NOTE TO USERS

MOTIVATING LEARNERS IN EDUCATIONAL COMPUTER GAMES

Hakan Tuzun

UMI Number: 3134052

Copyright 2004 by

Tuzun, Hakan

All rights reserved.

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.
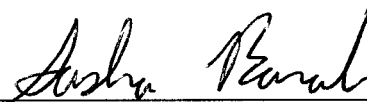
UMI®

UMI Microform 3134052

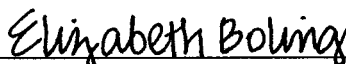Copyright 2004 by ProQuest Information and Learning Company.

All rights reserved. This microform edition is protected against

unauthorized copying under Title 17, United States Code.

Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

_____
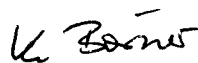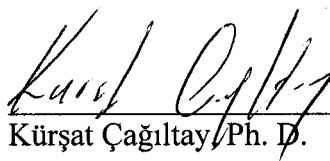Chair: Sasha A. Barab, Ph. D.

_____
Elizabeth Boling, M. F. A.

Doctoral Committee

_____
Katy Börner, Ph. D.

_____
Kürşat Çağıltay, Ph. D.

Date of Oral Examination: January 11, 2002

ii

program. I am also thankful to my peers in the IST department for sharing their friendship with me.

I show appreciation to Dr. Sasha A. Barab one more time for inviting me to the Quest Atlantis project. I feel so lucky to be part of this international project, both as a researcher and a developer. I want to recognize the contribution of people to the QA project while I was an active participant in it: Sasha A. Barab, Michael K. Thomas, Tyler H. Dodge, Bob Carteaux Jr., Steven C. Jackson, Jo A. Gilbertson, Jenny Cheshier, Anna Arici, Melanie Misanchuk, Tami Goodrich, Markeda Newell, Stori Snyder, Larry A. Campbell, Andrew J. Brown, Gary R. Neely, and Kyle Haskins. Thank you all; without you there would have been no QA, and without QA, this study would not have been possible.

I wish to acknowledge and express my gratitude and love for my family. I am particularly grateful to my parents. I want to thank to my wife Ozgul for putting up with me and for supporting me during the long dissertation journey. I want to recognize my little baby-girl Melissa Bilge, who was born during this study, and who made me joyful with her existence.

Finally, I acknowledge and appreciate the financial opportunity given to me by the Turkish National Education Ministry to finish my degree.

ABSTRACT

Hakan Tuzun

MOTIVATING LEARNERS IN EDUCATIONAL COMPUTER GAMES

The purpose of this study was to identify motivational elements for an online multiplayer educational computer game. A secondary purpose was to compare high, medium, and low participating group members' participation in the game with respect to the motivational elements. The educational game selected was "Quest Atlantis," a learning and teaching project that uses a 3D multi-user environment to immerse children in educational tasks.

In researching this game, design ethnography with naturalistic interpretations was used as a research method. Semi-structured interviews were the primary method of data collection. A total of twenty interviews were completed with participants playing the educational game. Prolonged observations were conducted where participants played the game in a natural setting. The constant comparison method of grounded theory was used for analyzing interview and observation records.

The qualitative methods used in this study provided additional insights into the previous research on motivation, offering a more complete list of motivational categories than did previous research. Thirteen categories emerged for the kids as the motivational elements to play this game: identity presentation, social relations, playing, learning, achievement, rewards, immersive context, fantasy, uniqueness, creativity, curiosity, control and ownership, and context of support. These categories are interpreted in a way that has experience-local meaning while also having experience-distance significance to others analyzing motivation in other contexts and conditions.

This study replicated the conclusions of previous research on motivation in finding that the constructs of curiosity, control, choice, fantasy, achievement, and rewards motivated learners. It advanced the field in finding that the availability of choice options to learners was more important than previously thought. It further offered the constructs of creativity, identity of learners, social relations, and active learning as important constructs in providing motivation. Most importantly, it integrated many past contributions in the field that were perceived as distinct, such as intrinsic and extrinsic motivators, playing and learning, and achievement and rewards into a coherent framework of motivation. This framework, "Multiple Motivations Framework," advances motivation as distributed among many elements, some of which are intrinsic and extrinsic to the learners, and which treats playing and learning together as a strong motivator.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

Educational Computer Games and Motivation

Even the most elegantly designed educational software will fail if the learners are not motivated to learn. For this reason, designers of any educational software must try hard to establish a context that learners will find motivating. Motivation is related to learning because learning is an active process that requires conscious and deliberate effort (Bruner, 1960; Wlodkowski, 1986). Even the most skilled learners are unlikely to learn if they are not motivated to apply the necessary effort. In recent years there have been extensive efforts in building learning environments that provide motivational elements. In particular, some educators are examining the potential of computers and even using principles underlying the design of video games to establish rich learning contexts (Barab, Thomas, Dodge, Carteaux, & Tuzun, in press; Malone, 1980; Malone & Lepper, 1987).

Study Description

It is 4 a.m. in the morning. A pair of bloodshot eyes stares at the TV monitor, which is connected to a Commodore 64 personal computer. The owner of the eyes is very exhausted; he has been trying to finish a computer game called "Henry's House" for the past 48 hours. While doing so his hands are almost integrated with the joystick. Although he is hungry and sleepy he refuses to leave the scene until he finishes the game. He has the task of organizing Henry's messy house room by room. He is currently in the cellar, the eighth and final room. Until finishing the game he will have no peace on earth; everything beyond Henry's House lies beyond his horizon of interest or concern.

The person in the previous paragraph could be one of millions of children caught up in today's video game dominant world, but this specific instance is based upon the author's personal experience. Computers and especially computer games have been a major part of my life, since the age of ten. Much water has passed under the bridge and computer game technologies have grown exponentially since then. I eventually finished Henry's House, the Commodore became obsolete, new technologies have been invented for playing computer games, and the video game revenues surpassed movie box office revenues in the U.S. (Greenspan, 2002). Video games have gone so mainstream that Wal-Mart, the top retailer in the world, has a "Video Games" section in its online store among its other big sections. Recently Personal Computers (PCs) are being used for gaming in addition to solving many problems of life, but there have also been dedicated systems, called game consoles, for playing video games. Among those, Sony with its PlayStation 2, Nintendo with its GameCube, Microsoft with its Xbox, and Sega with its DreamCast are the reigning technologies in the gaming world of today. The transformation is still in progress; the diffusion of the Internet in the 1990's added the multiplayer element to video games.

Meanwhile, my gaming adventures have continued with these new technologies, and as time passed I eventually became a grown up. In the beginning of 2002, I joined the Quest Atlantis (QA) project both as a developer and researcher. Since then I have interacted with many kids who loved playing QA and who loved learning in the QA context. Observing the interest, devotion, and consequent motivation of these kids, I became curious about their reasons for playing this game. What was so motivational in this computer game for almost two thousand kids even though this game was

educational? Past research on motivation in educational computer games, which was dominated by Malone and Lepper's (1987) "taxonomy of intrinsic motivations for learning," provided a partial answer. Their taxonomy asserted that challenge, curiosity, control, and fantasy were the motivational elements for the players of the educational computer games. However, this assertion was limited to isolated individuals. In contrast, recent learning theories emphasize the importance of the social and contextual factors in the learning process. In alignment with this emphasis, after reviewing sixty years of research on motivational research in education, Weiner (1990) concluded that:

- Older grand formal theories, such as drive, psychoanalytic, and associationistic conceptions, have faded away because they lacked cognitive approaches

- Motivational research on individual difference variables was diminishing

- Achievement was at the center of the study of motivation

- Cognitive variables were starting to be incorporated into motivation theories more and more

- There was a growing interest in the incorporation of emotions into motivation theories

Furthermore, Weiner (1990) perceived limiting the motivation studies in learning just with the individual as a narrow focus. He put emphasis on "considering frameworks larger than the self" (p. 621) and thinking about additional motivational constructs, "such as belongingness" (p. 621). He also added that there could be "many uncharted areas to incorporate" (p. 622) into motivational theories. Consequently, this dissertation addresses the question: *What are the motivational elements of Quest Atlantis, whether intrinsic or extrinsic?*

My observations also yielded that although most kids loved the game, their participation differed within the game. Some of them participated in almost all QA activities, including doing Quests, building on a virtual land, having a QA job, interacting with others, and so forth, while others participated in less of these activities. Therefore, I observed different groups in terms of their QA participation: the high participating group, the medium participating group, and the low participating group. Consequently, this dissertation additionally addresses the question: *How do high, medium, and low participating groups differ in their responses with respect to the motivational elements answered in the first question?*

To address these two questions, this study examined kids' motivational perspectives on QA through an examination of interviews, field notes, and participation levels as recorded in the QA database. The details of the methodology I followed to answer these two questions are presented in Chapter 3 of this dissertation.

Significance of the Study

Motivation is an important part of any successful learning context (Wlodkowski, 1986). It is apparent in education that modern physical facilities, state of the art computer equipment and software, and even millions of dollars spent on research will not be sufficient unless learners' motivation to use these new opportunities is understood. In this sense, this study will advance our understanding of the motivational elements that can be used in educational computer games.

Some of the design decisions of Quest Atlantis are based on commercial games (Barab, Thomas, Dodge, Goodrich, Carteaux, & Tuzun, 2002). According to the latest survey results released by the Interactive Digital Software Association (IDSA), the trade

4

group that represents U.S. computer and video games publishers, 96% of people who purchase computer games and 86% of people who purchase video games are 18 years old or older ("Interactive Digital Software Association," 2002). In addition, for computer games 66% of most frequent game players are 18 years old or older, and for console games 55% of most frequent game players are 18 years old or older. Therefore, the design decisions adopted from commercial games may not be appropriate for Quest Atlantis target audience, which covers 9 to 12 year old children. This study will further our understanding of what motivational elements seem to engage these younger learners and, more importantly, the extent to which these can be integrated into an educational context. Based on the results of this research, the designers can justify their design decisions and make changes in the design of the Quest Atlantis game. Furthermore, other educational game developers might also benefit from the results to attract potential players and learners.

Study Background

Quest Atlantis Description

Quest Atlantis is an educational computer game that immerses children in a virtual environment for completing educational activities. The purpose of the game is to save mythical Atlantis from an impending disaster (Barab, Thomas, Dodge, Carteaux, & Tuzun, in press). According to the back story of the game, as the Questers complete the educational activities called "Quests," they help with saving Atlantis from this disaster.

Quest Atlantis lies at the intersection of education, entertainment, and social commitments. However, instead of conceptualizing Quest Atlantis as simply computer

software, or a computer "game," it would be better described as a virtual environment designed to support an online community as well as multiple face-to-face communities. The Quest Atlantis storyline, its virtual worlds, and policies make up the Quest Atlantis meta-game, a term used to refer to Massively Multi-Player Online Role-Playing Games (MMORPG) in the commercial gaming sector. Examples of MMORPGs include Asheron's Call or Dark Age of Camelot. The Quest Atlantis meta-game contains the following key components:

- A mythological legend that provides a back story for Quest Atlantis activities

- A number of 3D worlds and villages through which Questers, mentors, and the Quest Atlantis council members can interact with each other

- A Personal Digital Assistant (PDA) for each Quester, serving as a portfolio of their learning and participation

- An advancement system centered on pedagogically valid activities that encourage academic learning, entertainment, and social commitments

- Extrinsic rewards structure

Quest Atlantis combines play, role playing, adventure, and learning, allowing learners to immerse themselves into virtual 3D worlds where they select or are assigned developmentally-appropriate Quests, talk with other Questers and mentors, and build virtual personas (Turkle, 1995; Bers, 2001). Quest Atlantis is implemented in different contexts, including schools as part of the curriculum through QA unit plans, and after school programs as a volunteer activity (i.e., Boys and Girls Clubs of America).

Quest Atlantis has many components that can be categorized under different major groups: for example, communication, collaboration, and ownership. Within the

game the channels of communication are chatting in the 3D space, the internal e-mail system, telegramming, and other discourse within the physical space through various means (i.e., talking within the computer lab, or Questers talking over the phone). The methods of collaboration are co-questing, being part of a guild, requesting help from others, and helping others related to different QA tasks. The modes of ownership are having a personal PDA with various elements on it (emoticons, awards, etc.), X-points that Questers accrue after successfully completing Quests, having a unique representation, called an avatar, through customization, renting virtual land and building on it, artifacts created as the result of the Quests, and merchandise (QA trading cards, QA rulers, QA pencils, etc.) that can be purchased from the Quest Atlantis trading post in exchange for the X-points.

Definitions

In this part, I introduce the reader to the concepts that are repeated throughout the text very often. Other less repeated concepts, such as specific game structures within the game, will be introduced in the context where they are referenced. Here, I define motivation, computer game, educational computer game, 3D virtual world, Quest Atlantis, and Quester.

<u>Motivation</u>

Since "motivation is a hypothetical construct" (Martin & Briggs, 1986; Good & Brophy, 1997) and differs among academicians we need to define motivation from the perspective of this study. In this study, motivation is defined as an individuals' showing their willingness to initiate and sustain participation in Quest Atlantis activities.

Examples of QA activities are completing Quests (engaging curricular tasks),

participating in synchronous and asynchronous discussions, joining guilds, and signing

up for QA jobs.

Computer Game

A computer game is interactive entertainment software played on various

platforms such as personal computers, game consoles (i.e., Sony PlayStation 2), or

handheld devices (i.e., Nintendo Game Boy). In the context, a game is defined as "any

contest (play) among adversaries (players) operating under constraints (rules) for an

objective (winning, victory, pay-off)" (Gredler, 1994, p. 13).

Educational Computer Game

An educational computer game is a sub-category of computer games which aims

to change knowledge, attitudes, and/or skills of its players in a purposeful direction.

3D Virtual World

A 3D virtual world is also known as a "3D Inhabited Virtual World" (Jensen,

1999). It is network-based computer software that is inhabited by its users through a

representation called "avatar." While immersive in nature, the 3D world researched in

this study does not use head-mounted displays or a Cave Automatic Virtual Environment

(CAVE) context, but instead uses a basic desktop computer so as to provide a window on

the world.

Quest Atlantis

Quest Atlantis is an educational multi-player online role playing game that

leverages a fictional backstory and a 3D engine to immerse children ages 9-12 in a virtual

experience (see http://QuestAtlantis.org).

<u>Quester</u>

A Quester is a learner who participates in Quest Atlantis activities. Throughout the text this term will be used interchangeably with the word "learner."

CHAPTER 2: LITERATURE REVIEW

The literature review will focus on four areas: motivation in general, motivation in educational computer games, 3D virtual worlds, and after-school environments. Some of these areas overlap each other; for example, some educational games are explained under after-school environments. It should be noted that this review on these four areas is by no means comprehensive, but instead focuses only on relevant content that has direct significance to the topic of this study.

Motivation

Motivation is an essential element in most learning theories. Below, I summarize the three major learning theories and their views of learning and motivation.

Behavioral, Cognitive, and Situative Views of Learning and Motivation

According to the behavioral view "All organisms, including humans, are greatly influenced by the consequences produced by their own behavior" (Carpenter, 1974, p. 5). The environment plays an important role in this view, because the consequences are the results of the outer environment. A behavioral view sees learning as the accumulation of associations and skills. Learning and motivation are individual to the user. In this view, motivation is described as "having three psychological functions": initiation, direction, and persistence (Alderman, 1999, p. 14). For example, Wlodkowski (1986, p. 12) defines motivation "as a word to describe those processes that can (a) arouse and instigate behavior; (b) give direction and purpose to behavior; (c) continue to allow behavior to persist; and (d) lead to choosing or preferring a particular behavior." Similarly, Walker and Symons (1997) define motivation as "the conditions and processes that activate, direct, and sustain behavior."

The cognitive view is the dominant recent perspective on motivation (Turner, 2001). In contrast to the behavioral view, an underlying assumption to the cognitive view is that learning involves more than stimulus-response conditions and instead has mental factors that influence one's motivation. In motivation studies that emphasize the cognitive view, a common theme is a focus on cognitive and emotional variables. These variables consist of one's self thoughts such as causal attributions (De Charms, 1968), self-efficacy (Bandura, 1986), learned helplessness (Peterson, Maier, & Seligman, 1993), thoughts about goals, and self-worth. Many cognitive theorists recognize the social nature of motivation (Weiner, 1990).

The situative view is the intersection of the behavioral and the cognitive view. Instead of the clash of outside vs. inside, this view gives importance to *activity* rather than knowing and emphasizes the reciprocal character of the interaction through which individuals, as well as cognition and motivation, are considered socially and culturally constructed. The core shift in this perspective is from the individual as the unit of analysis to the larger context through which one chooses to engage or not to engage in a particular activity (Barab & Plucker, 2002). From this perspective, neither individuals nor environments are unmotivated or even maladaptive, but particular activities are motivating with respect to individual-environment fits.

Developed by Leontiev, the concept of activity is "the fundamental unit of the life process ... of the organism" (Fichtner, 1999, p. 55). The knowledge is distributed among people and their environments including the objects, artifacts, tools, books, and the communities of which they are a part. Therefore, learning depends not only on the individual but also on social relations. The situated nature of participation distributes the

motivation among the participants of a context, which positions both the context and the

individual as important variables for providing motivation (Turner, 2001). Aligning most

closely with this perspective, the focus of this dissertation is on understanding what

aspects of the QA context seem to resonate with the goals and interests of particular

individuals.

Different Types/Models of Motivation

Extrinsic and Intrinsic motivation. A close counterpart of the behavioral approach

have been studies that identify two kinds of motivation: extrinsic motivation and intrinsic

motivation (Byrne, 1999). With extrinsic motivation, there are external rewards for the

task. For example, a child who helps her mom because she has been told that her dad will

take her to an amusement park when she is done is extrinsically motivated to help her

mom. In the school context, a student studying hard for an exam to get a high score is

extrinsically motivated to study for the exam. In either case, the children do what they do

because doing these tasks is seen as a means of obtaining some other desired end

(Spaulding, 1992).

With intrinsic motivation, the task is carried out for an inner reward, the

completion of the task being the reward itself (Byrne, 1999; Spaulding, 1992). Intrinsic

motivation results when people perceive themselves as both being competent and self

determining (Deci, 1975). It has been emphasized that one must be competent before he

can self determine (Spaulding, 1992). In the school context, intrinsic motivation has two

implications. First, as educators we need to make sure students are capable of performing

tasks successfully. Second, academic environments should provide them control of

opportunities.

Flow theory. Going beyond the approaches to understanding intrinsic motivation, Csikszentmihalyi (1990) proposed the flow concept in response to the question of "How does intrinsic motivation feel?" (Jones, Hollenhorst, & Perna, 2003). He has developed an empirically based model of enjoyment and an accompanying methodology, called the experience sampling method, which measures the qualities of enjoyable activities in the various contexts of day-to-day life. In his flow framework, the researcher contrasts pleasure with enjoyment. Pleasure is an important element of life, but it does not necessarily bring happiness. Ordinary elements of life, like sleep, food, and sex, help with maintaining order in life. Enjoyment, on the other hand, occurs when people goes beyond what they are programmed to do and achieve an unexpected task. In this sense, they experience flow, without any anxiety or boredom, when the challenge of the task matches their skill levels (Csikszentmihalyi, 1990). He discusses the following components as bringing about flow (Csikszentmihalyi, 1990):

- A balance between the challenges of the activity and the skills of the individual

- Merging of action and awareness

- Clear goals and feedback

- Concentration on the task at hand

- Control over actions

- Loss of self-consciousness

- Transformation of time

An increase in intrinsic motivation and the ability to carry out tasks at higher levels of complexity are the important consequences of flow experiences (Grabe, 2002).

Hierarchy of Needs. The hierarchy of needs theory belongs to Abraham Maslow (1987). He believed that most of the motivation theories of his time came from psychotherapists dealing with patients and not from psychologists. For this reason, these theories were based on unhealthy people, who provided both useful and problematic data. He believed that any theory of motivation should apply to all kinds of people, whether they are healthy or not. Aligned with his vision, he developed a theory called "Hierarchy of Basic Needs." His theory derived from clinical data and it is holistic-dynamic in nature. He stated that his "theory was in the functionalist tradition of James and Dewey, and was fused with the holism of Wertheimer, Goldstein, and Gestalt psychology and with the dynamism of Freud, Fromm, Horney, Reich, Jung, and Adler" (Maslow, 1987).

Maslow (1987) categorized five types of needs for human beings: physiological need, safety need, belongingness need and love need, esteem need, and self-actualization need. These needs are hierarchic and dynamic; when lower level needs are gratified other higher level needs emerge and dominate the individual.

The physiological needs are at the bottom of the hierarchy, and they include needs for air, food, drink, sleep, and sex. Once these physiological needs are satisfied the safety needs emerge. Human beings need to feel secure, stable, and protected from dangers. On the next level are the belongingness and love needs. When people have gratified their physiological and the safety needs they will hunger for relations with other people. They will want to become a part of family, friends, class, or society. To satisfy the love need they will exchange their affection (Maslow, 1987).

Esteem needs can be categorized into two groups. The first group includes the individual's desire for achievement and mastery. The second group includes others'

recognition of the individual's importance. Gratifying these two groups satisfies one's

self-esteem and this leads to self-confidence. If this need is not satisfied the individual

feels weak and helpless. At the highest stage of the hierarchy people tend to "become

everything that one is capable of becoming" (Maslow, 1987, p. 22). This takes different

forms for different people; some desire to be the best basketball player, some others try to

invent things.

Keller's ARCS model of motivation. Developed based on Keller's (1979) macro

"theory of motivation, performance, and instructional influence," the ARCS motivational

design model offers four basic categories of motivational conditions (Keller, 1983).

These are attention, relevance, confidence, and satisfaction (Keller, 1987). Each of these

categories includes several concepts or theories of motivation.

Keller (1983) stated that the ARCS model of motivation served three purposes.

First, it integrates numerous strategies into a theoretically based model for increasing

motivation. Second, the model facilitates the identification of motivational conditions and

motivational strategies. And third, the model allows a problem solving approach to

solving motivational problems.

The A of ARCS represents attention in the model. Attention refers to if the

learner's curiosity is initiated and if this curiosity is sustained over the time. The model

employs the following strategies to make the learners curious: perceptual arousal, inquiry

arousal, and variability (Keller, 1987; Small, 1997). With perceptual arousal, novelty,

uncertainty, or surprise can be provided. With inquiry arousal the curiosity of the learners

can be stimulated by directing questions. With variability, a set of methods and media can

be utilized to match the varying needs and capabilities of the learners.

The R of ARCS represents relevance in the model. Relevance refers to the learner's perception of the learning satisfying the need of the learner. The following strategies are used to provide this component of the model: goal orientation, motive matching, and familiarity (Keller, 1987; Small, 1997). With goal orientation, the objectives and purpose of the learning are presented to the learners. With motive matching, the objectives and purpose of the learning are matched with the needs of the learners. With familiarity, the content of the instruction is presented in a way that will relate to the previous experience, knowledge, and values of learners.

The C of ARCS represents confidence in the model. Confidence refers to the learner's perceived chance of success as the result of the learning. The following strategies can be used to provide this component of the model: learning requirements, success opportunities, and personal responsibility (Keller, 1987; Small, 1997). With learning requirements, the learners are informed about performance requirements and also assessment criteria for the learning. With success opportunities, learners are provided opportunities that are both challenging and meaningful, for the purpose of practicing what they learn. With personal responsibility, the effort and ability of the learner are recognized and therefore the success of the learner is linked to these variables.

The S of ARCS represents satisfaction in the model. Satisfaction refers to the extrinsic or intrinsic rewards they get from the learning. The following strategies are used to provide satisfaction in the model: intrinsic reinforcement, extrinsic reinforcement, and equity (Keller, 1987; Small, 1997). With intrinsic motivation, the learners are supported for the enjoyment of the learning. With extrinsic motivation, learners are provided

positive reinforcement. With equity, consistent standards and consequences for success are maintained.

Summary and Areas of Consideration

As shown above, motivation is an important part of every major learning theory. Therefore, what motivation means and how it can be provided in a learning context will differ depending on the kind of philosophy one adopts.

The review of the literature suggests that the major theories of motivation are confined within either the individual or the environment. In addition, the building blocks of these major theories differ significantly. For example, some theories include the issue of "relevancy" while others mention no word of it. Therefore even if these theories, and specifically the ones based on empirical data like the hierarchy of needs, are good at explaining what makes learners motivated, probably all of them are missing the big picture since each one of them is providing a partial explanation. For that reason, there is a need for an explanation that includes a broader spectrum of variables that are both within the individual and within the environment.

Motivation in Educational Computer Games

The place of technology in education and schools has been a hot topic of debate for a long time (Mayer, Schustack, & Blanton, 1999). During the 60s and 70s the focus was on programmed-instruction, which included methods like drill and practice. During the 80s the focus shifted to computer programming by using languages like BASIC and Logo. In the 90s the focus changed to learning to use various computer software including office applications and computer games.

Games and simulations have been played for enjoyment for thousand of years. However, their use in education and training is a recent development. Games involving the use of maps were first used in military training as early as 1798 (Langton, Addinall, Ellington, & Percival, 1980). After following their commercial success in the 80s and 90s, computer games were recognized as a learning tool by educators to improve learner motivation. For example, Malouf (1988) investigated the effects of computer games on continuing student motivation to engage in an academic task after the computer instruction. For this purpose half of 25 sixth-, seventh-, and eight-grade students were assigned into an experimental group that utilized a game to match root words with negation prefixes. The other half of the students were assigned to a control group that utilized a non-game computer program for the training of the same academic skill. When the continuing motivation of the students from both groups were measured in a non-computer free-choice activity one day after their experience, it was found that the computer game produced significantly higher continuing motivation on the academic skill than did the computer program that lacked game features. The game and non-game conditions resulted in similar increases in competence with the academic skill.

According to Garris, Ahlers, and Driskell (2002) there are several reasons for using computer games for education and training purposes. These are:

- The learning approach is shifting from traditional didactic model of instruction to a learner-centered approach, which emphasizes a more active learner role

- There are some studies in the literature showing that games can be effective tools for supplementing teaching and teaching complex subject matter

- The intensity of engagement that computer games can invoke in learners

Related to this last notion, implicit in the research literature is the notion that when certain game features are paired with instructional content, the power of games can be exploited to engage and motivate learners towards learning (Garris, Ahlers, & Driskell, 2002).

Prensky (2002, p. 6) argues that people play games because they think "the process of game playing is engaging." He further gives evidence from the Interactive Games Association data relevant to this argument and lists the top two reasons for playing games as games being challenging and games being relaxing. He explains why games are motivating and education frequently is not. The purpose of the designers of computer games is to keep the players engaged. They need their players to come back to the game, and players' doing so is a measure of designers' success. However, the purpose of educators in general is not to engage the learners but to get the content across. To motivate their players designers of the games use gameplay, which is all the activities and strategies employed in the game to sustain the engagement and motivation of its players. Therefore, in recent years the question for educators became "what game features should be paired with instructional content so that the learners are motivated to learn?"

The framework for this question has been largely provided by Malone and Lepper's (1987) work (Tzeng, 2001). They developed a taxonomy of intrinsic

motivations for learning, based on four factors motivating the learner: challenge, curiosity, control, and fantasy.

This outcome is based on several studies. The bulk of the taxonomy (challenge, curiosity, and fantasy) came from Malone's (1980) dissertation work. For this work there were three studies that looked for reasons for computer games being attractive: a survey study of computer game preferences (Malone, 1981a), an experimental study that utilized the "Breakout" game, and another experimental study that utilized an educational "Darts" game (Malone, 1981b).

For the first study, the researcher asked 65 elementary-school students to rate 25 different computer games of that time, like Breakout, Mission, Stars, and Eliza. The students rated these games on a scale from 1 to 3, 1 being "don't like", 2 being "like", and 3 being "like a lot." Then the researcher investigated the correlation between the mean scores for each game and some researcher-determined variables within the game, like whether the game has a goal, what the audio effects are within the game, whether the game has a score-keeping mechanism, and so on. He found that there was a correlation with the mean score when the game provided a goal, when the game kept a score, when there were audio effects, when there was randomness, and when there was fast feedback. The presence of a goal was found to be the most important feature to determine game preference (Malone, 1980; Malone, 1981a).

For the second and third studies, the researcher aimed to find out factors that made Breakout and Darts games fun. For this purpose multiple versions of these games were tested. In each version certain key features, determined by the researcher, like fantasy, feedback, and scorekeeping were included. Then differences in the appeal of

different versions were attributed to the key feature in that version (Malone, 1980; Malone, 1981b).

In the experimental study that utilized Breakout game, the most important motivational feature of the game was found to be the graphic display, which showed a score and multiple level goals at the same time. Versions of the game that offered no goal were found to be significantly less appealing than the other versions (Malone, 1980; Malone, 1981b).

In the experimental study that utilized the educational Darts game, 80 fifth-graders were assigned to one of the eight versions of the Darts game. Each of these versions differed in the features such as music, scorekeeping, the fantasy of arrows popping balloons, and several forms of feedback. Users in all eight groups were offered another game, Hangman. The measure of motivational appeal among the different versions was how long students played with their version of Darts game in comparison to the Hangman game. Significant individual differences were found, specifically among boys and girls. For example, the boys liked the fantasy of arrows popping balloons, and did not like constructive feedback. The girls liked the music playing in the game, and did not like the fantasy of arrows popping balloons. The author concluded that both fantasy and music appeared to be more important than simple feedback in determining the appeal of the game (Malone, 1980; Malone, 1981b).

In a later study Lepper and Malone (1987) presented identical instructional content through a game format and a drill format, and they were interested in comparing children's learning from these two formats. They utilized the previously mentioned educational Darts game for the game format. For the drill format they used a version of

the educational Darts game, from which all the game-like elements, like audio-visual elements, music, the fantasy of popping balloons, were removed. Two groups of children were offered the Darts game and another alternative program. Two other groups of children, using either the game version or the drill version, were given a standard amount of time. The results showed that the motivational appeal between the two instructionally similar activities was different. When the content was presented in the game format, the children chose the activity 50% more of the time than when it was presented in the drill format. In addition, comparisons with control subjects indicated that significant learning occurred.

Based on these four studies Malone and Lepper (1987) offered a taxonomy of intrinsic motivations for learning. This taxonomy included four classes of individual motivations, which are challenge, curiosity, control, and fantasy. Below, the four components of this taxonomy are briefly discussed.

Related to challenge, the researchers claim that people enjoy activities that offer a challenge. However, consistent with flow theory, this challenge should be at an optimal level. Activities that are very easy or very hard to accomplish will not be challenging. Activities that will provide an intermediate level of challenge difficulty will provide the maximum intrinsic motivation. In order for an activity to be challenging, it must first provide goals. However, this is not enough to make an activity challenging. In addition, there should be uncertain outcomes. Uncertainty can be provided by offering variable difficulty levels, multiple levels of goals, hidden information, and randomness. Third, a performance feedback should be provided to the learner related to his or her performance.

And fourth, the challenge should increase the self-esteem of the learner (Malone &

Lepper, 1987).

Curiosity can be stimulated by an optimal level of information complexity or an

optimal level of information discrepancy. The authors distinguish between two types of

curiosity: sensory curiosity and cognitive curiosity. Sensory curiosity includes variations

that address the senses, like change in light, sound, or other sensory stimuli. Cognitive

curiosity is initiated by modifying higher-level cognitive structures. This can be

accomplished by making people believe that their existing knowledge structures are

incomplete (Malone & Lepper, 1987).

Many people find computer games so motivating because of the powerful sense of

control given to the players. There are three characteristics of control: contingency,

choice, and power. Contingency refers to the fact that learners' outcomes are dependent

upon their responses. The choice is visible to the learner when there are alternatives for a

specific task. These alternatives can be offered through different game formats, fantasies,

or audio-visual effects. Learners' actions in learning environments should create

powerful effects. This strategy might have strong effects on subsequent motivation

(Malone & Lepper, 1987).

The fantasy environment was defined as one that invokes illusionary images of

physical or social situations, which actually don't exist. The fantasy environments can

contribute to intrinsic motivation in three ways. The first of these are exogenous and

endogenous fantasies. Exogenous fantasies depend on whether answers to a series of

problems are correct or not. The fantasy element emerges based upon right or wrong

answers. In this type of fantasy context the learning is not dependent upon the fantasy. In

endogenous fantasies the learning and the fantasy depend on each other. For that reason, for the learning to occur the fantasy should exist. Second, fantasies should satisfy emotional needs of the learners. Fantasies satisfy emotional needs most of the time when the learner can identify the illusionary physical or social situations, or characters. And third, fantasies should also satisfy the cognitive needs of the learners. The fantasy might provide learners analogies or metaphors, which might help them with understanding new information by relating it to past knowledge (Malone & Lepper, 1987).

In addition to extensive research conducted by Malone and Lepper, some other researchers also studied the elements that made educational computer games motivating. For example, Cordova and Lepper (1996) examined the effects of contextualization, personalization, and choice on the learning process. For this purpose, they put 70 fourth and fifth grade students into five game groups that differed in fantasy and choice conditions: the first game group included generic fantasy and no choice; the second group included generic fantasy and choice; the third group included personalized fantasy and no choice; the fourth group included personalized fantasy and choice; and the fifth group did not include any fantasy or choice. Therefore, the design was a 2 x 2 (Personalization x Choice) factorial. Results indicated that for each of the three treatment strategies learners showed higher levels of intrinsic motivation. As a result, they were more deeply involved with the activities and learned more in a fixed period of time. They also showed higher perceived competence than learners in the control group. The learners using personalized version of the games, based on their backgrounds and interests, displayed higher gains in motivation, involvement and learning than the learners using non-personalized version of

the games. Similarly, learners who were offered choice showed higher increases in motivation and learning.

Griffiths (1997) surveyed 147 eleven year old computer game players attending a summer camp. The reasons for these children to play computer games were to have fun (64.6%), for a challenge (35.4%), because there was nothing else to do (34.7%), and because their friends played (29.3%). 15.6% of the respondents indicated that they played because they were addicted. When asked about what they considered to be the good things about computer games, 38.7% said the games were fun and entertaining, 30.6% said the games were challenging, competitive, and exciting, 21% perceived the games as preventing boredom, and 13.6% liked good graphics.

Chen, Shen, Ou, and Liu (1998) utilized a Web Quest to promote motivation in learners. This Web Quest was in the form of a multi-user web-based game. For this purpose the designers wanted to teach arithmetic skills to ninth-grade students. Eight classes of students were assigned to an experimental group using this Web Quest and two classes of students were assigned to a control group that included the courseware without the game elements. A descriptive analysis of the actions of the students in the experimental group showed that these students liked the competition with others and getting goods with their points. The analysis also showed that these students seldom read the material presented to them. Further, the researchers identified curiosity and challenge as the most important motivational elements. A comparison of high and low achievement students showed that the low achievement students liked the game elements, including curiosity, control, challenge, fantasy, competition, and cooperation, more than the high achievement students.

Summary and Areas of Consideration

The framework for motivation in computer games has been largely built on

Malone and Lepper's (1987) taxonomy of intrinsic motivation. They concluded that

challenge, curiosity, control, and fantasy were the elements that made computer games

motivating. The studies that they based their conclusions on utilized computer games that

were the products of the eighties. When compared to their relatives of today, these games

are low in audio and video effects, in the use of multimedia elements, in the utilization of

cooperation, and many other factors. For example, the Darts game utilized a screen in

text mode that lacked colors. In addition, as pointed out by Chen, Shen, Ou, and Liu

(1998), Malone and Lepper (1987) studied computer games when most of these games

were designed for single-user play, and therefore lacked the multi-user component. For

that reason, most of the factors they considered included only internal factors.

All of the studies described above included inherent methodological problems, the

most important being the researcher-determined variables. Even Chen et al. (1998), who

criticized Malone and Lepper's (1987) taxonomy for the lack of multi-user elements

offered preset factors of competition, collaboration, and recognition. The second

important problem with these studies is the data collection methodology. These studies

employed survey methodology and the results came from questionnaires administered

only one-time. Sustainability and persistence of human motives can not be explained with

data collected in just one session. As Bandura (1986) points out, motivation toward

activities can be measured at different points in time, which can decrease the risk of

misinterpreting short-term changes in motivation. The third important problem is the

significance of novelty effect in these studies. These studies offered the innovation, the

computer games, to the learners and then measured the motivation of the learners quickly after these games were used. For that reason, the validity of the findings of the factors that explain the motivation of users playing these games becomes questionable, especially from the perspectives of sustainability and persistency.

As Garris, Ahlers, & Driskell (2002) indicated, initiating player engagement and sustaining it over time are different phenomenon, and we know little about the latter. Additionally, as Weiner (1990) points out, motivation should not be limited to "the self". Since learning is a shared activity and since it does not take place in a vacuum, new motivation theories should incorporate new constructs like "belongingness" and "cooperative learning." To sum up, although the research on student motivation is old and extensive, the changing technology means that we should re-visit motivation toward the evolving technology.

3D Virtual Worlds

3D virtual worlds have been a new emerging medium for human interaction. They are the result of a mixed legacy including multi-user text chat environments such as Multi-User Dungeons (MUDs), Object-Oriented Multi-User Dungeons (MOOs), and Internet Relay Chats (IRCs), realistic three dimensional computer images, and the infrastructure of Internet protocols (Damer, 1996). Also called "3D Inhabited Virtual Worlds" (Jensen, 1999), these worlds are network-based computer programs that are inhabited by users through representations called "avatars." These worlds are immersive in nature; however instead of using specialized expensive head-mounted displays or a

CAVE context, they use a basic desktop computer so as to provide a window on the world.

The concept of virtual worlds can be traced back to 1985, when Lucas Film launched the first networked multi-user virtual world "Habitat" for Commodore 64 microcomputer platform (Damer, 1998). Although Habitat was a virtual environment, 2D images and objects were used to construct its environment. It was the first virtual world to utilize avatars for the representation of the users. Later, another virtual world "The Palace" (http://www.thepalace.com/) followed the footsteps of Habitat in that it also used 2D images for creating its environment. In 1995, Worlds Inc. (now Activeworlds Inc., http://www.activeworlds.com/) offered first realistic 3D virtual world, Activeworlds. Since then other virtual worlds including Worlds.com (http://www.worlds.com/), Blaxxun (http://www.blaxxun.com/), Adobe Atmosphere (http://www.adobe.com/products/atmosphere/), and many others jumped on the bandwagon, offering more choices for the utilization of 3D virtual worlds. A more comprehensive list for 3D virtual worlds is available in Open Directory Project (http://dmoz.org/Computers/Virtual_Reality/Multi-User_Systems/) or Virtual Worlds Review (http://www.virtualworldsreview.com/).

Use of 3D Virtual Worlds in Education

Just like the 60s, the 70s, the 80s, and the 90s were the eras for trying out different technologies for learning, it looks like the beginning of the new millennium will be an era where 3D virtual worlds are used in the context of learning. The research on the potential of 3D virtual worlds for communication and social interaction has been conducted since this technology emerged. A key finding from the beginning has been the need for

interdisciplinary collaboration between the technologists building these worlds and the experts specializing in different disciplines like education (Damer, Kekenes, & Hoffman, 1996). A number of studies were conducted that examined the educational value and effect of this new medium in curriculum-based education as well as informal education. A subset of these studies also examined the motivational effects of this new medium.

Osberg (1997; Osberg et al., 1997) compared the educational value of a 3D virtual learning environment to a traditional classroom approach and to a no-instruction approach in teaching about wetland cycles. The 3D virtual learning environment provided students with access to their choice of content, 3D modeling tools, and instruction in developing visual, auditory, and interactive symbols in the virtual environment. Traditional classroom instruction included a biology textbook, worksheets, and teacher-led discussions. For this purpose, a total of 117 students were assigned into four groups. Each of these groups studied one of carbon, energy, nitrogen, and water cycles by designing and building the virtual environment associated with their group. To do so, they selected the content, put objects into the 3D world, specified their behavior, and demonstrated what they have learned by using the 3D world. Students studied two of the four cycles using traditional classroom approach. They received no instruction on one of the remaining cycles. Researchers found that the world building process, coupled with the opportunity to experience one's virtual learning environment, is a powerful and motivating way in which to learn about wetlands ecology. They also concluded that the virtual world building was both motivational and educationally effective. Constructing virtual environments gave students ownership over their learning, which in turn motivated them.

Dickey (2000) investigated the unique learning opportunities through the use of 3D virtual worlds. In her study she examined the use of a virtual world technology in a formal and in an informal educational setting. Her findings revealed that in both cases 3D virtual worlds provided unique learning opportunities that would be difficult to replicate in a physical environment. It was the communication, collaboration, and experiential affordances that enabled these learning opportunities (Dickey, 2003).

Corbit (2002) examined the use of 3D virtual worlds for the utilization of informal science learning. Their design experiments (SciCentr and BioLearn projects) showed that this kind of technology allowed them build a virtual science museum (Corbit & DeVarco, 2000). They concluded that this new medium had the potential for the constructivist informal science and technology education. Trindade, Fiolhais, and Almeida (2002) created a virtual environment for teaching Physics and Chemistry to high school and college students. They designed "Virtual Water" project to teach phases of matter, phase transitions, and atomic orbitals. After exploring the 3D motion and its relationship to the physical properties in this environment, college students reported increased motivation towards learning molecular dynamics.

Bailey and Moar (2003) examined the children designing and creating structures in virtual worlds in the primary school context. As part of their project, named VERTEX, they empowered the users of these virtual worlds by giving them chance to design their own avatars and objects. This empowerment created a lot of extra tasks for the kids such as learning 3D modeling software to create their own objects and learning to upload files to the virtual world server. However, the authors claimed that the level of excitement related to making an object to add to the worlds created a powerful motivational aspect

that the children persisted on these tasks and ultimately overcame these difficulties. While studying with this technology all the children were highly motivated, but this was especially the case with children who had various learning difficulties and also with children who had behavioral difficulties. Teachers in the schools in which this project was implemented reported a significant increase in the confidence and self-esteem of certain children.

Dede (2003; Dede, Ketelhut, & Ruess, 2002) has been the only researcher in the literature to date, who included the topic of motivation in the agenda of a research project that utilized a multi-user virtual environment. In their project, which they call as "Multi-User Virtual Environment Experiential Simulator" (MUVEES), they use digitized museum resources to enhance middle-school students' motivation and learning about science ("MUVEES," 2003). As part of the project they developed a participatory curriculum unit called "River City." In the virtual world students encounter residents of this fantasy city and they can hear the conversations among these residents. By using disclosed information and other clues in the environment, such as water samples, they experience the health problems and environmental problems in the River City and suggest ways to improve the life of the inhabitants.

In a three-week implementation of this curriculum unit piloted in three public-school classrooms, forty-five students were assigned to an experimental group using the River City curriculum, and thirty-six students were assigned to a control group that utilized a technology free curriculum (Dede & Ketelhut, 2003; Dede, Ketelhut, & Ruess, 2002). The researchers examined usability, student motivation, student learning, and classroom implementation issues. The results showed that students found the multi-user

virtual environment interface usable and the learning experience as motivating, even after repeated trials. This motivational interest covered all students, even lower ability students typically uninterested in classroom activities. The experimental group had more positive changes in motivation mastery than did the control group. Also, students' perceptions of academic efficacy showed significant differences between the experimental group and the control group. The experimental group showed an increase of 1 point out of 5 on average, while the control group's score decreased .31. In terms of student learning, more students in the experimental group improved their content knowledge than students in the control group. The researchers found these results as encouraging and concluded that multi-user virtual environments could be a learning modality in helping students, who struggle with motivation, self-worth, and lack of content knowledge.

Summary and Areas of Consideration

There is a booming interest in using 3D virtual environments for educational purposes in recent years. The research summarized above emphasized that these technologies could provide constructivist opportunities to learners in which they can construct their own knowledge and play an active role in the learning process (Jonassen, 1999). It was documented that this technology provided learning gains and motivated learners towards learning. However, most of the time motivation was used as a buzzword and it was generally supposed that using the 3D technology and the immersion feeling that was afforded by it motivated the learners. One can easily argue that it is other aspects of the learning process, like active learning, that is motivating in these projects. More research is needed to fully understand what motivates the learners while they use this new medium for learning.

After-School Programs

United States federal statistics show that approximately 5 million children spend non-school hours without any adult presence. In addition, most of the juvenile crimes are known to happen between the hours of 2pm and 8pm, when the schools are closed (Henkel, 2002). For this reason, the utilization of after-school programs has been a rising trend to keep children in a safe place when they are out of school.

A wide range of out-of-school activities and organizations are defined as after-school programs (Gootman, 2000). Examples include drop-in programs provided by community organizations, schools offering structured curricula, and neighborhood programs that integrate the resources of schools and communities (Patten & Robertson, 2001).

The Boys and Girls Clubs of America (BGCA) is one of the largest after-school programs in the United States. There are about 3300 club locations in all 50 states. About 40,000 trained professional staff members serve 3.6 million children in these clubs. Overall, 64% of these children come from minority groups, and 30% of them are 10-12 years old, which is the target age group for QA ("BGCA The Facts," 2003).

After-school programs can provide a safe place for children. It was documented in one case that an after-school environment successfully created a neutral zone even among gang territories and made a difference in the lives of local children living in a neighborhood full of crime (Coleman, Lahey, & Orlando, 1999). In addition to being a safe place, it was stated by practitioners and researchers that effective after-school programs are the ones that mix activities that include academic elements (i.e. doing homework), cultural elements, enrichment elements (i.e. cooking, music, drama), and

recreational elements (i.e. arts and crafts, games, team sports) (U. S. Department of Education, 2000). In this sense, eight essentials were identified for quality after-school programs. These are (U. S. Department of Education, 2000):

- Goal setting, strong management and sustainability

- Quality after-school staff

- Attention to safety, health, and nutrition issues

- Effective partnership

- Strong involvement of families

- Enriching learning opportunities

- Linkages between school-day and after-school personnel

- Evaluation of program progress and effectiveness

In recent years, the number of after-school programs has increased with the increased federal support by the U. S. Department of Education's 21st Century Community Learning Centers initiative. This initiative contributed almost $1 billion to after-school programs for the fiscal year of 2003 ("21st Century," 2003).

This program has been designed specifically to provide academic activities to children during the after-school hours (Garner, Zhao, & Gillingham, 2002). For example, the term, "community learning center," was defined as a place where students are provided with opportunities for academic enrichment activities in addition to other activities during non-school hours. It was intended that through these academic activities, students would meet state and local academic achievement standards in such academic standards as reading and mathematics ("21st Century," 2003).

A recent evaluation report of the program has been released by the Education Department (Dynarski et al., 2003). This evaluation included elementary-school based programs and middle-school based programs in the 2000-2001 academic year. The programs' effects have been considered in a number of areas including academics, safety, parent involvement, and personal development. It was found that the program produced only slight academic gains for students, and did not make students feel safer or significantly improve their behavior ("Federal Study," 2003). Eventually, the Bush administration used the results of this evaluation as a justification to propose cutting program's funding to $600 million in the fiscal 2004 budget plan.

Learning Projects in After-School Programs

The Fifth Dimension (5D). The Fifth Dimension is a Community of Practice (CoP) (Wenger, 1998) environment where computers and telecommunications technologies are used to connect local learning communities in a global world (Blanton, Greene, & Cole, 1999; Cole, 1996). The purpose of the project is to develop and reinforce the communication among the members of this CoP. The pedagogy of this project is driven by socio-cultural theories of learning (i.e. Activity Theory). These theories emphasize that knowledge is produced as the result of the communication, which is mediated by physical and conceptual artifacts.

The name of the project (5D) implies that the education and learning goes beyond the 3 dimensions of physical space, and the 4th dimension of time. The ultimate 5th dimension is about making learning meaningful. The Fifth Dimension is contextualized as an after-school activity for several reasons. First of all, parents, schools, and community organizations have a strong desire to increase the amount of time children

spend on academic learning. Therefore, after-school settings provide opportunities to children to engage in academic content. Second, the project requires supervision, and children's parents usually don't have time to supervise them during the day. Third, the limited funding makes it difficult for after-school programs to sustain educational programs.

Fifth Dimension mixes activities which don't mix well for most of the children such as play, interaction with peers, and educational activities. The main component of the project is a wooden maze that contains 20 rooms. Each of these rooms contains two or more activities. 75% of these activities utilize educational software and computer games. Subject matter includes math, science, technology, communication skills, social studies, health, and the arts with an emphasis on problem solving.

The research on the Fifth Dimension project demonstrated multiple outcomes (Blanton, Greene, & Cole, 1999). For example, students achieved increasingly higher levels on tasks in which they participated. In comparison studies, significant effects were found on measures of near transfer, such as solving math problems, and mastery of computer skills and knowledge, and on measure of far transfer, such as statewide measures of reading and math achievement. More generally, the Fifth Dimension program has been highly successful, positively impacting dozens of library centers, school contexts, and Boys and Girls Clubs across the nation and overseas.

The Computer ClubHouse. The Computer ClubHouse has been a collaborative effort between the Computer Museum of Boston and the MIT Media Laboratory. During its first two years, the project has attracted more than one thousand children, 98 percent of whom came from underserved communities (Resnick, Rusk, & Cooke, 1998). Intel has

also supported this effort with the goal of establishing the ClubHouse learning approach as a replicable model for technology learning ("Computer Clubhouse," 2003). As a result, the Computer ClubHouse network has expanded to 75 sites in 14 countries with 20,000 members (Resnick, Kafai, & Maeda, 2003).

The main goal of the Computer ClubHouse is to teach young children basic computer skills and applications. While doing so, the philosophy is letting the participants express themselves fluently with the computer technology. By technology fluency the authors mean not only accessing or using the technology, but also "knowing how to construct things of significance with these tools" (Resnick et al., 1998, p. 266). Towards this goal, the project has adopted principles at the social, pedagogical, technological, and emotional levels. These principles are (Resnick et al., 1998):

- Support learning through design experiences
- Help youth build on their own interests
- Cultivate "emergent community"
- Create an environment of respect and trust

While children design the projects, the technical, intellectual, and emotional support from adults and volunteer mentors are seen as critical elements.

Summary and Areas of Consideration

In addition to providing a safe environment, it was demonstrated that after-school programs can provide learning opportunities for children. The Fifth Dimension project and the Computer ClubHouse project have been examples of quality after-school learning projects that provided efficient learning opportunities while scaling-up to broader contexts. However, a recent evaluation of the 21st Century Community Learning Centers

initiative presented opposite results and it was claimed that the program resulted in slight academic gains for children. Advocates of the after-school programs pointed to the faulty methodology of the study; however, they acknowledged that "… programs need to find better ways to attract students and keep them attending regularly…" ("Federal Study," 2003, p. 11). Since the issue of engagement has not been addressed in this evaluation study, and since it is not in the research agenda of the Fifth Dimension project and the Computer ClubHouse project, there seems to be a need that will address such an issue in the after-school learning projects.

CHAPTER 3: RESEARCH METHODOLOGY

This chapter will describe the research methodology utilized in answering the research questions. In addition, relevant literature will be presented that led me to employ this methodology.

Social and educational researchers have increasingly used qualitative research methodologies since the 1970s. Qualitative research and quantitative research stem from different paradigms. Guba and Lincoln (1994) define a paradigm as the following:

> A paradigm may be viewed as a set of basic beliefs ... that deals with ultimates ... It represents a world view that defines, for its holder, the nature of the 'world,' the individual's place in it, and the range of possible relationships to that world and its parts ... (p. 107)

Therefore, qualitative and quantitative research methods differ in their fundamental world views. Actually, the terms "qualitative" and "quantitative" refer to different types of measurement techniques. For example, the quantitative method studies phenomena by using the statistics, such as means, standard deviations, and frequency (Hinkle, Wiersma, & Jurs, 1998). Qualitative methods usually use narrative descriptions of phenomena to describe it. However, the term qualitative research is broadly used nowadays as a research paradigm as an alternative to quantitative research. Although both measurement techniques can be used in either paradigm, the quantitative researcher likes to explain the phenomena with quantitative results while the qualitative researcher favors qualitative results (Mark, 1996).

In qualitative studies the research procedures are not strictly set in advance. Qualitative research uses multiple methods and involves a naturalistic approach to the phenomena being studied (Denzin & Lincoln, 1994). As a result, there are multiple qualitative research methods including ethnography, naturalistic observation, action

research, grounded theory, the case study, participant observation, field research, phenomenology, and the historical method (Mark, 1996).

In this sense, this study can be characterized with multiple labels. It can be characterized as an ethnographic research since its purpose is to describe a group (Fetterman, 1998). For example, I spent considerable amount of time among the people at the selected research site. In addition to one year of frequent visits prior to this study, I spent two months at the site for data collection. Since "good ethnography requires both emic and etic perspectives" (Fetterman, 1998, p. 22), I tried to capture both the insider's and outsider's perspectives of reality. The study included common elements of ethnographic studies such as field work, participant observation, and interviews. This study can also be characterized as a naturalistic research study (Lincoln & Guba, 1985), because the data collection took place in a natural setting. Also, there were no variables manipulated to confirm or disconfirm a priori hypothesis.

Being one of the designers of this educational game complicates my role as a researcher in addition to those challenges traditionally associated with ethnography or naturalistic research (Clifford & Marcus, 1986; Fielding & Fielding, 1986; Silverman, 1993), because I have been more than a participant observer. The philosophy of the Quest Atlantis implementation calls for collaboratively developing a vision for each of the centers, while this vision is researched at the same time it is created. Barab, Thomas, Dodge, Newell, and Squire (in press, p.5) refer to this process as "design ethnography," referring to "an ethnographic process involving participatory design work with the agenda of transforming the local context while at the same time producing a design that can be used in multiple contexts."

Design ethnography draws upon a collection of methods, including ethnographic research and action research. Action research, also known as participatory research (Adelman, 1993), has emerged in response to the limitations of the positivist paradigm for studying many important aspects of human organizations and real-world practice (Susman & Evered, 1978). Susman and Evered (1978) argue that the cyclic process of action research eliminates the limitations of the positivism and deals with practical concerns of the people. Actions are planned in mutual agreement by the researcher and the researched. The action researcher acts as a catalyst who helps the participants being researched by identifying local problems and offering interventions to address those problems (Hart & Bond, 1995).

In this sense, the goal of design ethnography can be described as changing or empowering the culture under study (Barab et al., in press). During the process, individuals and local contexts transact in a co-evolving fashion. The researcher wears the hat of a change agent (Rogers, 1995) and his goal is to support a transformational process. While doing so his role has elements of "peripheral membership" (Adler & Adler, 1987, p. 36) and "active membership" (Adler & Adler, 1987, p. 50) (i.e., she or he is both outside the culture and within the culture).

Design ethnography requires three ongoing focal points that need to be considered. These focal points are trust, intervention, and sustainability (Figure 3.1). The trust issue is a necessary component in any relationship. This issue is more sensitive in a context where the researchers might be viewed as using others for their own agendas. The second focal point is the designed intervention, in this case the Quest Atlantis educational game. Design ethnography involves a social commitment but with an emphasis on the

building of a specific intervention to support the change process. The third focal point involves the sustainability of the designed intervention. Most often researchers leave design projects after their data collection, at which point the intervention cannot continue without the necessary support. Sustainability refers to the process whereby the intervention is independent of the researcher's participation. While one focal point might be more dominant than others at times, it still touches upon and interacts with the others.
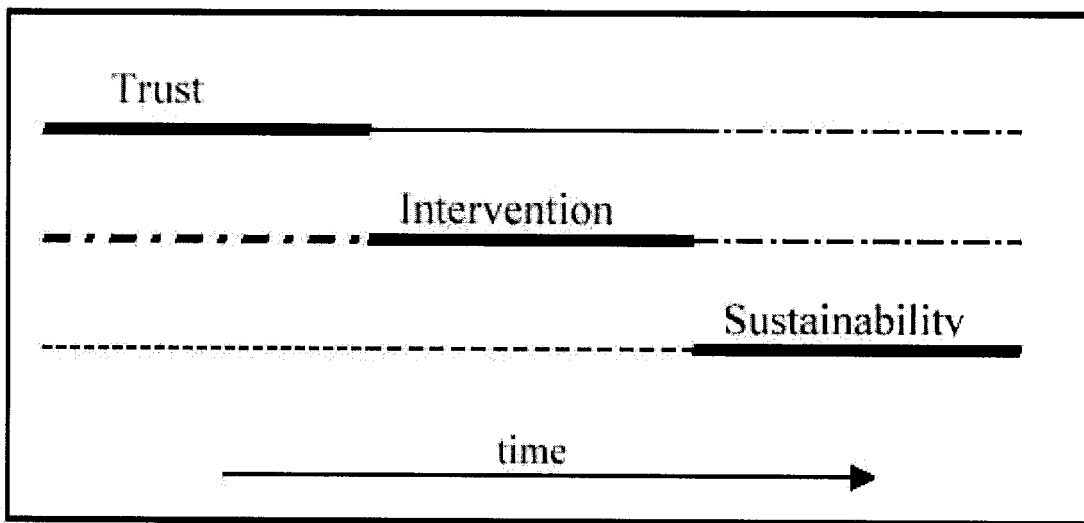
Figure 3.1. Design Ethnography Process

It is design ethnography that drives the methodology of this study. In the following sections, the details of data collection and data analysis are explained. Furthermore, trustworthiness, one of the most important methodological issues in qualitative research, will also be discussed. But before that, let me discuss my role in this research to provide a background narrative of this study.

Researcher role

Most of the primary participants and I knew each other prior to this study because I was a member of the team that designed the Quest Atlantis game. For over a year prior

to this study I had been making frequent visits to the site. During these visits, I conducted workshops for the primary participants, conducted on-site usability tests for the development of the game, installed new versions of the game on Club computers, observed the members while they played the game, and provided other information along with technology assistance requested by the lab manager. In addition, I interacted with many of the Questers within the online game space both remotely and at the site. For this reason, there were moments during this study when I took the role of more than an outside observer.

Whenever I visited the Club I put on a "Volunteer" tag bearing my name at all times. Although the kids perceived me as a "Quest Atlantis guy" at the beginning of the study, later this focused role has diminished with my daily visits. With time, whenever I arrived at the club when the computer lab was closed, the kids started to line up in front of the computer lab door. Therefore, they started to treat me as a lab staff person. There were times when they chanted my name with joy after I opened a closed computer lab. One day when I was entering the Club one of the kids playing outside approached me and followed me to the computer lab. While doing so, he told me "No Hakan, no computer lab," indicating my level of support to the continued running of the computer lab.

During the computer lab observations, there were many instances when the Questers asked me questions related both to the game and to other tasks. Related to the game they asked such questions as how to go into the different worlds, how to change their avatars, how to rent virtual land and how to build on it, and many other questions. Related to the other tasks, they asked me about computer problems, how to find and start specific software, how to print, how to type, and many other questions. Finally, during

the interviews, when there were moments that arose from the discussions that led me

believe that a certain information related to the game would be beneficial for the Quester,

I did not hesitate to mention it.

Research Questions

The purpose of this study is to identify motivational elements for an online

multiplayer educational computer game. The above methodological efforts were guided

by the following research questions:

1.   What are the motivational elements of Quest Atlantis, whether

intrinsic or extrinsic, in terms of student-defined motivation?

2.   How do high, medium, and low participating groups differ in their

responses with respect to the motivational elements?

Context and Participant Selection

Context Selection

I conducted a purposeful sampling for the selection of the context. The following

were the two major criteria for identifying the context: (a) Quest Atlantis centers that

were enrolled in Quest Atlantis program in the same region that I lived in, and (b) Quest

Atlantis centers that were enrolled in the Quest Atlantis program for at least six months.

As a result this study took place in an after-school program located in a Midwestern

town.

Quest Atlantis is a project implemented at an international level. The project has

centers located in the United States, Australia, Malaysia, Singapore, and Denmark.

Therefore, after applying the first sampling criterion, there were a total of four centers in the sample pool (three of which were schools, and one of which was an after-school program).

The second sampling criterion was used because I wanted a center that went beyond the early adoption level (Rogers, 1995). In this way I wanted to eliminate the novelty effect (Clark, 1983). In media studies, the novelty effect is an uncontrolled effect and tends to disappear over time (Krendl & Broihier, 1991). After applying the second sampling criterion, the number of centers in the sample pool was narrowed down to just one center (the after-school program) and that was selected for this study given their willingness to participate.

The Quest Atlantis team had been collaborating with this after-school program for over two years and the team had a fairly strong relationship with the program, making this a convenient sample location in which to carry out this research. Further, the fact that it was an after-school context made it an interesting context for examining motivation in that learners were not compelled by teachers to participate.

Participant Selection

Primary participants. The primary participants of this study were members of an after-school program meeting the following criteria: (a) Quest Atlantis players, who had played the game at least five different sessions, and (b) Quest Atlantis players, who had spent at least three hours within the game. With these criteria I wanted to make sure that the Questers had accumulated the prerequisite skills necessary to play the game at a basic level. I interviewed these primary participants.

As it is typical in Midwestern communities, almost all primary participants were Caucasian Americans. Just one of the primary participants was African-American. Five of the primary participants were female and fifteen were male.

Secondary participants. The secondary participant was the program director. The program director was female. She was Caucasian American.

Data Collection Methodology

I used primarily ethnographic methods including interviews, document analysis, and observations in the different areas of the Club with an emphasis in the computer lab. Later, I developed a demographics questionnaire to support the interviews. Table 3.1 summarizes these data collection methodologies.

Semi-structured interviews were the primary method of data collection in this study. As Fetterman (1998, p. 33) stated, "the ethnographer should ask the right questions" to provide validity for a research study. He suggested going into the field and finding out what people do in their daily lives to ask the right questions. Aligned with this suggestion, a year of visits to the collection site preceded my forming the questions I asked during the interviews. For example, after observing the characteristics of our target audience I decided not to use direct questions because most of the children tend to give just simple "Yes" or "No" answers. For forming the interview questions I followed two additional techniques. First, I tested these questions both in the data collection site and within the online space of the game. This helped me with clarifying the interview questions and with setting the best order for the questions. Although I created an order for asking the questions, I still dynamically changed the order of them during the interviews

to "promote a positive interaction" and to "keep the flow of the conversation" (Kvale, 1996, p. 130). Second, I discussed the interview questions during our QA meetings with other designers and researchers. These three techniques produced the final interview questions, which are presented in Appendix A.

Table 3.1. Data Collection Procedure Summary

Methodology	Sources	Procedure
Interview	Primary participants Secondary participant	Recorded semi-structured interviews from primary and secondary participants on a digital voice recorder, then transcribed
Demographics Questionnaire	Primary participants	Interviewees filled in after the interview is completed
Observation	Computer lab Other areas of the Club	Took notes on scratch paper, recorded with a digital voice recorder and digital camcorder at times
Document Analysis	Materials available at the Club such as annual meeting reports and member information Materials available electronically on the Quest Atlantis servers	Read all materials coming from the Club and the Quest Atlantis servers, and documented any descriptive statistics related to interviewees

A total of twenty interviews were completed over a thirty six day period. These interviews were recorded on a digital voice recorder with the consent of the interviewees. Then the records were uploaded to a computer, and transcribed. The first ten Quester interviews were transcribed by another member of the Quest Atlantis design team. The

latter ten Quester interviews and the secondary participant interview were transcribed by the researcher and resulted in 161 single-spaced pages of data.

Initially, interviews entailed answering questions related to Questers' experience with club life, Quest Atlantis use, and information technology use. However, I found that the attention spans of the members at this age group (nine to twelve) were very low during the interviews. For this reason, a demographics questionnaire form was developed (Lincoln & Guba, 1985) to collect factual data from the Questers. The questionnaire form is presented in Appendix B. This questionnaire included open-ended and close-ended questions related to their club life, Quest Atlantis use, and information technology use. I requested that they fill in the form just after the interview was completed. I followed-up with Questers I had interviewed previously. As a result, I was not able to obtain questionnaire data from two of the twenty primary participants.

Observations were conducted primarily when members were interacting with Quest Atlantis in the computer lab. During the observations I took notes, summarizing events and interactions that took place in the computer lab and within the online space. When the computer lab was used heavily and there were many kids asking questions and waiting for attention, I recorded the events and interactions with a digital voice recorder and digital camcorder, so that I could catch the events later. I typically spent five hours a day, Monday through Friday, from 3pm to 8pm, in the computer lab for two months. Therefore, I was able to conduct prolonged observations both at the computer lab level and Club level. Usually, I spent the first four hours observing and the remaining hour writing the notes. These notes were entered into an electronic research database available through the Internet. This database, created by the project team, provided a central data

repository available twenty-four hours a day. A screen shot of the data entry form is provided in Appendix C.

Document analysis consisted of examining materials from two resources. These were documents from the Club and documents from the Quest Atlantis servers. Documents from the Club included annual meeting reports and member information within the electronic database of the Club. Data related to members' social and economic status were obtained through this database. Obtaining these documents and data was the result of our Quest Atlantis team's close relationship with the Club, and the strong rapport between the staff members of the Club and the team.

Documents from the Quest Atlantis servers included all electronic data related to Questers' participation within the game. These electronic data can be categorized within two groups: the frequency of participation and the content of participation. Examples of the data related to frequency are the time spent in the 3D space, the number of logon times to the game, the number of e-mails received and sent, and the number of Quests done. Examples of the data related to the content of the participation are responses to the Quests and the contents of the e-mails. As a programmer of the Quest Atlantis game, I had the ability to access directly all kinds of electronic data on the Quest Atlantis servers.

Participants at any QA center need to get permission from their parents before playing QA. This permission is given through a series of forms, which contain a parent letter and a consent form. Both Quest Atlantis project and this study were approved by Indiana University Human Subjects Committee for the participation of human subjects. All data collected in this study, including digital records of the interviews, transcripts, and any other documents, will be stored at least one year from the end of this study. The

anonymity of individuals participating in this study was preserved through the use of

pseudonyms of the individuals.

Data Analysis Procedures

Qualitative data analysis is inductive rather than deductive. The researcher starts

with the data, and then develops concepts and categories, instead of beginning with

theory, predicting a pattern of results, and examining the data to test the deduction.

Therefore, instead of starting with a hypothesis, the researcher generates the hypotheses

from the data (Fielding & Fielding, 1986).

I used the constant comparison method of grounded theory for data analysis.

Grounded theory is a systematic set of methods to collect, code, and analyze data (Glaser,

1992). Specifically grounded theory is

> ... A general methodology of analysis linked with data collection that uses
> a systematically applied set of methods to generate an inductive theory
> about a substantive area (Glaser, 1992, p. 16).

In the constant comparison method, a method recommended for generating grounded

theory, the researcher asks the following question while he continually codes, compares,

analyzes, and writes memos about the data while analyzing them: "What category or

property of a category does this incident indicate?" (Glaser, 1992, p. 19). The categories

inductively emerge out of the data rather than being decided prior to the data analysis

(Patton, 1987). Possible data sources might include interviews, field observation records,

documents, and video tapes (Strauss & Corbin, 1994).

Glaser and Strauss, the inventors of the constant comparison method, originally

described four stages to analyze the data through the constant comparison method. These

stages were (Glaser & Strauss, 1967, p. 105): (1) comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting the theory, and (4) writing the theory. However, in their later work they reorganized these into three stages. These stages are (Glaser, 1992; Strauss & Corbin, 1998): (1) open coding, (2) axial coding, and (3) selective coding. I employed the constant-comparison method with the interview and observation records through these three stages. Below, I describe the three stages of the constant comparison method.

Open Coding

At this stage, data are broken down into their parts. While doing so, incidents are examined closely, and they are compared for differences and similarities. In this sense the data are conceptualized. The purpose of conceptualization is to reduce mountains of data into manageable chunks by abstracting that data. While doing so, the labels might be assigned by the researcher, or the labels might be taken from the words of the participants. This latter case is referred to as "in vivo" codes (Glaser, 1978, p. 70).

Another purpose of conceptualization is to figure out the degree to which these concepts vary dimensionally (Strauss & Corbin, 1998). It should be emphasized that at this stage data are not simply labeled, but conceptualized into a pattern among many incidents (Glaser, 1992). The data may be broken down into parts by three different methods. They can be analyzed line by line, as a whole sentence, or as a whole document (Strauss & Corbin, 1998; Glaser, 1992).

Axial Coding

This is the stage where categories are systematically developed and related to each other along their properties and dimensions. Open and axial coding are not

sequential stages. The researcher keeps on coding for properties and dimensions while she/he develops relationships between categories. When it seems as though no new properties or dimensions of a category emerge during the coding, that category is considered saturated (Strauss & Corbin, 1998).

Strauss and Corbin (1998) introduce "the paradigm" (p. 127), which is an "organizational scheme," and "which helps to systematically gather and order data in such a way that structure and process are integrated" (p.128). The basic components of the paradigm are conditions, actions/interactions, and consequences. Actions/interactions take place in a context and result in consequences. Therefore, the researcher should study both structure and process to interpret the dynamic nature of events (Strauss & Corbin, 1998). Conditions help with grouping the data based on why, where, how come, and when questions. Actions/interactions help with grouping the data based on by whom and how questions. Consequences help with grouping the data based on what happens as a result of those actions/interactions (Strauss & Corbin, 1998).

Selective Coding

In selective coding the theory is integrated and refined (Strauss & Corbin, 1998). To this end the emerging story is explained around a core category. All other categories are linked to this core category. The core category accounts for most of the variation in the problem.

Versions of the Constant Comparison Method

In their later work, Glaser and Strauss chose to develop their own versions of the grounded theory and constant comparison method. Strauss and his student Corbin (1990) assumed an approach in which they adopted an eclectic vision. In this sense, they

concluded that the constant comparison method could include both induction and deduction, especially during the axial and selective coding stages. This is how they described their vision for the axial coding stage:

> Although statements of relationship or hypothesis do evolve from data (we go from the specific case to the general), whenever we conceptualize data or develop hypotheses, we are interpreting to some degree. To us, an interpretation is a form of deduction. We are deducing what is going on based on data but also based on our reading of that data along with our assumptions about the nature of life, the literature that we carry in our heads, and the discussions that we have with colleagues. (This is how science is born.) In fact, there is an interplay between induction and deduction (Strauss & Corbin, 1998, p. 136).

Strauss and Corbin (1998) also advocated forcing data in the selective coding stage. For example, they proposed the "paradigm model" for facilitating the arrangement, rearrangement, and linking of categories and sub-categories, which is limiting the data in nature. While identifying the core category in this stage, they said it is up to the analyst to choose a core category name, which is another example of forcing data. Strauss and Corbin (1990) saw theory validation as a necessity. They offered comparing the theory to raw data or presenting the theory to respondents as techniques for the validation process. They claimed a theory that is grounded in the data will be recognized by the participants. Not everything in the theory will fit every participant, but the main categories will fit for most of them.

Glaser on the other hand severely disputes the ideas of Strauss and Corbin. His primary argument is that the constant comparison method is emergent in nature and data should not be forced in any of the stages. Glaser was so enraged at Strauss and Corbin that he demanded the withdrawal of Strauss and Corbins' (1990) book and re-writing it by their mutual consent. After Strauss's refusing to do so, Glaser went on to publish a

corrected version of Strauss and Corbin's (1990) book. Glaser started criticizing the other

two from the cover of his book; the title read "Emergence vs Forcing: Basics of

Grounded Theory Analysis" (Glaser, 1992).

Glaser advocated the inductive approach and emergent nature of the findings in

the constant comparative method. According to him the research question in this type of

approach "is not a statement that identifies the phenomenon to be studied." (Glaser, 1992,

p. 25) The phenomenon emerges out of open coding, axial coding, and selective coding

stages inductively. The researcher codes for categories and properties during the open

coding and should let "whatever theoretical codes emerge" (Glaser, 1992, p. 63) during

the axial and selective coding. In this sense, Glaser (1992) opposed Strauss and Corbin's

(1990) "paradigm model" since this model would exclude emerging codes.

My Approach to Using the Constant Comparison Method

Some researchers, wishing to use the grounded theory approach for their research,

came across difficulties and ended up with an adapted version of the constant-comparison

method. For example, Sarker, Lau, and Sahay (2001) intended to use Strauss and

Corbin's version to build an inductive theory of collaboration in virtual teams. However,

later in the data analysis process they found the methodology and especially the

"paradigm model" too constraining. They perceived the "paradigm model" as one of the

many possible frameworks for facilitating the constant comparison method. For that

reason, they attempted to fulfill the requirements of data analysis by following their own

tactics. For example, during the axial coding stage they identified the major categories

and created an integrative memo for each of the major categories. During the selective

coding stage in which they developed the story line, they utilized meta-theories related to

communication and co-presence, which they deemed necessary to be included in their theory since any collaboration would require communication, and since virtual team communication would require co-location of its members. They concluded that the use of their adapted grounded theory methodology allowed for their creativity, flexibility, and insightfulness, while preserving the rigor of systematic data collection and data analysis.

Similar to the approach followed by Sarker et al. (2001), the approach I followed using the constant comparison method for my data analysis is neither Glaser's nor Strauss and Corbin's in their pure format. It can be said that I followed an adapted version of the constant comparison method by adopting tactics from both versions. Since Weiner (1990) pointed out the "many uncharted areas to incorporate" into motivational theories, I perceived the inductive approach in data analysis as a suitable tool that would enable me to unearth these "uncharted areas." Aligned with this idea I hesitated to force data as much as possible, and let the data emerge. For this reason, it can be said that my adaptation of using grounded theory and constant comparative method is closer to that of Glaser's (1978, 1992) in philosophy. Below I describe open coding, axial coding, and selective coding stages of my data analysis.

Open Coding. The first five interview documents were openly coded by three researchers (author of this dissertation, another doctoral candidate, and a faculty member), while the remaining fifteen interview documents were openly coded by two researchers (author of this dissertation, and another doctoral candidate). The same two researchers coded one of the observation records. All of the remaining observation documents were coded by myself. One coder was a doctoral candidate also studying Instructional Systems Technology and serving as project manager for the Quest Atlantis

project. He also was researching the project as part of his dissertation and thus had a deep appreciation of the data. The other researcher was a faculty member in Instructional Systems Technology and was the principal investigator of the Quest Atlantis project. This researcher was also the director of this dissertation. Below I describe the process I followed for the open coding of these documents.

Before the coding, the researchers read all interview documents to explore and to grasp the content in them. When coding for an interview document the researchers first read the question and the answer for it. Then the answer part of this chunk was coded as a whole paragraph. Data stated by the researcher, like questions or clarifications, were not coded. The researchers negotiated the codes within the chunk until they arrived at a 100% agreement. This process of open coding was independent of the research questions. An example to illustrate this open coding process is shown in Table 3.2.

Table 3.2. Open Coding Illustration for an Interview Question and its Answer

Paragraph Chunk	Sample Codes Generated
Question: What do Quest Atlantis points mean to you? Answer: The points mean that, uh, if you get enough points you can either get some cards, or if you even get enough and go to this one special place in the trading post, you can get Internet time, a pencil, just basically anything that gets listed there.	Internet time, trading post, points, store items, points as exchange currency

A qualitative data analysis package, NVivo version 1.3, was used for the open coding of the data. For this purpose, interview documents and observation documents were imported into the software. Within the software the coding was reflected into a

format similar to the illustration in Table 3.2. The software provided convenience to the researchers by providing a "select text and code" approach to the coding process, by providing storage functionality for the data and the codes, by providing easy retrieval of previously set codes, and by providing merge functionality for the combination of similar codes.

During this phase thousands of codes could be produced if the coding were done at a low level. This would be in contrast to the conceptualizing feature of the open coding, in which the major purpose is to decrease the magnitude of the data into a manageable size. For this reason, the researchers followed an approach in which the purpose was to create codes more abstract in nature. For example in Table 3.2, although the datum "pencil" in the answer could be coded as "pencil," the researchers coded this at a higher level as "store items." In a similar fashion data such as "t-shirt" and "ruler" were coded as "store items." Although "Internet time" was another store item, it was coded as "Internet time" at a lower level; because it was a concept that made a difference in the context where the data were collected. The experience of researchers with the implementation of QA over two years at multiple research sites and the constant comparison of data were important elements in evaluating the abstraction levels of the codes.

Open coding of the observation documents was done in a fashion similar to that described above. Naturally, the majority of the codes emerged during the open coding of the interview documents. For that reason, existing codes from the interview documents were used for open coding of the observation documents. Since there were no questions

in these documents the coding was done at the paragraph level. An example to illustrate an open coding for a paragraph in an observation document is shown in Table 3.3.

Table 3.3. Open Coding Illustration for a Paragraph of an Observation Document

Paragraph Chunk	Sample Codes Generated
{First Name, Last Name} ({QA username}) tried to buy a land but since he had 8 points, he could not. He seems an aggressive kid at times. Several times today, he got angry when some kids were standing in the lab or touching him when trying to go to the other computer. I am not sure if he was trying to enforce the lab rules on the door.	buying, land, points, rules

The open coding of the interview documents continued intensively for a week-long period. After the open coding of the interview documents there were 202 codes. Two-weeks of open coding of the observation records added 32 new codes. At the end we obtained a total of 234 codes. These codes are listed in Appendix D.

Axial Coding. In this stage we tried to systematically develop the categories based on the codes. Open coding and axial coding were not sequential stages. We moved back and forth between the two stages. Just after completing the coding of the interview documents and just before starting the coding of the observation documents two researchers preliminarily organized 202 codes in 16 categories. While organizing these categories some codes were perceived as orthogonal, i.e. they belonged to more than one category. We accepted this reality and put such codes under all the categories for which they provided the most explanatory power for that category.

These 16 categories were: store items, edutainment, building, 3D, identity, social, different from others, QA extras, people, homepage, Boys and Girls Club context, design, implementation, control, motivation, and feelings. Further, these categories were collapsed then again under 5 of these original categories so as to create more parsimony and usefulness to the codes: The different from others category included identity, social, building, and edutainment; design category included homepage, 3D, and QA extras; motivation category included store items and control; implementation category included Boys and Girls Club context and people; and feelings category stood alone.

Selective Coding.

The three researchers then got together to discuss these categories and the codes within them. Since the open coding and the collapsing of categories were done independent of the research questions, these 16 categories and the larger 5 categories were characterizing the data well in general but not well with respect to the research questions of the study. For that reason, the researchers re-debated the codes and the categories in light of the data, by using their own characterization of motivation based on salient themes and the research questions, and by re-visiting the current literature on motivation theories. This re-debate was a dialectic intersection of the categories grounded in the data, our intuitive responses to the research questions, and the current theories of motivation.

After the re-debate a number of changes were made. Nine of the categories were kept but renamed: building as creativity, social as social relations, identity as identity presentation, store items as rewards, motivation as achievement, 3D as immersive context, Boys and Girls Club context as context of support, different from others as

uniqueness, and control as control and ownership. Six categories were dropped and they were collapsed under other categories: QA extras, people, homepage, design, implementation, and feelings. The remaining edutainment category was huge in size; therefore it was split into playing and learning categories. Two new categories emerged which were previously nested under one of the 16 categories: curiosity and fantasy. In the end, we obtained thirteen categories all of which related to and were placed under one of the research questions: identity presentation, social relations, playing, learning, achievement, rewards, immersive context, fantasy, uniqueness, creativity, curiosity, control and ownership, and context of support.

Some researchers have encouraged the use of quantitative data to supplement qualitative data (for example, see Flick, 1992; Silverman, 1993). I counted the frequency of the codes to characterize the thickness of categories. Toward this end I developed a labeling scheme. For example, when there were two to five opinions in the data that characterized a specific subcategory, I used the label "few." These labels are explained before the presentation of the data in chapter four. The frequency of codes were also used to answer the second research question, for the comparison and characterization of high, medium, and low participating groups.

In selective coding stage the main purpose was to obtain a core category and link other categories to this core category. A secondary purpose was to link the thirteen categories with each other. These two act together and the categories grounded in the data helped with asserting my arguments in Chapter five of this dissertation. In this section the data were interpreted in a way that has both experience-local meaning and at the same time experience-distance significance (Geertz, 1973) to others analyzing motivation in

different contexts and conditions. This occurred through ensuring that local interpretations were informed by and responded to previous research and theory, with presentations of the assertions being contextualized in terms of the broader literature.

Measuring Participation and Assigning Participants to Groups

The second research question required assigning the interviewees into high, medium, and low participating groups. The difficulties with measuring participation in research studies have been documented in education as well as other domains (see, for example, Mussino, 1999). The biggest difficulty is the selection of indexes of participation, i.e. what activity or activities show participation in a specific field. To overcome this complexity in education Fin (1989) developed a four-part taxonomy to identify the forms of student participation in schools. Participation in the first level is basic and it involves students' tendency to attend the class. At the second level students take initiative in the class. For example, they might ask questions to teachers or they might do extra school work. The third level of participation occurs outside the class. For example, students might participate in social or extracurricular school activities. The fourth level involves the empowerment of students by involving them in the school's disciplinary system or school government.

Finn, Folger, and Cox (1991) developed an instrument for elementary school students to measure their participation based on the four-part taxonomy. They also examined the empirical relationships among the parts of the taxonomy. They found the correlations among the parts of the taxonomy sufficiently high, concluding that any one of them could be used as a single participation index.

In alignment with Finn's taxonomy of participation, I chose two indexes to calculate Questers' participation in QA. These indexes were the total amount of "time spent in QA" and the number of "Quests" undertaken. Since all QA activities take time to complete, Questers need to spend time within the game as a basic requirement. For that reason, the total amount of time spent in QA is equivalent to the first level of the participation taxonomy. Doing Quests is the salient activity in this educational game and initiative is required to do them. For that reason, the number of Quests undertaken is equivalent to the second level of the participation taxonomy.

Since kids attend the club with varying frequencies, kids attending the club more frequently would have more chance to spend time in QA. For example, a youth visiting the club everyday would have more chance to spend time in QA than a youth visiting the club just once a week. This would create a measurement error while calculating the participation in QA. To eliminate this error for "time spent in QA," I divided "time spent in QA" by "club attendance per week" for each interviewee (Table 3.4; since there were three kids playing QA once a week at their schools, I added a day to their "club attendance per week," as bolded in Table 3.4) —this gave me equalized "time spent in QA." To obtain the number of "Quests" undertaken by a child I summed accepted, pending, and revise type Quests for that child. I did not include saved Quests in this index, because saved Quests do not necessarily show effort for that Quest. Then I calculated standard scores for equalized "time spent in QA" and "Quests." For this purpose, I calculated Z scores for equalized "time spent in QA" and "Quests" by using SPSS v11.5. Since the cognitive and intellectual development of kids are dependent on doing educational activities more than other activities in the game, Questers' doing the

Quests in QA are given the most importance by the designers of QA. In alignment with this philosophy, I gave more weight to the index of "Quests" while calculating the overall participation score. To obtain the participation score I doubled the Z score of "Quests" and added it to the Z score of equalized "time spent in QA." Table 3.4 shows interviewees sorted by their participation scores from high to low. The participation scores were used as a mean to sort the interviewees based on their participation. For that reason the numbers themselves are not meaningful beyond that purpose.

Table 3.4. Questers Sorted by Their Participation in QA

Quester	Time spent in QA	Club attendance per week	Equalized time spent in QA	Quests	Z of equalized time spent in QA	Z of Quests	Participation Score
Andrew	71	5	14.2	22	1.03	2.93	6.88
Emily	142	5	28.4	5	3.27	-0.14	3
David	27	5	5.4	15	-0.36	1.67	2.97
Jason	27	4	6.75	13	-0.15	1.31	2.46
John	47	5	9.4	10	0.27	0.77	1.8
Ryan	80	5	16	6	1.31	0.05	1.4
Kevin	18	2	9	6	0.21	0.05	0.3
Anthony	21	2	10.5	5	0.45	-0.14	0.18
Jennifer	12	3	4	6	-0.58	0.05	-0.49
Thomas	41	5	8.2	4	0.08	-0.32	-0.55
Rebecca	8	5	1.6	6	-0.96	0.05	-0.87
Eric	6	1	6	4	-0.27	-0.32	-0.9
Brian	16	5	3.2	5	-0.71	-0.14	-0.98
Amy	10	2	5	3	-0.42	-0.5	-1.41
Mark	9	1	9	1	0.21	-0.86	-1.5
Scott	18	3	6	2	-0.27	-0.68	-1.62
Tyler	6	1	6	2	-0.27	-0.68	-1.62
James	17	5	3.4	0	-0.68	-1.04	-2.75
Luke	4	5	0.8	0	-1.09	-1.04	-3.16
Sarah	3	4	0.75	0	-1.09	-1.04	-3.17

After sorting the interviewees by their participation scores it was apparent that Questers towards the top of list would belong to the high participating group, Questers

towards the bottom of the list would belong to the low participating group, and Questers between these groups would belong to the medium participating group. The difficulty was in choosing the cutoff points. To determine the cutoff points I compared the Questers in the list next to each other starting at the top of the list. While comparing them I depended on my intuition, which was based on my longitudinal observations of the kids. I asked the following analytical question during the comparisons: "Did I observe a difference in the participation of Questers in row X and row X+1?" After following this methodology, it became evident that the first seven Questers belonged to the high participating group, while the next seven Questers belonged to the medium participating group, and the last six Questers belonged to the low participating group. Each Quester's belonging to a specific group highly correlated with my intuition. In order to check the validity of these results, I asked the most experienced member of computer lab staff to put these twenty Questers into high, medium, and low participation groups based on their participation in QA. I asked him not to look into QA usage statistics and just to depend on his observations. He placed 17 of the 20 Questers into three categories in alignment with the assortment in Table 3.4. This high agreement validated the methodology for dividing the Questers into three participation categories.

Trustworthiness

Lincoln and Guba (1985) summarized four areas for considering the importance of any scientific study: truth value, applicability, consistency, and neutrality. Since qualitative research and quantitative research differ in their world views they require different kinds of paradigms to evaluate their worth. Creswell (1998) documented that

multiple perspectives existed for the verification of results in the qualitative research paradigm. Lincoln and Guba (1985) recommended using the word "trustworthiness" to refer to the verification in qualitative studies. They defined the trustworthiness as persuading the audience of a research study that the findings of the study are worth paying attention to.

Triangulation has been a common method to provide trustworthiness in this type of research (Patton, 1980). The term comes from the application of trigonometry to navigation. Locating the precise point of a geographic location requires using two points. The intersection of these two points gives the precise geographic location for the navigators (Bogdan & Biklen, 1998). Denzin (1970) originally advocated the use of multiple methods and multiple sources of data to provide triangulation in a qualitative research study. He later suggested using multiple researchers and multiple theories to improve the triangulation (Denzin, 1978; Merriam, 1998). I followed the first three approaches of triangulation to increase the trustworthiness of this study. I applied multiple methods to collect data: semi-structured interviews, observations, questionnaires, and document analysis. I used multiple sources of data: children using QA, personal observations, membership information in club records, and QA participation information in QA electronic databases and logs. And finally, three researchers participated in the constant comparative analysis of data. Since I wanted to discover the "uncharted areas" in motivation, finding any of them would contradict other theories of motivation. For that reason, I did not use other theories for the triangulation of my findings.

Although triangulation has been a common method to provide trustworthiness for a qualitative study, it has also been criticized by other researchers. For example, Silverman (1993, p. 158) argued that triangulation ignores the "context-bound and skilful character of social interaction" and supposes that participants are "cultural dopes," who need a researcher to give away their world views. He concluded that there were better solutions to show trustworthiness.

Lincoln and Guba (1985) suggested another common method as an alternative for providing trustworthiness. Aligned with their taxonomy for considering the importance of a scientific study, they offered credibility to deal with the truth value, transferability to deal with the applicability, dependability to deal with the consistency, and confirmability to deal with the neutrality.

Since multiple realities are involved in a qualitative research study Lincoln and Guba (1985) offered "credibility" as an operational term. The implementation of credibility requires two tasks: doing the research in such a way that the possibility of finding credible outcomes is enhanced, and showing this credibility by having the results agreed to by the constructors of multiple realities (i.e., participants and other researchers). With respect to the former task, I followed prolonged engagement with the research site (frequently for a year), persistent observation in the research site (daily for two months), and triangulation of methods, sources, and researchers. Fetterman (1998, p. 36) agreed that "working with people, day in and day out, for long periods of time is what gives ethnographic research its validity and vitality." With respect to the latter task, I followed up with peer debriefing. During the peer debriefings I was challenged by my advisor and by the QA design and research team. This helped me with increasing my awareness to

"substantive, methodological, legal, ethical, or any other relevant matters" (Lincoln & Guba, 1985, p. 308) about the research study, with defending my assertions, and with developing the methodology.

The implementation of transferability requires providing a thick description of the culture (Lincoln & Guba 1985; Gilbert 1993; Creswell, 1998; Merriam 1998). If the researcher knows the rules and norms of the culture under study and if he can convey this information to the readers such that they can integrate themselves into the culture by following the description of the researcher, transferability is established (Gilbert 1993). Further, since the researcher can not apply the findings to many other substantive fields, providing a thick description of the research site allows others "to compare the 'fit' with their situations." (Merriam, 1998, p. 211)

Dependability criterion reflects the consistency of a qualitative study. The existence of multiple realities and the changing nature of the research site create "instabilities" (Lincoln & Guba, 1985, p. 299), which prevent applying the traditional reliability techniques into qualitative research. Lincoln and Guba (1985) use the term "confirmability" to refer to the neutrality of a qualitative study. They claim the emphasis of objectivity should be on the data instead of the researcher. Therefore, confirmability becomes an issue of checking the characteristics of the data. Lincoln and Guba (1985) recommend using external audit trails to establish both dependability and confirmability at the same time. In this sense, an outsider can examine data, findings, and interpretations just like a fiscal auditor checks the process and the product of a business account (Creswell, 1998). Approving the process provides dependability while approving the product provides confirmability. During the axial coding stage, the third researcher

provided such an audit trail. He examined the products of the two researchers, which

were the data and the sixteen categories, and also the process to produce those products.

Boys and Girls Club

In this section I provide information about the Boys and Girls Club that was the

context for the study. There are some core guidelines to which different Boys and Girls

Clubs need to stick. However, I was informed by the club program director that different

clubs all across the country are very different and how things go completely depends on

who is in charge. This is how she describes this:

> National Boys and Girls Clubs have their own idea of what programs are.
> [According] to them, kids involve in specific things, outside free play,
> educational activities. [The director] kind of has two separate ideas.
> Programs can mean what is going on in each main area of the club; art
> room, computer lab, game room, teen room, library, canteen, gym. And
> also [there are] programs meaning the clubs, the specific groups like Torch
> Club, Keystone Club. Those are two different clubs that are similar to a
> student council at school. But they kind of do things here at the club. We
> also have Smart Moves program, which covers alcohol awareness and
> early pregnancy prevention. Different things like that. Programs can mean
> daily area activities. It can also mean the specific clubs' get together, and
> have plan field trips, things like that. (Program director interview, May 28,
> 2003)

The club is a member of the national Boys and Girls Clubs of America. The club

has 645 members. Membership fee is $15 a year. Most programs except for camps are

free with the membership. In the following information can be found on the members'

social and economic status, club staff, components of the club, and a typical day at the

club.

Social and Economic Status

The number of boys is greater than the number of girls at the club. There are 231 girls (36%) and 414 boys (65%). Therefore, the ratio of boys to girls is close to three to two. In terms of ethnicity most of the club members are Caucasian. 417 members are white (65%), 118 members are African-American (18%), 52 members are bi-racial (8%), and the remaining 9% are Hispanic, Asian, and American Indian.

The age group of the children attending the club ranges between six and eighteen years old. 165 members are younger than 9 years old (25%). There are 346 members between the age of 9 and 12 (54%), which is the target age group for QA. There are 134 members older than 12 years old (21%).

Considering the household type, just 242 members live with their natural parents (38%). 50 members live with hybrid parented households (8%) (mother and step father, grandparents, father and step mother, etc.). 343 members live with a single parent (53%). Among single parents, 289 members live with their mothers (45%) and 44 members live with their fathers (7%). 10 members are in foster homes (1%).

In terms of economic status, for 206 members their annual family income is less than $15,000 (32%). For 216 members the family income is between $15,000 and $35,000 (34%). For 78 members the family income is between $35,000 and $56,000 (12%). For 81 members the family income is more than $56,000 (13%). For the remaining 9% the family income was unknown.

Club Staff

There are four full time staff members working in five positions at the club. Although their positions are hierarchical in nature, they work as a team. They are

supported by forty to fifty part-time staff members. The functions of all these people are described below in the order of the highest position to the lowest.

Executive director. The executive director is in charge of the club. He is also in charge of another smaller Boys and Girls Club in the same town, but he spends most of his time in this club. To do things for the club, he works with different organizations both at a local level and at a national level. In this sense, he works with an organization that supports not-for-profit member organizations, the board of directors of the club, and other people from the community. He reports to the national Boys and Girls Clubs of America to make sure the club functions based on the standards.

Unit director. The unit director is in charge of special activities. These activities include banquets, the Thanksgiving party done each year, and special events. She runs the transportation program. With the help of the transportation program, members are transported from the every single school in the county to the club. She plans the monthly calendars.

Program director. The program director mainly directs and deals with programs. In addition, she does many other things, "anything from cleaning up a vomit to presenting about club activities at different meetings." She fills in for the executive director and unit director when it is needed. She organizes recruiting, training, pay, and scheduling of part-time staff. She deals with disciplinary problems of the members on a daily basis. Since the office manager position is empty, she deals with the tasks required to be done by this position.

Social/Athletic director. The social/athletics director works closely with the program director. He works with the gym programs and also with the programs outside. He also drives one of the buses and directs the summer camp.

Office manager. In the past, there used to be an office manager but this position has been empty for about eight months. The program director takes care of the tasks required by this position to save money. The tasks include doing part-time staff's paperwork for money and paychecks.

Part-time staff. There are between forty and fifty part-time staff members. They run different areas of the club. Most of part-time staff members are students at a university, who are paid based on the work study plan. They start with a wage of $6 an hour and they can get raises depending on the levels of initiative they take, their abilities and skills, and their behavior towards the members. In general, this group tends to come and go and frequently miss their shifts or quit. The program director commented on this matter as follows:

> They have about ten priorities. They may have class, studying, drinking,
> partying, friends, watching TV above their job [at the club]. They are kind
> of just here for the paycheck. (Program director interview, May 28, 2003)

In addition to supervision of members in all rooms, part-time staff members supervise games in the game room, act as tutors in the library and referees in the gym, and instruct and lead activities in the art room.

Building Supervisors. There are a total of four building supervisors. Two of them actually do the job and the remaining two are trained for the future. These people actually belong to the part-time staff category, but they are selected based on certain qualifications. They must be: 1) over 21 years old; 2) certified for first aid and CPR; and

3) licensed to drive 15-passenger vans. They also organize serving the snacks and can function as the program director when it is needed.

<u>Components of the Club</u>

The club has its own two-story building. This is a two story building. The first floor contains the membership desk, the game room, a canteen area, a teen room, the library, an art room, and the computer lab. The second floor contains the gym and office spaces.

<u>Membership desk.</u> Members sign-in and out at this place. Interested parents can query for membership information. Supplies for the game room are also provided here.

<u>Game room.</u> The entrance to the club is a large area called the game room. This large area provides central access to the canteen area, teen room, library, art room, gym, and computer lab. This is the busiest area of the club. There are usually anywhere from two to fifty members in this area. This number can go up to seventy when snacks are served. This room provides an environment for free play. Organized tournaments including air hockey, foosball, bumper pool, and regular pool also take place here. The room hosts board games including Twister, checkers, and chess. Game room supervisors run the tournaments and teach the members how to play the different games.

<u>Canteen area.</u> This area is off to the side of the game room. Snacks are served here. This area also contains a big screen TV and vending machines for sodas and snacks. Members usually use this area to get together and socialize.

<u>Teen room.</u> Anywhere from zero to ten members might be present in this area. This room is for the use of members who are in the seventh grade or higher. There is not any special activity in this room, but there are separate lockers, a pool table, a foosball

table, and a TV allocated for these privileged members. It is a place where they can hang out without feeling as if they are six-year old children.

Library. There are 2 staff members who tutor in this room. They usually help with members' homework, but they can also tailor specific tutoring programs outside of the school curriculum. Some of the members go in of their own free will and some of them are forced by their parents. The club does not force the members to go into the library, but parents can make arrangements with the club to make sure that their children go into the library. The club also communicates with members' teachers to let them know about their progress. The tutors might utilize suggestions from the members' teachers.

Art room. This room includes art related activities including drawing and painting. Just like watching TV, members like to watch other members' doing art activities.

Gym. Games, including basketball and floor hockey, are played by the members in this large room. Members' accomplishments in these games are charted on the wall of the gym.

Outside. When weather permits, interested members are taken to a nearby park to play there.

Computer lab. This room is a busy place. When it is closed for a day for some reason the staff feels the extra load in the other areas of the club. Although there are only 14 computers, the room still takes care of a lot of the members. The lab is L shaped and the workstations are located by the walls of the lab. This setting provides an atmosphere that is conducive to collaboration. For example, kids can easily share ideas while sitting next to each other. In addition, the free space in the middle of the room facilitates

interaction among the kids. For example, kids can use this space for activities that require a large working area (making collages for example). There is a small room next to the lab, which is utilized for storage purposes. Since this room is not used by people and it is accessible just by the computer lab, it provided a convenient place for the interviews.

Members of the club need to get permission from their parents to use the computer lab by having them sign a form. Aligned proportionately with the ratio of boys to girls at the club, more boys use the computer lab. During my attendance there was no official lab manager, and there were five part-time staff members to watch the lab. These staff members worked on different days, and usually one to three staff members were present in any day. The part-time staff member with the most experience functioned as the lab manager and took care of the tasks required by this position. These tasks included setting the weekly lab schedules, maintenance of the server and the workstations, regulating the behavior of the kids, talking to the kids who behaved against the rules, and so on.

The equipment includes 14 PC workstations, a file server, a flatbed scanner, and a laser printer. Headphones are attached to each of the workstations. The hardware profile for a workstation is provided in Table 3.5.

The activities include Internet, free play, Quest Atlantis, and other educational games. A list of educational games available on all workstations is presented in Table 3.6. These activities are scheduled weekly by the lab manager and advertised by the entrance to the lab. An example schedule is presented in Table 3.7.

Table 3.5. The Hardware Profile for a Computer Lab Workstation

Operating System	System Model
Windows Millennium Edition	Compaq Deskpro SFF Series
Processor	**Main Circuit Board**
500 megahertz Intel Pentium III 32 kilobyte primary memory cache 512 kilobyte secondary memory cache	Board: Compaq 0620h Bus Clock: 100 megahertz BIOS: Compaq 686J1 v2.06 10/13/1999
Drives	**Display**
Generic IDE hard disk drive (9.99 GB) COMPAQ CD-224E [CD-ROM drive] Generic floppy disk drive (3.5")	Intel(r) 82810E Graphics Controller [Display adapter] COMPAQ S710 [Monitor] (15.7"visible)
Memory Modules	**Multimedia**
128 Megabytes Installed Memory	SoundMAX Integrated Digital Audio
Communications	**Other Devices**
Intel(R) 82559 Fast Ethernet	Standard 101/102-Key Keyboard

Table 3.6. The Educational Games Available on a Computer Lab Workstation

- Bus Stop Utility - Human Body
- Civilization II
- CUC/Knowledge Adventure Inc. - JumpStart Kindergarten '98 Version 2.2
- Eastman Software, Inc., A Kodak Business - Imaging for Windows® Version 1.01
- JumpStart Kindergarten 98 Menu
- Maxis - SimCity 3000
- Maxis, Inc. - SimCity 2000® Version 1.00
- Microsoft PC Health Version 4.90
- Microsoft Corporation - Magic School Bus Explores in the Age of Dinosaurs Version1
- Microsoft Corporation - Encarta Encyclopedia Version 9.0
- Microsoft Corporation - Magic School Bus Explores in the Age of Dinosaurs Version1
- Microsoft Corporation - Magic School Bus Explores Inside the Earth Version 1
- Microsoft Creative Writer Version 2.0
- Microsoft Creative Writer Viewer Version 2.0
- Microsoft Kids Plus! Paint It! Version 1.0
- Microsoft - Office 2000 Premium
- Mindscape - Mavis Beacon Teaches Typing! Version 9
- Mixman Studio LE Version 1.5
- Quest Atlantis
- SimCity Urban Renewal Kit
- Solid Oak Software, Inc. - CYBERsitter 2001 Version 1.0
- The Learning Company - Reader Rabbit's Math Ages 6-9 Version 1.0
- The Learning Company, Inc. - Amazon Trail 3rd Edition Version 1.0
- Word Munchers Deluxe

Table 3.7. An Example Schedule of the Computer Lab Activities

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
3:30-4:00	FREE PLAY!	Microsoft Suite	Technology Vocabulary	Typing Only	FREE PLAY!
4:00-4:30	FREE PLAY!	Computer Club	Boys Only	Girls Only	Typing Contest
4:30-5:30	FREE PLAY!	Learning About Computers (Parts and Functions)	Quest Atlantis	Quest Atlantis	PowerPoint Contest
5:30-6:00	Cadets Ages 6-7	Intermediate Ages 8-9	Preteen Ages 10-12	Teens Ages 13+	FREE PLAY!

The broadband Internet connection of the club was donated by a local Internet service provider. All workstations run a software (CYBERsitter) that runs in the background, analyzing Internet activity and restricting access to objectionable Internet content. Kids need to earn the use of Internet by using educational software. For example, when they use the typing tutorial software for 30 minutes, they can use the Internet for 30 minutes. Lab staff members keep track of the account of Internet use for each club member. Most of the kids use their Internet time to play games on the Cartoon Network web site (http://www.cartoonnetwork.com/). Kids do not have to have Internet time to play QA.

A Typical Day at the Club

The members get to the club between 3pm and 4pm. Most of them come from their schools, although there are some members who are home-schooled. Their transportation from the schools to the club is provided by the club. They come to the membership desk and sign in with their membership card. They put their belongings into the lockers located in the bathrooms. From that point on, it is up to them what to do at the

club during the rest of the day. However, a lot of members have to complete their homework before they start playing.

Snacks are served in the canteen area at 4pm and this can last from 15 minutes to half an hour. The snack is donated from people in the community on Thursdays and Fridays. The snack time can be described as "the hyper-chaotic" moment, because most members arrive at the club at the same time the snacks are served. The craze starts to calm down toward 4:30pm.

After the snack, members normally choose one of the routine activities in the game room, the canteen area, the teen room, the library, the art room, the gym, playing outside, or the computer lab. They can also participate in age-specific activities or tournaments organized at different days and times. They need to sign up in advance for these later two activities. Some members may not find a routine activity and just run from room to room. Discipline problems usually start after this. The club staff tries to minimize these kinds of problems by planning activities that will interest the members.

Just after 5pm starts "the attack of the parents." Many parents leave their jobs and drop by the club to get their kids. Most of the members leave the club between 5pm and 6pm. The club closes at 8pm.

Participants

There were a total of twenty primary participants and one secondary participant in this study. In this section, I will provide portraits of the primary participants. These portraits include their social and economic status, their family life, their information technology access and experience, and their club experience. While providing the

portraits for the interviewees I used my observation records, the demographics questionnaire data that they provided, and the member information data within the electronic database of the Club. The participants were sorted by their participation in QA, higher participants being described first.

Andrew

He is eleven years old and he is in the fifth grade. He is Caucasian-American. He is home schooled. He also has two brothers attending the club. The older brother was selected "2002 Youth of the Year" at the club. The interests of these two brothers are quite different; he spends most of his time in the computer lab, while his brother has more interest in sports. His family has five members including parents, and their income is between $15,000 and $25,000. Both of his parents work.

He uses a computer with an Internet connection at home. He also has a game console. He plays QA at home. He has broad experience with the use of information technologies. He has been using the computers and the Internet for more than four years. He uses word processing software, Internet software, and games on the computers. He also learned using the Internet by himself and at the club. On average he uses the Internet several times a month. In addition to his own home, his friends' homes and the club are the places where he uses the Internet. The World Wide Web is the main application he uses on the Internet. He also uses the Internet to do homework assignments and to consult with his friends. I observed him as a frequent user of the Cartoon Network web site.

He is a regular of the club; he has been attending the club for more than four years. He comes over to the club everyday. He comes to the club because of several reasons; he likes to be in the club, his friends are at the club, and his parents send him to

the club. At the club, he spends most of his time in the computer lab, in the game room, and in the gym. His favorite activity at the club is playing on the computers. His favorite computer lab activity is QA.

I observed him as a child who likes to help others with various computing tasks in the lab. He is a popular kid at the club, in addition to John and David. Other kids model them and consult them very often. He is a very determined kid. One time, he was using a typing tutorial and after finishing the game he became so happy. He said he had been trying to "beat the shark" for two years. His mother comes over to the club not just to take the children but also to spend time. She volunteers for different club activities. She has a QA account and she informed me that she was trying to play it at home with the help of her children.

Emily

She is nine years old and she is in the fourth grade. She is Caucasian-American. Her family has five members including her two brothers and parents and their family income is between $35,000 and $44,000. Both of her parents work.

She uses a computer with an Internet connection both at home and at her school. She has also a game console. She plays QA at home. She has been using computers for 3 years. Games are the basic application she uses. She has been using the Internet for two years. She uses e-mail, the Web, chatting, instant messaging, and downloading on the Internet. She also uses it for homework assignments, for consulting friends, for consulting classmates, and for entertainment. She uses the Internet both at the club and at home on a daily basis. She learned how to use the Internet by herself and from her parents.

She has been coming to the club for two years. There are multiple reasons for her going to the club: she likes it, her friends are at the club, and since her mother works during the day it is a place she can stay while she is at work. She comes over to the club everyday. When she is at the club she spends most of her time in the computer lab, in the game room, and playing outside. Playing QA is her favorite activity both at the club and in the computer lab. She usually groups with another girl, who is about seven years old.

David

He is eleven years old and he is in the fifth grade. He is Caucasian-American. He has two brothers and a sister. His sister also comes to the club. He lives with his mother and their income is less than $5,000. His mother is a house wife. Since their income is low they receive support from social services. His hobbies are art, drawing, computers, and trading cards. He attends an art class in a youth program. He also likes rap music very much.

He does not have a computer at home, but he has a game console. He uses a computer with an Internet connection at his school though. His experience with information technology is high. He has been using computers and the Internet for more than four years. The main applications he uses are the Internet and game software. He uses the Internet at the club and at his school and he connects everyday. He learned how to use the Internet at the library, at the club, and at school. He spends most of his time on Cartoon Network when he is on the Internet. He also uses Internet for his homework.

He comes to the club by choice. He is another regular of the club. He has been coming for more than four years, and his attendance at the club is on a daily basis. He spends most of his time at the club in the computer lab, in the gym, and in the game

room. Internet and QA are his favorite activities both at the club and in the computer lab. He usually groups with John in the computer lab. He is a popular kid at the club, in addition to John and Ryan. Other kids model them and consult them very often.

Jason

He is thirteen years old and he is in the sixth grade. He is Caucasian-American. He lives with his mother. She works and their family income is between $25,000 and 35,000. His hobby is computers.

He has a computer with an Internet connection both at home and at his school. He has a game console. I observed him as someone who has a broad experience with information technologies. He has been using computers and the Internet for five years. He is an experienced MMORPG player. He prefers to be alone while in the computer lab. He does not mind helping others if they request help.

John

He is eleven years old and he is in the fifth grade. He is Caucasian-American. He is the only kid in his family. Their family income is between $25,000 and $35,000.

He does not have a computer at home, but he has a game console. He has access to a computer with an Internet connection at his school. In addition to the club, he plays QA in his class. His information technology skills are intermediate; he has been using computers and the Internet for two years. Word processing and Internet software are the basic applications he uses. He uses the Internet for chatting and for Cartoon Network. He uses the Internet at school and at the club almost everyday.

Using the Internet is his main reason to come over to the club. He is also a regular of the club; he has been coming to the club for four years. He attends the club everyday.

He spends most of his time in the computer lab, in the gym, and in the game room. The Internet is his favorite activity both at the club and in the computer lab.

He usually groups with David in the computer lab. He is a popular kid at the club, in addition to David and Ryan. Other kids model them and consult them very often. He adores helping other kids with computing tasks. Other kids bug him very often but he does not mind helping them. If he observes a kid who is stuck with a computing task, he offers help without being called for.

Ryan

He is eleven years old and he is in the fifth grade. He is Caucasian-American. He is the only kid in his family. Both of his parents work and their family income is more than $65,000. His hobbies are computers and playing piano. He is a member of a baseball program.

He uses a computer with an Internet connection both at home and at his school. He also has a game console. He plays QA at his home computer. He has much experience with information technologies. He has been using the computers and the Internet for more than four years. He uses the computers for multiple purposes: word processing, spreadsheets, presentations, the Internet, image processing, and games. He thinks he does not know how to use the Internet, but my observations point to the opposite. On average, he uses the Internet several times a week. In addition to the home and school, his friends and the club are additional places that he uses the Internet. He uses the Web and e-mail in addition to the chatting on the Internet. He also collects information for his homework assignments.

He has been a member of the club for three years. He comes over to the club everyday. The reason for coming to the club is his parents' wanting him to do so. He likes the computer lab, the library, and the gym at the club. His favorite activity at the club is playing QA. This is also his favorite activity for the computer lab.

Kevin

He is nine years old and he is in the second grade. He is Caucasian-American. He has a brother and a sister, and their family income is more than $65,000. Both of his parents work.

He does not have a computer at home, but he uses a computer with an Internet connection at his school. He has been using computers and the Internet for three years. He uses game and Internet software on computers. He uses the Internet at his school and at the club on a daily basis. He learned how to use it from his parents. He uses the Web and games on the Internet.

He is pretty new to the club; he has been coming for less than a year. He comes 2 days a week. The reason for coming to the club is that he wants to and his parents want him to. He spends most of this time in the computer lab, in the gym, and in the game room. His favorite activity at the club is getting on the computers. QA is his favorite activity in the computer lab. He perceives Ryan as a leader in the computer lab and consults with him for help with various computing and QA tasks. If possible, he sits next to him in the computer lab.

Anthony

He is fourteen years old and he is in the seventh grade. He is Caucasian-American. He has a sister and their family income is between $44,000 and $56,000. Both of his parents work.

He uses a computer with an Internet connection both at home and at his school. He also has a game console. He has been using computers and the Internet for three years. On the computer he uses word processing, presentation, Internet, and game software. He connects to the Internet from the club in addition to the home and school. He connects everyday. He learned how to use the Internet at school. On the Internet he mainly chats and consults with his friends.

He has been attending the club for four years. He comes over to the club by choice. He spends two days a week at the club. He spends most of his time in the computer lab, in the canteen area, and in the gym. His favorite activity at the club is playing computers. Playing on the Internet is his favorite activity in the computer lab. He usually spends his time in the computer lab alone.

Jennifer

She is thirteen years old and she is in the seventh grade. She is Caucasian-American. She is the sister of Sarah, who was also interviewed for this study. She has a very large family, four sisters and one brother. One of her sisters also attends the club. Both of her parents work and their family income is between $35,000 and $44,000.

She uses a computer with an Internet connection both at home and at her school. She also has a game console. She has been using computers and the Internet for more than four years. She uses word processing, presentation, and game software, and the

Internet. She uses the Internet at her friends' homes and at the club in addition to home and school. She connects several times a week. She learned how to use the Internet herself. E-mail, the Web, and chatting are the main applications she uses on the Internet. In addition she uses it for homework assignments and for consulting with classmates.

She has been coming to the club just for a year. Her motivation for coming to the club is her friends at the club and also her parents' sending her. She comes over three days a week. She spends most of her time in the library, in the computer lab, and in the teen room. She does not have a favorite activity at the club; she likes to do a variety of activities. Playing QA is her favorite activity in the computer lab.

Thomas

He is eleven years old and he is in the fifth grade. He is Caucasian-American. He has a sister and he lives with his father. Their income is between $25,000 and $35,000. His hobbies are soccer, football, computers, and model making.

He uses a computer with an Internet access both at home and at his school. He also has a game console. He plays QA at home and at his school in addition to the club. He has been using computers for more than four years. He uses computers for word processing, presentation, the Internet, image processing, and games. He connects to the Internet from the club as well as from home and from school. He connects everyday. He learned how to use the Internet himself and also from his father. He uses e-mail, chatting, downloading, and uploading on the Internet. He also uses it for homework assignments, for consulting with classmates, and for playing games.

He has been coming to the club for more than four years. He comes to the club by choice. He comes four days a week. He spends most of his time in the computer lab, in

the gym, and in the art room. His favorite activity at the club is playing basketball, and his favorite activity in the computer lab is QA.

Rebecca

She is twelve years old and she is in the sixth grade. She is Caucasian-American. She has a sister and two brothers. She lives with her mother and their income is between $15,000 and $25,000. Her mother works. She likes doing art work.

She uses a computer with an Internet connection both at home and at her school. She has been using computers and the Internet for more than four years. She uses word processing, the Internet, and game software on computers. She uses the Internet at home, at school, and at the club on a daily basis. She learned how to use the Internet herself, from her friends, and from her family. She uses e-mail, the Web, chatting, and instant messaging features of the Internet. She also uses it for homework assignments and to play games.

She is a regular of the club; she has been attending the club for more than four years. She comes over to the club because she wants to and she needs to spend her time somewhere while her mother works. She comes over to the club everyday. She spends most of her time in the art room, in the computer lab, and in the game room. Her favorite activity is making stuff in the art room and playing on the Internet is her favorite activity in the computer lab. She usually groups with a girl in the computer lab, who is the same age as she is.

Eric

He is thirteen years old and he is in the seventh grade. He is Caucasian-American. He has a brother and two sisters. He lives with his mother with a family size of four. His

mother is a graduate student and they get assistance from social services since they have a limited income.

He has a computer with an Internet connection both at home and at his school. He also has a game console. On the computers he usually just plays games. He prefers to be alone while in the computer lab.

Brian

He is eleven years old and he is in the fourth grade. He is Caucasian-American. He has a brother and a sister and he lives with his father with a family size of three. Their income is between $25,000 and $35,000.

He does not have access to a computer or Internet connection at home and at his school, but he has a game console. He has been using the computers and the Internet for more than four years. He uses word processing, presentation, the Internet, image processing, and game software on the computers. He uses the Internet just at the club. He connects almost everyday. He learned how to use the Internet from his mother. He uses e-mail, the Web, chatting, instant messaging, and gaming features of the Internet. He also uses it for his homework assignment and for consulting with classmates.

He has been coming to the club for just one year. He comes everyday. His reason for coming to the club is the computer lab. He spends most of his time in the computer lab, in the gym, and in the game room. His favorite activity at the club is the computers, and QA is his favorite activity in the computer lab. He requests a lot of help with various QA tasks from more experienced Questers.

<u>Amy</u>

She is eleven years old and she is in the fifth grade. She is Caucasian-American. She has a sister and a brother, the latter of whom also attends the club. She lives with her parents and their income is between $44,000 and $56,000.

She uses a computer at home. She uses a computer with an Internet connection at school. She also plays QA at her school. She has been using computers for more than four years. She uses computers for word processing, presentation, Internet, and games. She uses the Internet at school, at friends' homes, and at the library once a month on average. She learned how to use the Internet herself. She uses the Web on the Internet.

She has been coming to the club for a year. She comes once a week. She comes because she wants to spend her time at the club. She spends most of her time in the art room, in the computer lab, and in the gym. Her favorite activity at the club is doing art work. Her favorite activity in the computer lab is QA. I observed her as not a frequent user of the computer lab.

<u>Mark</u>

He is nine years old and he is in the third grade. He is Caucasian-American. He has two sisters. He lives with his mother and their family size is three. Their income is between $15,000 and 25,000. His mother works.

He uses a computer with an Internet connection both at home and at his school. He has been using computers and the Internet for a year. He uses the computer for word processing, presentation, Internet, and games. He connects to the Internet from home, school, and the club almost everyday. He believes that he does not know how to use the Internet very well. He uses it for homework assignments.

He has been attending the club less than a year. He comes just one day a week. He spends most of his time in the computer lab, in the game room, and in the gym. His favorite activity at the club is playing in the computer lab, and his favorite activity in the computer lab is playing QA. In the computer lab he groups with Tyler at times and with James at other times.

Scott

He is ten years old and he is in the fourth grade. He is Caucasian-American. He has two sisters and five brothers and he lives with his mother with a family size of five. One of his brothers also comes to the club.

He has a game console at home. He uses a computer with an Internet connection at the school. He plays QA at his school in addition to the club. He has been using the computers and the Internet for three years. The basic application he uses on the computer is Internet software. He also uses it for his homework assignments. He connects to the Internet from the school and from the club. He connects several times a week. He learned how to use the Internet himself.

He is a regular of the club; he has been coming to the club for more than four years. The reasons for his coming to the club are his friends and his mother's working. He comes two days a week. When at the club he spends most of his time in the gym and in the computer lab. Playing in the gym is his favorite activity at the club. His favorite activity in the computer lab is QA.

Tyler

He is nine years old and he is in the third grade. He is African-American. He has four sisters and one brother. However, he lives with his grandparents. Their family

income is between $5,000 and $10,000. Since their income is low they get financial support from social services.

He uses a computer at home. He also uses a computer with an Internet connection at his school. He has been using computers and the Internet for just a year. He plays games on the computer. He uses the Internet from school, friends' homes, and the club once a week on average. He learned how to use the Internet from his friends. He uses the Web on the Internet. He also uses the Internet for homework assignments.

He has been attending the club for a year. He wants to spend his time at the club. However, he does not attend very often; he comes over to the club just one day a week. He spends most of his time in the computer lab, in the gym, and in the art room. Playing in the computers is his favorite activity at the club, and QA is his favorite activity in the computer lab. In the computer lab he groups with Mark.

James

He is twelve years old and he is in the sixth grade. He is Caucasian-American. He has a sister and two brothers. He lives with his father with a family size of three. Their income is between $15,000 and $25,000.

He does not have a computer at home but he uses a computer with an Internet connection at his school. He is a novice at using computers and the Internet. In the computer lab he groups with Mark.

Luke

He is thirteen years old and he is in the sixth grade. He is Caucasian-American. He has a sister and two brothers, one of whom also attends the club. His father is the only working person and their family income is between $35,000 and 44,000.

He does not have a computer at home but he has a game console. He uses a computer with an Internet connection at his school. He has been using computers and the Internet for more than four years. He just plays games on the computers. He connects to the Internet from the school and the club on a daily basis on average. He thinks he does not know much about the Internet. Playing Cartoon Network and consulting with his friends are the main tasks he uses the Internet for.

He is pretty new to the club; he has been coming to the club for less than a year. He comes over because he has friends from his school. He attends the club everyday. He spends most of his time in the library, in the art room, and in the computer lab. His favorite activities at the club are the gym and the library. He does not have a favorite activity in the computer lab. I observed him as a kid spending his time alone in the computer lab.

Sarah

She is eleven years old and she is in the fourth grade. She is Caucasian-American. She is the sister of Jennifer, who was also interviewed for this study. She has four other sisters and one brother. She lives with her parents and their family income is between $35,000 and $44,000. Both of her parents work.

She uses a computer with an Internet connection both at home and at her school. She has been using computers for two years. She plays games on computers. She has been using the Internet for a year. She uses the Internet at home, at school, and at the club once a week on average. She learned how to use the Internet from the library. She uses the Internet for chatting and for homework assignments.

She comes to the club at her parents' request. She has been coming to the club for a year. She attends to the club everyday. She spends most of her time in the gym, in the art room, and in the library. Her favorite activity at the club is playing the slamwich game, and playing Oregon Trail is her favorite activity in the computer lab.

CHAPTER 4: DATA PRESENTATION

First Research Question

After the data analysis, thirteen categories emerged as the motivational elements to play QA. These categories address the first research question of this dissertation. These categories are: identity presentation, social relations, playing, learning, achievement, rewards, immersive context, fantasy, uniqueness, creativity, curiosity, control and ownership, along with context of support. Each of these categories also has sub-categories. The description of these categories and their sub-categories is presented below. An advance organizer for them with the number of responses for each of the sub-categories appears in Table 4.1. The relationships between the categories are discussed in Chapter 5 of this dissertation.

I will use the following labels to inform the reader about the quantity of the opinions that are used to explain a category or its sub-categories: One for 1 opinion, few for 2 to 5 opinions, some for 6 to 9 opinions, half for 10 to 13 opinions, most for 14 to 19 opinions, and all for 20 opinions. These opinions are usually opinions expressed during the twenty interviews done with the kids. At times I also used the same labeling to quantify my observations.

These labels and numbers do not necessarily show a statistical significance for a category or its sub-categories. It should be emphasized here again that the categories and their dimensions and properties have more value as the product of a qualitative study.

Table 4.1. Thirteen Categories and Sub-Categories as Motivational Elements

Category	Sub-category	Total number of responses (phrases)	
1. Identity Presentation	Avatars	22	83
	Usernames	10	
	Homepages	51	
2. Social Relations	Interaction with others	166	260
	Sharing	40	
	Competition	3	
	Showing off	28	
	Groups	13	
	Privacy	5	
	Security	5	
3. Playing	Multimedia	5	147
	Points	138	
	Pushball	4	
4. Learning	Unique learning	4	288
	Meaningful learning	17	
	Active learning	231	
	Feedback	23	
	Multimedia	5	
	Attitudes	8	
5. Achievement	Challenge	9	36
	Recognition	27	
6. Rewards	Awards	9	269
	Points	185	
	Trading cards	7	
	Open market	68	
7. Immersive Context	Support structures	6	170
	3D	164	
8. Fantasy	QA myth	19	31
	Council members	12	
9. Uniqueness	Unique opportunity	19	133
	Different from others	16	
	QA vs. others	98	
10. Creativity	Building	129	129
11. Curiosity	End of the game	3	28
	Quest status	5	
	Secret places	20	
12. Control and Ownership	Control	38	52
	Jobs	14	
13. Context of Support	School vs. club differences	9	14
	Username	2	
	Trading post items	3	

1. Identity Presentation

Kids present their identity through their avatar choices, their homepages, and their usernames. These three elements let them express themselves and show themselves to the others. In this way they feel that they are empowered within the game.

1a. Avatars

Transforming into an avatar is part of their identity presentation in the game. Half of them loved to identify their avatars as themselves. The avatars partly represent their physical appearance. While interacting with others they try to make a connection to the other people by looking into the avatars of the opposite side:

> Hakan: If you compare [QA] to Cartoon Network, how is it different?
> John: Well, it's more digital than Cartoon Network. You can interact with others across the world on both of 'em BUT it's more like you can see other people. You can see what...the avatar is part of it because it shows you what they like, what they are like.

In addition, I observed the kids always chose an avatar that is compatible with their gender. One of them indicated she would expect that others would make a similar choice:

> Hakan: Do you change [your avatar] very often?
> Jennifer: One time I logged on, and I was kind of a guy, and I didn't like it, and I changed it to a girl.
> Hakan: What did you think about that? Being a guy actually you were a girl?
> Jennifer: I thought that was weird. I didn't like it.
> Hakan: What would you think if some guys would choose some girl avatars? Is it ok, or is it not ok?
> Jennifer: I don't really care what they do with their person, but if they didn't know I would alert them. So I would tell them that.

For one kid avatars were so familiar that he identified some avatars specifically by their names during the interview:

Hakan: Why do you get excited [in QA]?
Anthony: Excited? Um, because you get to, like, transform into a ball or, James or any person you want ...

Through the avatars they were able to express themselves. Thanks to the 3D technology QA utilizes, kids are able to click on specific buttons on the interface and perform a variety of gestures, like waving, dancing, or being happy. These gestures are shown in real time to the person on the other side. One Quester indicated how QA enabled her to express herself:

Hakan: How is Quest Atlantis different than other things you do at the school?
Sarah: It's like you could be angry, happy. Or dance. And others you can't.

1b. Usernames

Having a unique username is one of the ways the Questers can represent their identity. Some of them indicated that they liked how their screen name was listed on top of their personal homepages. Few kids chose their real names as their usernames. However, most other kids set their usernames as something that they adored in their lives. For example, one kid who liked the Looney Tunes cartoon character "Tasmanian Devil" set his username as "Tazy." Another one who liked a famous basketball player set his username as "Jermaine oneal." One girl who played QA at her school complained that her teacher did not allow her class to choose their usernames, and informed what she would choose if she could:

Hakan: What are the things that you don't like in your homepage?
Amy: I don't like my name.
Hakan: What is the reason for that?
Amy: Because it is really weird.
Hakan: What is your username?
Amy: [A combination of the first two letters of the last name and the full first name].

96

Hakan: Would you change it?
Amy: Yes.
Hakan: Ok, what would you set to?
Amy: Ice cream.
Hakan: What is the reason for that?
Amy: Because I love ice cream.

Few Questers adopted their usernames in such a way that it overshadowed their real names. It was their usernames which identified them in this game, and therefore their usernames were what they were. For that reason they started to sign the e-mails and the Quest responses with their usernames. Here is how one of the Questers adopted his username as his identity in his Quest responses over time:

Below is a Quest response from 04/16/03
    [Quest response]
  thank your time
    [Firstname Lastname]

Below is a Quest response from 05/07/03
    [Quest response]
   your qa member
    [username]
    [firstname]
    thaks

Below is a Quest response from 05/15/03
    [Quest response]
   senserly
  [username],[firstname],

At times most Questers changed their usernames. When the old username of a Quester was selected by another one, the first kid became angry and there had been a tension between the two. The kid who used to have the username stated to me that many other users linked this username to him, and therefore the other kid should not have chosen this username. The same tension was replicated between these two kids over another username at another time.

A few kids also used usernames for role-playing, and therefore adopted someone else's identity. There was a time when one of the Questers at the club came across one of the QA designers with in the online space of the game. The two got into a chat and later several other kids from the club joined them. The username for the kid was 50cents. This is the name of a recent popular rap singer. I observed this kid as a big fan of the singer; for example, he often visited the singer's web site and listened to his streamed songs while doing other activities on the computer. The Quester started to behave as if he was really this rap singer. Our designer seemed to accept this role-playing. I observed that suddenly all the kids in that group thought that the designer really perceived this kid as the real 50cents. Then the Quester started to take the identity of the rap singer, as if he was the real 50cents:

```
(David):       so have you herd 50 cent
(David):       i am really 50 cent
QA Designer:   How did you get your name 50cent
(David):       im a gangsta
QA Designer:   I see
QA Designer:   Is that a gansta name
QA Designer:   Is it a musician's name?
(David):       im a rap stare singer
QA Designer:   cool
(David):       im a millyonar
QA Designer:   Yea right!
(David):       i am a rap stare singer
QA Designer:   Cool
(David):       im not joking dud
QA Designer:   I beleive you
QA Designer:   Have you ever sung on stage yet>
(David):       im from new york
```

1c. Homepages

To go beyond showing physical appearance, most Questers use their homepages. The items they like on their homepages include self info, mood indicator, and the

username. Part of every Quester homepage includes information on what they like, what they are good at, their favorites, what they care about, and what they want to be when they grow up. This information makes up the self-info for that Quester. They can easily personalize their homepages, and they update them from time to time. They seem to like to express their identity this way:

> Hakan: What do you think about your homepage?
> Emily: Um, it's cool, I guess 'cause people can learn about you.
> Hakan: What are the things that you like on your homepage?
> Emily: Um...how you can say what you like and what you can do.

Showing their moods through their homepages is another way to express themselves. By using such emoticons as happy, excited, angry, or silly, they show to others how they feel at that moment. At least half of them used this feature:

> Hakan: What are the things that you like in your homepage?
> Thomas: I like, like express your mood, with the little face icon.

One Quester indicated how his mood was always reflected to the game:

> Hakan: What about the mood icon?
> John: Yeah, yeah I've done that.
> Hakan: You like that?
> John: I put on Unsure because I'm never sure of how I feel.
> Hakan: So you are reflecting your actual mood?
> John: Yeah I'm like, um, 'well I don't know if today's good or bad. It's just okay. You know. I mean, it's just like any other normal day.

2. Social Relations

Social relations happening in the game was one of the biggest motivators for the players. These relations happened both within the online space and within the physical space where they connected to the game. In their relations, they interacted with various people through multiple communication modes. At times there was competition among the Questers but data showed that sharing dominated over competition. Although there

were Questers who wanted to play the game individually, playing it as a group was more frequent. And security features within the game bettered the social relations. The details of these social relations are explained below.

2a. Interaction with Others

The multiplayer feature of QA supported its players in interacting with each other. As an example, an experienced multiplayer online role-playing game player indicated that he joined QA because he liked playing this type of game. In this sense, he perceived QA as a multiplayer game. The multiplayer games he compared to QA included popular ones like Everquest, Dark Ages of Camelot, and Ultima Online. He was so experienced that he recognized all the effort and money spent while developing these kinds of games.

All Questers communicated to meet new people and to interact with their friends. Various communication modes enabled the interaction between these people. Trading QA cards was also a kind of interaction. And finally, these interactions ended up with conflict at times.

Interacting with other people. Meeting new people was an act that most Questers liked to do. Frequently, when they encountered someone in the game that they did not know they tried to be friend them. The people they met included kids from other parts of the world, like Australia. In addition, a few kids at the club who did not know each other before, met through QA. For some kids making friends was what QA was for:

> Hakan: So Quest Atlantis created an opportunity for you to meet [new people]?
> Kevin: I think Quest Atlantis is trying to make you friends. I think that's why the people made Quest Atlantis, so if you were just lonely at the club, you could get friends on Quest Atlantis. That could help you have more fun at the club.

In addition, existing friends met in QA space. QA closed the gap for most remote friends:

> Hakan: ... Which parts of Quest Atlantis keep you coming back to Quest Atlantis?
> John: ... being able to interact with some of my friends I don't get to interact with everyday.

A few kids treated the members of QA design team as their friends with which they often interacted. Many kids recognized and valued the friendship of several team members who interacted with them and helped them online.

Communication modes. The modes for communication were chatting, e-mail, and telegrams. The chatting was the main communication mode. It was "like a telephone on a computer" as one of the Questers characterized. Thirteen out of twenty Questers indicated chatting was one of their most favorite activities in QA. "Talking to various people" was replicated in almost every interview as something they liked a lot. The ability to chat made QA different from most other educational games. A few of them characterized the game as a "chat room."

They utilized chatting for various purposes. Sometimes, they got on to QA just to talk to people. They recognized the utility of chatting for connecting remote people. A few of them used chatting to talk to their remote friends in another city, something they were not able to do easily before. And most importantly, they used chatting to get help from others when doing Quests:

> Hakan: Why do you get excited?
> Anthony: ... you get to also chat on it and the words pop above your head and if you need help on like, a quest, you can like, say, if you guys know where desert is, a presenter, if they know they'll show you. And that's why it's so much fun and exciting.

The chatting feature was also used to eliminate communication problems locally. A few kids indicated that chatting enabled them to talk to each other within the same computer lab without going or screaming to the other side of it:

> Hakan: What else [do you like in QA]?
> David: And, uh…I like to also talk to my friends on there 'cause there are a lot of people at the Boys & Girls Club that like to play that. And I can talk to my friends without screaming to the other side of the computer room.

The e-mail feature was the second most commonly used option for supporting communication. The homepage for each Quester hosts a mail button, which is visible all the time. When there is a new message for the user this is indicated below this button. Also, Questers can click this mail button to e-mail others. Most of the properties of this communication mode are similar to regular e-mail, except for the fact that it is internal to the game. Therefore, players can read and send e-mail just within the game.

The e-mail was used for various purposes as was the chatting. It was used to greet people within the same physical space. At times, one kid noticed another kid playing the game in the lab and sent an e-mail to that kid. Then the receiving kid was usually informed by the sender about this new e-mail. After a content analysis of the 383 received e-mail messages and 235 sent e-mail messages for the twenty interviewed Questers, I found out that the e-mail feature was used for the following purposes: meeting other people, requesting help for specific tasks within the game like building and doing Quests, helping others, sharing what is going on in someone's life, and sharing feelings. I noticed that a few Questers sent several e-mails to each other in a very short amount of time while playing the game. In this sense, they preferred to use e-mail over chatting. E-

mail was the only communication mode between the Questers and the mythical council members.

The telegrams were seldom used for communication. Sending telegrams is an internal feature of the 3D technology QA uses. When someone receives a telegram it is indicated in the chat window by a red text that the user has a message to read. If the user is offline the message is displayed the next time user is online. These characteristics of the telegram make it similar to instant messaging software, like MSN Messenger or ICQ. Using this feature for communication was not intended by the designers to be used by the Questers. Therefore the use of it was not documented, not included in QA help files, and not encouraged. However, I observed some kids still somehow learned to use it and extensively used it. Telegrams were usually used for greetings between the Questers. In addition, when I was in development worlds that the Questers were not able to access, a few of them sent me telegrams to say something to me.

Trading. Exchanging trading cards was a form of interaction that the game afforded within physical space. The distribution of the cards happens in the computer lab. For that reason, when someone got a pack of cards this became a point of interest for QA card collectors and they started to make offers for certain cards. The content analysis of the e-mail messages showed that trading QA cards happened even through e-mail between a member of the club and a member of a school, which used QA.

Conflict. As a natural result of the interaction between humans, I observed several conflicts among the kids. In one of these conflicts one Quester wanted other players out of his house while he was building. I observed three different discussions related to this issue on different days that involved this kid and other kids. Eventually, other kids left his

building and he continued building without others' presence in his virtual home. Another conflict emerged when a few users changed their usernames to the old usernames for some other players. These users usually kept their usernames. And lastly I observed conflicts as the result of the cursing in the chat space. In such cases, kids either made a complaint about the person who cursed to the lab staff or they reported these to the Atlantis security. The security issue is explained in detail as a sub-category later.

2b. Sharing

Most Questers shared different information to overcome the difficulties of the game. The modes for the sharing were cooperation, getting help, and helping others.

Co-questing is the main mode for cooperation intended by the designers. Questers' doing the same Quest, at the same time or at different times, is called co-questing. Any player can initiate co-questing when they review the description for a Quest, and they can select other co-questers. I observed that none of the Questers co-quested, although they cooperated in some other ways for Quests. For example, I observed three Questers, while sitting next to each other, completing the same Quest after discussing it as a group. There were many other instances where the Questers completed Quests after cooperating with the lab staff. All these could be named as co-questing, but this was not co-questing procedure intended by the designers.

I also observed cooperation with building activities. Two of the interviewed Questers engaged in such a cooperation. One of them built a hotel and the other built a restaurant in the Questers' building area. When other players visited the restaurant they were seated by the restaurant builder and also their orders were taken. After that, players

could go to the hotel to sleep in. The hotel was the tallest structure of the game at that time. It included a lobby, rooms, and a swimming pool at its top.

The help desk was recognized as a place where they could get help from other Questers working there. In addition, some Questers got help from other players related to various QA tasks. These tasks included building, using e-mail, finding a specific world or place in 3D, doing Quests, and location of the Quests:

> Hakan: Tell me about activities you don't like to do in Quest Atlantis.
> Tyler: To read the story thing. When you try to do the quest. But now I just, my friends [Mark], he just taught me how to make the words read it to me.

One of the Questers improved his gameplay with the help he got from his friends:

> Hakan: How did you learn about playing Quest Atlantis? Did you just get on and learn yourself or did you learn from your friends?
> Kevin: I learned myself. And then, I got more advice from my friends. That's how I got so good at Quest Atlantis.

Some Questers seemed very enthusiastic about helping other kids with game tasks. These tasks included finding secret places, components of the homepage, changing avatars, doing Quests, and location of the Quests. One of the kids informed me that helping others in the game was an indicator that you were an experienced player in this game:

> Hakan: Do you want to show your points to other people? You want to show others that you are an experienced Quester?
> Jason: Yeah. Uh huh.
> Hakan: You think that the points are the only way to do this?
> Jason: Not the only way. You can help people.

Also, Questers who learned something became a source of data and they started to disseminate the same information to others who did not know about it. For example, one

of the kids asked me how to use the e-mail system. After showing him how to use it, I observed that he taught this task to another kid in the lab.

2c. Competition

Although most of the Questers liked sharing, still a few of them were competitive at times. For example, one of them competed against others with their creativity. They made competitions among themselves and tried to build the best house in a certain amount of time. Another one wanted to have the best and the most of everything in the game:

> Hakan: So you like building, you like your name on the wall?
> Jason: I like being first, pretty much. Having the most points and being that was closest to top.
> Hakan: You want to be the one with the most points?
> Jason: Yeah.
> Hakan: That's your purpose [in the game]?
> Jason: Yeah. And to have, like, the best house and stuff. I don't think I have yet, considering I can't get the second floor roof on.

2d. Showing off

At least half of the Questers liked showing off what they have done to their peers. For a few of them it was points that they were showing. For another few it was the number of trading cards. There were also times when a few of them showed off to others in addition to their peers. One time one of the designers visited the computer lab. One of the kids grabbed him and immediately showed off his land and virtual house. At other times I observed that a few kids dragged their parents or other relatives, who came over to pick them up, to the computer lab to show off their points and completed Quests.

A few kids also mentioned their names on the wall of the Otak. The Otak Hub, which is the entrance world to the game, contains a lot of empty plaques that say "Your name could be here." When Questers complete at least three accepted Quests and fill in

their homepage information they can e-mail Alim, one of the fantasy characters, and request their names to be written to one of these plaques. The Quester plaque is also linked to the homepage of that Quester, therefore others can click on any plaque with a Quester name on it and learn about that Quester. These plaques were perceived by few Questers as a means to show off their presence in the game.

The purpose of showing off was to emphasize one's experience in the game. Completed Quests, received points, the name on the wall, and all other earned symbols showed the experience of that Quester. The Questers showing off these symbols expected respect because of their experienced status. One of the Questers explained that this was the case even at other online spaces for kids, such as Cartoon Network. On the Cartoon Network C-points were similar to QA points, C-toons were similar to QA Quests, and the C-zone was similar to the QA homepage. Having more of them would give you respect among the kids at the club and also among the kids at sites elsewhere in the world:

> Hakan: [Why do you like trading online cards on the Cartoon Network so much?]
> John: … And then we have 'em on these C-zones and it's like again it's a respect factor. Your C-points and your C-toons, where it fills up your whole C-zone, then you get respect.
> Hakan: But respect among people here [at the club], right? Not like respect in, like, all over the world. Respect among club members.
> John: Yes.
> Hakan: Like, respect by people who …
> John: Yeah, respect all over the world, too. 'Cause people look at your C-zones.

2e. Groups

Most Questers did activities in groups, both physical groups and online groups. I observed that about twelve groups were formed at the club. The members of these little groups never changed. They hung out together most of the time and the members of these

groups sat close to each other while doing the same activity in the game. This is how one

of the Questers described their group activity:

> Hakan: ... And what else [keeps you coming back to Quest Atlantis]?
> Mark: All my friends have Quest Atlantis.
> Hakan: Who are they?
> Mark: [XXX] and all those people. Umm [Ryan]. And [XXX].
> Hakan: Do you usually hangout together?
> Mark: Yeah.
> Hakan: What do you do?
> Mark: We play the ball game, I don't know what it is called. Play stuff
> with each other and stuff. And make it like help each other out. And we
> follow each other and stuff.

Peer group. For some kids, other kids playing QA was a reason for playing QA.

These kids mentioned that either they heard QA was a cool game, or they saw everybody

was playing this game. And that is why they started to play QA:

> Hakan: Why did you join Quest Atlantis?
> Luke: Everybody says pretty cool game so I wanted to see how good it
> was.

> Hakan: Why did you join Quest Atlantis?
> David: A lot of people were getting on and I just wanted to see what it was
> like.

Among the peer groups, watching over the shoulder was a common practice. Kids

without a QA account often asked for permission from the lab staff to watch other kids

playing the game. In addition, Questers with less experience watched Questers with more

experience to learn about specific tasks. Among these tasks doing Quests and building

were the significant ones.

Guilds. Guilds were designed as the online version of grouping the Questers. The

guilds are formed around a common theme or mission statement that identifies some

characteristic about the Questers and give them a focus for some of their work. At the

time of the data collection there was a guild for each of the worlds. Questers could join

any guild they wanted without any prerequisite. After joining to a certain guild they got a small percentage of points for each of the Quests completed by a member of the same guild. In addition, while joining a guild they had to pick a mentor, who would get two points for being the mentor. They usually picked a much more experienced Quester, who helped them in some way:

> Hakan: So, you are a guild member for Ecology guild?
> Brian: Uh huh.
> Hakan: Do you do any activities as part of being in that guild?
> Brian: Well, I just started not too long ago because [Ryan], he helped me out and really showed me how you join guilds. And he's my mentor in the guild.

Since the guild structure was tentatively designed in the game I did not observe much activity as a guild. For this reason kids joined a guild just to be part of that guild. In addition, getting extra points through other guild members was a reason for most of the guild members. As of writing this dissertation, design decisions for the use of the guilds were in progress.

2f. Privacy

Although socializing with other people was an important motivator, there were a few Questers who wanted to maintain their privacy at times. When this happened, they preferred to be alone and for that reason they avoided the others. One of the Questers said he went to another world when he got into a struggle with somebody. Another Quester said he did not like players' entering his virtual house when he was building it. I observed at least three different incidents on different days between this kid and other kids, in which he wanted others out of his house.

2g. Security

The secure environment maintained within the game gave rise to the social relations. There were multiple security modes for maintaining the safety of the Questers. First of all, all the chat that takes place is logged and reviewed daily by QA design team. In addition, all this discourse is made publicly available, and anyone within the game space can read the chat that belongs to a specific day. Another security feature is the security link that exists on the links part of their homepages. They can use this link to report security problems directly to the designers:

> Hakan: So what are the things that you like on your homepage...?
> Anthony: ...you can see the links. Like, if somebody is saying something bad, you can report on them...

I observed that the security link being used extensively by the kids to report cursing, rude behavior and flooding (i.e. typing the same words again and again), and to make complaints about junk e-mail, telling real names to others, inappropriate pictures in the Questers' building area, inappropriate usernames, and identity theft. They did not discriminate between the designers and players when they reported. One of the designers was also reported for the rude behavior:

> Subject: Security Report
> Date: Wed, 30 Apr 2003 13:42:25 -0500
> From: "Username" <Name.Lastname@atlantis.crlt.indiana.edu>
> To: "ATLANTIS" <atlantis@indiana.edu>
> hey i have a complaint about [XXX] like being very rude he is one of you

3. Playing

To most Questers, QA is a game that they can play. They frequently referred to their QA experience as "playing the QA." Multiple factors contributed to the gameness of QA. Controlling an avatar was one of them. Another factor was the different worlds and

villages that made up the OTAK. They explained that looking for Quests in them was an exciting activity to do. Exploring these worlds and villages and finding out secret places in them were fun things to do for them. They used their points in the trading post to buy store items. The synergy of all these factors made QA a fun game. Most of the interviewees fell in love with QA space, its characters, and its story:

> Hakan: I know you like Cartoon Network pretty much right? How is [QA] different from Cartoon Network?
> David: Quest Atlantis is a thing that is only one thing, and you are actually a real person and you can talk to people and you don't have to just play a game, or anything. It's a learning thing where you can learn and have fun too at the same time.

> Hakan: Why did you join Quest Atlantis?
> Brian: I just thought it would be fun to play a game that you have to do quest and get points and you can build houses and stuff like that.

Half of the Questers thought that QA was such a complete and fun game that there was nothing else to add to it. These Questers were also reluctant to criticize the game:

> Hakan: How might Quest Atlantis be different in a way that will make you come back? What additions?
> Anthony: Um…what should you add? I don't really know 'cause there's basically nothing else to add.
> Hakan: Why do you think that way, there is nothing else to add?
> Anthony: Because there's excitement, there's adventure 'cause you get to go around and see new things, there's…It's fun, you get to meet new people, you get to do quests, earn points, Internet time…um, that's basically all of it.

Adventure games are a genre of computer games that blossomed in the late 1970s. A typical adventure game contains puzzles, and the player needs to solve these puzzles by collecting various objects within the game. Adventure games have a beginning and an end. A few Questers were curious about the end of QA. In this sense, they treated QA as if it were an adventure game:

111

> Kevin: I'm always curious about what happens when you beat Quest
> Atlantis. 'Cause, like, when you do all the quests or you build the...um,
> what is it called again...that you have to rebuild?

Although the Questers engage in educational activities in QA, they do not see these educational activities as hard work. The gameness of QA contributes to this feeling:

> Hakan: Do you see Quest Atlantis as a game or as a work? I mean as
> homework for example.
> Mark: I think it's a game, because you don't really have to do hard work,
> you can buy and stuff. I don't know, like you don't have to do English or
> that stuff, you just spell stuff. That's all you have to do hard.

Among the game elements multimedia elements, points, and pushball were the ones most mentioned.

3a. Multimedia

Multimedia elements within QA also added to the gameness feature of it. These elements include animations in streaming video format, audio narrations that accompany each Quest description, various sound effects associated with certain areas or certain objects, and images, pictures, and graphics used throughout QA space. QA is a media-rich environment from the very start. When they start playing the game they can watch the colorful animation, called "The QA Legend" and narrated by the council members, which tells the back story of the Quest Atlantis. For each world there is an additional animation, in which the council member for that world introduces the purpose of the world and the villages in it to the Questers. One Quester said it was fun to listen to Quest descriptions:

> Hakan: Do you like learning from those quests?
> Anthony: Yeah, I like learning. It's really fun to read and also to listen.

3b. Points

Another play element was the points. All Questers liked getting points after completing the Quests. They also liked seeing their points on their homepages. The points in QA made it like a computer game. In a typical action computer game you blow up the space ships and you get points for doing so. In QA you complete the Quests to get points. And that's why it is a computer game. One Quester indicated that he would not do Quests without the points:

> Hakan: Let's say we cut the points for doing quests. Would you do the quests?
> Anthony: No. I would never do 'em.
> Hakan: And what is the reason for that?
> Anthony: Because it wouldn't be fun.

3c. Pushball

Pushball Arena was another element that contributed to the gameness of QA. This is a rectangular area in Healthy World, which is designed as a typical football arena. In the arena, there are two goals and a large colorful ball, named as pushball. The purpose of the game is to push the ball to the other side's goal. When they score it is recorded to the scoreboard by the arena. Questers can form a team and play as a team, or they can play one-on-one. Consistent with the Healthy World theme, the teams are named as the heart team and the mind team. All this action is controlled by a "bot," an automated computer program. The bot also functions as a referee. For example, the bot makes announcements when the game starts or stops, or when someone scores. I observed that kids liked it when their names were announced by the referee as a scorer.

4. Learning

For Questers, QA is not just a game that they can roam around. This game also has an educational value and they enjoy learning through QA. Most of them emphasized learning in QA was a fun activity. They indicated QA was a place where "you can learn and have fun too at the same time."

> Hakan: How is Quest Atlantis different from other things you do on the computer?
> Scott: You have fun while you're learning.

This combination of fun and learning were so intermixed that at times that the participants were not aware that they were learning. In this sense, they experienced flow (Csikszentmihalyi, 1990) in the learning process:

> Hakan: How is Quest Atlantis different than other things you do on the computer? For example, I see a lot of kids, including you, play Cartoon Network. How is it different from Cartoon Network or from other educational games?
> Andrew: Well, Quest Atlantis doesn't have that many games [like] Cartoon Network or any of that. It's different than Cartoon Network and stuff like that because it's got education, and you learn, and sometimes you don't even know that you are learning.

There was a broad range of content that they learned. The content range included computers, information technology, environment, ecology, literature, and the world. One kid indicated that QA taught him "pretty much everything about computers." Another one indicated that his writing skills on the keyboard got better after he started playing QA. Related to the environment and ecology, they learned about "pollution, toxic waste, and water." The content they learned about was as rigorous as the content at the school. In terms of rigor, some kids indicated that completing the Quests in QA was not different content wise from doing worksheets at the school or doing homework:

Hakan: Do you see a difference from doing homework? For example, is there a difference between doing homework and playing Quest Atlantis?
Brian: Not really 'cause doing homework, you learn stuff from doing that and doing Quest Atlantis, you learn stuff doing that too.

Hakan: Do you see a difference from, for example, doing schoolwork or other hard activities?
Andrew: Not really. It's basically learning the same stuff as in school only you're in a different world.

Kevin: A quest is like a worksheet at school. You can feel the worksheet but you can't feel the quest sheet. On Quest Atlantis, you can't just put your hand through and feel it.

4a. Unique Learning

A few Questers indicated that they would not learn as much without QA. The game created an opportunity to learn content that was not available in their regular learning environments:

Hakan: So in Quest Atlantis you think you are learning things that otherwise you were not able to learn?
Ryan: Right, like all the water supplies and stuff. And then Culture World, WOW! I learned about; no, it was Unity World where I learned about some of the nations around the world. But in Culture World I learned about some artists. That was fun.

Hakan: How has Quest Atlantis changed your life? At the club, at the school, at home maybe...
Andrew: I think it's taught me to be more responsible and to think about the environment on earth more than anything else usually.

The Quests also guided them towards thinking in a way that they have not done before. In this way, Quests were a unique opportunity for them to learn new skills. Two Questers specifically mentioned how they have learned through QA that bullying was an incorrect behavior:

Hakan: How has Quest Atlantis changed your life?
Thomas: It just kind of taught me a lot of things, like I remember, I did this one bullying quest, and, it taught me a lot about how bullying is

wrong and stuff. And you shouldn't do it, which I wasn't thinking much about that before...

A few of them learned from the Quests indirectly. In this sense, the Quests often initiated learner interest towards a specific subject matter which they followed-up on outside the game. For example, during one of my observations I witnessed how one of the Questers got interested in "hacking" QA. Later, I observed him reading information about the Lynx operating system (a high level command-base operating system), although there was no reference to this content within the game. Another kid explained how QA initiated his interest:

> Hakan: Can you give me an example?
> Ryan: Beethoven would be a music one. Well, I didn't learn directly about him in QA, but I was interested and I went out and checked some books about him out at the library.

4b. Meaningful Learning

The learning provided by QA is not just information. They still learn new knowledge but the kind of learning they get is meaningful for these kids. It is not just rote learning; they learn about their community, about social life, and how to deal with life when they grow-up. QA equipped at least half of them with meaningful learning that they could apply to their lives:

> Hakan: In what ways do you think [QA] is useful to you? Are you having fun? Are you learning anything new?
> Jennifer: Yeah, I am having fun. Because a lot of my friends go in and stuff. And you learn stuff that is important to me too. So that's kind of a reason too.

> Hakan: In what way is [QA] helping you?
> Emily: Well, um...it helps me learn how to do...like, it will kind of help for when I get older, for somehow. I don't know why, it just probably will. And it will, like, help me be able to type faster for the chat room and stuff like that.

116

Hakan: If you compare Quest Atlantis with courses at the school, or with lectures, what do you think? Or with tests?

David: Tests? I think Quest Atlantis is a more learning thing. Because it teaches you about life, it teaches you about how you can treat others and about your neighborhood, what you can do, pick up trash and stuff, what you can do in the world when you get older instead of just teaching you. It still teaches you to something, like, to go on the web and learn about an artist. But, school doesn't teach you that kind of stuff.

Hakan: What do you think you learn at school?

David: Umm, I learn basically math and stuff like, writing stuff down and sentences. Stuff like that.

This application to life was quite powerful in some cases. One of the Questers

perceived the game as a guide, which directed him in the positive direction:

Hakan: Is that the only reason [for playing QA]?

Kevin: No, because it makes me learn stuff. When I'm doing the wrong thing, it helps me do the right thing.

4c. Active Learning

Participants liked learning with QA because the learning environment provided

was not similar to the one they were used to at their school. They did not have to

monotonously read a book or attend to teacher and respond to her or him. They also

actively searched for the answers, processed the information, and responded. They were

active participants in the learning process. For example:

Hakan: How is it different from the activities you do at home or at school? Like homework? Or other educational activities or games. Anything you can think of?

John: Yeah. Well, it's definitely different from homework. It's learning but its fun learning. It's not just like, 'sit down and write' kind of learning. It's where you have to go and get stuff and find stuff. It's fun.

Hakan: Why did you join Quest Atlantis?

Amy: Because it is a fun way to learn. And you don't have to like, just like the teacher just gives you a... 'here do this,' you can actually like go around and try to find your quest in like ecoworld, healthy world, and other worlds.

Hakan: What do you get out of playing Quest Atlantis?
Mark: You get points and you get smarter and stuff. Because you got to do quests and stuff and you got to look for stuff. You got to read, you got to type and all kinds of stuff, and stuff like that. You [are] like, like typing and saving Quest Atlantis.

4d. Feedback

This different kind of learning also required a different kind of feedback mechanism. Within the game, they were allowed to make mistakes during their learning. Making mistakes was part of the improvement process. For that reason, they were not disappointed when their Quests were rejected for requiring more improvement. They would revise their responses:

Hakan: So, you like questing, you like the council…and what else can you tell me?
Kevin: Yeah. Um also, when I make a mistake, I always like that because I like to read the letters that the council sends me if I made a mistake on my quest. I like to read those a lot.
Hakan: You like their feedback?
Kevin: Yeah.
Hakan: What they like and what you can improve on?
Kevin: Yeah. I like to read that 'cause it makes me feel like that I could get better at doing it.

4e. Multimedia

Multimedia features of the game positively impacted the motivation of the participants towards doing the Quests. Reading difficulty was one of the drawbacks I observed with these kids; for that reason, most of the time they preferred listening to the Quest descriptions and Quest goals over reading them. When they were not able to listen to several Quest descriptions because of technical difficulties, they asked lab staff to narrate them. I observed this incident multiple times with different kids. This is how one of the Questers indicated reading as one of his least favorite activities in QA:

Hakan: Tell me about activities you don't like to do in Quest Atlantis.
Tyler: To read the story thing, when you try to do the quest. But now I just listen, my friend [Mark], he just taught me how to make the words read it to me.

4f. Attitudes

In addition to learning, QA impacted attitudes of the Questers positively towards other areas. The most significant of these areas were environment and nature:

Hakan: What kind of knowledge?
Ryan: I learn about stuff that I might not know [of], like in Ecology World. It makes me enjoy the outdoors a lot more.

5. Achievement

While the Questers participate in different QA activities including doing Quests, building activities, finding secret places, and similar activities, most of them perceive these activities as a challenge. They try to overcome these challenges. When they succeed their accomplishment is recognized by the game by different modes. Eventually, they get satisfaction out of this overall process.

5a. Challenge

Most kids liked completing the Quests. One of the main reasons for that is they perceived the Quests as a challenge. Their favorite Quests were the ones that were more challenging. The Quests which were difficult to find, which required collecting more information from resources, and which took more time to complete were the challenging Quests. Here is how one Quester defined the Questing as a challenge:

Hakan: How is [QA] different from the Cartoon Network website?
Anthony: On Cartoon Network, there are so many games and on Quest Atlantis there's not hardly any. All you can play is follow the leader or chase...
Hakan: What about questing?
Anthony: Questing is...not really a game it's...actually a challenge. It's kind of a game, but kind of not...

Even Questers who found doing Quests as a difficult activity had fun from these

challenges:

> Hakan: You said you complete the quests for points, right? Is there
> another reason for completing quests?
> Brian: To, uh, get land and just to have fun.
> Hakan: What kind of fun are you having, because you already told me that
> some of the quests are hard to do and take a lot of time to type. And you
> even told me that you prefer not doing quests, but typing to get some
> Internet time. So, what kind of fun are you having?
> Brian: It's fun, like, the challenge to get it done just so I can get the
> points…it's just a challenge to get 'em. That's really my reason.

5b. Recognition

Likewise, activities like building and finding secret places were other challenges

in QA. With these challenges some of the participants recognized that their skills and

knowledge levels were improved. They enjoyed the achievement of overcoming these

challenges. On the one side the points were an exchange currency to run the QA open

market (see the rewards category for the QA open market concept). But, on the other

side, the points were also an indicator for Questers' achievement. With points, their

successes for handling challenges were recognized within the game:

> Hakan: What do Quest Atlantis points mean to you?
> David: A goal, because I did something and I got some points that I can
> spend. And I did a good thing so I get credit for it.

Actually, this recognition went beyond the game, and was shared by the other

players:

> Hakan: What do Quest Atlantis points mean to you?
> John: They mean a lot. They mean respect, 'cause people respect me for
> how many points I have if they're on Quest Atlantis.
> Hakan: Why do think they respect you? You have points, I know, but what
> do they mean to them?
> John: They know that I have done many quests and that means I'm smart.
> See, that's what they think.

Some users cared about getting store items or rewards not because of their material values. They felt that they have done a good job in completing Quests, specifically with tackling challenges. Therefore, they wanted to celebrate their effort and accomplishment with an object. For some, this was just keeping the points and looking at them. For others, it was getting some trading cards or another store item:

> Hakan: ... Why do you care about those cards?
> Amy: I care about them because, it's like, when you are working in a job, when you got your first paycheck, you have to go out and buy something with it. You are so proud of yourself because, that was your own money that you used to buy it. It's the same with if you use your own points to buy it. And it's really special.

A few kids shared their achievement with their parents. Showing QA points on their homepages to their parents was similar to bringing a school report to them:

> Hakan: What is the most exciting thing you have done in Quest Atlantis?
> Kevin: Um, showing my mom my points and making her be proud of me. I just like it when my mom is proud of me. That makes me feel special.
> Hakan: Was she proud of you?
> Kevin: I bet she's going to be proud of me now 'cause I got seventeen points.

Overcoming challenging activities eventually satisfied the Questers:

> Hakan: What is the most exciting thing you have done in Quest Atlantis?
> Emily: Like, whenever I got the idea that I could make a party room, and everyone started coming to my house and looking at it. And it really made me feel good.

6. Rewards

There were two kinds of rewards that they recognized: awards on their homepages and material items. Material items included trading cards and other items that they could buy with their points. All kids indicated that they liked having the ownership of these rewards.

6a. Awards

Awards are symbolic cups or trophies. There are seven kinds of awards: health award, creativity award, agency award, diversity award, kindness award, environment award, and community award. These are given to the Questers after they perform exemplary behavior. For example, when kids chose to participate in QA mini workshops at the club they were given the community award. Another kid was given a kindness award by one of the lab staff since this kid helped a lot of other Questers with various tasks. These awards are displayed on the Questers' homepages. Although these are labeled as "awards" by design, participants also labeled them with different names such as trophy, metal, and badge. When they did not have an award, they indicated their sadness with the lack of it from their homepages. The participants with an award indicated their desire to get more. Although these are symbolic and non-materialistic, kids definitely value them:

> Hakan: What do you get out of doing quests?
> James: Points, I get points. Like on top of the screen I get points. And right now I have 4. And I have a little bitty of badge on top of my screen...

6b. Points

There were varying opinions on the points. A few kids perceived points just as a number. They liked just having their points as a number and they did not get anything for their points. On the other side, most other kids perceived the points as an extrinsic motivator and completed the Quests to get some items. For example, one kid indicated that after he got his first item, he did a lot more Quests. Another one described "the stuff" he could get was a reason for coming back to QA:

> Hakan: Which parts of Quest Atlantis keep you coming back to Quest Atlantis?
> Eric: Probably the points and getting stuff. Mostly.

The available items they could get were card holders, Internet time, QA pencils, QA t-shirts, QA trading cards, QA rulers, and virtual land to build on. The place they can get these items is called "The OTAK Trading Post." I observed that some kids checked its content daily to see if anything new was added. They were also curious about what the items looked like and requested to see them. This is how one Quester described the trading post:

> Hakan: What do Quest Atlantis points mean to you?
> Anthony: The points mean that, uh, if you get enough points you can either get some cards, or if you even get enough and go to this one special place in the trading post, you can get Internet time, a pencil, just basically anything that gets listed there.

Almost every kid who I interviewed and knew about the trading post, listed most of the items available in the trading post. They explained how these items would be usable in their lives:

> Hakan: Do you care about getting these items?
> Kevin: Well, I could use a new pencil. And um…I'm curious what the Quest Atlantis shirt looks like, also…I could use a ruler, 'cause when I don't do one part of my homework on the A side of my homework that I need to measure, I could use the ruler that I get from Quest Atlantis and use it um…

> Hakan: Do you care about these items that I mentioned, like pencil, cards, virtual land, or t-shirts?
> Tyler: Yeah.
> Hakan: What is the reason for that?
> Tyler: Because like, a pencil you can take to school and you can write with it and stuff. Trading cards, you can trade with your friends if they have some. And t-shirts you can wear at school or something like that in the summer.

A few kids, especially girls, indicated that there should be more items in the trading post:

> Hakan: What do you think about the Quest Atlantis trading post?
> Emily: It's good, but like, I think it needs more stuff, 'cause there isn't that much stuff in it.

6c. Trading Cards

Among the material items, the QA trading cards emerged as one of the most valuable items kids wanted to have. Each village has cards that introduce famous people related to the theme of that village. For example, Jacques Cousteau is a famous ocean researcher; therefore, he belongs to water village in the Ecoworld. In addition to a hand-drawn picture of the famous person, these colorful cards also include information about the person and less meaningful numbers and symbols so that Questers can assign them their own meaning as they trade cards with each other.

Since there are many different cards, Questers indicated their desire to have them all. These cards were used by the kids for different purposes, mainly for trading. As soon as one kid bought a pack of cards, which included four cards, other kids became interested to see what kind of cards this kid had, and they made offers to get specific cards. Cards that contained more familiar people, like Albert Einstein or Steve Irwin, were valued more. Also, cards that contained the "Wild Card" label were valued more.

Apart from trading, a few kids bought them to include them in their card collections. These kids also collected other cards including Pokemon cards, Digimon cards, Yoyo cards, Star Wars cards, Baseball cards, and Dragonball Z cards. But a few kids without a card collection also started to collect QA cards to create a collection. A

girl, who I observed as obsessed with collecting the QA cards, indicated that the QA cards had also educational value over their visual appearance:

> Hakan: Why are you excited about cards?
> Amy: Because I like getting new other people and its just fun, because I usually don't collect cards like Pokemon, they are all boring. This is cool because like a famous person like Martin Luther King jr., so you don't know who he was, like it tells about him. And I didn't know who Nightingale Lawrence, something like that, was, and then I have her card and I know about this person.

6d. Open Market

The OTAK Trading Post created an open market feeling in QA. In this sense, they perceived the points as an exchange currency within the game. The points created a system in which they could make exchanges. For example, when they referred to getting the items from the trading post, most of them labeled that process as "buying" something:

> Hakan: Are you collecting points to do something?
> Brian: Yeah, to buy land.

They indicated that items "cost" certain amount of points and labeled some items as "too pricey" or "expensive." When they did not have enough points to buy a certain item they told to me that they could not "afford" it. When there was no land in the Questers' building area, they said the Questers' building area was "sold out." There was even inflation in the game, they complained when the cost of a plot of land went from 6 points to 10 points. Similar to saving money in a bank, they saved up their points to buy items that were more costly:

> Hakan: And what did you do with your points later?
> Andrew: I just saved them up until I had enough to buy some stuff. I bought, like, a card holder with some Internet time at the club.

Overall, this open exchange system seemed to create an order within the QA life. They completed the Quests, got points in return, and either saved those points for the

future or spent them on different items. They adopted this system so firmly that one of

them questioned how QA would function without such an exchange system:

> Hakan: So if there were no points for doing quests would you still do the
> quests?
> Kevin: Yes.
> Hakan: And what would be the reason for doing that?
> Kevin: So I could help rebuild the Arch. Also, if there were no
> points...well, I have one question: if there were no points then how could
> you buy land?

7. Immersive Context

Although most of the action takes place on a computer screen, the QA experience

utilizes other support structures, which elevates the game play and makes this experience

an immersive one. These support structures at the club included QA posters, QA activity

chart, QA trading cards, and QA comic books. 3D part provided most of the

immersivenes on the screen.

7a. Support Structures

QA posters include illustrations of the council members, a scenic view from the

Atlantis, and the tagline "Two Worlds...One Fate...Live the Legend." On several

occasions kids showed me some council members in this poster and asked for verification

about a specific member like, "Is this Alim?" There is also the QA activity chart,

designed so that the Questing history for individual Questers could be traced. The activity

sheet was not extensively used at the club, because it could ignite competition. However,

the names and pictures of the council members on it contributed to the immersive QA

context. Participants used this activity chart as a job aid about the council members.

Questers traded QA trading cards even at lab times not devoted to playing QA. QA comic

books were used by Questers as a resource to respond to some Quests, and also to learn about the game:

> Hakan: Can you describe for me which times [Quests] are hard to complete?
> Luke: For example, I didn't know how to do it. But I figured it out.
> Hakan: How did you figure it out?
> Luke: The magazine gives you sometimes little clues.
> Hakan: What kind of magazine is that? Are you talking about the teacher's manual?
> Luke: No, the Quest Atlantis book.
> Hakan: Oh, the comic book?
> Luke: Yeah.

7b. 3D

But still, the 3-Dimensional part of the game provided most of the immersion feeling. Although the game was on a 2-Dimensional monitor, they talked about experiencing a space on the computer screen. In this space they were able to walk or run around and interact with other players through their avatar representations. Some called the feeling of being in this space as being "digital," some labeled it as the "virtual space." All in all, they felt as if they were part of this environment:

> Hakan: How is it different from other things in the computer lab?
> John: It's different 'cause it's more interactive. It's more digital. You can, like, walk around in a digital space.

> Hakan: How is Quest Atlantis different than other things you do on the computer?
> Thomas: Well it is a learning environment. You get to talk to people and stuff, in a virtual space sort of, and that's about it.

> Hakan: Why do you think [QA] is fun to play?
> Sarah: Because, like, you get to do stuff, something like that, you don't get to do other things in there. It is like you are inside the computer. Because like that.
> Hakan: How is Quest Atlantis different than other games in the lab?
> Sarah: It is different, because you get like, it feels like you are inside of it...

Although this space was designed and therefore it had limits, one of them did not feel these limits and characterized the game as "without boundaries:"

> Hakan: How is Quest Atlantis different from other things you do on the computer? For example, I know you like Cartoon Network pretty much right? How is it different from Cartoon Network?
> David: ... You can go anywhere you want instead of just going in some boundaries. Like, on a game, I don't know, say... Dexter's Lab, you're only [in] one place. The screen is just one place, it takes in one scene. In [QA] you can go everywhere.

Since they experienced the space, navigation in it was a natural part of this experience. At times, they just idled in the space; at others, they followed some other people, or explored this space. Exploring was a favorite activity for all of them. For ten out of twenty kids, exploring was one of the three most favorite activities to do in QA. Novice players wanted to see what was available in this space. More experienced players explored new places. They conceptualized different parts of QA, and indicated their will to uncover all of these parts. I observed exploring as being a primitive activity in QA. Even if they had not engaged in anything else they always explored. Every new Quester explored this new frontier impatiently, like the explorers of the earth did once:

> Hakan: What is the most exciting thing you have done in Quest Atlantis?
> Jennifer: I have explored... When I first started, that was the most exciting thing. Because I just didn't know what it was all about and just went around everywhere and everywhere.

The feeling of space was further amplified with the structures within this environment. These structures included all kind of different houses, big buildings built by other Questers, observatories, library, tenths, and sunken ships. What they liked specifically about these buildings was their ability to inhabit these structures. They were able to go into them and see what was in there. Further, their inhabitance was multi-dimensional; they could go up and down in a structure. Overall, the combination of this

space and the structures in it gave them plenty of freedom. Below is how one of the

Questers described the multi-dimensions of the game space:

> Hakan: Tell me about activities you like to do in Quest Atlantis.
> Sarah: One of the worlds has big buildings that you can go through, and upstairs you can go, and I don't know ... the square things... It does keep [going] up until you are, waaaaoooov, up to the top. And you got to go down [from] it.

All these structures in this space were not plain. They were all furnished with

different furniture and properties which are named as objects in technical terms. These

objects included flags, bikes, basketball, pictures, human organs, bicycle, teleporters,

chairs, tables, Quest objects, and many other objects:

> Hakan: What is the reason for that? Why do you like culture world?
> Tyler: Because there are all these different sculptures and stuff around and stuff like that...

The objects provided reference points for Questers in the structures. Many of them

perfectly described and articulated the placement of the objects within the structures and

within the space. They were even able to manipulate and interact with some of these

objects:

> Hakan: How did you learn about story inn?
> Thomas: I think I was in the library or something and then there was a small black thing, [a] chair or something, and I just went on it and I was in story inn.

The combination of different places, different structures, and different objects

made up the villages and the worlds. The Questers seemed to be more aware of the

worlds than the villages. They knew about almost all of the worlds, but not all of the

villages. Different worlds gave the game a theme park feeling. The OTAK Hub provided

access to all other worlds. From there they were able to travel into culture world, unity

world, healthy world, and ecology world. When I asked about their most favorite worlds,

five of them selected healthy world and another five selected the Otak hub. There was a spread among unity world, culture world, and ocean world, which were selected by three different Questers. Ecology world was selected by just one Quester as the most favorite world.

There were many different reasons for liking these worlds. Most of the time they liked these worlds because of the way they were put together. One Quester liked the OTAK Hub because it was a central location, and therefore most of the participants were there. Another one liked it the most, because it provided access to all the other worlds. In addition, this world contained the Questers' building area:

Hakan: What about [your] favorite village?
Luke: Otakhub.
Hakan: Why it is your favorite village?
Luke: Because you go around and you can look at people's houses.

One Quester liked the unity world, because it contained many houses. But unity world was best known by the country flags it contained. In a similar fashion, many Questers liked the culture world since it hosted Van Gogh's home. Another Quester liked the ecology world, because it provided information about the earth:

Hakan: Which parts of Quest Atlantis keep you coming back to Quest Atlantis?
Brian: … Ecology World, and stuff like that 'cause I care about our world…

Healthy world was one of the most favorite worlds among the Questers. In addition to being newer than the others, secret places, pushball arena, and human organs lying around made healthy world a special one. One Quester explained how the addition of this world created a craze:

Hakan: Can you tell me about your favorite worlds?
Thomas: I like healthy world a lot.

Hakan: What is the reason for that?
Thomas: I don't know. I think it is just new. It is kind of all the craze and stuff.
Hakan: What kind of craze?
Thomas: Like everybody likes it and stuff. Because it is new. So everybody is there.

8. Fantasy

During my observations at the club I witnessed several incidents in which kids immersed themselves into a role-playing context and played with fantasizing. In one of those incidents John and David were playing QA as a group while sitting next to each other. Suddenly John started a fantasy story. He told David that he touched the brain of David, and therefore he became a servant for him. Then John changed his QA username to "David's servant." David was also carried into this story and started to give orders to John. I wanted to be involved in this fantasy game. I pretended I was a superhero rescuing John. I touched his brain, and he said he became normal again. He changed his username back to what it was. This incident shows that fantasy for the kids of this age is an important play element.

The fantasy elements the Questers like about QA include the QA myth and the QA council. At least half of the interviewees mentioned these two elements specifically.

8a. QA Myth

When asked the reason for playing QA, some Questers emphasized that they wanted to help the Atlantian people. They indicated that when Questers responded to the Quests, the Atlantian people would be able to rebuild "the Arch of Wisdom:"

> Hakan: Can you explain more about why you complete quests?
> John: Two things: I want to help the Atlantians, plus points.

> Hakan: Why do you complete quests?
> David: To rebuild the Arch of Wisdom.

131

A few of them went one step beyond and indicated that they did not care about getting points. They cared about helping the Atlantian people, and therefore, they would complete the Quests even when there would not be points in the game for completing them:

> Hakan: Without the points, would you still do quests?
> Mark: Yeah.
> Hakan: What is the reason for that?
> Mark: So you can help those people to build back their town.

8b. Council Members

Some Questers liked the council members within the game. They personalized the council members as if they were real people. They specifically liked the interaction with council members. Most of this interaction was through Quest feedback or e-mails:

> Hakan: Are they hard to complete? The quests?
> Ryan: It kind of depends. Some are hard and some are easy. One of them, it won't get accepted and I got a ton of help on it.
> Hakan: Oh really?
> Ryan: Yeah, the person I was with, we went to all this extent making a power point presentation, and then Unidad sent back a message saying, 'Oh, I like the pictures and everything but it needs more information,' and we took all the information we could find on the Internet.
> Hakan: Did she mention a specific kind of information? What kind of information she was looking for?
> Ryan: No. She said it was all good except I needed more information.

> Hakan: So, you like questing, you like the council…and what else can you tell me?
> Kevin: Yeah. Um also, when I make a mistake, I always like that because I like to read the letters that the council sends me if I made a mistake on my quest. I like to read those a lot.

In the game design, there are opportunities to interact with the council members. For example, when they complete certain Quests they can e-mail Alim for extra points and explain the links between these different Quests. After meeting certain requirements, like completing at least three Quests and filling in their homepage information, they can

e-mail Alim to put their names on the Otak wall. Or, when they break the rules they might be asked to send an apology e-mail to the council.

Here is how a club Quester communicated with a council member by sending an apology e-mail to Alim when he used cursing during the chatting:

> From: XXX X (username)
> Date: Apr 30, 2003 09:47 AM
> Subject: Apology
> Dear Alim,
> I am very sorry for calling people dummies. I will not do this again.
> [XXX].

In addition to the five council members (Alim, Unidad, Calron, Lan, and Salik), the OTAK computer and Park&Rec emerged as the fantasy characters that the Questers liked to interact with. In the first QA comic book the OTAK computer was portrayed with a personality who was able to speak like a human being. Furthermore, the portrayal was such that the OTAK computer had a humorous personality. This seemed to have an effect on a few of the Questers:

> Hakan: Did you complete that quest?
> John: I tried to but it caught me copying. See, I was copying of off websites and it caught me copying.
> Hakan: You mean one of the council members?
> John: Yeah, one of the council members. The Otak did and it told the council members, that little rat.
>
> Hakan: Tell me about your favorite Quests.
> James: You have to scan a picture, and you have to send it to the Otak and you can what they really have to do in quest Atlantis… they try to help to questers to get back their this portal thing. And that's all.

Park&Rec was not originally conceptualized as a character. He was for taking care of administrative tasks related to building and few Questers had started to personalize him. Therefore, he unintentionally became a part of the council. Here is a

message that Park&Rec received from Ryan, before he was introduced as a council character:

> From: Ryan (username)
> Date: May 01, 2003 04:47 PM
> Subject: Land Rent
> Hello! This is [username]. I've gotten two more [points] and can pay the rent. I'd like to keep my land for two more months.

One Quester indicated that she wanted to have more interaction with the characters in the OTAK. She suggested that they could interact with these virtual characters within the OTAK directly:

> Hakan: How might Quest Atlantis be different so that you will want to come back more often?
> Amy: When you are going around, it could be like, like in the comic book there is a bad person in there. And maybe that person could be like over there. And like if you see her, you like get 2 points, so like, it'd be like, more of an adventure. And just like go around and look around and make sure she is not anywhere near.

9. Uniqueness

Most Questers play QA because it is "a game that sticks out from all the others." It is unique because it creates a unique opportunity to do different things. In this way, it is different from other educational games, other computer software, and other activities in Questers' daily lives.

9a. Unique Opportunity

Half of the Questers perceived QA as a unique game which allowed them to do different tasks. They indicated that QA provided a unique opportunity to them because they were not able to accomplish those tasks without QA. The unique opportunities provided by the game were scattered among learning, using information technology, socializing, creativity, and the local context.

Questers pointed to the learning aspect of QA, and indicated that QA provided a

learning opportunity to them:

> Hakan: Why did you join Quest Atlantis?
> Thomas: I thought it'd be pretty cool, because most of the Internet games
> are not learning environments, you know shoot'em all, kill'em kind of
> games. So yeah, I thought it would be really cool to join something this
> totally different from that.
>
> Hakan: Do you think you would not be able to learn this without Quest
> Atlantis?
> Jason: Yeah, you probably could learn it. But maybe you wouldn't
> because you wouldn't get the chance.

Another Quester indicated that QA provided content and subject matter that was

not taught at the school:

> Hakan: For example, at the school, let's suppose you have Quest Atlantis.
> Would you learn through Quest Atlantis or would you learn through
> worksheet activities?
> Kevin: I'd do both. 'Cause sometimes at school there's stuff that they
> don't teach on Quest Atlantis and on Quest Atlantis, there's sometimes
> stuff that they don't teach at school. So that's why I'd do both.

QA provided a unique opportunity for Questers to use the information

technologies:

> Andrew: And we can email. I like emailing because I can't really get on
> the Internet and email.
> Hakan: Oh, really?
> Andrew: So this is one of the few chances I have to email and do fun stuff
> with my friends.

QA is perceived as a place where participants can meet new people. To do this

they usually use the chatting feature of the game:

> Hakan: How is Quest Atlantis different than other things you do on the
> computer?
> Eric: Well, it gives me chance to meet new people and talk about things.
>
> Hakan: How is it different from other educational games at the club? For
> example, there are some other educational games...

Ryan: Hmm...you can't build and you can't chat on 'em.

QA provides an opportunity for the Questers to be creative. The most salient way for promoting creativity is having a chance to build in QA. One Quester indicated that QA allowed him to build even though he was a child:

> Hakan: If you were to describe Quest Atlantis to me, why would you think it is fun? What would you tell me?
> Kevin: Like, building 'cause I thought I never get I'd have to wait till I'm a grown up to build, but now since it's Quest Atlantis, I can build when I'm a child.

QA provided an opportunity for some Questers at the club for getting Internet time. One of the Questers indicated that he preferred to get Internet time through QA instead of doing typing with Meavis Beacon software, because doing QA is a more fun way to obtain Internet time:

> Hakan: What do you think about the trading post?
> Anthony: It's really a great idea. I'm actually really glad that you did it 'cause you can get Internet time really fast without having to do Meavis Beacon and it's much more fun 'cause if you don't have enough points, you can just go out and do a quest and get the points, come back, and you got yourself some Internet time.

9b. Different From Others

The QA experience is quite different from other experiences that some Questers get from the other aspects of their lives. QA is different from other computer software they use. When they compared QA with their home life, school life, and club life, they often emphasized the difference of QA and praised it:

> Hakan: How is Quest Atlantis different from other things you do at school or at home? For example, at school you do some schoolwork, right? In a typical day, what do you do at school?
> Scott: Sit there at my desk and work on worksheets. Yeah, but on Quest Atlantis you get to run around and get to do quests.

136

Novelty. Questers think QA is different from the others; because, it is something new to try among all the other products in their life. One of the Questers explained how he started playing QA:

> Q: ... Why did you join Quest Atlantis?
> Ryan: I joined Quest Atlantis because a few years ago when I started, it looked really, really awesome. Everyone was doing it and I figured, this looks awesome, I'll try it. I'm into trying new things.

Escape. A few Questers see QA as a place, where they can get away from the ordinary things in their lives:

> Hakan: Why did you join Quest Atlantis?
> Andrew: Because I wanted to try something new and I wanted to get away from everything else I'd been doing and it seemed fun.

Kid friendly. A few Questers perceived QA as a learning environment, which is appropriate for their age:

> Hakan: Do you see Quest Atlantis as a game, or as educational software or, as it is?
> Kevin: An educational thing...and a game, a lot of things.
> Hakan: And what are those other things? Can you tell me?
> Kevin: Fun...a good game for children my age.

Virtual-real distinction. QA is seen by most Questers as a mixture of virtual place and real world. Furthermore, some Questers had difficulty in describing this distinction:

> Hakan: And how is it different from other activities at school or at your home?
> Ryan: It's "outdoorsy," but it's indoors. It's outdoor/indoor. Like, it's in the outdoors but you play it inside.

9c. QA vs. Others

Because of the way QA differed from the others, Questers often compared their home life and school life with their QA experiences. They also compared playing video games and playing QA.

137

QA vs. home activities. In their home life watching TV occupies a big chunk of Questers' life. When I questioned about the reason why some Questers' valued Cartoon Network online cards more than the QA trading cards, one Quester made the connection to the TV shows:

> Hakan: For example, QA has real cards, right? Others could do quests, get points…real cards, instead of just online cards.
> John: Well the deal is, part of it is, it's our favorite cartoon shows.
> Hakan: Oh, I see. Like Tasmania monster, Scooby Doo…
> John: Yeah, all kinds of stuff like that. It's our favorite cartoon shows, stuff that we watch on TV everyday.

One of the virtual houses in Unity World became very popular among the Questers. The reason for that was that this house included a TV object with a Shrek picture on it. When clicked on, the object shows the Shrek web site in the internal web browser. Over time, the house was named "The Shrek House" among the Questers and the research team noticed many references to it in the chat logs. One of the Questers explained she liked "All About Us" village because of "The Shrek House:"

> Hakan: Do you have any favorite villages in these worlds that you know about? Each world contains certain villages…
> Jennifer: All about us [village], that one is pretty cool.
> Hakan: What is the reason for that?
> Jennifer: There is like houses in there, you can go into the houses and you can like see what's in there. One of them have playing Shrek on the TV.

QA vs. school activities. Doing worksheets and doing homework are common learning activities for the Questers' school learning. They are usually not allowed to play computer games in their schools. Some educational software they use includes games like Oregon Trail. To escape from the stress of learning they choose to go to the gym or outside during the recess and play there.

Some Questers perceive that the kind of learning they get out of QA is a similar kind of experience they get out of their school learning activities. Most of the time, they compared doing a worksheet to doing a quest in QA. They indicated that learning through worksheet activities or homework and learning through quests in QA was not different; because, they still learned almost the same content knowledge. One Quester explained a one-on-one comparison for every aspect of school life to QA life: Healthy World is like gym, Culture World is for art, the country flags in Unity World are for social studies, and the water in the Otak Hub Village is for science.

If they are offered an opportunity to learn at the school through QA, they prefer to choose QA over worksheets or homework because of the value QA adds to the learning process, which makes it a fun learning opportunity:

> Hakan: Is [QA] different from worksheets [at the school], for example?
> Anthony: Worksheets you have to read, and on quests you also have to read. And on the worksheet, you have to write something down. On the computer, you just type it and it's like words. You send it by puttin' it in the inbox. I mean, at school you put it in the inbox. Here you just send it to the council. They'll read it, reply and, uh, give you your points. Like, one out of ten is for a worksheet.
> Hakan: If you had a choice at your school. Your teacher came over, let's suppose, and said, 'Okay guys here is Quest Atlantis. Within Quest Atlantis you will complete this quest. And here is a worksheet.' Which one would you choose?
> Anthony: I'd say Quest Atlantis.
> Hakan: Quest Atlantis? If there is no difference between them, why Quest Atlantis?
> Anthony: Because you get to change into someone and get to go to other worlds, but you can't go here; you can, uh, see the sites that have been provided for you; you can lift things, as in Healthy World you can lift a bike; you can see a big basketball; you can see other people's houses, what they've built; you can see pictures; you can build a house.
> Hakan: With the worksheets you couldn't have those?
> Anthony: It's not really that much fun with a worksheet. Unless you have to like, change the worksheet into an airplane, then a paper ball, and then throw it into the trashcan!

QA vs. video games. Playing video games is the next big spare time event for children second only to watching TV. When Questers compared other video games available to them at the club and in their school to QA they indicated that they would play QA over other games. There were several reasons for this. For example, QA being an educational game was the most repeated reason. They also liked the immersive environment QA provided, in which they could explore and walk by using the avatars, which was not available in most of other video games they played. One Quester summarized this comparison in the following excerpt:

> Hakan: How is Quest Atlantis different than other activities in the computer lab?
> James: What I usually play is, I usually play different games. I usually play pinball.
> Hakan: How do you think QA is different from Pinball?
> James: It's got more extra kick on. Quest Atlantis have more energy kick on, where you can do stuff and learn.

An experienced Massively Multi Player Online Role-Playing Game (MMORPG) player indicated that QA was different from some multiplayer games like "Age of Mythology" and "Age of Empires:"

> Hakan: How is [QA] different from other things on the computer, like educational games or other software?
> Jason: Well, because you can't really fight in it. You don't kill people and stuff. And there's more kids in it, because all the games I play, there are mostly adults. Which isn't always a bad thing but sometimes it is.

10. Creativity

Creativity is defined as "the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others, and entertaining ourselves and others" (Franken, 1998, p. 354). According to Franken, people

are motivated to be creative because they need a novel stimulation, they need to communicate their ideas and their values, and they need to solve their problems.

I have seen this information from the literature in most of the Quester interviews. They said that they like "creating stuff." They like to be creative and they like to convert their ideas into reality. They all indicated again and again that the way to do this in QA was through building activities. In the virtual space they can build virtual structures, furnish them with different objects like pictures, and therefore impact the QA space. For one of the Questers, building became such an obsession that he kept working non-stop for three days to build his first virtual building. Another Quester, who was observed to be obsessed with building, explained that QA let her be creative:

> Hakan: Why do you like building so much?
> Emily: Because it's fun to like, make houses, be creative and make up a whole bunch of ideas and look at other people's houses too.

Builders explained that QA allowed them to build any way they liked. There were no constraints that hindered their creativity; they could rotate, shift, lift, and manipulate the objects:

> Hakan: How is Quest Atlantis different from other things you do on the computer? You mentioned some other games. How is it different from other games, for example?
> Kevin: Because they are...on other games there's no building stuff that you can build by yourself. Like, in Civilization II, you can only put stuff and you can only go to view and see it. You can't get around, because they only put it in certain place and I don't like that. But, in Quest Atlantis you can put your stuff in certain places and change it around and stuff. That's what I like about Quest Atlantis.

Eight out of twenty Questers chose building as one of their three most favorite activities in QA. In addition, one fourth of the interviewees indicated that building was one of their main reasons to come back to play QA:

141

Hakan: Which parts of Quest Atlantis keep you coming back to Quest Atlantis?
Jason: Probably, building my house...

Claiming a plot of land was something that most Questers cared about. They indicated that they were doing quests to get points, so that they could rent land:

> Hakan: Then why do you complete quests?
> Anthony: So I can get more and more points so I can get some land and have fun as much as they are and get pictures on my land, and adventure and...that's basically why I do quests.

> Hakan: Do the items in the trading post, like, pack of cards or virtual land make you do quests so that you can earn points to buy them?
> Brian: Well, land kind of, but nothing else.

Although there was no policy or requirement on what to build on the land they rented, most of the kids talked about building "their own house." There were some exceptions to this. One Quester at the club converted his home into an art gallery and decorated it with many pictures. Another interesting collaboration emerged between two club Questers. One of them built a huge hotel building and the other built a restaurant. The hotel was built with such a detail that it had rooms and a pool at its top. The two together designed these structures such that people would lodge in the hotel and eat in the restaurant.

There are a number of plots available in an area in QA. The Questers can rent one of these plots for two months with their points. At the end of this period, they can keep their land by re-paying the rent. The area they are allowed to build in QA is called "Questers' Building Area." Questers' Building Area became a part of QA popular culture. Even Questers who do not have land go there to see what others have created. Here is how one Quester included this area in the description of the OTAK:

> Hakan: What does [Otak] mean? Can you describe it?
> Kevin: The Otak? It's just a big, um, piece of land like the Otak trading post, the job place, the help desk, the building area, the place where you start...

One time all of the plots were rented, so Questers had to wait for land to be available. During this period they saved up their points towards renting a land:

> Hakan: Do you plan to purchase anything in the future?
> Thomas: Yeah. Saving up for a land or something. Like once it is available and stuff.

During the time when land was not available kids kept asking me when there would be more land available. When there was more land for renting I observed that a few Questers were excited by this availability. For example, there was a Quester who was playing QA for a long time, but he did not know how to do the quests. His motivation to buy land eventually made him do the Quests.

Although building activities were the only available creativity form available in QA, one of the Questers offered an additional creativity option. He suggested that Questers could create their own avatars:

> Hakan: What can be added, for example, to make you get excited about that and whenever you are at the club, you will always want to come back [to QA]?
> Mark: You can make your own dude [avatar] or something. Your guys that you can walk around and stuff. Like, you can build your own guy and walk him around.

Based on this suggestion, the QA team recently has been developing an interface called "Avatar Machine." Through this interface Questers will be able to customize their virtual persona.

11. Curiosity

There were several aspects within the game that made the Questers curious. These aspects increased their interest towards the game, and they wanted to come back to the game more often. These aspects were the end of the game, Quest response statuses, and secret places.

11a. End of the Game

Seeing the end of the game was something that a few Questers were curious about. In traditional arcade games the end of the game is typical, and the "Game Over" motto is recognizable by anyone who has some video game experience. Similarly, the purpose of the adventure games is to solve a chain of puzzles to reach the end of the story. Since QA had a back story and it was similar to adventure games, they wanted to see the ending of the game:

> Kevin: ...I'm always anxious, I'm always curious about what happens when you beat Quest Atlantis. 'Cause, like, when you do all the quests or you build the [wisdom of the arch]...
> Hakan: If there were no items in the trading post would you still do quests to restore the lost Arch of Wisdom?
> Kevin: Yeah. I would do quests for anything.
> Hakan: What would be the reason for that? Why would you do that, what's the reason for that?
> Kevin: Because, um...I wonder what it looks like when it's all rebuilt. And um...I'm so curious about that.

11b. Quest Status

The statuses of the Quests that they submitted were also a source of curiosity. When a Quester submits a response for a Quest, the status of that Quest response is marked by the system as "pending." This means the Quest response was received and it will be reviewed by a mentor soon. When it is reviewed and accepted, its status changes to "accepted." When the reviewer concludes the response needs revision, the status of the

Quest response changes to "revise." The statuses of all Quest responses can be reviewed by Questers on the "Quests" part of their homepages.

During my observations, two Questers (they were also interviewees) asked me at separate times about the time it took to review the Quest responses. They informed me that they were both curious if their responses were accepted or not. Also, I observed that after logging on to the game, most kids went directly to the "Quests" page to see the status of their pending Quests. They indicated disappointment for long review times. Their expectation for the review time was around two days:

> Hakan: What is the least exciting thing you have done in Quest Atlantis?
> Rebecca: When it is like still pending, it is not very fun, because you want to know if you got it right or wrong.
>
> Hakan: You just want to learn immediately after you submit your quests?
> Jason: Well not really immediately, but I hope that I don't have to wait, like, a week.
> Hakan: Like, the next day, for example?
> Jason: Yeah, or maybe even two days. Because I don't get on that much at my house, so...

11c. Secret Places

Finding secret places was a special activity when they explored different worlds. They explained that something becomes secret when "not many people know about it." Some of them pointed out that they liked the worlds with secret places much more. This is how one Quester explained this:

> Hakan: What makes Healthy World special?
> John: Healthy World...it's got a lot of secret places. That's what I like about a world.

Ocean world and story inn world were adored by these Questers just because they were secret worlds:

Hakan: Can you tell me about secret areas, a couple of them maybe?
Ryan: Well, there's Story Inn World, which is in the Otak Library, and Culture World. It's in the biggest chair thing with the biggest hole. The big black hole you fall into. Once you get there, there's some swirl teleports that put you up on this building. Then, there's also Ocean World, which is under the observation area under the bridges. There's a big black hole that you walk into. Because there's the water and, like, you swim down.

Among these secret places the fire cave was distinguished from the others. It was interesting that most of the boys had a specific passion about fire:

Hakan: Okay. Tell me about activities that you like to do in Quest Atlantis.
Brian: I like to search around for, like, new secret places, like fire cave and stuff like that.

I observed that although Questers liked sharing information, they were more likely not to share the location of the secret places. One time, a Quester was doing a Quest and told me that he thought this Quest was at a secret place. Later, another Quester next to him also wanted to do the same Quest. Although I had observed the first kid as someone who was enthusiastic about helping others, he was very reluctant to show the location of that Quest. Eventually, he showed the place to the other kid with more requests.

12. Control and Ownership

The design and development of QA is based on a design model called "Participatory Design" (Barab, Thomas, Dodge, Carteaux, & Tuzun, in press). In this sense, the opinions of the users of the game are constantly evaluated by the QA design team and reflected in the game. As the result of this approach, half of the Questers felt as if they were the rulers of the game most of the time. In this sense, they treated the game

as "their own game." The kids were definitely aware that QA was created by outside people:

> Hakan: Can you tell me about your favorite worlds or villages?
> David: I like...Ocean World.
> Hakan: What is the reason for that?
> David: Uh...I just really like the ocean and it's cool that Quest Atlantis has got it where you can go down in the ocean and talk to people. 'Cause no other games would like, consider the ocean. And you guys, like, make us swim down there and stuff.

However, this creation by outside people was in the form of implementing it. Actually, most of these implementation ideas came from the Questers themselves. For example, when one of the Questers got a pack of trading cards I asked if he liked them. He pointed to specific symbols on one of the cards and told me "I designed these." He was referring to the previous site visits by the game designers, who collected ideas from the kids related to card design. Therefore, he was implying that he liked the cards since he had a saying in their design.

12a. Control

Since this was their game, they also wanted to have control over it without any restrictions. During a period we tried to implement QA in a more structured manner. In the structured way, we envisioned creating a mini-unit by combining several Quests. For this purpose, we put three Quests together and named them as "The Mission Quests." The idea was that we would change the mission Quests biweekly. After completing the mission Quests, they could also e-mail Alim, a council member, for extra points. To get extra points they had to explain what they had learned from these Quests and the links between them.

The QA system can be customized so that only selected Quests can be responded to by the Questers. These Quests are referred to as "Quests allowed," and the remaining as "Quests not allowed." When a Quester reads the description for a Quest, the system shows whether that Quest is available to complete. Within the game there are about four hundred and fifty Quests. Before this structured implementation they were able to pick any Quest they wanted among these.

The implementation of this plan ended up with disappointment. During the two-week period a total of nine responses were submitted to the mission Quests. Most of the time kids complained that they were not able to do other Quests:

> Hakan: So you don't like technical problems. What else in terms of activities, like questing for example, or building...those kinds of things?
> Andrew: I don't like that some of the quests you can't do 'cause they have little red things next to them.
> Hakan: Do you like this idea or you don't like it? You want all quests to be available?
> Andrew: Yeah and maybe if you know 'em you get all the quests!

Towards the end of this biweekly period one of the Questers asked me if I could allow other Quests within the system. Based on this request I allowed all the Quests. When I announced this the next day there was a flood of excitement among the Questers. I observed there was six submitted Quests in that single day.

In a similar fashion, a Quester who also played the game at his school informed me that he was more likely to complete the Quests when he had control over the game:

> Hakan: If you compare the implementation of QA in your class and at the club, what are the differences and similarities?
> Thomas: Well the club, you get a lot more freedom. At school it is kind of do this, do that. You can still talk and stuff but at the club you can just do whatever you want sort of you know talk to people, do quests. So at the club I think I am most likely to do a quest or something.

A similar frustration was emphasized by another Quester, who also played the game at his school:

> Hakan: What is the least exciting thing you have done in Quest Atlantis?
> Scott: When I'm at school and I can't go anywhere [our teacher] makes us, we have to keep our hands off the keyboard.

When the control of the game was taken from them, the game did not provide them enjoyment anymore. It was more like an obligation:

> Hakan: Can you tell me about activities you don't like to do in Quest Atlantis?
> John: Uh...well, there's really not that many. Its only when we're like, say, if you want to do something else on the computer and you're forced to do Quest Atlantis, that's the only real time that I really don't want to do Quest Atlantis. But that's the only thing.
> Hakan: What is the difference between those times and times when you don't want to do it?
> John: Because there are certain times that I really want to, say, check out my orbit zone. Or like, check out mail. Some people have mail, which I don't but, you know. And um...at those times Quest Atlantis is just not much of an enjoyment to me. It's more of like, a must.

12b. Jobs

The idea of QA jobs was offered by one of the Questers at the club. This Quester spontaneously started to help out other people in the game and adopted this as a job. In addition, she employed others to help her in organizing them. Here is the conversation between this Quester, one of her recruits and myself when I first discovered this issue:

> [username1]: hakan come to [our] job
> hakan: ok I am next to you
> [username1]: i'll show you where i work for fake and i help people at my job
> [username1]: [username2] works here
> hakan: hello, is it helpdesk?
> [username2]: can we help u
> [username1]: may i help you
> hakan: yes please
> [username2]: what can i do for u
> [username1]: what may i do

hakan: I found myself in this Quest Atlantis thing. What is it about?

[username2]: Well you came to the right place

[username1]: here you just have to live a good comunity

hakan: mmm sounds interesting. Is it a big community here?

[username2]: Yes!

[username1]: and you have to help these 4 world in cleaning them up lol being nice everything

[username2]: yes thats right!

hakan: and how do we do help these worlds with cleanup?

[username2]: by gaining points

[username1]: well you just keep the world from having bad cusswords and by alot of things

[username2]: thats very right

[username1]: hey [Name of username2] if someone else comes you better be over bye your computer

[username1]: well hakan will that bee all the help you need

hakan: yes mam, thank you very much for your help (I mean both [username1] and [username2])

Later, these two Questers indicated their desire to work in this job for getting points:

[username1]: can you make this where you can get points for working here like money like real life

hakan: nice work [username2] and [username1]. Of course you can get credit when you work at the helpdesk

[username2]: ok

[username1]: how much? lol

[username2]: u can get ponits

[username2]: lol

hakan: But as makers of the game, we need to discuss this. I cannot make individual decisions. I am just a member of a larger community :)

[username1]: we know but can you like discuss at the next meeting

[username2]: what do u mean??

[username1]: hakan helped make this

[username2]: WOW!!

[username1]: he helped make qa

As the result of this request QA jobs were created by the designers. Within the game, Questers with certain experiences can apply for different jobs. These jobs include working at the help desk, working as a chat monitor, greeter, tour guide, engineer, link

checker, and usability tester. When they complete the requirements of these jobs they earn points. For example, when a Quester works ten hours over a month as a help desk consultant, she or he gets twelve points. At a later date, the Quester who suggested the QA jobs idea was telling everybody about this:

[username1]: im the one who made up the job idea

Later, Quester opinions were also honored in modifying the design of the QA jobs. For example, when Questers complained that the hour requirement for jobs was excessive, these hours were cut in half.

Since the QA jobs idea came from the Questers, they tended to perceive jobs more like a responsibility instead of a chore. The initial user interface for the jobs had some usability problems. As the result of this, when they read that the "prior points" requirement for a job was twenty, they thought that they had to spend twenty points. For this reason, they saved their points towards getting a job. What is incredible about this is that these kids were willing to spend their points for working in the job, although they had to spend a lot of effort for doing the job. I believe the reason for that was because the game was "theirs."

13. Context of Support

Since QA was implemented in multiple contexts, including after-school environments and schools, it is noteworthy to point to the contextual implementation differences. Three of the interviewees also played the game in their schools and they all pointed to the differences in these implementations, which made the gameplay experience different.

13a. School vs. Club Differences

First of all, the implementation at the schools was more rigid and procedural. Teachers assigned a specific Quest to everybody in a class and did not allow much freedom. Students had to complete that Quest before doing anything else. In addition, usually one day in a week was assigned for a class's QA activity. On the contrary, kids who played the game at the club indicated that they were able to do any Quest they wanted in their free time. Also, they could play the game everyday as long as they came over to the club. Because of these differences at the school and at the club three interviewees, who also played the game at their schools, conceptualized QA more as a game at the club and more as a work at the school.

13b. Usernames

Another difference was in selecting a username. Kids at the club were free to choose or change any username they wanted, as long as it was not against the QA username policy. However, the kids at the school were assigned specific usernames by their teachers, usually a combination of their first and last names. Under "Identity Presentation" category of this chapter, it was already explained that having a unique username motivated the Questers. Therefore, this freedom also made a contextual difference.

13c. Trading Post Items

The items in the trading post were another contextual difference. Each class in QA can be customized so that just certain items are available in the trading post to the Questers of that class. The Questers, who played the game both at the club and at the school, complained that there were not as many items in their schools. The QA trading

cards and a picture of the teacher were the only available items for one of these Questers. On the other side, Questers at the club had broader options and could choose among card holders, QA pencils, QA t-shirts, QA trading cards, QA rulers, and Internet time.

Among these items, Internet time was the most important contextually different item. Using the Internet was valued by almost all users of the lab. When I offered multiple QA items to my interviewees as an appreciation for their interview time, one fourth (five) chose the Internet time. To use the Internet the kids needed to have certain amount of "Internet time." They could earn the Internet time through spending some time with educational software, usually typing software, or they could buy it with their QA points through QA. At least half of the interviewees bought Internet time with their QA points. This is how one of the Questers, who I observed as being very enthusiastic about getting Internet time, described getting it through QA:

> Hakan: Did you say you've spent [your points] already?
> David: Yeah, I think it was...on Internet minutes at first.
> Hakan: Why did you get the Internet time through Quest Atlantis and not through typing, for example?
> David: Because...on Quest Atlantis, it's actually fun to get on, but typing, you just got to sit there and type stuff that you already know about.

Second Research Question

To answer the second research question, each of the high, medium, and low participating groups was characterized based on the motivational categories found above. These three groups were then compared for similarities and differences to see to what degree their participation differed. Table 4.2 shows the mean number of responses for the motivational categories for each of the high, medium, and low participating group

members. Figure 4.1 provides the same data in a visual form. The specifics of these data

are detailed below.

Table 4.2. The Mean Number of Responses from High, Medium, and Low Participating

Group Members with Respect to the Motivational Elements

Category	High participating group (phrases per member)	Medium participating group (phrases per member)	Low participating group (phrases per member)	All interviewees (phrases per member)
Identity Presentation	4.6	5.7	4	4.8
Social Relations	15.6	12.6	10.5	12.9
Playing	14	13.6	8.3	12.0
Learning	12.3	18	11.3	13.9
Achievement	1.9	2.6	0.8	1.8
Rewards	14.4	14.6	9.8	12.9
Immersive Context	7.1	9.3	9.2	8.5
Fantasy	3	0.4	1.2	1.5
Uniqueness	9.1	6.1	4.3	6.5
Creativity	11.1	4.4	3.3	6.3
Curiosity	1.3	1.4	0.2	1.0
Control and Ownership	3	3.3	1.3	2.5

	Identity Presentation	Social Relations	Playing	Learning	Achievement	Rewards	Immersive Context	Fantasy	Uniquness	Creativity	Curiosity	Control and Ownership
High	4.6	15.6	14	12.3	1.9	14.4	7.1	3	9.1	11.1	1.3	3
Medium	5.7	12.6	13.6	18	2.6	14.6	9.3	0.4	6.1	4.4	1.4	3.3
Low	4	10.5	8.3	11.3	0.8	9.8	9.2	1.2	4.3	3.3	0.2	1.3
All	4.8	12.9	12.0	13.9	1.8	12.9	8.5	1.5	6.5	6.3	1.0	2.5
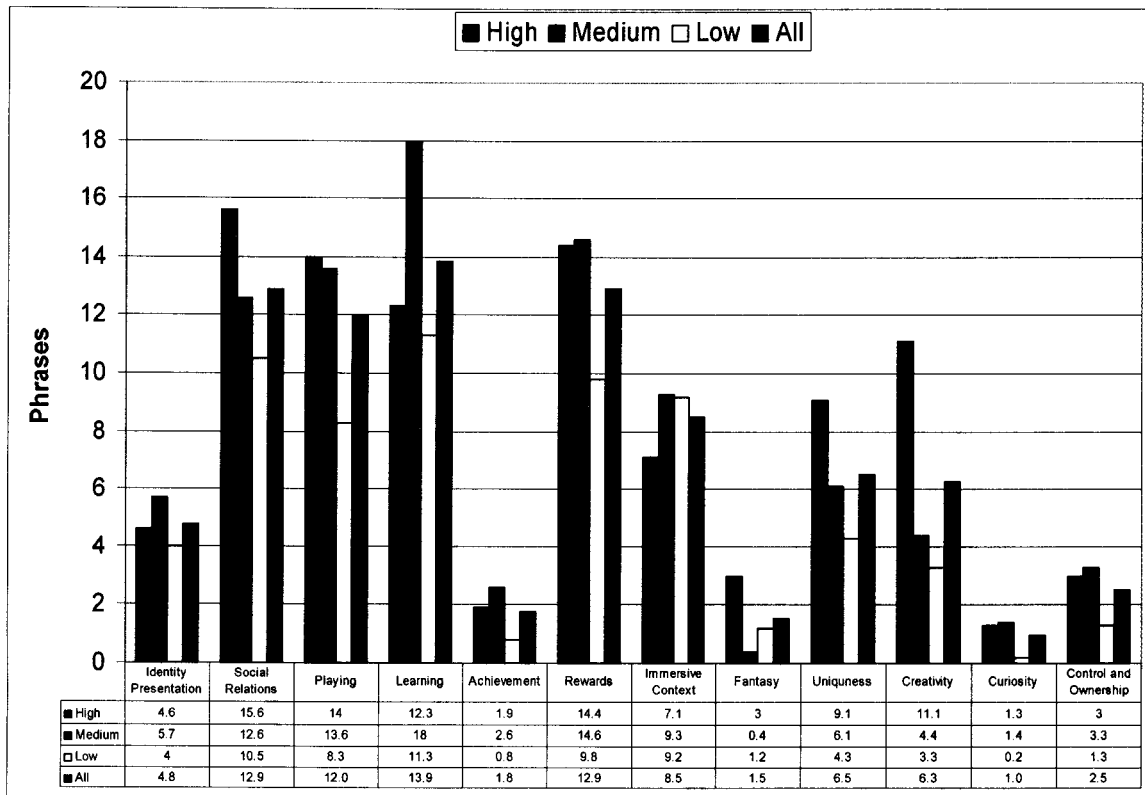
Figure 4.1. A Visual Comparison of the Mean Number of Responses from High, Medium, and Low Participating Group Members with Respect to the Motivational Elements

Characterization of High Participating Group

There were seven members in this group: Andrew, Emily, David, Jason, John, Ryan, and Kevin. Their mean age was 10.5. The average family income was $36,000. Andrew, David, and John were described as opinion leaders at the club and specifically in the computer lab. They were perceived as the children who tried out new things. Other children followed them and used whatever they discovered. This is how John explained the Cartoon Network web site and its games and activities became popular in the computer lab among the kids:

Hakan: I know a lot of guys—and some gals—like Cartoon Network,
and you also like it.
John: Oh, yes.
Hakan: Most of the time, you collect online cards, right?
John: Yes.
Hakan: They're just online. Why are you collecting them?
John: I really don't know that. It's just weird, its...I think its just
part...one kid, one popular kid ends up liking it, just likes the online
card factor. And almost everybody else wants to play it because this one
kid likes it.
Hakan: Who do you think that popular kid is here at the club? Who
started it?
John: At the club...oh, I really don't know who started it. But me and
David and probably Andrew would be good candidates.

Jason was a self-actualizing kid. In his terms, he "likes being one of the most top people with the most points and rewards [in QA]." Emily and Ryan were the independent kids initiating activities themselves. Kevin was the most amateur in this group, and got a lot of help from Ryan.

When asked about their three most favorite activities in QA, a total of six responses were given for building, four responses were given for chatting, three responses were given for each of making friends, doing Quests, and exploring. Therefore, activities related to social relations, creativity, learning, and immersive context categories were considered as the most engaging activities.

When asked about the least favorite activities in QA, most of them were hesitant to list any. When they were pushed by explaining that the least favorite activities did not necessarily mean they did not like those activities, they indicated that activities related to 3D navigation, such as standing, idling, exploring, and finding secret places were considered as their least exciting activities. They indicated these were exciting once, since they did not know anything else but navigating, but their thrill faded away with

time. Moreover, certain routine paths, like going from ground zero to the Questers'

building area or to the teleports that takes players to other worlds became boring:

> ... When I just get on Quest Atlantis when I come here – the computer lab
> opens, I get on Quest Atlantis – I wish there was a teleporter right there
> beside me that I can just hop into and I'll go right to the land place, to my
> house.

However, three kids still chose exploring as one of their most three favorite activities.

Members of this group developed strategies over time to handle different tasks.

These strategies included the following:

- Keeping some points aside for paying future rent on the virtual land: Since they

  rented their plot of land for two months, all of them reserved some points for

  paying future rentals.

- Getting points through guilds: More than half discovered that they earned points

  through their guilds when someone in that guild completed a Quest.

- Using tabs: The 3D technology adopted for QA included some tabs on the left of

  the screen. These tabs included various functions for doing tasks in a shorter time.

  Although these tabs were disabled and therefore not visible in the default QA

  installation, members of this group discovered enabling the tabs and used them

  extensively. They used tabs to quickly teleport to other worlds, and also to

  monitor the number of people in the worlds.

- Doing Quests with lower point values instead of doing Quests with higher point

  values: One of them indicated that this strategy earned him more points.

- Saving points towards purchasing a specific item: They all expressed at one time

  or other they were saving their points towards purchasing a specific item.

- Securing virtual homes against others: They indicated, and I observed, at times that they blocked entrance to their virtual homes to make it protected.

On average, members of this group spent 59 hours in the game and logged on 139 times. They also played QA outside the club. These places included their homes, and their relatives' homes like grandmother. For this reason, these kids had high parent involvement. Most of their parents knew about QA and that their kids were playing QA, and they helped them.

Identity and Social Relations. The mean number of responses related to the social relations category (15.6) was much more than the identity category (4.6). Most of the time their gameplay experience included others, i.e. they were part of a group playing the game together next to each other. Therefore, their social relations happened both within the game and outside the game. They recognized the game as an opportunity in which they interacted and communicated with their current friends. On average, they sent 20 e-mail messages and received 25 e-mail messages, and typed 600 lines of chat. Most of them also used the game to make new friends. When asked about their homepages they always listed e-mail function as a way to communicate with their friends. Most of them had double-digit entries in their friends page, the average number of friends being 12. All of them requested to have their names put on the wall of the Otak, which required three accepted Quests and their self-information to be filled in. Four of them were involved with a guild.

Related to identity all of them talked about how easy it was to customize their homepages. By customizing it they made it their "own" homepage. All of them liked everything on their homepages, and described their homepages as "complete." All of

them learned about other Questers through their homepages. They reflected their current

mood in the game by using the mood function on the homepage.

Playing and Learning. All Questers in this group characterized QA as a fun game.

All of them started playing it because QA seemed fun to them. This was such that the

mean number of group responses related to the playing category (14) was slightly more

than the learning category (12.3). However, at the same time they were aware of the

learning element. This is how one of the group members described the relationship

between playing and learning:

> ... You've gotta do quests to maintain the fun stuff on Quest Atlantis.
> That's one way that Atlantians keep their knowledge going, is supplying
> fun things for us to do and making sure we do quests by keeping that stuff.

When asked if they would do Quests without points, most of them said they

would as long as the Quests were fun. On average each of them worked on 12 Quests.

Most of them indicated they learned about computers and information technology a lot

through the game. The difficulty of the Quests varied according to their skills. They

indicated "some of the Quests were easy and some of them were difficult." They disliked

Quests that they did not understand. When confronted with a hard Quest they tended to

get help from other people including other Questers and lab staff. The impact of QA

social commitments was visible among the members of this group. Most of them talked

about the environmental problems and emphasized QA's role as a vehicle to convey these

problems to them.

Achievement and Rewards. For this group, the mean number of responses for the

rewards category (14) was well above the achievement category (2). However, I need to

emphasize the weight of points in the rewards category. At the basic level points made up

almost half of the rewards category; although, two important perceptions of users of this group related to points need to be conveyed.

First of all, in addition to helping others, having more points is an important indicator of showing one's experience in the game. According to participants in this group, points show their broad experience in the game and for that reason they expect respect from other Questers. These kids liked their points being displayed on top of their homepages:

> Hakan: What do Quest Atlantis points mean to you?
> Kevin: Probably just nothing. Well, you could get stuff with it but, if it means so much to you, then you're just selfish so you can get all the cards and all the other stuff. That's not what I think about points. I just think they're nothing and you just like to look at 'em. That's what I do.

Second, points are perceived by them as an exchange currency. In this term, points are similar to wages one is paid after doing a job, like a credit:

> Hakan: What do Quest Atlantis points mean to you?
> Andrew: Maybe, like, a reward for doing hard work that you've done, like chores. You get money for doing chores.

Participants in this group knew pretty much about the game. They could completely list what items were available in the trading post. Members of the high participating group made four to seven purchases through the trading post. The items they bought included land, trading cards, and Internet time.

Immersive Context. The mean number of responses for this category was 7.1. All of the group members had a solid cognitive map of all the worlds. For instance, when asked, they were able to describe specific landmarks within the 3D space. They desired the structures and objects within the 3D space to be more interactive.

Fantasy. The mean number of responses for this category was 3. Most of them internalized the backstory of the game well. Three of them specifically mentioned the QA myth and linked their efforts with doing Quests to save Atlantis. In addition, five of them articulated the characters in the game pretty well.

Uniqueness. The mean number of responses for this category was 9.1. All of them indicated QA was a unique game as a whole. They found it different from other computer games in that it was educational. They also pointed to the unique learning opportunities provided by the game.

Creativity. The mean number of responses for this category was 11.1. Building on virtual land was the most engaging activity for the members of this group. Five out of seven kids specified the building as their most favorite activity in QA. In addition, all members recognized the enjoyment related to building. Six out of seven kids rented a plot of land, and the remaining Quester expressed that he was saving points towards purchasing land. Once they claimed a piece of virtual land, they continued the ownership of it by re-paying the rent. Questers were so passionate about their land that they felt the anxiety of re-paying their rent:

> ... I just get all tense about wanting my quests to be accepted so that I can pay the rent on my land. Right now I can only pay the rent on one of them.

They indicated they had spent a lot of effort for building. For one of them this was "three days of non-stop working," for another it was "for months." Two of these kids informed me that they also enjoyed playing with Lego pieces. Most of them liked Otak Hub world, because it contained Questers' building area, which hosted their virtual homes.

Curiosity. The mean number of responses for this category was just 1.3, and this was the smallest among all other categories. Secret places were the main source of curiosity. One of them said finding secret places was the most exciting activity to do. Another three mentioned that they liked finding secret places. However, the location of secret places became a social event and they either conveyed that information to others or they solicited information on it. One Quester was very passionate about the end of the game and seeing the arc of wisdom, and it was his whole purpose for playing the game.

Control and Ownership. The mean number of responses for this category was 3. Control of the game was a main tension for them. They all talked about restricting aspects of the game and their wish to overcome these. For example, one of them indicated when he was "forced" to play QA, the game was not an enjoyment to him. Several of them pointed to the past when not all Quests were allowed and they perceived this as a constraint. In the past, Quest response submissions had to be approved by a lab staff person or teacher, but later this authorization was removed from the system. One of them remembered this issue and he said he did not like it when someone had to approve the Quest submission. Related to building, several of them indicated their wish to buy their land instead of renting it. They complained that they were not able to use certain objects in their building anymore, and they wished to have those objects back.

They perceived themselves as experienced Questers and they helped other Questers. Two of them worked on a QA job, and two others indicated their plans to sign up for a job soon.

Characterization of Medium Participating Group

There were seven members in this group: Anthony, Jennifer, Thomas, Rebecca, Eric, Brian, and Amy. Their mean age was 12. The average family income was $34,000. All of them were independent, self-initiating kids. On average, members of this group spent 16 hours in the game and logged on 50 times.

When asked about their three most favorite activities in QA, six responses were given for chatting, five responses were given for doing quests, and five responses were given for exploring. Based on this data, social relations, learning, and immersive context categories seemed to provide the most engaging activities.

When asked about the least favorite activities in QA, the members of this group were less forgiving. All of them listed at least one without further prompt. Although these activities seemed to be scattered, most of them were related to the learning aspect. These least favorite activities were building, following people, doing assigned Quests, doing hard Quests, waiting for the Quest review, providing reflection as part of Quest submission, being interrupted while doing Quests, and doing Quests.

Identity and Social Relations. The mean number of responses related to the social relations category (12.6) was much more than the identity category (5.7). However, I did not observe them as social game players. Most of the time their gameplay was limited to their own computer and they played alone. Therefore, their social relations happened just within the game. On average they sent 9 e-mail messages, received 24 e-mail messages, and typed 60 lines of chat. The average number of their added friends was 3, and one of them did not have any entries on the friends page. Just two of them have their name written on the wall. Five of them were part of a guild. Related to identity, half of them

filled in their self-information on the homepages. Most of them liked the e-mail function on their homepages.

Playing and Learning. Members of this group also characterized QA as a fun game. Most of them added they liked everything in the game. However, the mean number of group responses related to the learning category (18) was more than the playing category (13.6). Interestingly, when asked about the least exciting activity in QA, most of them indicated that as doing Quests.

When asked if they would do Quests without points, half of them said they would and half of them said they would not. On average, they worked on 5 Quests. The Questers in this group also indicated that the difficulty of Quests varied between easy and difficult. The QA social commitments impacted half of them, and this was in the areas of environment and family. One of them said the Quests were not challenging enough and recommended increasing the number of reflection questions for each Quest. On the other hand, another one thought answering the reflection questions was not useful for him and he thought these were more useful for people researching the game.

Achievement and Rewards. The mean number of responses for rewards category (14.6) was much higher than the achievement category (2.6). However, just three of them were aware of the trading post; four of them indicated that they did not know about the trading post. In addition, just two of them exchanged their points for an item in the trading post.

Immersive Context. The mean number of responses for this category was 9.3. For three of them exploring the 3D environment was the most exciting activity. In addition,

five kids indicated exploring was one of the three most favorite activities. They were all aware of the worlds that made up the 3D space.

Fantasy. The mean number of responses was 0.4, and this was the smallest number among all other categories. Just one of them named the council specifically. None of them referred to any characters in the game. They also did not mention anything about the QA legend.

Uniqueness. The mean number of responses for this category was 6.1. Half of them indicated QA created unique opportunities for them in the area of learning and communication.

Creativity. The mean number of responses for this category was 4.4. All of them knew the option of building within the game and Questers' building area. None of them rented virtual land yet, and therefore they did not build. However, three of them saved their points towards renting land. One of them disliked the idea of building and she perceived that it was not worth spending the points on building.

Curiosity. For this theme, the mean number of responses was 1.4. Four of them talked about the secret places in QA. One of them listed finding secret places as his most favorite activity and this kid was the person who talked the most about secret places among all other interviewees.

Control and Ownership. The mean number of responses for this category was 3.3. About half of them talked about the limiting parts of QA. These included having more freedom at the club as compared to the school implementation of QA, and having more control over their homepages.

Related to jobs, two of them indicated that they glanced at the jobs. However, they perceived the points requirement as if they had to pay for the jobs. One of them did not value the importance of other kids working in the jobs, because he believed they would not be able to answer questions asked of them.

Characterization of Low Participating Group

There were six Questers in this group: Mark, Scott, Tyler, James, Luke, and Sarah. Their mean age was 10.5. The average family income was $21,500. Although Luke and Sarah spent 4 and 3 hours respectively within the game, their perception and knowledge of the concepts and rules of the game did not seem to be enough. Other members of this group were self-initiating. Most kids in this group indicated that seeing other kids playing QA was an important reason for their starting QA.

On average, members of this group spent 10 hours in QA activities and logged on 45 times. Almost everyone in the group indicated that they liked everything in QA. When asked about their three most favorite activities, five responses were given for doing quests, four responses were given for chatting, four responses were given for different worlds, two responses were given for exploring, and one response was given for each of building, looking into others' houses, and avatars. Therefore, their favorite activities scattered among the motivational categories found; however, immersive context, learning, and social relations were the dominant ones. When asked about their least favorite activities, three of them listed reading as their least favorite activity in QA. An additional response came for each of being lost, losing other people, and e-mailing.

Identity and Social Relations. The mean number of social relations category (10.5) was much higher than the identity category (4). On average, they received 7 e-mail

166

messages sent 5 e-mail messages, and typed 15 lines of chat. There were 2 entries on average on their friends page, and two of them did not have any friends added to their friends page. Two of them were part of a guild.

Related to identity, just two of them filled in their homepages. Their identity representation in the game was limited to using the avatars. This group talked the most about the avatars.

Playing and Learning. This group also described QA as a fun game. The mean number of responses for the learning category (11.3) was slightly higher than the playing category (8.3). Although three of them listed doing Quests as the most exciting thing they have done in QA, they worked on just one Quest on average. Three of them pointed out that reading was one of their least exciting activities in QA, and they indicated that they would rather listen to the recordings of the Quest descriptions—a functionality only available for some Quests. Therefore, this group seemed to benefit more from the multimedia elements in the game (like narrated Quest descriptions and goals). They typed very slowly; therefore, it took some time for them to submit their Quests. For this group, the Quest difficulty levels were perceived closer to being hard.

Achievement and Rewards. The mean number of responses for rewards category (9.8) was way over the achievement category (0.8). Interestingly, most of the group members said they liked the points and they were doing the Quests for points, but five out of six members did not know about the trading post, where they could exchange their points with different items. Just one of them purchased a single item from the trading post. Most of the group members liked their points being displayed on top of their homepages.

Immersive Context. The mean number of responses for this category was 9.2. Two of them said they utilized the comic book to get clues to complete the Quests. One of these kids also used QA at his school. For two of them exploring was the least exciting activity; for another two it was the most exciting activity. This was the only group, members of which listed different worlds as one of their three most favorite activities.

Fantasy. The mean number of responses for this category was 1.2. Just one of them linked his effort for doing Quests to help the Atlantian people. In addition, none of them talked about any of the council members.

Uniqueness. The mean number of responses for this category was 4.3. They did not mention any unique opportunities afforded by the game. They just compared it to some other computer games and found QA as more interactive and more fun.

Creativity. The mean number of responses for this category was 3.3. Just one of the group members listed building as one of the three most favorite activities, and similarly just two of them had plans to buy any virtual land.

Curiosity. The mean number of responses for this category was 0.2. This number was the smallest among other categories in this group, and also among other categories in the other two groups. Just one of them attempted to talk about the secret places; however, the secret place examples he gave were not correct. Two of them indicated they were fond of exploring houses other Questers had built.

Control and Ownership. The mean number of responses for this category was 1.3. They did not perceive many limiting aspects, one of them mentioned he was playing QA in his school and indicated the teacher control over QA as the least exciting activity. None of them were aware of QA jobs.

Comparison of High, Medium, and Low Participating Groups

Members of the high participating group wanted to lead other kids, in this way they can be described as innovators or early adopters in Roger's (1995) terms. Members in the medium and low groups seemed not to fit into this category. The high group members spent significantly more time (59 hours) in the game than the medium group (16 hours) or the low group (10 hours) members. Although there was a huge difference between the high and medium groups in terms of time spent in the game, the understanding of the kids from both groups about the participant structures in the game was pretty close. The low group members seemed to need more time to know more about the game.

The mean age for the high and low groups was both 10.5, but this was 12 for the medium group. The family income for the high and medium groups was very close, $36,000 and $34,000 respectively, however it declined noticeably to $21,500 in the low group. However, it should be noted that the family income of the most participating Quester was $20,000 and the family income for the least participating Quester was $40,000. Therefore, the family income did not necessarily correlate positively with the participation.

QA as a whole seemed a fun game for all three group members. When asked about the three most favorite activities in QA, the themes that included these activities matched for all three groups: learning, social relations, and immersive context. There was an additional category of creativity for the high group. Although their most favorite activities matched, the order of these differed among the groups. The order was:

- social relations, creativity, learning, and immersive context for the high group

- social relations, learning, and immersive context for the medium group

- immersive context, learning, and social relations for the low group

This preference was reflected in the interviews. For example, low group members talked most about the 3D worlds and villages, navigation in 3D, and avatars which constituted the immersive context category. On the contrary, members of the high and medium groups complained about the paths in 3D that became routine and suggested placing shortcuts to eliminate this problem. The least favorite activities for the medium group were related to the learning category and the least favorite activities for the low group were related to reading. The high group did not complain about the learning.

Considering the identity and social relations, the mean number of responses for the social relations category was much higher than the identity category for all three groups. The interview and observation data supported this outcome; all kids loved interacting with others through various communication modes, shared information, competed with others, showed off their own game artifacts (points, awards, self-information, etc.) to others, and experienced conflict at times as the result of all these interactions. Their usage statistics with respect to using e-mail, chat, and number of entries on the friends page correlated positively with the time spent in the game, and these numbers decreased while going from the high to low participating groups. There was a slight difference between the high and –medium and low- groups in that the members of the former included others in the same context in their gameplay more than the members of the latter.

Avatars had a higher impact on the identity of the Questers in the medium and low groups. High group members reflected their identity more in their homepages; each of them detailed their identity on their homepages. This using of homepages for identity decreased towards other groups; for example, half of the medium group and one third of the low group entered their self information into their homepages. Related to using the functions on the homepage, all three group members seemed to have limited information processing capability. One of them specifically indicated that she forgot about some functions during her usual play, or that some functions were just out of focus at a specific time.

For the members of the medium participating group and low participating group the mean number of responses for the learning category was higher than the playing category. On the other hand this was the opposite for the high participating group; the number of responses related to the playing category was higher than the learning category. The mean number of responses for the playing category for the high group (14) and medium group (13.6) was very close.

The mean number of responses for the rewards category was much higher than the achievement category for all three groups. This is a clear indicator that members of all groups valued extrinsic rewards. These rewards included QA points, awards, and trading post items. Members of the high group actively exchanged their points with items in the trading post; however, the majority of the members in the medium and low groups did not know about the trading post and participated in limited transactions. Although they did not know about the trading post and items in it, these kids heard about the availability

of some items from others. The mean number of responses for the rewards category for the high group (14.4) and medium group (14.6) was very close.

The mean number of responses for the immersive context category was close for the medium and low groups, being 9.3 and 9.2 respectively. This was 7.1 for the high group. All group members knew about the worlds and villages that made up the 3D space, but members of the high group were able to discriminate between the worlds and villages better than the other group members.

The fantasy category was another category that seemed to be different for the high group. In this category dimension, the medium and low groups were close to each other in that they did not absorb the legend well, and they did not remember about virtual council members. Many high group members on the other hand linked their efforts to helping the Atlantis people.

Related to the uniqueness category, the number of responses decreased gradually through the high group to low group, from 9.1 to 6.1, and to 4.3. Of particular note, the members in the high and medium groups pointed to the unique learning and social interaction opportunities afforded by the game. For the low group, QA did not seem any different from other games, excluding the immersive context mostly provided by the 3D feeling of the game.

The mean number of responses for the creativity category was 11.1, 4.4, and 3.3 for the high, medium, and low groups respectively. Almost all members of the high group actively built on virtual land, while almost all other Questers planned to rent land and build on it. The enjoyment of the building was not limited just to the builders; many

others indicated that visiting these structures was an activity in which they regularly engaged.

The mean number of responses for the curiosity category was very close for the high group (1.3) and the medium group (1.4). This closeness was reflected into the group characterization equally; both groups indicated secret places was the most exciting activity to do, and three to four kids from each group talked about the excitement of finding secret places. The low participating group members did not frequently engage in finding secret places, the mean number of responses being just 0.2.

Related to the control and ownership category, the numbers for the high and medium groups were close. This was 3 for the high group, 3.3 for the medium group, and 1.3 for the low group. All group members from the high participating group felt the tension of the controlling elements in the game and complained about them. Meanwhile, tension was a noted factor for only half of the medium group members. Lastly, none of the low group members felt any control tension. Related to jobs, two members from the high group signed up for a job and an equal number of people from both the high and medium groups indicated their intentions to sign-up for a job soon. Low group members were not aware of the availability of the jobs.

CHAPTER 5: DISCUSSION, ASSERTIONS, AND IMPLICATIONS

The main purpose of this study was to discover the motivational elements in

educational computer games. After a longitudinal study in the research context and going

through the constant comparison analysis of data, thirteen motivational elements were

identified: 1) Identity presentation, 2) social relations, 3) playing, 4) learning, 5)

achievement, 6) rewards, 7) immersive context, 8) fantasy, 9) uniqueness, 10) creativity,

11) curiosity, 12) control and ownership, and 13) context of support.

This chapter is divided into three sections: discussion, assertions, and

implications. In the discussion section the motivational elements are discussed and

related to each other through an emerging framework. In this section the data are

interpreted in a way that has both experience-local meaning (Geertz, 1973) while at the

same time having experience-distance significance (Geertz, 1973) to others analyzing

motivation in other contexts and conditions. This occurs through informing by and

responding to previous research and theories. Next, the assertions of the framework are

presented through local interpretations, which are contextualized in terms of the broader

literature. And the final section presents the implications of these findings and assertions.

Discussion

When I looked into the results of my data analysis, it was surprising that such a

broad range of categories that motivated children in QA emerged. Traditionally, research

regarding motivation in computer games has characterized motivation in a smaller

number of categories, usually challenge, curiosity, control, context, and fantasy. Since I

have been a close follower of the computer games since childhood, I was expecting new

emergent categories such as interaction based on my observation of the popularity of online multi-player games. Initially I had no ideas or expectations much beyond that.

Because of this diversity of motivational reasons to play an educational game, I want to refer to my findings as the "multiple motivations framework" for playing educational computer games. Any scholar in education or social sciences can guess that I was influenced by the theory of multiple intelligences developed by Gardner (1993) while naming my framework. This guess would be correct. I believe such a name selection reflects learners' multiple reasons for playing educational games. The properties of this framework are explained under the assertions section of this chapter.

Multiple Motivations Framework

The purpose of my multiple motivations framework is to provide an organizing framework from which to explain things of significance for motivating learners in this study. In this sense, its content includes categories which are formed by relating concepts through the constant comparison analysis of my data. Although my framework is inducted from multiple interviews and observations, it is only in relation to one study so I offer it as a descriptive framework for making sense of and interpreting this dataset and not yet as a theoretical framework with generalizable power.

The categorical content of multiple motivations framework contains the categories of identity presentation, social relations, playing, learning, achievement, rewards, immersive context, fantasy, uniqueness, creativity, curiosity, control and ownership, and context of support. After a comprehensive examination of these thirteen categories in the light of my data, further relationships between some categories,

universal generalizations so to speak emerged. These generalizations are characterized as an organizing framework and presented as a series of dualities in Figure 5.1. Along these relationships are those between identity presentation and social relations, playing and learning, and achievement and rewards. In addition immersive context, fantasy, and uniqueness came closer while creativity, curiosity, and control and ownership made another group. The fourth relationship is between these groups, with three categories in each. I will refer to the relationships between the categories as dualities.

Duality of Activity

Playing Learning

Duality of Subject

QA
as
implemented
in context

Duality of Outcome

Identity
Presentation Social
Relations

Achievement Rewards

Identification
- Immersive
  Context
- Fantasy
- Uniqueness

Negotiability
- Creativity
- Curiosity
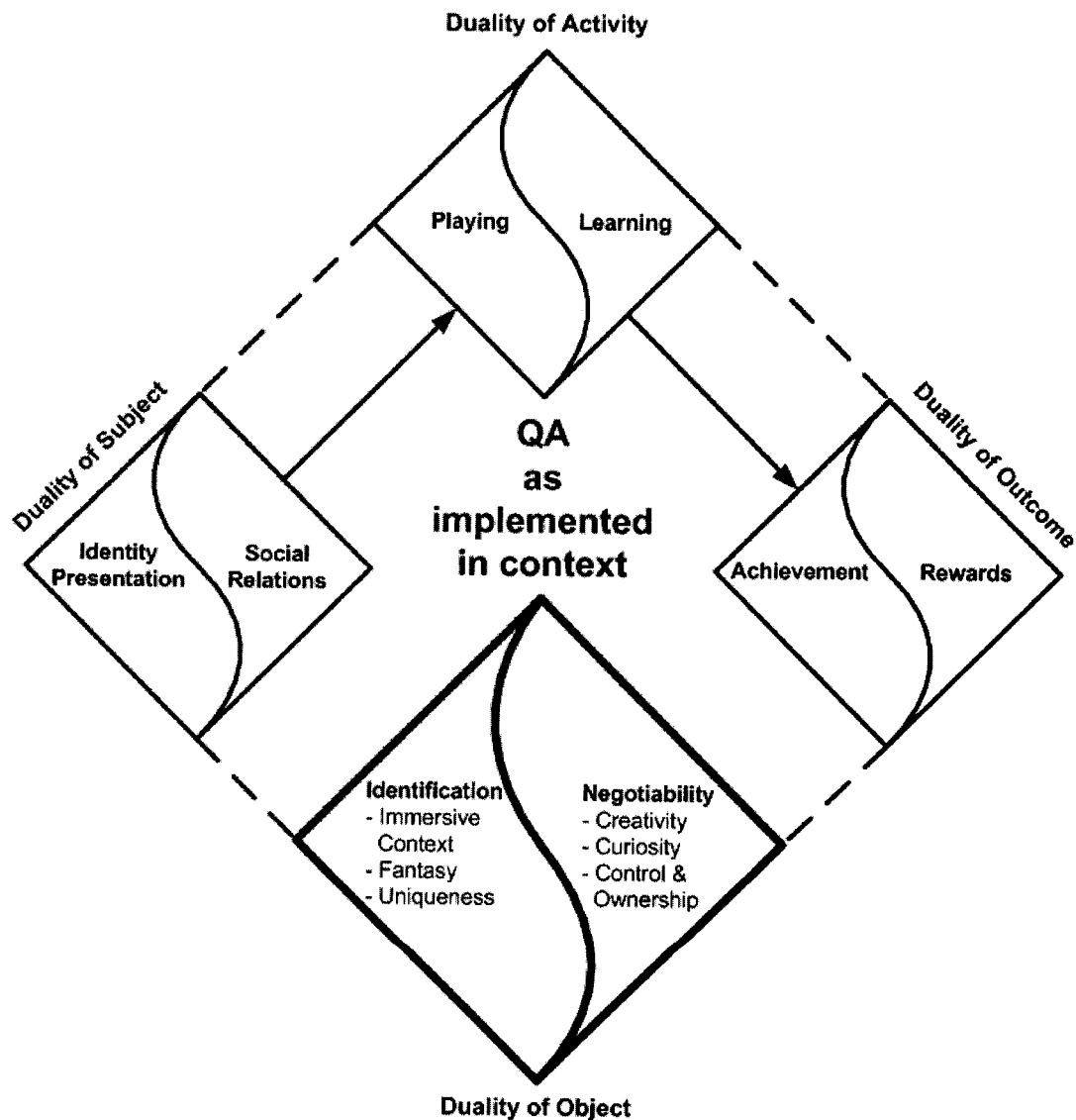- Control &
  Ownership

Duality of Object

Figure 5.1. Multiple Motivations Framework

176

Wenger (1998) defines a duality as "a single conceptual unit that is formed by two inseparable and mutually constitutive elements whose inherent tension and complementarity give the concept richness and dynamism" (p. 66). In this sense, dualities are not polarizations in a Hegelian or Marxist sense. They exist together. Dualities do not make up a spectrum. For example, going from one side to the other does not imply leaving the other. The effective functioning of one side of a duality necessitates, and is dependent on, the existence of the other (Barab, Makinster, & Scheckler, 2003). Sides of a duality describe an interplay. Understanding this interplay between the sides of a duality is of primary interest. For example, Wenger (1998) and Barab et al. (2003) utilized this understanding as a framework to understand the community life.

I will define the universal generalization between the categories of identity presentation and social relations as the "subject" duality, the one between the categories of playing and learning as the "activity" duality, and the one between the categories of achievement and rewards as the "outcome" duality. Additionally, I discuss the tension among identification and negotiation as the "object" duality.

Here I need to note Leontiev's concept of activity. Vygotsky and later his student Leontiev struggled to explain the differences between human beings and animals. For this explanation, Leontiev came up with the concept of activity. In his explanation he conceptualized activity as a collective process between the individual and community (Hedegaard, Chaiklin, & Jensen, 1999). In this sense, I need to clarify that my concept of activity is different from that of Leontiev's in that activity is not necessarily a collective process. However, I find Leontiev's framework, discussions, and even categorical labels

as discussed in terms of activity theory to be informative of my work, especially in that I use the labels subject, object, activity, and outcome.

<u>Duality of Subject</u>

Identity presentation and social relations categories make up the "object" duality. In this sense an individual likes to be part of a culture or social structure, however the individual still would like to keep his identity through various means, a duality expressed by Jung (as cited in Stone, 1997) as individuation (our need to be unique) and integration (our need to be part of a community). Therefore, an individual can participate in activities alone or he can participate with others.

In traditional computer games like pong and space invaders, the identity of a player is represented by an inanimate object, like a stick or a small spaceship. When modern kids were offered playing these classic games they described them as "yucky" ("Classic video games," 2003). Perhaps because of the advancements in computer game technology they expect more identity cues. As an example, it was repeatedly discovered in observations and interviews (see Chapter 4) that learners expected more identity cues.

Within QA, what gave identity meaning were avatars, usernames, and homepages. The existence of the individual in the game starts with an avatar. Avatars come ahead of usernames because of the nature of human beings. Human beings are visual creatures, and the saying "one picture is worth a thousand words" is an accepted rhetoric among many cultures. For most starters of the game, changing and trying different avatars was the first practice they engaged in. After a while they settled on a specific avatar. Learners always choosing an avatar in alignment with their genders, supports the research findings that using avatars in inhabited virtual worlds is a type of projection or personification of

the self (Dickey, 2000). This is in alignment with my experience of the virtual worlds. Many people I know, including myself, use a specific avatar in alignment with their gender.

A second cue of identity is usernames. Most of the kids selected a username, with which they identified. Users persisted with a username usually more than with an avatar. Donath (1998) expressed that using a name and signature were two of the most important indications of one's identity on the Usenet, the origin of all text-based discussion groups. In the case of QA, the usernames also functioned as one's signature. Learners used their usernames to sign their Quest responses and e-mail messages.

Avatars and usernames together contributed to one's trust and accountability within the game. For example, when learners met up with Bob, one of the QA designers, in the game they asked for his help based on their perception of his experience. In this sense, they gave him accountability and trusted his advice. It was the username of Bob and his unique avatar, a cool looking guy with a motorcycle, which attracted this trust and accountability. The trust and accountability of a username was further consolidated with the observation that some learners did not want their old usernames, the ones they had previously used, to be taken up later by anyone else, thinking that those usernames were attributed to them.

To reveal more of their identities learners used their homepages. By disclosing their self-information, what they liked, things that they were good at, they made public what and who they were. Username, homepage, and the avatar of a person were synthesized into a unified identity. Having such an identity was a reason for them to play and continue to participate in this game. This identity appeared to be enhanced through

social relations as they interacted with others and therefore were able to define their own identity. Learners used their identities for social relationships. These social relationships included interacting with others, sharing, competing, forming groups, and showing off.

At the foundations of the social relations were the communication opportunities in the game. These opportunities, ranging from chatting and e-mailing to telegramming, afforded players making different social relations. However, the interactions were not limited just within the game. For their social relations they also utilized their natural ability of talking. I believe the reason for this use of the physical space was the deficiency of the game's communication opportunities. When using the real conversation, kids were able to convey their ideas easily. While talking they were not concerned with their limited typing capabilities. As an example, it was both easier and more fun for them to trade a card in person. However, when that person was at a remote location they used the e-mail to bridge the gap for trading.

Kids' mostly preferring to play the game in groups instead of playing it individually supports their giving higher number of responses for social relationships over identity presentation. Here I need to convey the importance of the peer groups. Because of the work requirement of today's society, parents devote less time for interaction with their kids. As a result, other peers became an important reference group for children in shaping their actions (Maehr, 1974). It was documented that the impact of peer groups was universally an important element in motivating childrens' actions. For example, in "Coming of Age in Samoa" Margaret Mead (as cited in Maehr, 1974) showed that the sex education was handled by older peers. Such a peer effect was also visible among the kids at the club. More than one fourth of the kids I interviewed

indicated that they either saw other kids' playing QA, or other kids' talking about QA at the club. For these kids, such an effect triggered an initial interest towards trying the game. Therefore, without knowing anything about the game their peers made a jump-start effect for some kids towards playing the game. In his social learning theory, Bandura (1986) emphasizes the significance of observing and modeling the behaviors and attitudes of others. Such peer effects were also documented outside education. For example, Gladwell (2000) documents the impact of peer groups in the way Hush Puppies shoes became a popular brand.

For half of the interviewees' becoming a guild member, even without a firm structure for the guilds, supports the notion that players are more willing to undertake activities as a group. Considering the groups' size being small (four members at most), based on my observations, the guild structures should facilitate micro groups. Membership in this kind of permanent group is considered a main reason for many people's remaining in multi-player games even after they finish exploring the game world (Sellers, 2002).

Baron (1999) identifies glory and shame as feelings an individual experiences when playing multi-player online games. Both of these feelings require other players to be present. He claims that the reason more people aren't playing multi-player online games is that they fear the initial embarrassment of making mistakes. This kind of embarrassment is typically caused by being in front of an audience. In most of these games, glory is achieved at the price of shaming others. For example, in a first person shooter multi-player online game the glory comes from killing other players. However, glory can come without shaming others, by emphasizing individual achievement over

competitive achievement and focusing achievement on tackling challenges provided by the game and not defeating others.

Another such important new emerging feeling in QA was sharing. By cooperating and helping other players with various game tasks, more experienced players experienced the glory. By doing so, helpers were well aware of the fact that helping others was a way of showing their experience. While helping others they also enhanced their understanding of these skills in the social context of the game. However, this situation did not create shame for players getting help. Such learners were so happy with the help that they kept coming back to the game knowing that there would always be someone in the game to get help from. Furthermore, the existence of so many helpers in the game attracted more players to join the game.

Showing off is a type of self-presentation (Lott, 1977). Bennett and Yeeles (1990) conducted research to uncover children's understanding of showing off. For this purpose they asked the children what their peers showed off and why they thought their peers showed off. Related to the first question, researchers found references made to possessions and associations and references made to behavior. Related to the second question researchers found references made to intrapersonal psychological determinants and references made to interpersonal determinants. In the QA context, players showed off primarily possessions like points, virtual buildings, and trading cards. They showed off these because they wanted to emphasize their game experience. Therefore, their showing off was related to the interpersonal reasons. By showing off, these players achieved certain kind of satisfaction. The people they showed off to were not just their peers but also adults including their parents.

The secure environment provided by the game had a very important role in nurturing all these social relationships. In his hierarchy of needs Maslow (1987) put the security need towards the bottom of his pyramid. This way, the security of people is a prerequisite for most other human needs. The game provided flexibility for social relationships while providing this security. For example, learners were able to type anything in the chat area as long as what they wrote was not against the rules. In some other kid-friendly games, players do not have this flexibility. For example, in Toontown online (http://www.toontown.com) developed by Disney, a game similar to QA but without learning opportunities, players can chat by using a point-and-click chat system that lets them talk with other players by selecting canned phrases from a preset menu. Such a restrictive system in QA might weaken social relationships in the name of security. In educational computer games, the secure environment should be provided to nurture the social relationships, not to limit it.

Duality of Activity

Playing and learning categories make up the "activity" duality. In Multiple Motivations Framework, activities are performed by the duality of subject and activities result in the duality of outcome. The combination of lower level actions produces higher level activities. For example, when playing a game called pushball, players travel to the healthy world, navigate to the pushball arena, follow the ball object, and attend to other players and the scoreboard. When completing a Quest, they travel to different game worlds, navigate in them, find Quests, read and listen to Quest descriptions, interact with other learners to get help, submit answers, and get feedback. Each of these steps is an action, and actions contribute to the higher level activities of playing and learning.

Actions can be described as activities themselves, but one difference between activities and actions is that activities are relatively more meaningful than actions and therefore they have the potential to produce greater enjoyment. Perhaps the action of navigating in a 3D world is an amazing feeling for a learner who just starts the game. But over time this novelty wears off and users' enjoyment decreases. On the other hand, activities give learners consistent, sustained enjoyment.

This sustained enjoyment comes from the tight integration of actions that lead to an activity. Since there is a broad range of combinations of actions one can take while engaging with an activity, each instance of an activity becomes unique. As an example, a learner might logon to the game, meet with new players and talk to them, travel to "words of meaning" village in culture world, browse Quests in this village, choose a Quest, read the Quest description, browse online resources, discuss Quests with other players, and submit his answer in text format. Another player, on the other hand, might logon to the game, check to see if her previous response was approved, travel to "sound of music" village in culture world, find her assigned Quest, listen to a narrated Quest description, browse online resources, browse her textbook, create the artifact the Quest asks for, and submit this artifact as a response to Quest. Therefore, although these two learners can be said at the macro level to have simply complete a Quest, their engagement at the micro level differs greatly and reflects diversity.

Interestingly, for some activities there were varying opinions on the type of that activity. For example, some kids characterized completing Quests more as learning while some other kids characterized the same activity more as playing. This difference comes from the diversity of combinations one can take while engaging with an activity. Kids

who characterized doing the Quests more as learning were weak at integrating the play elements. On the other hand, kids who characterized doing Quests as fun tended to be good at integrating play elements into their learning.

Nonetheless, one should keep in mind that when the perception of an activity weighed more on playing or learning, the less weighed activity was still remembered and given importance. This supports the duality or inseparability of playing and learning. The playing and learning were so intertwined for the kids that they had difficulty distinguishing the two. For example, when I pointed to the education aspect of the game they reminded me about the playing aspect of it. Similarly, when I turned to the playing side they argued that one would also learn at the same time. Therefore, there was no point or need for them to separate the playing and learning.

Heaton (1978) supports this notion of "integrating" playing and working. He perceives learning as a kind of work; therefore it is safe to use either concept for the case of this study. The author states that these two acts should not be merely linked next to each other, but instead they must be integrated so that one can see the cultural world created by playing and learning. Play exposes the world around the learner, and helps by showing the things in the world. This occurs through naming, which brings things into existence for the learner. Energy brings together learning and playing. These two polarities create energy. In learning we gather and hold energy; in play we enjoy this energy.

Overall, learners considered QA as a game and there was no question about this issue. Multimedia elements, points, and the pushball game contributed, to a great extent,

to the game aspect of QA. Some other categories, like immersive context, creativity, or fantasy, were also considered as play elements.

Davies and Crowther (1995) point to the short term motivational effects of multimedia use in instructional products. While the novelty of multimedia elements may provide a short-term incentive to engage with the product, this does not ensure that students engage in the content and benefit from these elements towards learning. For this reason, using Herzberg's notion, they regard the multimedia features (graphics, sound, animation, etc.) as hygiene factors; i.e. the presence of them does not motivate, but their absence demotivates. However, the use of multimedia elements in QA showed the opposite; animation, audio, and graphics provide motivation by making the product more game like. For example, the presentation of the back story through a cartoon-like animation contributed to the gameness of the QA, and at the same time consolidated the understanding of the fantasy, which is also a motivational category itself. Moreover, the narration of Quests positively affected the learning. This especially applied to those many learners who disliked reading or had difficulty with reading. The redundancy of narration and text together seem to enhance learning, as suggested by Lee and Boling (1999).

Use of points in QA added to the gameness of it. This is probably because most computer games, including such genres as action, sports, adventure, arcade, puzzle, shoot'em up, simulator, and platform, include some kind of score keeping mechanism. Therefore, when learners noticed this mechanism in QA they automatically perceived it as a game. However, the points had some other functions more than merely being numbers. They were also used as a way to track one's development in the game. Since the points were accrued after completing educational tasks, ownership of more points

meant further experience and development. This was evident in the utterings of the Questers; for example, they differentiated between their overall score and their points available for spending, and they called their overall score as "experience points." Further, a few of them indicated the level they were in, suggesting that the points and levels were perceived as a symbol of development. And third, the points had a utility value; they helped with the creation of a QA economy. This issue is discussed under the "Duality of Outcome."

The third factor that makes QA game-like is the pushball game. This kind of game makes the learning environment more interactive. This way, in addition to inhabiting the game space, the users can also interact with the objects in it. In the pushball game, players can kick the ball and change the direction and speed of it. When they score in the game the numbers on the scoreboard changes; therefore, they impact the environment. In a similar approach, Corbit (2002) utilized such an interactive game in SciCentr 3D virtual world. They designed a multi-user musical instrument that resembled a pipe organ. Users could play the keys of this pipe organ and collaboratively improvise different chords. Beyond the play element, this kind of interactive games can be adapted to the curriculum. For example, the pushball game could be used to learn about the rules of a specific game, like soccer or football. Corbit (2002) integrated MATLAB software to let users visualize the chords improvised by the multi-user pipe organ. This could be an efficient way to learn about scientific visualization.

There are certain problems with this kind of interactive games though, the biggest problem being the development time. The main components of QA already take time to implement and support. Therefore, going beyond the primary participant structures and

adding this kind of interactive play elements require additional time and labor. Because of this overhead this kind of game should be conceptualized to include maximum motivational categories. For example, the pushball game can be played alone or with a group. When someone scores in the game, the name of the scorer is announced and recognized. The scores of teams are displayed on a scoreboard. The pushball arena provides an immersive context; it is part of the healthy world. The names of the teams, heart team and mind team, are consistent with the healthy world theme and provide fantasy elements. The integration of multiple motivations can justify the value of these games in the long run.

Besides, in developing such interactive elements, available tools to developers play a major role. For example, the 3D technology QA uses is from Active Worlds (http://www.activeworlds.com). This company provides a Software Development Kit (SDK) to programmers, which helps with developing applications that function within the 3D virtual environment. The pushball game was developed by using the SDK. When developing interactive elements, the designers of QA are bound within structures that are provided by the SDK. Therefore, some concepts cannot be implemented because of lack of methods in the SDK and have to wait until the company enhances their SDK. The support from the community of other developers using the same technology and the good connection between developers and the company towards enhancing their tools are important in overcoming these difficulties.

While these components, multimedia elements, points, and pushball, make QA game-like and make the learning fun, the fun part also comes from the learning itself.

What makes learning fun are the features of it: meaningful learning and active learning. These two features of learning are highly interrelated.

Ausubel (1968) defines meaningful learning as a process in which knowledge in symbolic form are related in a nonarbitrary and substantive manner to what the learner already knows. Therefore, meaningful learning depends on both the nature of the material or knowledge to be learned and the cognitive structure of a particular learner. For example, in learning a new formula in physics, the components of the formula might be meaningful but the learning task as a whole (learning the meaning of the formula) should be perceived meaningfully by the learner. The opposite of meaningful learning is rote learning.

Bruner (1973) considers two kinds of knowledge in the learning process: knowledge as detached, which is meaningless, and knowledge as a guide to purposeful action. Detached knowledge is competence; when that knowledge is used for purposeful action it is performance. Drawing upon the ideas of Francis Bacon and Lev Vygotsky, Bruner (1996) speculated that praxis typically came before the skill in human history (for example, the pyramids were built much before the theory of mechanics was known), meaning that skill was not a theory informing action. The implication of this statement is that knowledge is helpful only when it is used in action. For example, we can improve the skill of typing with the aid of learning the orientation of computer keyboard keys; however, our typing does not improve until we get that knowledge back into the skill of typing. In a similar way, Dewey (1938) advocated the importance of experience in learning, which involves real-world participation.

A learning approach that eliminates memorizing and is based on purposeful action and experience appear to be part of what makes learning meaningful in QA. Learners in QA are provided learning opportunities that do not require memorizing. The Quests that they undertake still ask for some factual knowledge; however, this knowledge is already provided to the learners through various resources. Accomplishing these Quests involves processing knowledge in a substantive manner like researching community problems, examining current events, conducting environmental field studies, writing autobiographical anecdotes, developing real-world action plans, producing advocacy media, and interviewing families and friends. Therefore, in their nature, the materials are usable in learners' lives and they have a meaning in the real-world.

One problem in making learning meaningful is the difficulty of doing so for many learners at once (Langer, 1997). This problem is overcome in QA by the diversity and flexibility of the Quests. For example, to accomplish a specific curriculum goal, multiple Quests are offered to learners. Learners can choose one of these based on their experience, interest, and therefore their cognitive structure. The flexibility of the Quests provides further choice options; for example, when learners are required to interview someone they are given the option of choosing any person they like.

Bruner (1973) proposes that for the education to be relevant to the learner, it should concentrate more on the unknown and speculative. The learner should use the known and established for extrapolation. This philosophy requires migrating from being a "knower" to be a "seeker." Knowers value declarative statements and passive learning. Seekers on the other hand perceive them as an opportunity for speculation and doubt. In QA, the Quests encourage multiple views and emphasize that there could be no right

answer to a specific problem. This in turn discourages learners from providing static information and encourages active participation. The learners do not just read a problem and try to give a right answer to it; they consult the resources to link their knowledge and provide a sound response from their perspective. Being a seeker in this process makes the learning active.

While emphasizing the importance of experience in learning, Dewey (1938) points to the properties of that experience. It is the continuity of experience that nurtures learning. Continuity of experience suggests that the results of previous experiences are carried over to the later experiences. Dewey (1916) states that reflection, "the discernment of the relation between what we try to do and what happens in consequence" (p. 144), in experience is important in providing this continuity. While reflecting on an experience the connections are established between what is done and its results. If the reflection part is separated from the active doing phase, the meaning and continuity of an experience is lost. Each Quest response in QA requires such a reflection from the learners. Specifically, answering the Quests involves thinking about the following three reflection questions:

- How does your response meet all the goals of the Quest?
- What did you learn about the topic and yourself from doing this Quest?
- Tell the council how your response helps the mission of QA.

By answering these reflection questions, learners make their experience explicit. The experience is explained and understood. They discover the relationships between what they have done and their results, and the whole experience is unified.

The feedback mechanism plays a major role in the Questers' learning process in addition to meaningful learning, active learning, and reflection. Dewey (1916) points to the importance of trial and error in experiences; learners simply do something and when they fail they do something else until it works. In traditional learning environments, like schools, this phenomenon is not recognized and learners are expected to perform above a standard in their first trial. Then their performances are graded and that experience is considered to be concluded. On the contrary, an experience that is improved over time, similar to QA context, seems to encourage learners to come back to the learning context.

It is apparent that learners enjoy learning through a game that educates them. Therefore, it can be suggested that play is an important element for learners and it should be combined with meaningful learning opportunities that require active participation to motivate them towards sustaining and completing these activities.

Duality of Outcome

Achievement and rewards categories make up the "outcome" duality. The duality of outcome is the result of the activity duality. Achievement refers to the enjoyment and recognition learners get after overcoming learning activities. Rewards refer to the extrinsic incentives they obtain. Achievement and rewards exist together; however, frequently the rewards outweigh the achievement. Understanding the reason behind this issue requires thinking about the purpose of learning. The purpose of learning and education in general seem to be a deep philosophical question.

Let us consider an informal learning situation, such as learning to play a guitar. A child might learn to play guitar for several reasons. She might just want to play guitar as a hobby in her spare time; she might look into a career in music when she grows up; or her

parents might force her to thinking that some kind of art form will better her development. In each of these cases there is an ultimate expected outcome for learning to play guitar.

Let us consider a more formal learning situation, such as a training course on interpersonal skills. An adult might attend this course for several reasons: his company might have sent him to this course since the evaluation of its employees pointed to such a need; he might think that attending this course will increase his chance for finding a better job in the future; or he might simply feel that his interpersonal skills need improvement. Again, there is an expected outcome for attending this course on interpersonal skills.

We can also consider a fully formal learning situation, such as those that typically exist at public schools. Children might go to schools for several reasons. They might like going to school; they might go to school to get a job in the future; it might be required to go to school by law; or their parents might send them to school thinking that this is a suitable way for the children to prepare to live in and succeed in their lifetime. Once again, there is an expected outcome for going to school.

Although there are different expected outcomes for each of the previous examples, there is a consensus among contemporary scholars and long held beliefs that the ultimate outcome of modern education is the continuity of culture and society. For example, Dewey (1916) expressed that transmitting the resources and accomplishments of a complex society requires a formal education system. When Bruner (1973) gives the case of a primitive hunter-gatherer society, he points that there is no school, lessons, or instructions in this culture. Members learn the requirements of life through participating

in activities like dancing and hunting. Nobody teaches anybody. Everybody in this culture knows or learns everything to continue the life as a member of this society. According to Bruner, as the knowledge and skills in cultures became too much to handle for an individual, the economical technique of teaching children in schools developed.

Breger (1974) documents this advancement from primitive cultures into modern society clearly. The author believes primitive societies like hunter-gatherer cultures represented an equilibrium: Humans were able to easily express their emotions, people lived closer to nature, and children were raised in a manner that was consistent with their future adult roles. The activities of the hunter and gatherer culture were directly related to their everyday life. They used their limited technology in a more direct and meaningful way than do modern human beings. For example, while making a clay pot, or spear, the function of the completed products clearly fit into their life. In their activities there was no money, no organization, and no bureaucracy between the work and the purpose of that work. They were organized along familial lines. Everybody was related to everybody else in some way: husband-wife, parent-child, grandparent-grandchild, cousin, niece, uncle, or aunt. Therefore, identification for the individual with this small social group was possible. Hunting and gatherer cultures lived closer to their natural environments. They felt the environment was part of their small social structure. Their dependence on vegetation and hunting kept them nomadic in the pursuit of food. This nomadic condition required having minimum possessions. Sharing was an important ethic in these cultures. Since food was shared and they did not compete for it, the members were anxiety free between themselves.

Breger (1974) thinks the discovery of agriculture shifted the way of life from the hunting and gathering base to a more technology dependent one. The nomadic existence was replaced with a fixed living area; therefore, the ownership of individual and private property was given importance. This in turn resulted in the exclusion or minimization of sharing. Group size increased with the availability of a stable and constant supply of food. Therefore, the basic social group became too large to remain familiar. With the increase in group size, people attempted to control and conquer nature by creating artificial environments, cities within which to live. Labor became more and more specialized, day by day. For example, at the beginning of agriculture, simple farming could be done by everyone. However, workers eventually performed one, or a few, small tasks repetitively, typically posited in assembly lines at factories or in offices. In sum, culture changed into our present state in which individuals own land, technological innovations, and assets. As Sfard (1998) indicated, the world became increasingly materialistic. In this world, people typically do not share materials with other members of the society; instead, they compete for them.

The current metaphors of education also support the idea that children go to school for the continuation of culture and society. When Cook-Sather (2003) examined the current metaphors in education, she found the "education as production" metaphor as the most powerful and most enduring metaphor that shaped the practices of education in the United States. She stated that this metaphor existed in the field of education at least since the industrial revolution. In the "education as production" metaphor:

> The school is a more or less well oiled machine that processes (educates?) children. In this sense, the education system (school) comes complete with production goals (desired end states); objectives (precise intermediate end states); raw material (children); a physical plant (school building); a 13-

stage assembly line (grades K--12); directives for each stage (curriculum guides); processes for each stage (instruction): managers for each stage (teachers); plant supervisors (principals)...uniform criteria for all (standardized testing interpreted on the normal curve); and basic product available in several lines of trim (academic, vocational, business, general) (Sawada & Caley, 1985, p. 14).

The purpose of this metaphorical system is to make children ready for the future; however, as Dewey (1938) points out

> The ideal of using the present simply to get ready for the future contradicts itself. It omits, and even shuts out, the very conditions by which a person can be prepared for his future. We always live at the time we live and not at some other time, and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future (p. 49).

Dewey (1938) adds that the connection between the present and the future can be accomplished just by those who become mature. For this reason, for those who are not mature yet, the conditions for the present should be established as an effect for the future.

Based on my data, I can assert that most of the children interviewed in this study perceive their learning and education "as a job." I speculate that the current status of the society described above might have an impact towards this end. Considering their learning as a job, it is so natural for them to expect a return for their effort. Who in the world works in a job without payment? Therefore, although they like the achievement of overcoming the challenges and the recognition associated with it, obtaining some kind of extrinsic incentives is indispensable. Both the achievement and the rewards are the conditions for the present that will affect the future.

In QA, the rewards are both materialistic and non-materialistic. Among the non-materialistic rewards are points, awards, and social approval. Among the materialistic rewards are items in the virtual trading post like trading cards, Internet time, pencils,

rulers, and t-shirts. The availability of both kinds of rewards gives learners choice options for the outcome of their activities.

The method for the distribution of these rewards is quite different from the distribution of rewards in traditional learning and research contexts. In QA, learners always get points for completing educational activities. However, it is up to them what to do with these points. Points are like tokens, which have no value on their own, but which can be exchanged for items that do have value (Vernon, 1972). Some learners enjoy just keeping their points and do not exchange them for any materialistic rewards. If they like, they can visit the virtual trading post and exchange their points with materialistic rewards. This kind of compensation structure eliminates the harmful effects of the extrinsic rewards on learners' later intrinsic interest in the activities.

It is not just the method of the distribution that is different from traditional learning contexts, but also the nature of the materialistic rewards. These rewards have educational elements to a certain degree. QA trading cards are the best example of this educational element. While trading cards are extrinsic rewards, they are also educational at the same time; therefore they help in the creation of a recursive learning cycle.

Lastly, one very interesting point about the rewards is the emergence of a liberal open market in QA. Learners perceive the QA points as a kind of exchange currency and use them for meaningful transactions. Again, I argue that this perception might be the result of our current society in which money is very important for ordering life. In this way, points in QA actually have an educational value in addition to being a motivational element. It was documented that American children, collectively, between the ages of 7 to 12 collect $11.3 billion per year as allowance ("Bring me," 1997). This amount is huge

and requires children learning about the virtues of saving. The market environment in QA

has such a potential where children can learn the basics of saving. Having this skill is a

prerequisite for one's financial well-being in the future.

<u>Duality of Object</u>

Six categories, immersive context, fantasy, uniqueness, creativity, curiosity, and

control and ownership, make up the duality of object. Specifically immersive context,

fantasy, and uniqueness categories contribute to the "identification," while creativity,

curiosity, and control and ownership categories constitute the "negotiability."

I adapted the terms identification and negotiability from Wenger (1998). He

utilizes identification and negotiability duality to characterize identity in communities of

practice. Identification refers to "the process through which modes of belonging become

constitutive of our identities by creating bonds or distinctions in which we become

invested" (p. 191). Negotiability is "the ability, facility, and legitimacy to contribute to,

take responsibility for, and shape the meanings that matter within a social configuration"

(p. 197). In the framework of multiple motivations I use these two terms slightly

differently. In my framework, identification refers to the overall reification of game

material providing the experience. In a sense, identification is the learners' identifying the

game as something. Negotiability on the other hand is the investment of learners in this

reification. In a sense, it is learners' impact or "mark" on the game.

Immersive context is one of the categories that give QA its identification. The

immersive context of QA is provided by both its 3D technology and support structures.

These support structures include QA posters, QA activity chart, QA trading cards, QA

comic books, and recently a QA novel. These support structures extend the gameplay

beyond the computers and make the experience part of life. There is a Turkish proverb "out of sight, out of mind." These materials, being in sight, remind the learners about the availability of the game and encourages further play. This kind of immersivenes has been used by recent Hollywood blockbuster movies to increase audience interest towards these movies. For example, when "Matrix Reloaded" and "Matrix Revolutions" movies were launched they were accompanied by many support structures including posters, comic books, series of animation, and computer games. Actually, the purpose of these support structures for these movies was more than immersivenes. They also carried the narrative of the movies outside the movies. Similarly, two of the support structures in QA, QA comic books and the QA novel, have similar functions. They present the backstory of the game in alternative forms. This assures the fantasy element of the game will be understood by many learners with different interests and learning styles.

The 3-Dimensional part of QA contributes to its immersivenes to a great degree. It is the possibility of navigation in 3D that feeds this immersive feeling. User interface design expert, Jakob Nielsen (1998), once stated that "2D is better than 3D," because people were not frogs with eyes sitting on the side of their heads. He argued that since humans had their eyes in front of their face, they looked straight out, and therefore 2D interfaces were better for their face ergonomics. He also added the difficulties of using 3D interfaces on the computers like poor screen resolution and non-standard software. Technically these difficulties have been overcome. In terms of 2D being better than 3D, this probably depends on the conditions where the interface is used; however, I will argue that humans have a natural cognitive ability of recognizing and performing in the spatial context. When children are introduced to the QA 3D game environment, they don't need

to be taught about how to navigate in this 3D environment. They just navigate in it. It is so natural and appeared to be intuitive. Furthermore, 3D space affords continuity unlike traditional WIMP (Windows, Icon, Mouse, Pull-down menu) user interfaces; i.e. the performance of navigation is carried out in real-time without any transitions.

There are three forms of representations in semiotics: iconic, indexical, and symbolic (Woolley, 1992). A photograph of a house is an iconic representation, because the image carries some relation to the house it depicts. House is the index of family, because it is a sign that carries a causal or sequential relationship to what it represents. A symbol has an arbitrary relationship with what it presents, like the word "house." If we were to define the navigation in 3D space with one of these three semiotic representations this would not be possible, because it exceeds these three forms of representations. The experience of navigation in 3D itself is the representation. It does not require translation. A house in the game is a house which can be inhabited. Overall, 3D is motivating because it is naturally intuitive to players and therefore it requires less cognitive translation.

Although the feeling of the space in a computer game is natural for children and it is motivating, a space is a space and nothing more than that. For example, remove the rides from an amusement park and you will have a space that loses its attractiveness. Similarly, what makes the QA space attractive are the worlds, villages and structures that fill this space. Furthermore, these fundamentals are not scattered in an arbitrary and loose manner but converged through a fantasy story: People of Atlantis lost their knowledge and demand the help of earth children to restore their knowledge. Therefore, children are attracted to the game space, which is a matrix between Atlantis and earth, and help

Atlantians in restoring their knowledge by accomplishing Quests in the villages and the worlds. Herz (1997) argues that the computer game "Doom" was a very successful game not just because it used 3D technology, but because it also invoked the emotional feeling of horror in its players. Similarly in QA, the altruistic motive of helping the Atlantis people adds an emotional layer to the gameplay.

While reading a fictional novel or watching a fictional movie, the audience experiences two paradoxical feelings. On the one hand most of the characters, places, or story described in the novel or movie do not exist outside the pages of the novel or screen of the movie. On the other hand once the fiction is acknowledged, characters, places, or story inside the novel or movie are thought to have some sort of reality. When the novel or movie is over, the audience does not believe the characters, places, or story ends with it (Woolley, 1992). Likewise, the backstory of Atlantis and its characters are considered as real by its players to a surprising degree. The possibility of the players' communicating with the characters of the story strengthens the realism of the fantasy.

The third category that contributes to identification of QA is its uniqueness. The dictionary meaning of the word uniqueness is "being the only one of its kind" or "without an equal or equivalent" ("Dictionary.com-uniqueness," 2004). What makes QA unique are the unique opportunities it provides in the area of learning, information technology, socializing, and creativity, its difference from players' home life, school life, and club life, and its difference from their home activities, school activities, and club activities. Overall, the four dualities of motivation assist with the emergence of a unique game that is perceived by the learners "as a whole."

One of the categories that provides the negotiability of QA is creativity. Although there are other modes of creativity in QA, like producing Quest responses, the most evident mode of creativity in the eyes of players is building in the virtual space. Building is the players' stake in the 3D game space. As it was indicated in Chapter 4, claiming a plot of land and building on it were the only discriminate motivational activities that separated high participating group from the medium and low participating groups. Furthermore, all participants who claimed a piece of land and built on it kept on paying the rent for it and building on it. These data suggest that the activity of building in the virtual space is a strong motivator for the learners to come back to the learning environment. Similarly, Osberg (1997) and Osberg et al. (1997) found that virtual world building activities were motivating for learners.

Creativity requires an environment that is conducive to being creative. In this environment one must be challenged, be free, and have the time and resources that help with being creative (Fox & Fox, 2000). QA provides these opportunities to its players. First of all, there is an area in one of the game worlds, named "Questers' Building Area," devoted for building activities. Once players rent a plot of land, they are free to build anything they want on this land. The challenge comes from the other builders in the neighborhood; by observing others' building activities they improve their own structures. The building activities not only allow spatial creativity but also imaginative creativity. For example, builders construct hotels, restaurants, and galleries for role-playing. Furthermore, some of them share these places with other players and assign rooms and roles in them. The literature supports that this kind of creative imagination can increase children's cognitive and social skills (Singer & Singer, 1998).

It must be noted here that the building activities in QA were not structured around a curriculum goal, and therefore it was in free play mode. In this free play mode, most of the players started their building activities with a house although this was not dictated or constrained by an outside power. In traditional text-based shared environments, like MUDs and MOOs, the ability of building one's own room in the textual environment has been identified as crucial to the success of these environments (Schroeder, Huxor, & Smith, 2001).

Another category that provides the negotiability of QA is curiosity. There are two types of curiosity in QA identified by Keller (1987) and Malone and Lepper (1987): Sources that address the senses of learners, and sources that address the cognition of learners. Secret places in game worlds and villages provide sensory curiosity and this source is the prevailing source of curiosity in QA. I need to point to the difference of this kind of sensory curiosity from the one described in the traditional sense. In Keller (1987) and Malone and Lepper (1987), sensory curiosity refers to the availability of color, sound, animation, and graphics. In QA, sensory curiosity reveals itself in the form of exploring. Players explore the game space to see what is available and also to find the secret places in it. Therefore, this type of curiosity is more than sensory and it blends into cognition; the players want to know what is available in the space and where are the secret areas. Similarly, Berlyne (1960) stated that the two types of internal and external curiosity could coincide. Waiting for the feedback of Quest responses keep learners in suspense and this is a type of cognitive curiosity. However, if the learners do not obtain the feedback in a reasonable time, like within several days, this type of curiosity might end up with detrimental effects. Another source for cognitive curiosity is seeing the end

of the game. However, this has been less emphasized by learners among other sources of curiosity, which suggests that the curiosity sources related to the process of the gameplay is more engaging than the sources related to the product of the gameplay.

The last category that provides negotiability of QA is control and ownership. The literature on motivation supports the importance of control over one's behavior for continuous motivation. For example, De Charms (1968) coined the terms "origin" and "pawn" to distinguish between activities that are accomplished freely and activities that are forced. When a person perceives that her or his behavior is determined by her/his own choosing she/he is an origin; when that person perceives that behavior is determined by external forces that person is a pawn. According to De Charms (1968) when people feel that they are the origins of their own actions this is a powerful motivational force directing future behavior.

Likewise, control over the game is a basic tension for learners. This tension of control is sensed in many dimensions. For example, they wanted to work on Quests that were not allowed, they wanted to use telegramming as a communication mode that was not supported by the designers, they wanted to use objects that were not available to them in their building activities, they wanted to buy their land instead of renting, and they wanted to see more than just one avatar in the ocean world. This tension creates a real dilemma for game designers. On the one side, designers need to provide playing and learning opportunities within the game. On the other side, once a usable basic game environment comes out, learners must have control over these opportunities so that they come back to this environment. In a similar fashion, the designers of Habitat, the first networked multi-user virtual world, recognized the importance of giving control to the

users; however, they struggled on the level of power that should have been given to users (Morningstar & Farmer, 1991). Their survey of the users revealed that there were two kinds of users: those who valued anarchy, and those who liked management. Designers were not able to implement any structure in their pilot design, but concluded that this issue had to be addressed in future virtual worlds.

The framework of multiple motivations is in accordance with Malone and Lepper's (1987) taxonomy of intrinsic motivations in that both recognize the importance of control. However, it enhances the meaning of control to reflect the tension of players and the dilemma of designers. In the taxonomy of intrinsic motivations control is defined with three characteristics: contingency, choice, and power (Malone & Lepper, 1987). This framework of multiple motivations acknowledges the characteristic of contingency, which is apparent and requisite for control; without user involvement or response control cannot exist. This basic level is accomplished by players in QA by directing their avatars, inputting Quest responses, and changing information on their PDAs (homepages). However, this basic level is not enough to drag the players back to the game. What drags users back to the game in terms of control is the plasticity or adaptability of game identification. In this sense, control is the ability of players stretching game elements and rules. An example is players' wish to use objects not available to them in their building. This explanation suggests the availability of choice options, but it is actually more than choice for the reason that it embraces choices not yet available. For example, they might request objects not available in the inventory.

When learners accomplish this kind of control over the game their ownership of the game seems to increase; as a result they come back to the game more often. An

example of this in QA is the creation of jobs. There was no such plan on the side of the

design team to add such a participant structure to the game. However, the players pushed

the game in such a direction to include it. Apparently, providing this kind of control

requires interplay between players and designers.

The twelve categories mentioned so far in the framework of multiple motivations

impact the motivations of learners playing educational computer games. However, there

is another category that impacts these twelve categories, the context in which the

educational game is played and therefore in which the learning takes place. Other

researchers have also recognized that motivation is influenced by the context in which the

learning takes place (see for example, Jarvela, 2001). Three contextual differences

emerged in terms of motivational categories in the implementation of QA at the club and

at the schools. These differences were in the area of control, identity, and rewards and is

discussed in the next section.

Context of Support

Since learners naturally need to participate in many learning activities at the

schools, they have fewer opportunities to participate in the game. For this reason, for a

typical learner using QA at the school, the time she/he spends is one to two hours a week.

Because of this limited usage it appears that teachers try to maintain the management of

learners by enforcing control over them. For example, in one of the learner's classroom

the teacher synchronized Questers' participation so that everybody was doing the same

activity at the same time. Even after this kind of strategy to sync the learners'

participation, this learner ended up with uncompleted Quests. The descriptions of learners

using QA at their schools revealed a frustration over this control. The learners indicated

that with increased control on the teachers' part, and decreased control on their part their motivation to participate in the activities tended to decrease. At the club, learners had more time to participate in the activities. Also, their participation was less controlled by outside mentors.

A second contextual difference between the club and schools was in the assignment of usernames. At the club Questers were free to pick up any username they liked, as long as it was not against the QA policies. At the schools teachers tend to assign usernames to Questers, usually in the combination of Questers' names, last names, and some numbers. This is understandable from the viewpoint of teachers, because this kind of strategy probably helps the teachers in the management of their classes or gives them the feeling that it does. However, doing so may harm the identity of players and at the same time removes the empowerment from them.

The third contextual difference was in the diversity of rewards in the virtual trading post. The implementation of QA at the club included many more materialistic items in the virtual trading post than the school implementations. As it was discussed under the duality of outcomes, having a diversity of materialistic rewards is a necessity for both the effort of Questers and also for the creation of a QA economy. Possibly, addition and distribution of these rewards by teachers has been neglected by time constraints or they were simply in conflict with their teaching beliefs.

Apart from these differences, the "Internet time" emerged as a contextual item in the trading post of the club. The culture of the club was such that the use of Internet was tied to using educational software. When members used educational software for a specified amount of time, they then had the right to use the Internet for a specified

amount of time. Having the Internet time as an item in the virtual trading post created a win-win situation for the members; they participated in the learning activities and had fun in QA, and at the same time they exchanged their points with Internet time, which was extremely meaningful and valuable in this context. This reward item may not make sense and may not have a value in most other contexts, like schools.

As these examples verify, the culture, values, and norms of the context of the game implementation can make a difference in providing the motivational categories. More research needs to be done in broader contexts in order to see the extent to which the implementation of motivational categories differs in other contexts.

Limitations of the Study

This dissertation carries the limitations which are inherent in qualitative studies. Among the most important of these limitations are the individual biases of the researcher and the complexities with the generalization of the results.

Since the researcher is one of the members of the QA design team and therefore he has substantial control over the design of QA, this study might have been influenced by the perceptions of the researcher. This is exacerbated by the fact that the researcher has participated in QA activities in the computer lab of the selected center for about one and a half years. Therefore, many of the learners at the center have close connections with the researcher. These connections have been sustained through some learners' participation through their home computers when the center's Internet connection was down due to financial constraints.

Another limitation lies in the generalization of the results to broader contexts. The unique features of the setting under study, such as young age group and participation in

QA activities on a voluntary basis make it difficult to generalize. In addition, some of the game features, such as the QA being a "multiplayer" game, make it even more difficult to generalize the results to all educational computer games. However, generalization of the setting is not a major limitation since many authors indicate that qualitative research is a way to describe unique social structures, and that "all social structures are unique" and therefore, generalization may not be a norm by which qualitative research should be judged (Schloss & Smith, 1999).

Assertions

In the following section of this chapter, I present my assertions in the light of multiple motivations framework. In this section my intention is to generalize my framework to the broader topic of motivation.

Assertion 1: Motivation is distributed among many elements

Traditionally, theories of motivation have focused on just one, or a few, traits. My framework of multiple motivations includes multiple elements that contribute to one's motivation and that collectively constitute the activity of motivation. Ignoring most of these elements, and the interactions between them, while focusing on just one or a few of them, could produce incomplete research results and possibly invalid conclusions. Motivation is dependent upon not just reinforcers as Skinner (1953) suggested, not just intrinsic reasons as Deci (1975) and Malone and Lepper (1987) suggested, not just modeling others as Bandura (1986) suggested, not just self-actualization as Maslow (1987) suggested, not just need for achievement as Atkinson (Atkinson & Feather, 1966) suggested, and not just the origin of people's own actions as De Charms (1968)

suggested. As a researcher in social sciences, I understand these researchers' passion for

explaining motivation with reduced variables just like physicists and astronomers have

been struggling to come up with a theory of everything with a compact formula like

$e=mc^2$. However, I don't see this as simply a case in motivation research, and instead

posit that the most condensed form would have to include multiple motivations.

Assertion 2: These elements are both intrinsic and extrinsic to the learners

While browsing the literature on motivation and learning, it has been so typical to

come up with a piece like the following for commenting on the decrease in motivation:

> ... Before school age, learning seems clearly and universally intrinsically
> motivating for children. Few of us have ever seen, or even heard of, a
> three- or four-year-old with a "motivational deficit." Instead, young
> children seem eager and excited about learning of all sorts, and the more
> typical parental complaints concern their children's apparently insatiable
> curiosity and boundless energy. Yet, by the time these same children have
> entered school, a sizeable fraction are quickly labeled as having
> motivational difficulties of one sort or another in learning (Lepper, Sethi,
> Dialdin, & Drake, 1997, p. 23).

The same ideas were expressed in the past by Cordova and Lepper (1996) and Brugman

and Beem (1986). These kinds of ideas can be summarized in the following steps: 1)

children are motivated to learn from their birth, 2) when children enter school their

motivation to learn falls dramatically, and 3) what is the reason for this decreased

motivation as the children grow up? Lepper et al. (1997) indicated that there was no

single answer to this question, and worse there were no convincing data to help with

choosing alternative explanations. One of their possible explanations was the heavy use

of extrinsic rewards over time undermining children's intrinsic motivation in the school.

Actually there has been extensive literature that attempts to explain the decrease

in motivation of learners as being the undermined intrinsic motivation. Three independent

studies conducted almost at the same time by Deci (1971, 1972), Kruglanski, Friedman, and Zeevi (1971), and Lepper, Greene, and Nisbett (1973) showed the negative effects of the extrinsic rewards on learners' subsequent intrinsic interest in the activities, for which the extrinsic rewards were no longer available (as cited in Lepper & Henderlong, 2000). Since then, another 100 additional research studies have been conducted challenging the same issue; however, these follow-up studies came up with a similar conclusion (Lepper & Henderlong, 2000).

Some other researchers on the other hand objected to the idea of the negative effects of rewards on intrinsic motivation. These various meta-analytical reviews of previous research on this issue revealed that negative effects of rewards occur under certain conditions, and rewards can be used to increase motivation when properly arranged (Cameron & Pierce, 1994; Eisenberger & Cameron, 1996; Cameron, Banko, & Pierce, 2001). Based on these conclusions, Cameron and Pierce (2002) stated that intrinsic motivation was a misguided construct. The opponents of these findings claimed that these meta-analyses were flawed and that their conclusions were incorrect and came up with their meta-analyses (Deci, Koestner, & Ryan, 1999; Deci, Koestner, & Ryan, 2001). They claimed again that extrinsic rewards undermined intrinsic motivation.

While there are different viewpoints, my finding is that multiple motivations can exist simultaneously, including those that are intrinsic and extrinsic. Many reasons, both intrinsic and extrinsic, exist for learning. Moreover, both intrinsic and extrinsic reasons might be involved for a learning activity at the same time. As an example, some of the learners indicated that they completed Quests in the game both to get points and to help the Atlantian people. Likewise, they collected points to buy extrinsic items but at the

same time points were a motivator as showing their development. Assuming the coexistence of intrinsic and extrinsic motivations is a very important theoretical standpoint; because it can change the scales used to measure motivation, and the conclusions based on data coming from these scales. As an example, Harter's (1981) self-reporting scale, which is one of the most widely used scales for measuring motivation, assumes that intrinsic and extrinsic motivations are mutually exclusive. Therefore, while completing this scale a student has to be either intrinsically or extrinsically motivated for a learning activity. By using a modified version of this scale that allowed being intrinsically and extrinsically motivated at the same time Lepper, Sethi, Dialdin, and Drake (1997) found that both type of motivations could coexist. Eventually, even Lepper, whose taxonomy of motivation (Malone & Lepper, 1987) included just intrinsic factors, concluded that "... [S]uccess in school, as in many areas of life outside of school, may require us to attend simultaneously to both intrinsic and extrinsic sources of motivation" (Lepper & Henderlong, 2000, p. 295).

This conclusion of Lepper and Henderlong (2000) came after a review of intrinsic and extrinsic motivation research within the past 25 years; however, this idea is not new. When the philosopher Plato conveyed the dialogues of Socrates and Glaucon about 25 hundred years ago, he mentioned the highest class where individuals who would do tasks both for their own sake and for their results:

> Glaucon: ... How would you arrange goods -- are there not some which we welcome for their own sakes, and independently of their consequences, as, for example, harmless pleasures and enjoyments, which delight us at the time, although nothing follows from them?
> Socrates: I agree in thinking that there is such a class, I replied.
> Glaucon: Is there not also a second class of goods, such as knowledge, sight, health, which are desirable not only in themselves, but also for their results?

Socrates: Certainly, I said.

Glaucon: And would you not recognize a third class, such as gymnastic, and the care of the sick, and the physician's art; also the various ways of money-making --these do us good but we regard them as disagreeable; and no one would choose them for their own sakes, but only for the sake of some reward or result which flows from them?

Socrates: There is, I said, this third class also. But why do you ask?

Glaucon: Because I want to know in which of the three classes you would place justice?

Socrates: In the highest class, I replied, --among those goods which he who would be happy desires both for their own sake and for the sake of their results.

Plato, The Republic, 357b-358c&d

Our task then, as educators and researchers, is to utilize both intrinsic and extrinsic motivators to promote and support student learning. The framework of multiple motivations provides a useful framework for the coexistence of both kinds of motivations.

Assertion 3: The use of playing and learning together is a strong motivator

As Csikszentmihalyi (1990) points out, "One cannot enjoy doing the same thing at the same level for long. We grow either bored or frustrated..." (p. 75). It was discussed under the heading of "Duality of Activity" that when playing and learning elements are integrated, they produce unique activities. These unique activities eliminate or reduce the redundancy and the boredom in the learning process by providing sustained engagement. In the QA context, elements like backstory of the game, virtual characters, use of points, multimedia elements, pushball game, immersive game context, and building in this context make it playful. It was shown in Chapter 4 that learners in the high participating group, who engaged with most of these playful activities, undertook more Quests than the learners in the medium or low participating groups.

After recognizing this assertion, one problem becomes that of figuring out what is play. Although there are many definitions of play, Fromberg's (1992) characterization of

213

play provides a useful explanation that includes all the play elements listed above. According to Fromberg (1992), play is symbolic, meaningful, active, pleasurable, voluntary, rule-governed, and episodic. One can notice that these characteristics of play also apply to the kind of learning in QA, which suggests that even this kind of learner-centered learning can be playful without the play elements.

When we examine traditional learning environments, we see a sharp distinction between playing and learning. As an example, school environments reflect a culture in which learning is treated as hard and serious. In such environments, play elements are excluded from learning, and most of the time playing is used as a separate and isolated reward after learning activities are completed (Silvern, 1998). Moreover, there is a concern among some educational researchers that when fun and entertainment are integrated into learning, learners will develop a new kind of attitude towards learning (see for example, Okan, 2003). These researchers fear that with this new kind of attitude, learners will despise the school and demand more enjoyable learning environments.

Some other researchers on the other hand perceive this demand as a good thing. As an example, Prensky (2002) states that it is not the use of the Internet, distance learning, computers, wireless devices, computer-based learning, and e-learning that will revolutionize the learning in the 21st century. It is making learning fun and relevant, and therefore discarding the pain and suffering that accompanied it for so long, that will revolutionize it. Prensky (2002) predicts that after spending so much time playing with fun and engaging computer games, learners will demand these types of learning environments, to the point that parents and teachers can no longer resist. Moreover, he envisions a future in which learners can get their degrees by choosing distributed

accredited courses. Since the course content will be relatively the same among the courses with the same title, it will be the motivational elements of the course that will guide the learners towards choosing one of these courses.

Although playing and learning together motivates learners and increases learner participation, providing a balance between playing and learning is crucial (Bergen & Fromberg, 1998). Besides, although this dissertation examines how to increase learner motivation and participation, this might not be the ideal in every learning context. As an example, one of the teachers at a school where QA is implemented was concerned about the amount of time that is being spent by certain users on the bulletin boards (A mode of communication that enables asynchronous threaded discussions among Questers, it is similar to Usenet discussion groups) as opposed to educational activities. The whole purpose of this dissertation was to find out ways for increasing such participation. Evidently, this is not preferred in all contexts and motivation should be considered with other factors of the learning context including learners, teachers, administrators, and parents.

Assertion 4: Creativity is the new emerging "C" over traditional "4Cs"

Traditionally, motivation in educational computer games and intrinsic motivation in general have been explained by 4Cs: challenge, curiosity, control, and context (Lepper & Henderlong, 2000). The results of this study showed that creativity is the new emerging "C" as a candidate for inclusion with the intrinsic motivators. Moreover, it is not just a candidate but it seems to be the most important construct in providing intrinsic motivation, based on the fact that it was the only discriminant category that separated the high participating members of QA from the medium and low participating members.

There seem to be many definitions of creativity. For example, Sanders and Sanders (1984) cited various definitions of creativity given by leading educators and researchers. However, creativity defined in this study is closer to the spatial intelligence defined in Gardner's theory of multiple intelligences (Gardner, 1993; Armstrong, 1993). This kind of intelligence includes perceiving the spatial and visual nature of the world, and the ability to perform transformations in it. A spatially intelligent person can shape and mold images in the world, either through physical means such as building, drawing, molding, sculpting, and inventing, or through mental means such as rotations and transformations (Armstrong, 1993). Children have used materials such as Lego bricks, wooden blocks, constructo straws, clay, pipe cleaners, and lasy blocks in the past to exercise their spatial intelligence (Forman, 1998). The 3D virtual worlds are the new frontiers for the utilization of digital objects for the same purpose.

To understand the relationship between spatial intelligence and building activities, it is helpful to present some information from neurophysiology. The left side of the brain is responsible for analytical, logical, and verbal abilities. This side controls cognition and language in people. The right side is responsible for imagery, intuitive thinking, and spatial relationships. In the development of the right side of the brain and in fostering creativity, it is essential to practice imagery information (O'Neil, Abedi, & Spielberger, 1994). Building activities present such an opportunity toward practicing imagery and spatial information. While building, children participate in constructive play in which they create symbolic patterns, real world objects, working systems, and sequences of actions (Forman, 1998).

This kind of spatial intelligence requires a context that is conducive to creativity. In such a context, people first observe the aesthetics of the materials such as shape, line, space, volume, balance, light and shade, color, pattern, and harmony. Then they examine artifacts created by others. Eventually, they become artists themselves producing these artifacts (Armstrong, 1993).

Two further examples illuminate the importance of creativity for sustained motivation in computer games. There was a time when a virtual world, called "Sandbox," was created in QA per request of our remote collaborators in Denmark. These collaborators used the Sandbox world for building activities in alignment with their curriculum. Because of technical issues, the world was allowed to be entered and built in it by all Questers. It was assumed by QA designers that just Questers in Denmark would use this world. After the need of the Denmark collaborators was over, the Sandbox world was closed. However, it was apparent from many angry inquiries that this world was actually discovered by other Questers and used for building activities. The QA team members received many questions asking why the Sandbox world was not open for building anymore.

Another example comes from the data collection site of this study. After my longitudinal daily observations were completed, I kept on visiting the Club on different occasions. In one of these visits, I observed that the computer game "Roller Coaster Tycoon" was just installed on all lab computers. The purpose of this simulation game is to design and manage an amusement park, keep its guests happy, and increase the park profit. Most of the building phenomenon in this game is similar to building in QA. For example, while building rides and attractions players use pieces from the game's library.

Although the ideas that can be created are limited to just rides and attractions, the final completed product is a working system. For example, after building a roller coaster track, players can put a roller coaster on it, let the virtual guests ride it, and observe different data of the ride, like the speed of the ride and the thoughts and feelings of its riders. On the day of my visit, both boys and girls were playing this game with great engagement. To see if this interest was due to its novelty, I kept on visiting the Club that week and on subsequent weeks. Not surprisingly, this interest has been high long after the game was introduced in the lab. Much of the interest towards this game came from the building activities in the game.

Assertion 5: Choice is in the foundations of all motivators

After reading through all of the discussion and assertions up to this point, the curious reader might wonder about the core category of the study. The availability of choices in an educational computer game is the core category of this study. Prior research supports that even a small amount of choice has the potential to motivate children (see for example, Cordova & Lepper, 1996). Interestingly, the "choice" code was not available after obtaining the codes at the end of the open coding process (Appendix D). The emergence of a core category from other categories and overall data is proof of the fact that I stood closer to the emergent nature (Glaser, 1992) of data analysis during the constant comparison method of grounded theory.

When Papert (1980) talks about his LOGO programming language, designed for children, he conveys a personal story. Papert fell in love with car parts when he was two years old. His obsession was so high that he knew most of the concepts like the gearbox, the transmission system, and the differential. Later when he grew up, he practiced with

these parts, and specifically with gears. He discovered the cause and effect relationships in the gear systems. He believes this experience with gears later helped him when he learned mathematics. For example, while solving equation problems with two variables (e.g., $5x+3y=12$), he made a mental gear model of the relation between x and y. Overall, he had a love relationship in addition to a deep understanding of the gears. Therefore, his interest in gears cannot be reduced to just cognitive terms.

This experience of Papert was a personal experience, and therefore it cannot be expected that many other children will like gears. Papert (1980) however, argues that computers have so much capability to simulate and are so flexible that they "can take on a thousand forms and can serve a thousand functions, [they] can appeal to a thousand tastes" (p. viii). Therefore, computers can be used as flexible instruments in which every child can find her/his gear, as long as the context does not stifle the child.

The availability of choices in a computer game is what gives it flexibility. An individual has the best knowledge about the self; therefore, by using the choices in the game the individual has the ability to stretch the learning process based on her/his personal interest and taste. In the context of QA the choices are many, and the availability of choices in dualities and categories of framework of multiple motivations is a proof for this. For example, the introvert learners can participate in activities alone while the social learners can join the crowd. While participating in the learning activities, they can enrich the process with playful elements. If the learner finds these elements somewhat childish, she/he can trim, or minimize, these elements and focus entirely on learning. When doing a Quest they can read the Quest description and purposes, or they can listen to its narration. After completing the activities they can enjoy the achievement of overcoming

these challenges, or they can get a reward for their effort. In choosing a reward, further options are available; materialistic souls can satisfy the cravings of a materialistic nature with trading cards, t-shirts, pencils, stickers, or other contextual items. In their social relations they can share information and activities with others; or they can compete over these activities. When interacting with others, they can choose different communication modes from among chat, e-mail, telegrams, and discussion boards. They can also use the immersive game context for exploring, for interacting with objects, for building, or for transactions. They can perceive the game points as an indicator of their development, or they can use them as an exchange currency in an open market environment. The backstory of the game can be learned through an animation, but further formats are available for different styles; in the form of a comic book for visual enthusiasts or in the form of a novel for those who like reading. These choice examples can go on for many other elements of the game.

Furthermore, most of these choices do not have to be mutually exclusive. For example, while a learner may prefer handling the activities alone, the same learner can take on social relationships to overcome activities which are not possible, or are very difficult, to handle alone. This issue points to the fluidity of human nature. Human beings might be prone to changes in their preferences, interests, and tastes as the result of their physical, cognitive, and social development, conditions and constraints of the context, and by other factors. For this reason, this study contradicts the findings of Cordova and Lepper (1996) in which they found the personalization of the learning process motivational. Since human nature is changeable, so much personalization might create a state where old and new interests clash, which in turn might prevent learners' coming

back to the learning environment. The explicit availability of choices in the learning

environment is the key for providing continued learner motivation.

Implications for Instructional Design

This study has implications for motivating learners both in educational computer

games and in other learning contexts. While designing an educational computer game or

other kinds of learning, designers of games and managers of learning contexts should

take all elements of the context into consideration. For example, elements in QA include,

but are not limited to, identities of learners, social relationships between them, along with

playing and learning opportunities within the context. In addition, since learners in

today's world perceive their learning activities as a job, some kind of compensation,

whether materialistic or non-materialistic, should be considered.

While providing learning opportunities and other non-learning activities in

educational games or other learning contexts, individual differences, characteristics, and

tastes of the learners should be considered for continued learner motivation. This implies

providing choice options to learners among subject matter, learning methods, and other

situationalities. While catering to these learning styles may prove complicated for

traditional learning contexts, the flexibility of information technologies, including

computers, can help bridge this gap.

The power of playing and learning is apparent in this study along with the direct

connection in providing continued learner motivation. In schools, playing should be more

than just a reward that is offered after learning; the integration of playing and learning

could prove a powerful curricular tool. In addition, the learners should be allowed to

enjoy the process of playing and learning activities, instead of focusing strictly on the learning outcomes—a difficult task in the current USA climate of accountability.

Actually, learning can be playful even without integrating play elements, or labeling the learning process/product as a game. For instance, by allowing active participation in the learning you have a product/context that is game-like to learners and is motivating. There are multiple strategies to assure such a context. Meaningful learning opportunities that learners value may be provided, learners might use knowledge and skills in real world activities, memorization might be eliminated from the learning as an objective, multiple perspectives in the learning process might be valued, learners might reflect on what they learn, and learning might be allowed to be improved over time.

This study identified more than intrinsic reasons for learners' actions. Learners do what they do not just for the sake of it, but also for personal, interpersonal, social, and contextual reasons. Therefore, while designing educational computer games and learning contexts, both intrinsic and extrinsic factors should be considered. Moreover, this appreciation should be reflected into future research in motivation.

Creative contributions by many participants in a game create an illusion on the learners' and players' side that the game is in constant modification in which there is no final product. For this reason, in educational computer games and generally in computer games, creative contributions of learners and players to the gameplay should be supported for increased participation. In addition to building in the game environment, other technical structures like rich backstory should be invented by programmers and game designers that will help with such an emergent gameplay.

Recommendations for Future Research

This study proposed an emergent explanation of motivation, "the framework of multiple motivations." The content and form of this framework were explicated by using the Quest Atlantis educational computer game. The framework needs to be amended and extended with further studies so that it can become more comprehensive. One way for doing this would be to replicate this study in different contexts.

The data for this study was collected within an after-school context. In this sense, while playing with the educational computer game learners were not exposed to the limitations of a traditional school context, like a strict curriculum and deadlines. It would be fitting to replicate this study in a school context with such constraints to investigate the extent to which the results match or differ. This is one of the ways to improve and add to the framework.

Other than by amendment and extension, future studies might verify the validity and preferably of the framework. For this purpose, horizontal studies involving other educational computer games need to be conducted. In addition, further vertical studies need to be conducted for different contexts, audiences, and conditions.

The results of this study tentatively advance categories that motivate learners in educational computer games. Additional data were provided on what factors establish these categories. A scale might be constructed to verify if these factors fit into the categories. Further, this scale might be used to statistically find out the weight of importance for motivational categories and the relationships between them.

Traditional motivation studies have typically relied upon quantitative methods, including one time data collection through surveys. In addition, tasks whose meaning

were not strategically aligned with the context were offered to measure motivation in most of these studies. The qualitative methods used in this study provided a very different perspective than what is available in understating motivation. I strongly recommend to future researchers of motivation the use of ethnographic methods, making prolonged observations in the research context, and observing learners in their naturalistic learning contexts.

Final Thoughts

Bandura (1986) acknowledged that "any theory of motivation must consider a large set of interactive processes if it is to provide an adequate explanation of human behavior" (p. 243). This statement has long been ignored in research regarding motivation, probably for the reason Bruner (1973) stated: "How one manages to time the steps in pedagogy to match unfolding capacities, how one manages to instruct without making the learner dependent, and how one manages to do both of these while keeping alive zest for further learning – these are very complicated questions that do not yield easy answers" (p. 122). As a result, motivation studies have focused on piecemeal factors to explain human motivation. On the other side, this study revealed the large set of interactive processes as a whole and proposed the multiple motivations framework to provide an adequate explanation of human motivation.

I am encouraged that the framework will be useful to guide the theory and practice in this field, because the content, form, and assertions of the framework are supported by a large body of literature. Sternberg, Kaufman, and Pretz (2002) have presented a descriptive taxonomy called "propulsion model of creative contributions."

They suggest that creative contributions propel a field in some way. They identified eight

kinds of creative contributions which might propel a field:

1) In *replication* a field stays where it is

2) In *redefinition* the current status of the field is seen from a new perspective

3) In *forward incrementation* the field is moved in the direction in which it is already moving

4) In *advance forward incrementation* the field is moved in the direction in which it is already moving, but beyond where others are ready for the field to move

5) In *redirection* the field is moved to a new direction

6) In *reconstruction/redirection* the field is moved back to where it was so that it can be moved to a new direction

7) In *reinitiation* the field is moved to a different starting point and then the field is moved in a different direction from that point

8) In *integration* many past contributions of the field, that were viewed as distinct, are put together

This study replicated the conclusions of previous research on motivation in finding that the constructs of curiosity, control, choice, fantasy, achievement, and rewards motivated these learners. It advanced the field in finding that the availability of choice options to learners was more important than previously thought. It reinitiated the field in that creativity, identity of learners, social relations, and active learning were proposed as important constructs in providing motivation. And most importantly it integrated many past contributions in the field that were perceived as distinct, such as intrinsic and extrinsic motivators, playing and learning, and achievement and rewards into a coherent

framework of motivation. I hope that these creative contributions move the conceptual understanding and practice of motivation positively. I also hope that the framework will be improved with progressive, analytical critiques by interested practitioners and scholars in the field.

REFERENCES

21st Century Community Learning Centers. (2003). Retrieved November 19, 2003, from

    http://www.ed.gov/21stcclc/

Adelman, C. (1993). Kurt lewin and the origins of action research. *Educational Action*

    Research, 1(1), 7-24.

Adler, P. A., & Adler, P. (1987). *Membership roles in field research.* Newbury Park, CA:

    Sage.

Alderman, M. K. (1999). *Motivation for achievement: Possibilities for teaching and*

    learning. Mahwah, NJ: Lawrence Erlbaum Associates.

Armstrong, T. (1993). *7 Kinds of smart: Identifying and developing your many*

    intelligences. New York, NY: Plume.

Atkinson, J. W., & Feather, N. T. (1966). *A theory of achievement motivation.* New York,

    NY: Wiley.

Ausubel, D. P. (1968). *Educational psychology: A cognitive view.* New York, NY: Holt,

    Rinehart and Winston, Inc.

Bailey, F., & Moar, M. (2003). The VERTEX project: Designing and populating shared

    3D virtual worlds in the primary (elementary) classroom. *Computers & Graphics,*

    27(3), 353-359.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.*

    Englewood Cliffs, IN: Prentice Hall.

Barab, S. A., & Plucker, J. A. (2002). Smart people or smart contexts? Cognition, ability,

    and talent development in an age of situated approaches to knowing and learning.

    Educational Psychologist, 37(3), 165-182.

Barab, S. A., MaKinster, J. G., Scheckler, R. (2003). Designing system dualities: Characterizing an online professional development community. In S. A. Barab, R. Kling, & J. Gray (Eds.), *Designing for virtual communities in the service of learning*. Cambridge, MA: Cambridge University Press.

Barab, S. A., Thomas, M. K., Dodge, T., Carteaux, B., Tuzun, H., (in press). Making learning fun: Quest Atlantis, a game without guns. To appear in *Educational Technology Research and Development*.

Barab, S. A., Thomas, M. K., Dodge, T., Goodrich, T., Carteaux, B., & Tuzun, H. (2002). Empowerment design work: Building participant structures that transform. *Proceedings of the Fifth International Conference of the Learning Sciences*. Seattle, Washington October 23-26, 2002, 232-236.

Barab, S. A., Thomas, M. K., Dodge, T., Newell, M., Squire, K. (in press). Design ethnography: Building a collaborative agenda for change. To appear in Anthropology Education Quarterly.

Baron, J. (1999). *Glory and Shame: Powerful Psychology in Multiplayer Online Games*. Retrieved December 14, 2003, from http://www.gamasutra.com/features/19991110/Baron_01.htm

Bennett, M., & Yeeles, C. (1990). Children's understanding of showing off. *Journal of Social Psychology, 130*(5), 591-596.

Bergen D., & Fromberg, D. P. (1998). Emerging and future contexts, perspectives, and meanings of play. In D. P. Fromberg (Ed.), *Play from birth to twelve and beyond: Contexts, perspectives, and meanings* (pp. 537-541). New York, NY: Garland.

Berlyne, D. E. (1960). *Conflict, arousal, and curiosity*. New York, NY: McGraw-Hill.

Bers, M. (2001). Identity construction environments: Developing personal and moral

   values through the design of a virtual city. *The Journal of the Learning Sciences,*

   10(4), 365-415.

BGCA The Facts. (2003). Retrieved November 19, 2003, from

   http://www.bgca.org/whoweare/facts.asp

Blanton, W. E., Greene, M. W., & Cole, M. (1999). Computer mediation for learning and

   play. *Journal of Adolescent & Adult Literacy, 43*(3), 272-278.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education: An*

   introduction to theory and methods (3rd Ed.). Needhan Heights, MA: Allyn &

   Bacon.

Breger, L. (1974). *From instinct to identity: The development of personality.* Englewood

   Cliffs, NJ: Prentice-Hall.

Bring me the rating of ronald mcdonald. (1997). *Brandweek, 38*(16), 26.

Brugman, D., & Beem, A. L. (1986). Classroom climate and continuing motivation. In J.

   H. L. Van Den Bercken, E. E. J. De Bruyn, & Th. C. M. Bergen (Eds.),

   Achievement and task motivation (pp. 147-165). Alblasserdam, Netherlands:

   Offsetdrukkerij Kanters B.V.

Bruner, J. S. (1960). *The process of education.* Cambridge, MA: Harvard University

   Press.

Bruner, J. S. (1973). *The relevance of education.* New York, NY: Norton.

Bruner, J. S. (1996). *The culture of education.* London, England: Harvard University

   Press.

Byrne, P. (1999). *Intrinsic motivation in the computer science classroom* (Tech. Rep.).

Galway, Ireland: National University of Ireland, Department of Information

Technology. Retrieved March 21, 2003, from

http://www.it.nuigalway.ie/publications/TR/abstracts/pb.doc

Cameron, J., & Pierce, W. D. (1994). Reinforcement, reward, and intrinsic motivation: A

meta-analysis. *Review of Educational Research, 64*, 363-423.

Cameron, J. & Pierce, W. D. (2002). *Rewards and intrinsic motivation: Resolving the*

controversy. Westport, CT: Bergin and Garvey.

Cameron, J., Banko, K. M., & Pierce, W. D. (2001). Pervasive negative effects of

rewards on intrinsic motivation: The myth continues. *The Behavior Analyst, 24*, 1-

44.

Carpenter, F. (1974). *The skinner primer: Behind freedom and dignity.* New York, NY:

The Free Press.

Chen, G. D., Shen, G. Y., Ou, K. L., & Liu, B. J. (1998). Promoting motivation and

eliminating disorientation for web based courses by a multi-user game.

Proceedings of World Conference on Educational Multimedia, Hypermedia and

Telecommunications 1998(1), 1-7. (ERIC Document Reproduction Service No.

ED 428 657)

Clark, R. E. (1983) Reconsidering research on learning from media. *Review of*

Educational Research, 53(4), 445-459.

Classic video games may be a hard cell. (2003). Retrieved December 11, 2003, from

http://www.cnn.com/2003/TECH/12/10/hln.game.cell.games/index.html

Clifford, J., & Marcus, G. (Eds.). (1986). *Writing culture: The poetics and politics of ethnography*. Berkeley, CA: University of California Press.

Cole, M. (1996). *Cultural psychology: A once and future discipline*. Cambridge, MA: Harvard University Press.

Coleman, P. J., Lahey, E., & Orlando, K. (1999). *The robert taylor boys and girls club of chicago*. (ERIC Document Reproduction Service No. ED 441 070)

Computer Clubhouse. (2003). Retrieved November 19, 2003, from http://www.computerclubhouse.org/index.htm

Cook-Sather, A. (2003). Movements of mind: "The matrix", metaphors, and re-imagining education. *Teachers College Record, 105*(6), 946-977.

Corbit, M. & DeVarco, B. (2000). Scicentr and bioLearn: Two 3-D implementations of CVE science museums. In E. Churchill and M. Reddy (Eds.), *Proceedings of the Third International Conference on Collaborative Virtual Environments*, 65-71. New York, NY: ACM.

Corbit, M. (2002). Building virtual worlds for informal science learning (scicentr and scifair) in the active worlds educational universe (AWEDU). *Presence: Teleoperators & Virtual Environments, 11*(1), 55-67.

Cordova, D. I., & Lepper, M. R. (1996). Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice. *Journal of Educational Psychology, 88*(4), 715-730.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience.* New York, NY: Harper and Row.

Damer, B. (1996). Inhabited virtual worlds: A new frontier for interaction design. *Interactions, 3*(5), 27-34. Retrieved November 14, 2003, from http://doi.acm.org/10.1145/234757.234760

Damer, B. (1998). *Avatars! : Exploring and building virtual worlds on the internet.* Berkeley, CA: Peachpit Press.

Damer, B., Kekenes, C., & Hoffman, T. (1996). Inhabited digital spaces. *Proceedings of Conference Companion on Human Factors in Computing Systems: Common Ground* (pp. 9-10). New York, NY: ACM Press. Retrieved November 14, 2003, from http://doi.acm.org/10.1145/257089.257094

Davies, M. L., & Crowther, D. E. A. (1995). The benefits of using multimedia in higher education: myths and realities. *Active Learning,* (3), 3-6. Retrieved December 19, 2003, from https://www.ilt.ac.uk/public/cti/ActiveLearning/issue3/crowther/index.html

De Charms, R. (1968). *Personal causation.* New York, NY: Academic Press.

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18,* 105-115.

Deci, E. L. (1972). The effects of contingent and non-contingent rewards and controls on intrinsic motivation. *Organizational Behavior and Human Performance, 8,* 217-229.

Deci, E. L. (1975). *Intrinsic motivation.* New York, NY: Plenum Press.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125,* 627-668.

Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research, 71*(1), 1-27.

Dede, C. (2003). Multi-user virtual environments. *Educause Review, 38*(3), 60-61.

Dede, C., & Ketelhut, D. (2003). *Designing for motivation and usability in a museum-based multi-user virtual environment.* Paper presented at the American Educational Research Association Conference, Chicago, IL. Retrieved November 16, 2003, from http://muve.gse.harvard.edu/muvees2003/documents/DedeKetelMUVEaera03final.pdf

Dede, C., Ketelhut, D., & Ruess, K. (2002). *Motivation, usability, and learning outcomes in a prototype museum-based multi-user virtual environment.* Paper presented at the International Conference of the Learning Sciences, Seattle, WA.

Denzin, N. K. (1970). *The research act: A theoretical introduction to sociological methods.* Chicago, IL: Aldine.

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods* (2nd ed.). New York, NY: McGraw-Hill.

Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 1-17). Thousand Oaks, CA: Sage.

Dewey, J. (1916/1966). *Democracy and education: An introduction to the philosophy of education*. New York, NY: The Free Press.

Dewey, J. (1938/1963). *Experience and education*. New York, NY: The Macmillan Publishing Company.

Dickey, M. D. (2000). 3D virtual worlds and learning: An analysis of the impact of design affordances and limitations in active worlds, blaxxun interactive, and onlive! Traveler; and a study of the implementation of active worlds for formal and informal education. *Dissertation Abstracts International, 60*(08). (Publication No. AAT 9941313). Retrieved November 15, 2003, from http://michele.netlogix.net/newside/bioframe.htm

Dickey, M. D. (2003). Teaching in 3d: Pedagogical affordances and constraints of 3d virtual worlds for synchronous distance learning. *Distance Education, 24*(1), 105-121.

Dictionary.com-uniqueness. (2004). Retrieved January 5, 2004, from http://dictionary.reference.com/search?q=uniqueness

Donath, J. S. (1998). Identity and deception in the virtual community. In P. Kollock, & M. Smith (eds). *Communities in Cyberspace*. London: Routledge.

Dynarski, M., Moore, M., Mullens, J., Gleason, P., James-Burdumy, S., Rosenberg, L., Masnfield, W., Heaviside, S., Levy, D., Pistorino, C., Silva, T., & Deke, J. (2003). *When schools stay open late: The national evaluation of the 21st-century community learning centers program*. (ERIC Document Reproduction Service No. ED 473 230) Retrieved November 19, 2003, from http://www.ed.gov/pubs/21cent/firstyear/summ.html

Eisenberger, R., & Cameron, J. (1996). Detrimental effects of reward: Reality or myth? *American Psychologist, 51*, 1153-1166.

Federal study cites flaws in after-school program (2003). *Education USA, 45*(2), 10-11.

Fetterman, D. M. (1998). *Ethnography: Step by step* (2nd ed.). Thousand Oaks, CA: Sage.

Fichtner, B. (1999). Activity revisited as an explanatory principle and as an object of study – Old limits and new perspectives. In S. Chaiklin, M. Hedegaard, & U. J. Jensen (Eds.), *Activity Theory and Social Practice* (pp. 51-65). Aarhus: Aarhus University Press.

Fielding N. G., & Fielding, J. L. (1986). *Linking data.* Beverly Hills, CA: Sage.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59*, 117-142.

Finn, J. D., Folger, J., & Cox, D. (1991). Measuring participation among elementary grade students. *Educational and Psychological Measurement, 51*, 393-402.

Flick, U. (1992). Combining methods – lack of methodology: Discussion of sotirakopoulou & breakwell. *Ongoing Production on Social Representations, 1*(1), 43-48.

Forman, G. (1998). Constructive play. In D. P. Fromberg (Ed.), *Play from birth to twelve and beyond: Contexts, perspectives, and meanings* (pp. 392-400). New York, NY: Garland.

Fox, J. M., & Fox, R. L. (2000). *Exploring the nature of creativity.* Dubuque, IO: Kendall/Hunt.

Franken, R. E. (1998). *Human motivation* (4th Ed.). Pacific Grove, CA: Brooks/Cole

    Publishing Company.

Fromberg, D. P. (1992). Play. In C. Seefeldt (Ed.), *The early childhood curriculum: A*

    review of current research (pp. 42-84). New York, NY: Teachers College Press.

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York, NY:

    BasicBooks.

Garner, R., Zhao, Y., & Gillingham, M. (2002). An alternative to self-care in a small

    Midwestern town. In R. Garner, Y. Zhao & M. Gillingham (Eds.), *Hanging out:*

    Community-based after-school programs for children (pp. 1-17). Westport, CT:

    Bergin and Garvey.

Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A

    research and practice model. *Simulation & Gaming, 33*(4), 441-467.

Geertz, C. (1973). *The interpretation of cultures*. New York, NY: Basic Books.

Gilbert, N. (Ed.). (1993). *Researching social life*. London: Sage.

Gladwell, M. (2000). *The tipping point: How little things can make a big difference*. New

    York, NY: Little, Brown and Company.

Glaser, B. G. (1978): *Theoretical sensitivity: Advances in the methodology of grounded*

    theory. Mill Valley, CA: The Sociology Press.

Glaser, B. G. (1992). *Emergence vs forcing: Basic of grounded theory analysis*. Mill

    Valley, CA: Sociology Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for*

    qualitative research. Chicago, IL: Aldine.

Good, T. L., & Brophy, J. E. (1997). *Looking in classrooms* (7th ed.). New York, NY: Longman.

Gootman, J. A. (Ed.) (2000). *After-school programs to promote child and adolescent development: Summary of a workshop.* Washington, DC: National Academy. (ERIC Document Reproduction Service No. ED 446 849)

Grabe, W. (2002). *Motivating students: Finding the flow in the EFL reading classroom.* Retrieved November 18, 2003, from http://www.inged-elea.org.tr/archives.htm

Gredler, M. (1994). *Designing and evaluating games and simulations: A process approach.* Houston, TX: Gulf Publishing Company.

Greenspan, R. (2002). *Gaming industry serious business.* Retrieved September 07, 2003, from http://cyberatlas.internet.com/big_picture/hardware/article/ 0,1323,5921_1492881,00.html

Griffiths, M. (1997). Computer game playing in early adolescence. *Youth & Society, 29*(2), 223-237.

Guba, G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage.

Hart, E., & Bond, M. (1995). *Action research for health and social care: A guide to practice.* Buckingham, Open University Press.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology, 17,* 300-312.

Heaton, J. M. (1978). Ontology and play. In B. Curtis, & W. Mays (eds.), *Phenomenology and education: Self-consciousness and its development* (pp. 119-130). London: Methuen.

Hedegaard, M., Chaiklin, S., & Jensen, U. J. (1999). Activity theory and social practice: An introduction. In S. Chaiklin, M. Hedegaard, & U. J. Jensen (Eds.), *Activity Theory and Social Practice* (pp. 12-30). Aarhus: Aarhus University Press.

Henkel, J. (2002). Finding activities for kids after school. *FDA Consumer, 36*(3), 33.

Herz, J. C. (1997). *Joystick nation: How videogames ate our quarters, won our hearts, and rewired our minds*. Boston: Little, Brown, and Co.

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (1998). *Applied statistics for the behavioral sciences* (4th ed.). New York, NY: Houghton Mifflin.

Interactive Digital Software Association (IDSA). (2002). *Essential facts about the computer and video game industry* [Brochure]. Retrieved March 20, 2003, from http://www.idsa.com/IDSABooklet.pdf

Jarvela, S. (2001). Shifting research on motivation and cognition to an integrated approach on learning and motivation in context. In S. Volet & S. Jarvela (Eds.), *Motivation in learning contexts: Theoretical and methodological implications* (pp. 3-14). Amsterdam: Pergamon Press.

Jensen, J. F. (1999). 3D Inhabited virtual worlds: Interactivity and interaction between avatars, autonomous agents, and users. In P. D. Bra & J. J. Leggett (Eds.), *Proceedings of WebNet 99 - World Conference on the WWW and Internet: Vol. 1* (pp. 19-26).

Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M.

Reigeluth (Ed.), *Instructional design theories and models* (Vol. 2, pp. 215-239).

Mahwah, NJ: Erlbaum Associates.

Jones, C. D., Hollenhorst, S. J., & Perna, F. (2003). An empirical comparison of the four

channel flow model and adventure experience paradigm. *Leisure Sciences, 25*(1),

17-31.

Keller, J. M. (1979). Motivation and instructional design: A theoretical perspectives.

Journal of Instructional Development, 2(4), 26-34.

Keller, J. M. (1983). Motivational design of instruction. In C. M. Reigeluth (Ed.),

Instructional design theories and models (pp. 383-433). Hillsdale, NJ: Lawrence

Erlbaum.

Keller, J. M. (1987). Development and use of the ARCS model of motivational design.

Journal of Instructional Development, 10(3), 2-10.

Krendl, K. A., & Broihier, M. (1991). *Student responses to computers: A longitudinal

study*. Chicago, IL: Annual Meeting of the International Communication

Association. (ERIC Document Reproduction Service No. ED332250)

Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on

some qualitative aspects of task performance. *Journal of Personality, 39*, 606-

617.

Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing*.

Thousand Oaks, CA: Sage.

Langer, E. J. (1997). *The power of mindful learning*. Reading, MA: Addison-Wesley

Publishing Company, Inc.

Langton, N. H., Addinall, E., Ellington, H. I., & Percival, F. (1980). The value of

simulations and games in the teaching of science. *European Journal of Education,*

15(3), 261-270.

Lee, S. H., & Boling, E. (1999). Screen design guidelines for motivation in interactive

multimedia instruction: A survey and framework for designers. *Educational*

Technology, 39(3), 19-26.

Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic

interest with extrinsic rewards: A test of the "overjustification" hypothesis.

Journal of Personality and Social Psychology, 28, 129-137.

Lepper, M. R. & Henderlong, J. (2000). Turning "play" into "work" and "work" into

"play": 25 years of research on intrinsic and extrinsic motivation. In C. Sansone &

J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for*

optimal motivation and performance (pp. 257-307). San Diego, CA: Academic

Press.

Lepper, M. R., & Malone, T. W. (1987). Intrinsic motivation and instructional

effectiveness in computer-based education. In R. E. Snow & M. J. Farr (Eds.),

Aptitude, learning and instruction: Conative and affective process analyses (pp.

255-286). Hillsdale, NJ: Lawrence Erlbaum Associates.

Lepper, M. R., Sethi, S., Dialdin, D., & Drake, M. (1997). Intrinsic and extrinsic

motivation: A developmental perspective. In S. S. Luthar, J. A. Burack, D.

Cicchetti, & J. R. Weisz (Eds.), *Developmental psychopathology: Perspectives on*

adjustment, risk, and disorder (pp. 23-50). New York, NY: Cambridge University

Press.

Lincoln, Y. S., & Guba E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Lott, B. (1977). *Sex role ideology and the observed social behavior of children*. Paper presented at the Annual Meeting of the Eastern Psychological Association, Boston, MA.

Maehr, M. L (1974). *Sociocultural origins of achievement*. Belmont, CA: Brooks/Cole Publishing Company.

Malone, T. W. (1980). What makes things fun to learn? A study of intrinsically motivating computer games. *Dissertation Abstracts International, 41* (05), 1955B. (UMI No. 8024707)

Malone, T. W. (1981a). Toward a theory of intrinsically motivating instruction. *Cognitive Science, 4*, 333-369.

Malone, T. W. (1981b). What makes computer games fun? *Byte, 5*, 258-277.

Malone, T. W., & Lepper, M. R. (1987). Making learning fun: A taxonomy of intrinsic motivations for learning. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning and instruction: Conative and affective process analyses* (pp. 223-253). Hillsdale, NJ: Lawrence Erlbaum Associates.

Malouf, D. B. (1988). The effect of instructional computer games on continuing student motivation. *Journal of Special Education, 21*(4), 27-38.

Mark, R. (1996). *Research made simple*. Thousand Oaks, CA: Sage.

Martin, B. L., & Briggs, L. J. (1986). *The affective and cognitive domains: Integration for instruction and research*. Englewood Cliffs, NJ: Educational Technology Publications.

Maslow, A. H. (1987). *Motivation and personality* (3rd ed.). New York, NY: Longman.

Mayer, R.E., Schustack, M.W., & Blanton, W.E. (1999). What do children learn from

using computers in an informal, collaborative setting? *Educational Technology,*

39(2), 27-31.

Merriam, S. B. (1998). *Qualitative research and case study applications in education:*

Revised and extended from case study research in education (2nd ed.). San

Francisco, CA: Jossey-Bass Inc.

Morningstar, C, & Farmer, F. R. (1991). The lessons of Lucasfilm's Habitat. In M.

Benedikt (Ed.), *Cyberspace: First steps* (pp. 273-302). Cambridge, MA: MIT

Press.

Mussino, A. (1999). *Conceptual and operational problems in measuring participation in*

sports. Paper presented at the International Statistical Institute Conference,

Helsinki, Finland. Retrieved September 30, 2003, from

http://www.stat.fi/isi99/proceedings/arkisto/varasto/muss0846.pdf

MUVEES: Multi-user virtual environment experimental simulator. (2003). Retrieved

November 16, 2003, from

http://www.gse.harvard.edu/~dedech/muvees/index.htm

Nielsen, J. (1998). *2D is better than 3d*. Retrieved January 03, 2004, from

http://www.useit.com/alertbox/981115.html

O'Neil, H. F., Jr., Abedi, J., & Spielberger, C. D. (1994). The measurement and teaching

of creativity. In H. F. O'Neil Jr. & M. Drillings (Eds.), *Motivation: Theory and*

research (pp. 245-263). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Okan, Z. (2003). Edutainment: Is learning at risk?. *British Journal of Educational*

Technology, 34(3), 255-264.

Osberg, K. M. (1997). Constructivism in practice: The case for meaning-making in the virtual world. *Dissertation Abstracts International, 58*(06). (Publication No. AAT 9736351). Retrieved November 15, 2003, from

http://www.hitl.washington.edu/publications/r-97-47/osberg.rtf

Osberg, K. M., Rose, H., Winn, W., Hollander, A., Hoffman, H., & Char, P. (1997). *The effect of having grade seven students construct virtual environments on their comprehension of science.* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL. Retrieved November 18, 2003, from http://www.hitl.washington.edu/publications/r-97-19/

Papert, S. (1980). *Mind-storms: Children, computers, and powerful ideas.* New York, NY: Basic Books, Inc. Publishers.

Patten, P, & Robertson, A. S. (2001). *Focus on after-school time for violence prevention.* (ERIC Document Reproduction Service No. ED 455 975)

Patton, M. Q. (1980). *Qualitative evaluation methods.* Beverly Hills, CA: Sage.

Patton, M. Q. (1987). *How to use qualitative methods in evaluation.* Newbury Park, CA: Sage.

Peterson, C., Maier, S. F., & Seligman, M. E. P. (1993). *Learned helplessness : A theory for the age of personal control.* New York, NY: Oxford University Press.

Plato (1901). *The republic* (B. Jowett, Trans.). New York, NY: P. F. Collier & Son.

Prensky, M. (2002). The motivation of gameplay or, the real 21st century learning revolution. *On The Horizon, 10*(1), 5-11.

Resnick, M., Kafai, Y., Maeda, J., (2003). *A networked, media-rich programming environment to enhance technological fluency at after-school centers in*

economically-disadvantaged communities. Proposal to the National Science

Foundation. Retrieved November 19, 2003, from

http://web.media.mit.edu/~mres/papers/scratch-proposal.pdf

Resnick, M., Rusk, N., & Cooke, S. (1998). The computer Clubhouse: Technological

Fluency in the inner city. In D. A. Schon, B. Sanyal & W. J. Mitchell (Eds.), *High*

technology and low-income families (pp. 266-286). Cambridge: MIT Press.

Rogers, E. M. (1995). *Diffusion of innovations*. New York, NY: Free Press.

Sanders, D. A., & Sanders, J. A. (1984). *Teaching creativity through metaphor. An*

integrated brain approach. New York, NY: Longman.

Sarker, S., Lau, F., & Sahay, S. (2001). Using an adaptive grounded theory approach for

inductive theory building about virtual team development. *The Database for*

Advances in Information Systems, 32(1), 38-56.

Sawada, D. & Caley, M. T. (1985). Dissipative structure: New metaphors for becoming

in education. *Educational Researcher, 14*(3), 13-19.

Schloss, P. J., & Smith, M. A. (1999). *Conducting research*. Upper Saddle River, NJ:

Prentice Hall.

Schroeder, R., Huxor, A., & Smith, A. (2001). Activeworlds: Geography and social

interaction in virtual reality. *Futures, 33*(7), 569-587.

Sellers, M. (2002). *Creating effective groups and group roles in MMP Games*. Retrieved

December 14, 2003, from

http://www.gamasutra.com/resource_guide/20020916/sellers_01.htm

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one.

Educational Researcler, 27(2), 4-13.

Silverman, D. (1993). *Interpreting qualitative data: Methods for analyzing talk, text, and interaction.* London, Sage.

Silvern, S. B. (1998). Educational implications of play with computers. In D. P. Fromberg (Ed.), *Play from birth to twelve and beyond: Contexts, perspectives, and meanings* (pp. 530-536). New York, NY: Garland.

Singer, D. G., & Singer, J. L. (1998). Fantasy and imagination. In D. P. Fromberg (Ed.), *Play from birth to twelve and beyond: Contexts, perspectives, and meanings* (pp. 313-318). New York, NY: Garland.

Skinner, B. F. (1953). *Science and human behavior.* New York, NY: Macmillan.

Small, R.V. (1997). *Motivation in instructional design.* (ERIC Document Reproduction Service No. ED 409 895) Retrieved November 18, 2003, from http://www.ericfacility.net/databases/ERIC_Digests/ed409895.html

Spaulding, C. L. (1992). *Motivation in the classroom.* New York, NY: McGraw-Hill.

Sternberg, R. J., Kaufman, J. C., & Pretz, J. E. (2002). *The creativity conundrum: A propulsion model of kinds of creative contributions.* New York, NY: Psychology Press.

Stone, L. (1997). Virtually yours: The internet as a social medium. *Vision,* April 14, 1997. Retrieved December 11, 2003, from http://research.microsoft.com/vwg/papers/VISION.htm

Strauss, A., & Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Newbury Park, CA: Sage.

Strauss, A., & Corbin, J. (1994) Grounded theory methodology: An Overview. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 273-285). Thousand Oaks, CA: Sage.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.

Susman, G. I., & Evered, R. D. (1978). An assessment of the scientific merits of action research. *Administrative Science Quarterly, 23*(4), 582-603.

Trindade, J., Fiolhais, C., & Almeida, L. (2002). Science learning in virtual environments: A descriptive study. *British Journal of Educational Technology, 33*(4), 471-488.

Turkle, S. (1995). *Life on the screen: Identity in the age of the internet.* New York, NY: Simon & Schuster.

Turner, J. C. (2001). Using context to enrich and challenge our understanding of motivational theory. In S. Volet & S. Jarvela (Eds.), *Motivation in learning contexts: Theoretical and methodological implications* (pp. 85-104). Amsterdam: Pergamon Press.

Tzeng, S. C. (2001). *Optimizing challenges and skills in the design of an educational computer game and exploring adolescents' gaming beliefs.* Paper presented at the meeting of the Association for Educational Communications and Technology Conference, Atlanta, GA.

U. S. Department of Education (2000). *After-school programs: Keeping children safe and smart.* (ERIC Document Reproduction Service No. ED 438 395)

Vernon, M. V. (1972). *Motivating children: Behavior modification in the classroom.*

New York, NY: Holt, Rinehart, and Winston.

Walker, C. J., & Symons, C. S. (1997). The meaning of human motivation. In J. L. Bess

(Ed.), *Teaching well and liking it: Teaching faculty to teach effectively.* London:

Johns Hopkins University.

Weiner, B. (1990). History of motivational research in motivation. *Journal of*

Educational Psychology, 82, 616-622.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.*

Cambridge, Cambridge University Press.

Wlodkowski, R. J. (1986). *Motivation and teaching: A practical guide.* Washington, DC:

National Education Association.

Woolley, B. (1992). *Virtual worlds: A journey in hype and hyperreality.* Oxford, UK:

Blackwell.

APPENDIX A

Interview Questions for Primary Participants

- Why did you join Quest Atlantis?

- Which parts of Quest Atlantis keep you coming back to Quest Atlantis?

- How might Quest Atlantis be different in a way that will make you come back?

- What do you get out of playing Quest Atlantis?

- What do Quest Atlantis points mean to you? Do you care about getting points?

- Tell me about activities you like to do in Quest Atlantis.

- What are your top three favorite activities? (Prompt them about quests, avatars, council members, chat, e-mail, cooperation, virtual building, items in trading post, trading cards, comic book, and board game)

- Tell me about activities you don't like to do in Quest Atlantis.

- What are your bottom three favorite activities? (Prompt them about quests, avatars, council members, chat, e-mail, cooperation, virtual building, items in trading post, trading cards, comic book, and board game)

- What is the most exciting thing you have done in Quest Atlantis?

- What is the least exciting thing you have done in Quest Atlantis?

- How has Quest Atlantis changed your life?

- How is Quest Atlantis different than other things you do on the computer? In the computer lab? In school? At home?

- What do you think about the Quest Atlantis trading post?

- Which items are available in the trading post? Do you care about these items?

- Did you purchase any item from the trading post? Why did you get these items?

- Did the items in the trading post (buying virtual land, buying trading cards) make you do Quests to earn more points to buy them?

- What do you think about your homepage?

- What are the things that you like in your homepage?

- What are the things that you don't like in your homepage?

- Why do you complete Quests? Are they hard to complete?

- Tell me about your favorite Quests.

- Tell me about your favorite worlds and villages.

Interview Questions for the Secondary Participant

Staff related:

- How long have you been working at the club?

- What is your title at the club and what do you do?

- Who are high-ranked staff members and what do they do?

- Who are low-ranked staff members and what do they do?

Club related:

- What happens (start to finish) in a typical day at the club?

- Can you tell me about the activities at the club?

- What is the impact of the club on the local community?

- What are the problems of the club?

- What is the relationship of the club to other organizations (University, etc.)?

Statistics related:

- How many total members do you have?

- Among the total, what is the ratio of boys and girls?

- Among the total, what is the percentage of minorities?

- How many kids come over in a typical day?

- What is the usage percentage for the activities?

QA related:

- I heard the computer room would be moved into another room. What is the status of that plan?

- What do you think about the QA?

- What changes have you observed in the computer lab after QA has been implemented?

- What is the impact of the QA as an activity at the club?

- Have you heard from the parents related with QA? What have you heard?

- Have you heard from the kids related with QA? What have you heard?

- What do you like about the QA?

- What you don't like about the QA?

- What could be better in QA (design, implementation at the club)?

APPENDIX B

The Questionnaire Form to Collect Factual Data from Primary Participants

First Name: _____   Last Name: _____   Age: _____   Grade: _____

Gender (circle one):   Girl   Boy

Your School's Name: _____

Do you use a computer at home?	O Yes	O No
Do you have a game console?	O Yes	O No
Do you use computers at school?	O Yes	O No
Do you have Internet connection at home?	O Yes	O No
Do you have Internet connection at school?	O Yes	O No
Do you play Quest Atlantis at home?	O Yes	O No
Do you play Quest Atlantis at school?	O Yes	O No

How long have you been using computers? (Select just one)
O Never   O 1 year   O 2 years   O 3 years   O 4 years   O more than 4

How long have you been using the Internet? (Select just one)
O Never   O 1 year   O 2 years   O 3 years   O 4 years   O more than 4

On average, how often do you use the Internet? (Select just one)
O Never   O Once a week   O Once a month
O Every Day   O Several times a week   O Several times a month

Where do you use the Internet? (You can choose more than one)
☐ I don't   ☐ Home   ☐ School   ☐ Friend   ☐ Club ☐ Other _____

Which of the following software do you use on computers? (You can choose more than one)
☐ Word Processing   ☐ Spreadsheets   ☐ Presentations   ☐ Internet
☐ Image   ☐ Game   ☐ Other _____

Please answer the questions on the other side also!

How did you first learn to use the Internet? (You can choose more than one)
☐ I don't know it ☐ Self-taught ☐ Library ☐ Books/Journals
☐ Friends ☐ School ☐ Club ☐ Other _____

Which of the following do you use on the Internet? (You can choose more than one)
☐ E-mail ☐ World Wide Web (WWW) ☐ Chat rooms ☐ Instant Messaging
☐ Downloading ☐ Uploading ☐ Listservs ☐ FTP
☐ Telnet ☐ Newsgroups ☐ Other _____

What do you use the Internet for? (You can choose more than one)
☐ Homework assignments ☐ Consult with instructor ☐ Consult with classmates
☐ Retrieving class lessons ☐ Other _____

Why do you come to the club? (You can choose more than one)
☐ I want to spend my time at the club
☐ My parents want me to spend my time at the club
☐ My friends come to the club
☐ Kids from my school come to the club
☐ Other _____

How long have you been at the club? (Select just one)
○ Less than a year ○ 1 year ○ 2 years
○ 3 years ○ 4 years ○ more than 4 years

How often do you come over to the club in a week? (Select just one)
○ 1 day a week ○ 2 days a week ○ 3 days a week ○ 4 days a week ○ Everyday

In the first place, where do you spend most of your time at the club? (Select just one)
○ Open area ○ Library ○ Art room ○ Gym
○ Computer lab ○ Play outside ○ TV area ○ Other _____

In the second place, where do you spend most of your time at the club? (Select just one)
○ Open area ○ Library ○ Art room ○ Gym
○ Computer lab ○ Play outside ○ TV area ○ Other _____

In the third place, where do you spend most of your time at the club? (Select just one)
○ Open area ○ Library ○ Art room ○ Gym
○ Computer lab ○ Play outside ○ TV area ○ Other _____

What is your favorite thing to do at the club? _____

What is your favorite thing to do in the computer lab? _____

APPENDIX C

Electronic Research Database Used for Entering Field Notes

APPENDIX D

Codes Obtained After the Open Coding of Interview and Observation Documents

1	3D	41	confidence
2	3D structures	42	conflict
3	accomplishment	43	consistency
4	action	44	continuity
5	activity	45	control
6	activity sheet	46	cool design
7	alone	47	cooperation
8	alternative buying strategy	48	council
9	apology	49	creativity
10	application	50	curiosity
11	attendance	51	designer control
12	attention	52	different from others
13	avatars	53	difficulty
14	avoiding people	54	difficulty of the quest
15	awards	55	dislike
16	B&G club context	56	doing quests
17	belongingness	57	dont care
18	[School Name] context	58	edutainment issue
19	board game	59	effort
20	[QA Designer 1]	60	email
21	boring	61	embarassment
22	building	62	empowerment
23	buoy	63	enjoyment
24	buying	64	environment
25	cartoon characters	65	escape
26	challenge	66	expectation
27	changing vision	67	experience
28	chatting	68	experience playing muves
29	cheating	69	expert usage
30	club norms	70	exploring
31	club staff	71	fantasy
32	club vs school	72	favorites
33	comeback	73	feedback
34	comic book	74	feeling safe
35	communication	75	finished quests
36	communication with kids	76	fire
37	competition	77	flag
38	computer lab	78	flow
39	computer maintenance	79	following people
40	concern	80	forbidden fruit

81	free market	126	minority
82	frequency	127	mission quests
83	friends	128	modes of participation
84	frustration	129	monday meeting
85	fun	130	mood
86	gateway	131	motivation
87	getting help	132	multiplayer
88	girl use	133	myth
89	going local	134	Name
90	grade	135	name on the otak wall
91	graphics	136	new features
92	groups	137	novelty
93	guilds	138	objects
94	healthy world	139	ocean world
95	helping others	140	otak design problems
96	high participants	141	otak navigation
97	high places in 3D	142	others doing it
98	home activities	143	out of focus
99	homepage	144	outdoors
100	how join	145	ownership
101	identity	146	parent involvement
102	idling	147	participation
103	impacting the space	148	participatory design
104	improvement	149	peer group
105	inhabit	150	pets
106	interaction with others	151	playing
107	interest	152	points
108	international	153	points as exchange currency
109	internet time	154	privacy
110	interviews	155	pushball
111	kid friendly	156	qa account
112	lack of knowledge	157	qa as 3D
113	land	158	qa as club activity
114	leadership	159	qa as game
115	learning	160	qa browser
116	learning new things	161	qa buzz
117	links	162	qa commitments
118	links to pop culture	163	qa designers
119	listening	164	qa implementation
120	location of use	165	qa jobs
121	making of qa	166	qa presence
122	[QA Designer 2]	167	qa sequal
123	meeting new people	168	qa time
124	member of the month	169	qa vs others
125	mentoring	170	qa vs schoolwork

VITA for HAKAN TUZUN

EDUCATION

Ph.D., Indiana University, Bloomington, IN, 1998-2004
  Major: Instructional Systems Technology
  Minor: School of Library and Information Sciences

M.S., Indiana University, Bloomington, IN, 1998-2001
  Major: Instructional Systems Technology

M.S., Gazi University, Institute of Science and Technology, Turkey, 1997-1998
  Major: Computer Science

B.A. Gazi University, Faculty of Technical Education, 1992-1996
  Major: Computer Science

I.E.P. Middle East Technical University, Turkey, 1991-1992

WORK EXPERIENCE

Researcher, 2002-present
  Quest Atlantis Project, Center for Research on Learning and Technology, Indiana University, Bloomington, IN

Programmer, 2002-present
  Quest Atlantis Project, Center for Research on Learning and Technology, Indiana University, Bloomington, IN

Computer Support & Network Administrator, 2003-2004
  Anthropological Center for Training and Research on Global Environmental Change, Indiana University, Bloomington, IN

Computer Support & Network Administrator, 2000-2003
  Center for the Study of Institutions, Population, and Environmental Change, Indiana University, Bloomington, IN

Research Assistant, 1997-1998
  Gazi University, Faculty of Technical Education, Ankara/Turkey

Computer Systems Teacher, 1996-1997
  Gazi Vocational School, Afyon/Turkey

TEACHING

Assistant Instructor: R695: Research Issues in Distance Education, Spring 2002
Indiana University, Education Faculty, Instructional Systems Technology
Department

Instructor: NT Operating System workshop, Summer 1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Taught NT Operating System to instructional consultants of K-12 schools

Assistant Instructor: EBE-444 Computer Systems, Spring 1997-1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Assisted in teaching an undergraduate level course, in which microprocessor
design was taught

Assistant Instructor: 5492314 Database Management Systems, Fall 1997-1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Assisted in teaching a 3-credit graduate level course

Assistant Instructor: EBE-441 Database Management Systems, Fall 1997-1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Taught Access during lab sessions to undergraduate students

Assistant Instructor: EBE-443 Operating Systems, Fall 1997-1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Taught operating systems basics during lab sessions to undergraduate students

Assistant Instructor: EBE-341 Computer Use in Electronics, Fall 1997-1998
Gazi University, Technical Education Faculty, Ankara/Turkey
Taught ORCAD software during lab sessions to undergraduate students

Instructor: Software Applications, Spring 1996-1997
Gazi Vocational School, Afyon/Turkey
Taught Microsoft Word and Excel to high school vocational students

Instructor: Microprocessors, Spring 1996-1997
Gazi Vocational School, Afyon/Turkey
Taught microprocessor basics to high school vocational students

Instructor: Introduction to Programming, Fall 1996-1997
Gazi Vocational school, Afyon/Turkey
Taught Pascal programming language to high school vocational students

PEER REVIEWED JOURNALS

Barab, S., Thomas, M.K., Dodge, T., Carteaux, B., & Tuzun, H. (in press). Making learning fun: Quest atlantis, a game without guns. To appear in *Educational Technology Research and Development*.

Tuzun, H. (2004). Metodyka kształcenia online. *e-mentor, 2004*(2), 9-10.

Tuzun, H. (2003). Przekształcanie kursów tradycyjnych na format WBI. *e-mentor, 2003*(2), 4-12.

Bay, O. F., Tuzun, H. (2002). Delivering course content with web in higher education institutions: Part II. *Journal of Polytechnic, 5*(1), 23-33. Retrieved September 23, 2003, from http://www.politeknik.gazi.edu.tr/pdf_files/511339.pdf

Bay, O. F., Tuzun, H. (2002). Delivering course content with web in higher education institutions: Part I. *Journal of Polytechnic, 5*(1), 13-22. Retrieved September 23, 2003, from http://www.politeknik.gazi.edu.tr/pdf_files/512340.pdf

SELECTED MAJOR CONFERENCE PRESENTATIONS

Tuzun, H. (in press). Motivating learners in educational computer games. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology*.

Cakir, H., Tuzun, H. (in press). Design and development of an internet-based electronic performance support system for systemic change in k-12 settings. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology*.

Dodge, T., Carteaux, R., Tuzun, H. (2003). *Quest atlantis: developing participant structures that transform*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Yilmaz, O., Tuzun, H. (2002). Gender differences in middle school students' attitudes towards the educational use of the internet. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology*.

Tuzun, H., Cakir, H. (2002). A design model for internet-based electronic performance support systems. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology*.

Tuzun, H. (2002). *3-Dimensional virtual worlds on the internet.* Roundtable Discussion at the National Convention of the Association for Educational Communications and Technology, Dallas, TX.

Cakir, H., Tuzun, H., Reigeluth, C. M. (2002). An internet-based electronic performance support system for systemic change in K-12 settings. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology.*

Barab, S. A., Thomas, M. K., Dodge, T., Goodrich, T., Carteaux, B., & Tuzun, H. (2002). Empowerment design work: Building participant structures that transform. *Proceedings of the Fifth International Conference of the Learning Sciences.* Seattle, Washington October 23-26, 2002, 232-236.

Tuzun, H., Yilmaz, O. (2002). Instructor support in web-based instruction. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2002*(1), 1987-1992. Retrieved September 23, 2003, from http://dl.aace.org/10496

Tuzun, H. (2002). Evaluating the effectiveness of online courses. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2002*(1), 1985-1986. Retrieved September 23, 2003, from http://dl.aace.org/10495

Tuzun, H., Yilmaz, O. (2002). Bringing inservice and preservice teachers together in an online learning community. In S. Espinoza (ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 2410-2411). Retrieved September 23, 2003, from http://www.ericit.org/fulltext/IR021374.pdf

Yilmaz, O., Tuzun, H. (2001). Creating an online community by using ICQ activelist. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology* (pp. 455-461).

Tuzun, H. (2001). Guidelines for converting existing courses into web-based format. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology* (pp. 360-370). Retrieved September 23, 2003, from http://www.ericit.org/fulltext/IR021607.pdf

Yilmaz, O., Tuzun, H. (2001). Web based instruction: Instructor and student problems. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology* (pp. 462-469).

Tuzun, H., Graham, C., Sluder, K. J., Lee, S. (2001). Usability testing of the indiana university education faculty web forms. *Annual Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology* (pp. 350-359). Retrieved September 23, 2003, from http://www.ericit.org/fulltext/IR021606.pdf

AWARDS

Beechler Fellowship Award, Department of Instructional Systems Technology, Indiana University, 2004

Jerrold E. Kemp IST Fellowship Award, Department of Instructional Systems Technology, Indiana University, 2003

L.C. Larson Professional Development Award, Department of Instructional Systems Technology, Indiana University, 2002

L.C. Larson Professional Development Award, Department of Instructional Systems Technology, Indiana University, September, 2001

L.C. Larson Professional Development Award, Department of Instructional Systems Technology, Indiana University, October, 2000

Four years funding from Turkish National Education Ministry for Ph. D. in the USA, 1998

REFERENCES

Sasha A. Barab, Ph.D., Assistant Professor, Department of Instructional Systems Technology, Indiana University
(812) 856-8462; sbarab@indiana.edu

Charles Reigeluth, Ph.D., Professor, Department of Instructional Systems Technology, Indiana University
(812) 856-8464; reigelut@indiana.edu

Inan Guler, Ph.D., Professor of Electronics and Computer Education, Head of Department of Electronics and Computer Education, Gazi University, Technical Education Faculty, Ankara/Turkey
+90 (312) 212-3976; iguler@tef.gazi.edu.tr

Julie England, Director of Technology, Center for the Study of Institutions, Population, and Environmental Change, Indiana University
(812) 855-3196; england@indiana.edu