterschool settings. For instance, in the final reflective meeting, Dave and Jack highlighted that most units in Quest Atlantis deal with real-world dilemmas. “I like the method of open debates” says Jack, “... we need to do it at physical meetings... you achieve a lot in these debates, it opens up the opportunity to meaningful learning and kids learn a lot”. Jack suggests doing it the same way it is done at the Zofim. “There are moral dilemmas and social conflicts [in the Plague unit] ... and in an open debate you can reach deep levels of discussions and kids learn from it. They don’t need to change their minds, but they learn to listen to other views and this is equally important”, says Jack.
2. **Assuming a researcher’s role.** One of the initial constraints was the decision to stick with the English language of the game, with no localization or translation. The leaders brought up this issue several times to the discussion, but refrained from taking a stand about this topic until they studied it carefully and collected “empirical evidence”.
3. **Assuming a designer’s role.** Dave and Jack reflect on the relationship between the school and the afterschool, and the linkage to the Zofim in the Cyberscouts model. “The school is just a convenient way of communication [with the players]” says Dave, “it is just a resource”. “We don’t want to be perceived as school-related afterschool activity” agrees Jack, during the final reflective session. They both reiterate this several times, and explain that linkage to school will deter kids from joining. Similarly, they suggest to refrain from linkage to the Zofim youth movement. “I’m sorry”, says Dave, in a polite attempt not to hurt the researcher feelings to the Zofim, “it will have negative connotation to many kids [who are not enrolled with the Zofim]”.

### Co-DBR Related Findings

The two leaders formed, together with the researcher, a design-based research team. Our findings show that although the researcher served as a “grown-up supervisor”, the leaders saw themselves as equal partners in the co-DBR team. This was evident in the transcript of the final team meetings and the content of the final recommendation document. In instances in which the leaders did not hesitate to challenge the researcher or the Quest Atlantis design team. For instance, Jack said “we have an advantage. We have a closer point of view (to the kids). This not like a 30-year old teacher trying to think like a 10-year old kid. We think closer to his age, so I can tell what is more fun, what is less fun, a closer point of view”. Consequently, both Dave and Jack vote against the researcher suggestion to link the afterschool game activity to the school, even indirectly. They voice their opinion with confidence, and are not derailed by the researcher’s (potential) authority.

### Lessons Learned About the Model and About co-DBR How to Improve the Cyberscout Model

In addition to conclusions regarding the obvious need to remove obstacles, the following conclusions were made regarding the Cyberscouts model:

1. **Social proximity.** To increase communication, it is important to maintain a certain social proximity between the Cyberscout leaders and the group of players. Players and leaders should either live in the same neighborhood, or study in the same school.

2. **F2f vs. virtual social networking.** The virtual social networking tools were not sufficient to create the social capital needed for the game players. F2f social networking is required not only for practical reasons, such as training sessions, but also for improving communication by speaking at school breaks.
3. **Reflective player-group meetings.** Periodic face-to-face meetings of the whole player-group have the potential to enhance the learning experience. The meetings can enhance the social bonding of the group, and improve the cooperation between the players.
4. **School-afterschool relationship.** Following the strong evidence reflected in our findings, we will modify the model to use the school as a resource only, and remove the linkage to school as a part of the model.

### **Benefits of the co-DBR approach**

This study defines a novel extension to the already mature DBR methodological approach, by integrating it with the relatively new co-design approach. Co-DBR takes advantage of both DBR and co-design. It maintains the systematic and iterative manner in which DBR investigates learning in the context of design. But it also enables to incorporate into the design a fresh perspective brought by a practitioner. Our findings show that co-DBR is a win-win situation with clear benefits for both the practitioner and the researcher. The leaders' benefit in the current research was evident from their great satisfaction of the collaboration. They felt that they learned a lot, and maintained their enthusiasm even though the implementation did not work as expected. The benefit for us, the researchers was invaluable – we are now equipped not only with innovative ideas for how to refine the Cyberscouts model, but also with a viewpoint of “insiders”, who know best how to attract kids to participate in this model.

We view co-DBR as both a pedagogical and a methodological approach. It is pedagogical, because it can be used to help practitioners learn important things about the learning/teaching environment they are part of. It is methodological in a similar way that DBR is methodological, but extends the viewpoint of the researcher with the perspective provided by the partnership. Finally, co-DBR seems to have a great potential, especially for exploring design for informal learning contexts, in which our perspective of learning, as researchers, is still limited.

### **References**

- Barab, S., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. *Educational Technology Research and Development*, 53(1), 86-107.
- Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design Research: Theoretical and Methodological Issues. *Journal of the Learning Sciences*, 13(1), 15-42.
- Dieterle, E., & Clarke, J. (2007). Multi-user virtual environments for teaching and learning. *Encyclopedia of multimedia technology and networking*.
- Israeli Scouts Web Site. (2009). *Israeli Scouts*. Retrieved 1-Oct-10, 2009, from [http://zofim.org.il/about\\_tnua\\_english.asp](http://zofim.org.il/about_tnua_english.asp)
- Kali, Y. (2008). The Design Principles Database as means for promoting design-based research. In A. E. Kelly, R. A. Lesh & J. Y. Baek (Eds.), *Handbook of design research methods in education: Innovations in science, technology, engineering, and mathematics learning and teaching* (pp. 423-438). Mahwah, NJ: Lawrence Erlbaum Associates.
- Ketelhut, D. J., Dede, C., Clarke, J., & Nelson, B. (2006). A multi-user virtual environment for building higher order inquiry skills in science. *American Educational Research Association*.

- Penuel, W., Roschelle, J., & Shechtman, N. (2007). Designing formative assessment software with teachers: An analysis of the co-design process. *Research and Practice in Technology Enhanced Learning*, 2(1), 51-74.
- Ronen-Fuhrmann, T., & Kali, Y. (2008). How to design educational technologies? The development of an instructional-model. In V. Jonker & A. Lazonder (Eds.), *Proceedings of the 8th International Conference of the Learning Sciences: Creating a learning world. International Society of the Learning Sciences*. Utrecht, Netherlands.
- Shelton, B. E., & Wiley, D. A. (2007). *The Design and Use of Simulation Computer Games in Education*. Rotterdam, The Netherlands: Sense Publishers.
- The Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1), 5-8.