Video Games and English as a Foreign Language Education in Burkina Faso

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Abstract

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There has been a growing interest among researchers and second or foreign language educators in harnessing the motivational power of video games to improve learning outcomes and motivation. Little is known in terms of the design of educational video games for language learning and their integration into the teaching and learning process. The present study aimed to gain in-depth insights into high school students’ and teachers’ perceptions of Trace Effects (United States Department of State, 2012) in improving English as a Foreign Language (EFL) acquisition in Ouagadougou, Burkina Faso. Furthermore, the study sought to understand the pedagogical integration of Trace Effects into the EFL classroom.

The participants in the study were 113 12th grade students, four EFL teachers and four principals from four high schools in Ouagadougou the capital of Burkina Faso. The students and their teachers interacted with Trace Effects, a game designed to improve EFL acquisition for a few weeks. After gameplay, each one of the four English teachers integrated the game into a lesson. Data was collected from the participants using interviews, participant observations and document analyses.

The findings of the study indicated that the students and teachers perceived Trace Effects to be motivating in terms of design. In terms of EFL acquisition, the participants
believed that *Trace Effects* contributed to improving their EFL listening, speaking, vocabulary and pragmatic skills as well as their motivation to learn the language. It was also found that the integration of *Trace Effects* into the EFL classroom was associated with a change in foreign language pedagogical approach. The EFL teachers who participated in the study tended to rely heavily on the reading and audio-lingual approaches when no game was used, but shifted towards the communicative language teaching approach when *Trace Effects* was integrated in a lesson.
Dedication

This dissertation is dedicated to:

My late father, who believed in the power of education to change lives;

To my mother, wife, and daughter for their love and support.
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Chapter 1: Introduction

Video games constitute one of the fastest growing sectors of the entertainment industry in the United States (Entertainment Software Association, 2013). According to the Entertainment Software Association (2013), consumers spent 20.77 billion dollars on video game hardware and accessories in 2012.

While in the past, video games were produced mostly for entertainment, there has been a growing interest among scholars of game studies and educators in leveraging their motivational power to improve education (Gee, 2007a; Squire, 2006). Findings of several empirical studies suggest that games contribute to improving learning outcomes in mathematics (Nte & Stephens, 2008; Shin, Sutherland, Norris & Sloway, 2011), science (Bilyeu, 2010; Clark, Nelson, Chang, Martinez-Garza, Slack and D’Angelo, 2011), and foreign language education (Rankin, Morrison, McNeal, Gooch & Shute, 2009; Struppert, 2010; Sykes, 2008).

Background

The use of technology in second and foreign language education is not a new phenomenon. The blackboard, tapes and television have been used in second and foreign language teaching and learning for years (Warschauer & Meskill, 2000). The recent development of computer technology and the Internet has led to the establishment of Computer Assisted Language Learning (CALL) as an independent area of research and practice on the use of technology in second and foreign language education. Foreign language learners are taking advantage of computer technology and the Internet to meet and interact with native speakers in chat-rooms, forums and game spaces in order to
improve their communicative competence (Hanna & de Nooy, 2003; Thorne, 2009; Thorne, Black, Sykes, 2009).

The attention of CALL scholars and educators has been particularly turned to video games in recent years. Findings of recent studies suggest that video games have the potential to improve foreign language learning outcomes (Rankin et al., 2009; Sykes, 2008, Yang & Zapata-Riviera, 2010) and motivation (Connolly, Stansfield & Hainey, 2011; deHaan, 2011).

Statement of the Problem

Despite the growing enthusiasm around the use of games to support foreign language education, a number of issues have remained unresolved. Little is known concerning students’ and teachers’ perceptions of games in achieving EFL acquisition. There is a dearth of research on the pedagogical integration of games into foreign language instruction. If games are to achieve their full potential for increasing motivation and learning outcomes in the foreign language classroom, there is a need to identify pedagogical approaches associated with their effective use.

Purpose of the Study

The purpose of the present study was to understand the implementation of a video game in high school EFL education in Burkina Faso. The study aimed to gain deep insights into high school students’ and teachers’ perceptions of Trace Effects (United States Department of States, 2012) in achieving EFL acquisition as well as understand pedagogical practices associated with the implementation of the game in the classroom.
Research Questions

The following research questions guided the present inquiry:

1. What are students’ and teachers’ perceptions of Trace Effects in achieving EFL acquisition?
   a. What are students’ and teachers’ perceptions of the design of Trace Effects?
   b. What are students’ and teachers’ perceptions of the impact of Trace Effects on EFL acquisition?

2. How do teachers integrate Trace Effects into their pedagogy when the game is required?

Significance of the Study

The findings of the study have both theoretical and practical significance. The results of the study contribute to a better understanding of perceptions of educational video games in improving foreign language learning. In terms of practical significance, the study provides foreign language educators and teacher trainers with deeper insights on the types of foreign language teaching approaches that are associated with the use of games in the classroom.

Game

The main material that was used in the present study was the game Trace Effects. Trace Effects is a single player online adventure game designed and developed by a team of TESOL (Teaching English to Speakers of Other Languages) professionals and researchers in collaboration with The SuperGroup, a game development company.
Dr. Deborah Healey and Dr. Elizabeth Hanson-Smith worked as script writers for the game, while the SuperGroup was in charge of the programming part. Dr. Dawn Bikowski wrote the teacher manual. The team was headed by Mr. Rick Rosenberg, head of the Department of State Office of English Language Programs. Funding for the project was provided by the United States Department of State.

The purpose of the game is to provide high school students in foreign countries, aged between 12 and 16, with an engaging source of language input to enhance their English skills as well as their understanding of American culture (American English, 2012; Regional English Language Office for the Andean Region, 2012). *Trace Effects*, through its design, targets EFL reading, writing, speaking, listening, grammar, vocabulary and pragmatics skills (Hanson-Smith, 2013). The design of the game has been strongly influenced by the TESOL Technology Standards (Healey et al., 2008) in order to ensure that it contributes to improving both EFL and technology skills.

The game opens with Trace, the main character, on a university campus in the present. Trace is from the year 2045. He has traveled back in time from the year 2045 to the present. He needs help to get back to the future where he came from. In order to return to the future, Trace needs to successfully complete a series of tasks that require him to interact with various characters using the English language. Both accuracy and appropriateness of language use matter in the game. Trace loses points if he uses inaccurate or rude language. On the other hand, he gains points if he uses appropriate, polite, and accurate language.
The game is divided into seven chapters, each of which poses a different challenge to Trace. The challenges are phrased in the form of assignments that Trace must successfully complete in order to return home. The assignments include the following: Helping Emma to win a school election to become the student body president, helping Andre to get his music band together so that they can play to raise money for an elementary school music program, helping George to save the environment and helping Neela fulfill her dream of becoming a successful fashion designer. A variety of themes are explored in the game. These themes include “entrepreneurship, community activism, gender empowerment, science and innovation, environmental conservation, and conflict resolution” (American English, 2012). American culture is explored through museum visits in Washington, DC, and the celebration of holidays such as Thanksgiving.

The game is played using a computer keyboard and a mouse. The player uses the arrow keys to move around the game environment and the ‘E’ key to interact with characters and objects. Interaction consists of selecting among words, phrases and sentences that are prebuilt into the system. The player does not type or speak directly to characters in the game. Figure 1 shows the main interface of Trace Effects.
Delimitations

The present study used a multiple-case study design to understand the implementation of a video game in four public high schools in Burkina Faso, West Africa. The participants were 12th grade students, their English teachers, and the principals of the participating schools. The findings of the present study are only valid for the particular setting and populations. They are not meant to be generalized to other participants, games or settings.

However, readers may transfer the findings of the study to other participants, settings and games when appropriate. Lincoln and Guba (1985) suggested that transfer of qualitative research findings from one context to another depends on the degree of congruency between the two contexts. In order to assist readers in determining the degree
of congruency between the setting of the present study and other contexts they may wish to transfer the findings to, the researcher provided a thick and rich description of the setting, participants, research procedures and the game.

**Limitations**

The present study adopted a multiple case-study design. This is consistent with the aim of the study, which was to gain in-depth knowledge of the use of *Trace Effects* in 12th grade English classes in public schools in Burkina Faso. The study did not examine causal relationships between *Trace Effects* and language learning. A randomized-controlled-trial is an appropriate design for that purpose. The implementation of the study in each school lasted approximately one month. The findings reported are only valid for that time frame. It is possible that long-term changes may occur in participants’ perceptions of games in achieving language learning outcomes or in their pedagogical practices after the study was completed. A longitudinal study is needed to gain insights into those long-term changes.

**Definition of Key Terms**

*Communicative Competence*: Communicative competence refers to learners’ knowledge of linguistic forms as well as the social and cultural norms governing the appropriate use of these forms (Canale & Swain, 1981; Hymes, 1972).

*Educational video game*: Educational video games have been defined in opposition to games produced for entertainment. Sauvé, Renaud, Kaufman and Marquis (2007) state that an educational game is a game whose primary purpose is learning.
*Edutainment:* The term ‘edutainment’ comes from a blending of the words ‘education’ and ‘entertainment’. According to Susi, Johannesson and Backlund (2007) the word ‘edutainment’ refers to “any kind of education that also entertains” (p. 2). However, the researchers note that the word has been usually used to refer specifically to video games for educational purposes.

*EFL:* English as a Foreign Language (EFL) refers to the teaching and learning of English in a social context characterized by the absence of native speakers of English outside of the classroom (Nayar, 1997; Tarnopolsky, 2000). The present study concerns EFL teaching and learning. However, the terms ‘EFL’ and ‘English’ will be used interchangeably in the present study.

*ESL:* English as a Second language (ESL) refers to the teaching and learning of English in a social context characterized by the presence of native speakers of English outside of the classroom (Nayar, 1997; Tarnopolsky, 2000).

*Game:* The terms ‘game’ ‘Video game’ and ‘virtual world’ are used interchangeably throughout the study. However, other studies may make the distinction between the three. Salen and Zimmerman (2004) define a game as “a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome” (p. 96). Transparent in this definition are the notions of rules and score.

*Game design:* Salen and Zimmerman (2004) define game design as the conception and design of “rules and structures that result in an experience for players” (p. 1).
Language teaching approach: Richards & Rogers (2001) define language teaching approach as “theories about the nature of language and language learning that serve as the source of practices and principles in language teaching, (p. 20).” Teaching methods and techniques are therefore part of the concrete realization of an approach.

Motivation: Motivation to learn refers to “the magnitude and direction of behavior” (Keller, 1983 p. 389). In this definition Keller (1983) explains that motivation has to do with the choices people make in respect to what goals or experiences to pursue or avoid and the degree of effort they make in relation to those choices.

Serious game: Michael and Chen (2006) define serious games as “games that do not have entertainment, enjoyment, or fun as their primary purpose (p. 21)”. According to the authors serious games are designed to teach, train and inform. Even though serious games can be fun, the authors argue that fun is not their focus. These are games used in the defense and health care training.

Motivational design: “Motivational design refers to the process of arranging resources and procedures to bring about changes in motivation” (Keller, 2006, p. 3). According to the author, motivational design can be applied to education or work. It can be used to increase motivation to learn or motivation to work.

Simulations: “A simulation is a simplified, dynamic and precise representation of reality defined as a system (Sauvé et al., 2007, p. 253).” Simulations and games are different in the sense that simulations represent reality while games can be fictitious. Games involve rules, conflict and winning while simulations do not necessarily involve a situation of conflict and competition where there is a winner.
Smartphone: The Merriam-Webster Online Dictionary (2014) defines ‘smartphone’ as “a cell phone that includes additional software functions (as e-mail or an Internet browser).” In the present study ‘smartphone’ was understood to be any cellphone with Internet browsing and E-mail capabilities.

Virtual world: Schroeder (1996) defines a virtual world as “a computer-generated display that allows or compels the user (or users) to have a sense of being present in an environment other than the one they are actually in, and to interact with that environment” (p. 25).

Chapter Summary

This chapter introduced the research topic; discussed the research problem, the purpose of the study, the research questions; and closed by discussing the limitations and delimitations of the study as well as providing definitions for key terms used in the study. The second chapter reviews the literature pertaining to game design theory and the impact of video games on learning outcomes and motivation in language education; the third chapter focuses on the research methodology. It describes the research population, setting, instruments, data collection and analysis procedures and discusses ethical issues related the study. The fourth chapter reports the findings of the study. The fifth chapter discusses the findings and relates them to the literature. The sixth and last chapter concludes the study, discusses challenges encountered in the field, and makes recommendations for future research.
Chapter 2: Literature Review

Video games have been around for quite some time, but it was not until recently that ‘game studies’ became established as an independent field devoted to the promotion of scholastic work related to video game design and study (Wolf & Perry, 2003). Recent scholarship in game-based learning suggests that games have the potential to improve motivation and learning outcomes (Gee, 2004; 2007a; 2007b; Jenkins, 2002; Prensky, 2002; Squire, 2006).

The first section of the chapter describes the major game design theories; the second section critically reviews empirical studies that have examined the relationship between games, motivation and learning outcomes in the language classroom; the third section provides an overview of second and foreign language teaching approaches and the fourth and last section describes the context of the study.

Game Theory

This section describes the major game design theories, theories of play and theories of motivation. Each theory is presented, described and discussed in relation to other theories.

Major game design theories. Video game design is an interdisciplinary field of study that encompasses cognitive theories, theories of representation, media theory, hypertext theory, art theory, ludology and narratology (Wolf & Perry, 2003). The major theories that have generated a great deal of debate among scholars of game studies are narratology (Laurel, 1991; Murray, 1997, 2005), ludology (Adams, 1999; Costikyan,
2006; Frasca, 1999; Juul, 2001), interactive drama (Mateas, 2002; Mateas & Stern, 2006) and narrative architecture (Jenkins, 2006).

**Narratology.** Narratology can be defined as the study of video games as story systems (Murray, 1997). According to narratologists, video games are narrative media and should be studied using the same framework used to study novels, books and films (Laurel, 1991; Murray, 1997). The most compelling claim concerning the narrative nature of games comes from Murray (1997) when she argues that "games are always stories, even abstract games such as checkers or Tetris, which are about winning and losing, casting the player as the opponent-battling or environment-battling hero" (p. 2).

Proponents of narratology believe that video game design should be approached the same way one approaches storytelling. The designer controls the plot structure of the game and the sequence of events from beginning to the end (Simons, 2007). Gameplay then consists of experiencing the game events in their pre-determined sequence without any possibility of altering their order. From a classical narratological perspective, interactivity is discouraged because it negatively affects the quality of the story by disrupting its flow. In order for the story to achieve its intended impact it has to be experienced the way the designer chose to tell it.

**Ludology.** Ludology can be defined as the study of video games (Frasca, 1999). It is an attempt to establish a field of game studies that is independent from narratology (Aarseth, 1997; Eskelinen, 2001; Frasca, 1999; Juul, 2001). Unlike narratologists who claim that games are stories, ludologists argue that they are not (Eskelinen, 2001; Frasca, 1999; Juul, 2001).
Video games are not stories; they are games; and games are different from narrative media such as novels, films, and plays (Adams, 1999; Costikyan, 2006; Frasca, 2003).

According to ludologists, interactivity and active immersion is the major defining feature of video games that set them apart from stories (Costikyan, 2006; Simons, 2007). Stories are linear, while video games are interactive (Costikyan, 2006; Frasca, 2003). No matter the number of times one reads a book or watches a film, the sequence of events does not change. It remains the same. Games are interactive. The game environment changes as a result of players’ actions. The player gets a different experience each time he/she plays the game. The player does not have to follow a pre-determined plot or sequence of events created by a designer. They only have to follow the game rules.

The second major defining element of video games is active immersion. Games are immersive, while stories are passive (Costikyan, 2006; Juul, 2001). According to ludologists, video games require players’ active involvement while stories do not (Costikyan, 2006). Books, novels, and films feature a plot structure that flows under the guidance of the designer. They are meant to be experienced passively by players, which is the total opposite of games (Adams, 1999; Costikyan, 2006).

Game design from a ludological perspective is the design of rules and structures that define interactivity (Salen & Zimmerman, 2004). The game rules specify what players can do and cannot do in the game environment. Gameplay then consists of players’ interaction with the rules of the game. Play, according to Salen and Zimmerman (2004), is “free movement within a more rigid structure” (p. 304).
On one hand, narratologists argue that games are narratives. They constitute a fixed sequence of events under the control of the designer. Interactivity that gives control to the player is not welcome in narratives because it disrupts the course of the story. On the other hand, ludologists contend that games are not stories. They are interactive and immersive systems that give control to the player. Ludologists argue that the idea of a plot structure destroys the interactivity of games. The debate between narratologists and ludologists will likely continue into the next decade. New approaches to game design are attempting to find a middle ground between the two theories (Jenkins, 2006; Mateas, 2002; Mateas & Stern, 2006).

**Interactive drama.** Interactive drama theory attempts to combine narrative structure and interactivity using a neo-Aristotelian drama approach. From an interactive drama perspective, game design consists of creating a dramatic story in which the player assumes the role of a first person character (Mateas & Stern, 2006). Interactive drama boasts of being able to design games in which the player’s action can deeply shape the course and outcome of the story without jeopardizing the story structure. In other words, proponents of interactive drama argue that it is possible to design a game that combines maximum interactivity with a rigid plot structure.

Mateas and Stern (2005a) put their theory of interactive drama into practice in the design and development of a video game called *Façade* (Mateas & Stern, 2005b). The game features Trip and Grace, a young couple that is struggling with their marriage. The player enters the game as a close friend of the couple who has been invited to their house. A marriage debate erupts between Grace and Trip. The player has to get involved in the
debate. They can choose to take side with Grace, with Trip, with both or with none of them. The interesting aspect of the game is that its outcome depends to some extent on the player’s actions and words. In the end, Trip and Grace can decide to get a divorce, to reconcile or to throw the player out of their house. These different outcomes are totally dependent on what the player says or does in the game environment.

One would assume that interactive drama would be well received by both narratologists and ludologists because it attempts to accommodate both theories. However, nothing can be further from the truth. The theory has generated criticism in both ludological and narratological circles. First of all, both sides argue that the current state of artificial intelligence cannot support the production of a game that will blend maximum interactivity and a rigid narrative structure effectively as described by proponents of interactive drama (Bernstein & Greco, 2004; Frasca, 2004). Mateas and Stern (2005a) have confirmed this technical difficulty after developing their Façade game. Even though they succeeded in designing a game that gave the player some degree of agency to influence the outcome of the game at the global level, the program did not allow them to achieve the degree of agency that they had hoped for. The game software could only accommodate a limited number of parallel plot lines; not the maximum interactivity where there would be almost an unlimited number of plot lines. After playing Façade for a certain number of times, one notices that some of the narratives structures start to become repetitive.
Ludologists have criticized interactive drama for its emphasis on rigid narrative structure (Frasca, 2004). They do not appreciate the idea of maintaining a rigid story structure because it works against interactivity. On the other hand, narratologists have taken issue with interactive drama because of its emphasis on player agency (Bernstein & Greco, 2004). According to narratologists, the idea of giving players a higher degree of agency to deeply affect the outcome of the story is an unnecessary challenge.

Interactive drama has not resolved the tension between narratologists and ludologists. It is challenging to design a system that gives players maximum agency to influence the outcomes of a game and at the same time manage to maintain a “tight, author-given story structure” (Mateas & Stern, 2006, p. 647) as interactive drama theorists argue. Interactivity and plot structure are two opposites of the same continuum (Adams, 1999). Increasing one automatically leads to the decrease of the other. Jenkins (2006) offers a promising theory where narrative and game elements can both cohabitate without promising total agency to players.

**Narrative architecture.** Jenkins (2006) brings a compromise between narratology and ludology by arguing that video game design is more the design of a narrative architecture than linear storytelling. According to Jenkins (2006), video game design can combine narrative and interactive elements. This can be achieved through the design of evoked narratives, enacted narratives, embedded narratives and emergent narratives (Jenkins, 2006).
In terms of emergent narratives, the author explains that a narrative approach can be used to design the game environment at the macro level and an interactive approach can be used at the micro level. At the macro level, the game designer creates the overall structure or narrative architecture of the game environment. Players have little control over this overarching plot thereby ensuring that the game achieves its intended purpose.

The designer can allow some degree of interactivity inside the game environment at the micro level. Players can be given the opportunity to make choices and decisions that affect the outcome of the game at the micro level. They can be given some degree of freedom to construct their own narratives at the micro level in the game environment. However, these player-created narratives should not affect the larger narrative structure, which remains under the control of the game designer.

This section has reviewed the major game design theories such as narratology, ludology, interactive drama and narrative architecture. The next section describes play theory and how it relates to game design.

**Play theory.** Play theory has been traditionally dominant in the early childhood literature but has not received a great deal of attention in adolescent and adult education. According to Rieber (1996), this situation is partly due to the fact that people have been associating play with childhood. As a result, they see play discussion as only suited for early childhood education. Another contributing factor to the low level of attention to play theory in adolescent and adult education is the fact that ‘play’ has been wrongly defined as something that exists in opposition to work (Gee, 2005; Rieber, 1996). Many people view ‘play’ as what you do when you are not working (Rieber, 1996).
The recent development of educational video games has brought play theory to the forefront of academic discussion in adolescent and adult formal education. This section provides a definition of ‘play’ describes the major theories of play and discusses the relationship between play and learning.

The word ‘play’ is an elusive concept to define (Ailwood, 2003; Rieber, 1996; Zimmerman, 2004) because of the multitude of play discourses and the different contexts in which the word can be used. Zimmerman (2004) defines play as “the free space of movement within a more rigid structure” (p. 159) Apparent in this definition is the notion of rules. According to the author, rules are central to play, whether one is discussing play in the context of board games, card games or video games. Contrary to those who may think that the rules kill the game, Zimmerman (2004) argues that play exists because of the rules. Enjoyment, according the author, comes from learners’ interaction with the rules of the game. Monighan-Nourot, Scales, Van Hoorn and Almy (1987) identified the following characteristics of play: Active engagement, intrinsic motivation, attention to means rather than end, non-literal behavior, and freedom from external rules. Perry (1998) adds ‘enjoyable’ to the list of characteristics.

Play in the context of video games has been considered as a source of pleasure and learning (Gee, 2005). According to the author, video games combine fun and learning at the same time. The author argues that pleasure and learning are not dichotomous. Play can be a source of deep learning in itself. According to Gee (2005) humans drive their pleasure in gameplay from the sense of agency, control and
meaningfulness that games provide. Rieber (1996) goes further to argue that gameplay plays an important role in human cognitive, social and cultural development.

The relationship between play and learning as recognized in game studies is not a new idea. It has been long recognized in the early childhood education literature. The importance of play in education has been stressed by early educators such as Piaget, Vygotsky and Dewey (Ailwood, 2003). Piaget sees play as contributing to the cognitive development of the child. Recent studies in early childhood education have confirmed the relationship between play and cognitive development among pre-school children (Bergen, 2002; Kaufman, 2012; Russ, 2004). Bergen (2002) conducted a review of studies that found a relationship between pretend play and the development of linguistic, social and problem-solving skills among pre-school children. Play with embedded literacy materials has been found to positively impact the development of literacy skills among preschool children (Bergen & Mauer, 2000; Einarsdottir, 2000; Kim, 1999; Neuman & Roskos, 1992; Stone & Christie, 1996; Vukelich, 1994). Play has also been linked to the development of self-regulation (Berk, Mann & Ogan, 2006; Hirsh-Pasek, Golinkoff, Berk, & Singer, 2009; Krafft & Berk, 1998) and problem-solving skills (Fisher, 1992; Wyver & Spence, 1999). Other studies link child play to creativity (Russ, 2004; Singer & Singer, 2005).

Play theory plays an important role in early childhood education, but has received little attention in adolescent and adult formal education because of common misconceptions that tend to separate play from learning. This section has provided a
definition of ‘play’ and provided an overview of the major play theories. The next section of this chapter focuses on game design and motivation.

**Game design and motivation.** One of the most fascinating aspects of video games is their motivating power. In order for a game to be motivating its design has to adhere to specific motivational principles. This section examines the major motivation theories related to game design.

Malone (1981) and Malone and Lepper (1987) identified four key aspects of video game design that sustain the integrative motivation of players. These four elements are: challenge, fantasy, curiosity and control. After conducting a series of correlational and experimental studies on entertainment video games, Malone (1981) came to the conclusion that challenge, fantasy and curiosity are the key motivating features of video games. Challenge according to Malone (1981) can be achieved by incorporating clear and meaningful goals in the game, by making the outcomes of the game uncertain, and by varying the level of difficulty. The second motivating feature of video games is ‘fantasy’. A fantasy world according to Malone (1981) refers to an environment that evokes mental images of objects or social interactions that are not present to the senses within one’s actual experience. ‘Fantasy’ is an important motivation feature of video games because certain fantasy desires that cannot be fulfilled in real life can be satisfied through gaming. The third aspect of game design that increases integrative motivation is ‘curiosity’. According to Malone (1981) ‘curiosity’ can be achieved in game design by including an optimal level of informational complexity. That is, the activities of the game should
neither be too difficult nor too easy for players. If the activities are too difficult, players
will likely give up. On the other hand, if the activities are too easy, they will get bored.

Malone’s (1981) model was later expanded to include a fourth element, which is
‘control’ (Malone & Lepper, 1987). ‘Control’ refers to the players’ level of autonomy,
empowerment and self-determination in the gaming environment. Even though Molone
and Lepper (1987)’s model is useful in describing the features of game design that are
related to motivation, the model does not seem to be preoccupied with the design of
educational video games. Malone and Lepper (1987) do not make any prescriptions
concerning the use of games to support learning.

Garris, Ahler and Driskell (2002) provide a motivation model for the design of
educational video games and their implementation in an actual learning context. The
model comprises three main components that are: Input, process and output. ‘Input’
refers to the content and the characteristics of the game. Building on Malone and Lepper
(1987)’s model, the authors identified six characteristics of video games that are
associated with increased motivation: Fantasy, rules/goals, sensory stimuli, challenge,
mystery and control. ‘Fantasy’ refers to imaginary characters or contexts; ‘Goals’ refer to
the goals that players are trying to achieve, while ‘rules’ have to do with the guidelines
for playing; ‘sensory stimuli’ refers to visual and auditory stimuli that are not found in
real life; as far as ‘challenge’ is concerned, the game should have an optimal level of
difficulty and include uncertain outcomes; ‘mystery’ can be achieved by providing
learners with an optimal level of informational complexity that creates discrepancies and
inconsistencies in their knowledge and drives them to search for knowledge to fill these
The last motivating feature of video game design is ‘control’. ‘Control’ refers to the players’ ability to regulate, direct and control some aspects of the game.

The second major component of the model is ‘process’. ‘Process’ according to Garris et al. (2002) refers to the game cycle. It comprises three main components that are user judgment, user behavior and system feedback. Garris et al. (2002) argue that when players start a game they make an initial judgment about it in terms of interest, enjoyment, task involvement and confidence. The initial judgment that players make about a game determines whether they will persist in gameplay or not. The last aspect of the game cycle is ‘feedback’. Getting feedback on their performance is critical to players’ motivation.

The third major component of the model is ‘output’. ‘Output’ refers to learning outcomes. The authors identified different types of learning outcomes from video games, which are declarative, procedural, skill-based, strategic and affective learning outcomes.

Of particular interest in the input-process-output model is the notion of ‘Debriefing’. ‘Debriefing’ does not fall into any of the three categories of the model (input, process, and output). Debriefing occurs somewhere between “process” and ‘output’. It is the transition between the game cycle and the achievement of learning outcomes. Garris et al. (2002) define ‘debriefing’ as a discussion of events and activities that occurred in the game and an analysis of why they occurred. On the importance of debriefing in educational games, Garris et al. (2002) argue that the debriefing process is a critical component of the implementation of a video game to support learning because it
transforms gaming into learning outcomes. The implication of this argument is that gaming may not result in effective learning if it is not following by ‘debriefing’.

Malone and Lepper (1987)’s and Garris et al. (2002)’s models deal mostly with motivation to play rather than motivation to learn. Even though motivation to play is important in game design the ultimate goal of educational video game design is to motivate players to not only play but also to learn. Another shortcoming of the two models mentioned above is the fact that they do not prescribe any guidelines on how to incorporate educational content in the game. How to strike a balance between fun and learning in the design of an educational video game is probably one of the most challenging tasks in educational video game design. A call for an instructional design model with a strong motivational component to guide game design becomes a necessity.

Keller’s (1987, 2000, 2010) attention, relevance, confidence, satisfaction (ARCS) model can be used to guide the design of an educational video game. According to Gunter, Kenny and Vick (2013), most features of the ARCS model can be applied to game design. The choice of the ARCS model over other instructional design models is justified by its unique approach to instructional design that consists of combining instructional effectiveness with motivation to learn (Keller, 2006). Other instructional design models have overemphasized instructional effectiveness at the expense of motivation (Keller, 2006).

According to Keller (1983; 2000; 2010) attention, relevance, confidence and satisfaction constitute a set of conditions necessary for a person to be motivated to learn. This four-component model is grounded in expectancy-value theory, which stipulates that
people are motivated to engage in an activity if they expect some degree of success and perceive positive outcomes (Keller, 2010).

‘Attention’ in Keller’s (2000) model stresses the need for designers to incorporate elements in their instruction to capture and hold learners’ attention. This can be achieved by including visual elements or sound effects.

The second element in the model is ‘relevance’. ‘Relevance’ refers to the perceived value of the content of instruction. Learners may lose their motivation if they do not find the instructional materials relevant to their needs and interests. Keller (2000) suggests that designers should identify clear goals and objectives relevant to the learners’ needs and make the content of the design address those goals. Relating the content of instruction to learners’ needs, interests and experiences can increase their motivation to learn.

The third element in the model is ‘confidence’. ‘Confidence’ according to Keller (2000) refers to positive expectancies for success. Learners’ confidence can improve if designers make their expectations for success clear at the beginning of instruction and provide learners with activities that help them achieve success and take personal responsibility.

The fourth component of the model is ‘satisfaction’. It refers to “positive feelings about one’s accomplishment and learning experience” (Keller, 2000, p. 2). According to Keller (2000), learners’ intrinsic satisfaction improves if designers give them opportunities for applying the knowledge they acquired. Giving students some external
rewards such as grades can also improve their satisfaction. The major categories of the ARCS model and guiding instructional design questions are presented in Table 1.

Table 1

Major Categories of the ARCS Model and Corresponding Design Questions

<table>
<thead>
<tr>
<th>Major Categories of the ARCS Model</th>
<th>Design Questions</th>
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<tbody>
<tr>
<td>Attention</td>
<td>How can I capture and maintain the learners’ attention?</td>
</tr>
<tr>
<td>Relevance</td>
<td>How can I make my instruction relevant to the learners’ goals, needs and interests?</td>
</tr>
<tr>
<td>Confidence</td>
<td>How can I improve the learners’ expectations for success and their personal responsibility?</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>How can I provide reinforcement for the learners’ success (internal and external rewards)?</td>
</tr>
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</table>

Various models have been used to guide the design of games in order to ensure that they are motivating for players. The major ones are Malone and Lepper (1987)’s control, fantasy, challenge and curiosity model, and Garris et al. (2002)’s input-process-output model. For the design and study of educational video games, Keller (1987; 2010)’s model can be an effective guide in order to ensure that the game has instructional value and motivates players to learn. The major game design, play, and motivation theories have been reviewed and discussed. The next section of the chapter is devoted to the review of empirical studies in order to identity the relationships between games, motivation and learning outcomes in the context of language learning.

**Video Games and Language Learning**

Various studies have examined the effect of gaming on academic achievement in mathematics (Ke, 2008a; 2008b; Shin et al., 2011), science (Bilyeu, 2010; Clark et al., 2011; Papastergiou, 2009), language arts (Barab, Pettyjohn, Gresalfi, Volk & Solomou, 2012) and foreign language learning (Rankin et al., 2009; Shih & Yang, 2008; Struppert, 2010). The present review focuses on literature on games and language learning. The first part of this review examines the literature pertaining to the relationship between games and learning in subjects other than language; the second part examines the issue of games and motivation in the language classroom; the third part looks at the relationship between games and learning outcomes; and the last part reviews studies that have looked at language learning in affinity spaces beyond the game environment.
**Video games and learning in mathematics and science.** This section provides a brief review of studies that have examined the relationship between video games and learning outcomes in other subjects before jumping into the discussion on games and language learning. Findings from the studies reviewed suggest that games have the potential to positively impact learning in mathematics (Ke, 2008a; 2008b; Shin et al., 2011) and science (Bilyeu, 2010; Clark et al., 2011; Papastergiou, 2009).

Shin et al., (2011) suggest that video games may improve elementary school students’ arithmetic performance. The researchers conducted a quasi-experimental study to investigate the impact of games on arithmetic performance. Forty-one elementary school students participated in the study. The participants took a pre-test to assess their arithmetic performance and were assigned to control and experimental groups. The control group played an arithmetic card game and the experimental group played an arithmetic video game called *Skills Arena* for five weeks. After the treatments, both groups were given a posttest. The findings of the study revealed that both the game and card groups improved from their pre-test scores. Furthermore, the game group’s arithmetic score was significantly higher than the card group’s. Another study conducted by Nte and Stephens (2008) to investigate the impact of video games on learning performance in statistics came to similar conclusions. The participants who were undergraduate psychology students reported that the video game helped them better understand the concept of normal distribution.
However, Ke (2008a) reported findings that are inconsistent with Shin et al. (2011). In a study that investigated the effect of gaming on elementary school students’ mathematics performance, Ke (2008a) found that gaming did not have a significant effect on performance. Fifteen fourth and fifth graders participated in the study. The participants completed pre-tests that assessed their metacognitive awareness and arithmetic skills. The participants then played the game *ASTRA EAGLE* for five weeks and completed post-tests to assess their arithmetic skills and metacognitive awareness. The findings showed that the game did not have any significant effect on the students’ arithmetic performance and their metacognitive awareness. Ke (2008b) came to similar conclusions in another study conducted using a larger sample of 487 students. Qualitative data reported in the first study (Ke, 2008a) help shed light on the findings. The game used in the study had serious design problems and that might have contributed to the non-significant results obtained. According to the researcher, the math problems were too challenging for the students and the feedback was not informative. The problems were also not well situated within the game narrative.

Findings of empirical studies have revealed that video games may improve learning performance in science (Bilyeu, 2010; Clark et al., 2011). Clark et al. (2011) argue that video games improve learning outcomes in physics. The authors recruited 207 middle school students from Taiwan and 72 from the United States for a study that investigated the effect of gaming on learning outcomes in physics. The participants completed a pre-test designed to assess their knowledge of Newtonian physics and then were introduced to a video game called *SURGE*. After playing the game, the participants
took a posttest to assess their knowledge of physics. Additional data was gathered by means of a survey and students’ scores on the game. The findings of the study as revealed by a paired-sample *t*-test show that the Taiwanese students significantly improved from their pre-test scores. No significant improvement was found among the students in the United States. However, in a post-game interview, the students reported that they gained some knowledge of physics from the game and some participants could identify specific examples of learning gains from the game.

Bilyeu (2010) came to similar conclusions after using *Second Life* to teach middle school science curriculum. The researcher implemented the curriculum in a virtual classroom designed in *Second Life*. The students took a pre-test, completed the learning tasks in *Second Life* and took a posttest. The findings of the study revealed that the students’ test scores improved after playing the video game.

Papastergiou, (2009) found that video games improve students’ knowledge of computer science. The study involved 88 high school students and took place in Greece. The researcher randomly assigned the participants to a comparison and an experimental group. The comparison group learned computer memory concepts through a web application named *LearnMem2* and the experimental group learned the same content by playing a video game named *LearnMem1*. The participants took a pre-test and a posttest designed to assess their knowledge of computer memory concepts. The findings of the study show that the game group demonstrated significantly higher knowledge of computer memory concepts than the web application group.
Findings of the studies reviewed revealed that video games have the potential to improve mathematics and science education. However, these findings should be interpreted with caution because some of them used pre-test posttest designs (Bilyeu, 2010; Clark et al., 2011; Ke, 2008a) or relied on a quasi-experimental design (Shin et al., 2011). Only Papastergiou (2009) seems to have conducted a true experimental study that involved random assignment of participants to control and experimental groups. The next section jumps to the core of the review, which concerns the relationship between games and language learning. It begins by reviewing the literature on games and motivation.

**Video games and motivation in language education.** Video games constitute a potential source of motivation for foreign language learning. After conducting a study that involved 45 high school students in the European Union, Connolly et al. (2011) came to the conclusion that video games can motivate students to learn foreign languages. The study adopted a pretest-posttest design to investigate the relationship between games and motivation. The participants completed a motivation questionnaire, played a multilingual video game called *Tower of Babel*, and completed a post-game motivation questionnaire. The findings of the study showed that the participants’ motivation to learn foreign languages increased after playing the game. The students reported that they would continue to play the game after the project.

More than simply increasing learners’ motivation to learn a foreign language, video games can motivate students to acquire specific aspects of a language. Yang and Zapata-Rivera (2010) found that implementing a video game in English as a Second Language (ESL) classroom improves learners’ motivation to learn English pragmatics.
Fifteen foreign students enrolled in an intensive English program at an American university were recruited to participate in a study designed to investigate the impact of a video game on their pragmatic competence. The participants interacted with a video game designed to teach polite request strategies in English for 45 minutes. The students then completed a post-game questionnaire and participated in an interview. The findings of the study showed that the participants were motivated to learn more about English pragmatics after playing the game.

Other studies have shown that gameplay contributes to improving learners’ motivation to develop intercultural communicative competence (Guillén-Nieto & Aleson-Carbonell, 2012; Strupert, 2010) and improve their listening and speaking skills (Liu & Chu, 2010). Gameplay is not the only aspect of video games that motivate learners. deHaan (2011) argues that involving language learners in game development increases their motivation to learn a foreign language. The researcher conducted a study in order to examine the impact of digital video games on college students’ motivation to learn English. Three Japanese students learning English as a Foreign Language (EFL) participated in the design and development of a digital video game using the English version of RPG Maker VX. The discussion on the planning, design and development of the game was conducted in English. The participants were interviewed after the project was completed. The findings of the study revealed an increase in the participants’ motivation to learn English as a result of their participation in the game design and development.
Similar results were obtained by Oldaker (2010) after implementing a game design and development project in a middle school language arts classroom. The author reported that the involvement in the development of the game motivated students to read and write.

Some disconfirming evidence exists in the literature concerning the impact of video games on motivation in language learning. Barendregt and Bekker (2011) and Struppert (2010) reported that even though learners may demonstrate high levels of motivation and engagement with a video game initially, their interest tends to decrease over time. Barendregt and Bekker (2011) studied elementary students’ motivation and engagement with an EFL video game called *Hello You*. They reported initial high levels of motivation among the students. Their interest in the game tended to decrease over time. Struppert (2010) came to similar results after studying the motivation of middle school students to play an intercultural communication game. The researcher found that the students initially demonstrated a high level of motivation to play the game, but tended to get bored after playing it several times.

The findings of Barendregt and Bekker (2011) and Struppert (2010) may be due to poor game design. Even though the literature shows that video games can motivate students to play and learn a foreign language, not all video games are motivating. In order to develop games that are motivating, game designers have to be knowledgeable of the theories of integrative motivation. Malone and Lepper (1987) provide a useful motivation model for guiding game design. The model has four main components that are: challenge, fantasy, curiosity and control. Garris et al. (2002) have built a model that
expanded on Malone and Lepper (1987)’s model. Following motivational principles in the design of an educational video game can ensure that the game sustains players’ motivation over time.

The findings of the empirical studies reviewed indicate that involvement in both gameplay and game development contributes to increasing learners’ motivation to play and learn a foreign language. This is true regardless of whether the focus is on foreign language learning in general or on specific aspects of foreign language such as pragmatics, intercultural communicative competence, or listening and speaking. One may wonder whether increased motivation to learn a foreign language translates into positive learning outcomes. The next section of the paper examines the impact of video games on actual language learning.

**Video games and language learning outcomes.** Video games have the potential to improve reading, writing, speaking and listening skills. They can also contribute to vocabulary acquisition (Holland, Kaplan & Sabol, 1999; Rankin et al., 2009) and the development of communicative competence (García-Carbonell, Rising, Montero & Watts, 2001; Schwienhorst, 2002; Vickers, 2010). Their use is beneficial in both language arts (Barab et al., 2012) and foreign language classrooms (deHaan, Reed & Kuwada, 2010; Struppert, 2010; Yang and Zapata-Rivera, 2010). The next section focuses on the impact of video games on the four major language skills.

**The impact of video games on reading, writing, listening and speaking.**

Research conducted in language arts education showed that video games can have a positive impact on reading (Adams, 2009; Oldaker, 2010) and writing (Barab et al., 2012;
Oldaker, 2010). Oldaker (2010) argues that involving middle school language arts students in game creation contributes to improving reading and writing skills. The researcher conducted a study that involved 16 middle school students in the United States. The participants designed and developed video games to teach the content of a novel that they were studying in class. In addition to building the games, the participants had to write essays about their experience participating in the project and the process they went through in order to develop their games. The students presented their finish products at a school board meeting. According to Oldaker (2010), the process of creating the video games improved the students’ reading and writing skills. The students had to read and understand the novel in order to use its content to build their games. The project gave students something meaningful to write about and had a positive impact on their writing skills.

Similarly, Barab et al. (2012) argue that gaming has a positive effect on persuasive writing. The researchers embarked on a study that involved 65 seventh graders in an inner city school in the United States. The participants were randomly assigned to comparison and experimental groups. The experimental group played a video game and the control group read a novel. The findings of the study showed that playing the video game called Modern Prometheus significantly improved the participants’ persuasive writing skills. They were able to better position themselves as change agents and write persuasively from the perspective of one of the characters in the game.
Adams (2009) goes beyond traditional literacy skills to argue that the use of video games in the language arts classroom improve learners “virtual literacy skills” (p. 58). The emergence of computer technology has imposed new literacy demands on learners and educators. The twenty-first century learner must be equipped not only with traditional literacy skills such as the ability to read print media, but also the ability to read and understand online text and multimedia. According to the author, video games have the potential to equip learners’ with those new skills.

The literature shows that video games can improve reading and writing skills in the language arts classroom. The foreign language classroom is perhaps the context where video games can reveal their full potential. Unlike in the language arts classroom where the emphasis of instruction is on reading and writing, foreign language education emphasizes all four language skills that are reading, writing, listening and speaking. Video games show great potential for enhancing all four skills (Green, Sha & Liu, 2011; Holland et al., 1999, Liu & Chu, 2010)

Holland et al. (1999) found that video games improve foreign language learners’ pronunciation and fluency. The researchers designed a Microworld called MILT to teach Arabic to the United States’ military. In order to assess the impact of the game on learning they recruited 16 participants from the United States military to take part in a study. The participants took a pre-test, interacted with the game and took a posttest. The findings of the study showed a significant improvement in the participants’ pronunciation and fluency.
Green et al. (2011) found that gameplay contributes to the development of reading and listening skills especially for low-proficiency students. An EFL video game called *The Forgotten World* was implemented over an academic year in five middle schools in China. Five additional schools were selected to participate in the study as a control group. The results of quantitative data collected with pre-tests, posttests and questionnaires showed that there was no significant difference between the experimental and control groups in reading and listening. It was found that students in the low-level classes performed significantly better than those in the high level ones.

Unlike Holland et al. (1999) and Green et al. (2011) who have focused either on productive (speaking, writing) or receptive (listening and reading) skills, Liu and Chu (2010) examined the impact of video games on both productive and receptive language skills. After implementing a video game named *HELLO* in a seventh grade curriculum, the researchers conducted an experimental study to assess its impact on the learners’ listening and speaking skills. The findings of the study showed that the students who interacted with the video game outperformed the control group that studied the curriculum through printed materials and lectures.

The findings of the review show that video games contribute to improving learners’ reading, writing, listening and speaking skills in both first and second language acquisition contexts. However, these findings are broad. It is not clear what the impact of video games on some sub-areas of language learning such as vocabulary may be. The next section reviews the literature pertaining to the impact of video games on vocabulary acquisition.
**Video games and vocabulary acquisition.** Holland et al. (1999) found that video games increase foreign language vocabulary knowledge. The researchers conducted a study that investigated the impact of a Microworld called MILT on learners’ knowledge of Arabic vocabulary. The participants took a pre-test, played the game and took a posttest. The results of the posttest showed an improvement in the participants’ vocabulary knowledge from their pre-test scores.

Unlike Holland et al. (1999) who focused on Arabic, Rankin et al. (2009) examined the effect of gameplay on English vocabulary knowledge. Eighteen university students and eight native speakers of English participated in the study. The researchers randomly assigned the participants to three groups: One group attended a lecture on English vocabulary; another group played a video game called *EverQuest II* by themselves and the third group played the same video game but with native speakers. The findings of the study showed that the game groups demonstrated significantly higher vocabulary knowledge than the group that attended the traditional classroom instruction. These findings confirmed the results of a prior exploratory study conducted using an earlier version of the same game (Rankin, Gold & Gooch, 2006). The results of the earlier study showed an improvement in vocabulary recall. Rankin et al. (2006) argue that the participants recalled at least 35% of the vocabulary in *EverQuest II* after playing it. The researchers also found that intermediate and advanced learners performed significantly better than low-level learners.
Yip and Kwan (2006) arrived at similar conclusions as Rankin et al. (2009) in a study that involved undergraduate engineering students. The researchers conducted an experimental study to identify the effect of a video game on vocabulary acquisition and found that the game group demonstrated significantly higher vocabulary knowledge than the group that attended traditional lecture.

Gameplay does not always contribute to improving vocabulary knowledge. deHaan et al. (2010) argues that gameplay can induce cognitive load which in turns negatively impacts vocabulary recall. deHaan et al. (2010) conducted a study to investigate the impact of gameplay on vocabulary recall. Eighty EFL learners in Japan were paired to play a music video game called *Parappa the Rapper*. One student played the game for 45 minutes while another student was watching. The players and watchers took pre-tests and posttests to assess their vocabulary recall. The findings revealed that the watchers recalled significantly more vocabulary words than the players. The researchers attributed the low performance of the players on vocabulary recall to the interactivity of the video game, which according to them, seemed to have induced cognitive load among players. The video game included audio, text and images. The researchers suggest that game designers should watch the level of interactivity in their games, as it can be counterproductive.

Video games are found to positively impact foreign language vocabulary acquisition. The impact seems to be moderated by the proficiency level of the learners. Advanced and intermediate level learners demonstrate higher vocabulary knowledge gains than low-level learners (Rankin et al., 2006).
Such general claims may not be useful as both low-level and high-level learners can benefit equally from video games in terms of vocabulary knowledge. The trick may reside in game designers’ ability to match the game vocabulary to learners’ proficiency level. A game where most of the vocabulary words are too difficult or too easy for learners may not achieve its intended outcome.

Vocabulary knowledge plays an important role in foreign language learning, but does not guarantee learners’ ability to communicate effectively. Learners need to develop communicative competence in order to be able to use the language in a real world communicative situation (Canale & Swain 1981; Hymes, 1972). The next section discusses the impact of video games on communicative competence.

**Video games and foreign language communicative competence.** With the recent development of computer technology, scholars in linguistics and foreign language education have postulated that video games have the potential to promote communicative competence among foreign language learners (García-Carbonell et al., 2001; Schwienhorst, 2002; Vickers, 2010). Various empirical studies have attempted to investigate the impact of video games on strategic competence (Shih & Yang, 2008), pragmatic competence (Cohen, 2008; Rankin et al., 2009; Sykes, 2008; Yang & Zapata-Rivera; 2010) and intercultural communicative competence (Guillén-Nieto & Aleson-Carbonell, 2012, Struppert, 2010).

Pragmatic competence can be defined as “the speaker's knowledge and use of rules of appropriateness and politeness which dictate the way the speaker will understand and formulate speech acts” (Koike, 1989, p. 279). Due to their ability to simulate real
world communicative contexts, many researchers have argued that video games have the potential to improve foreign language pragmatic competence (Cohen, 2008; Rankin et al., 2009; Sykes, 2008; Yang & Zapata-Rivera, 2010).

Yang and Zapata-Rivera (2010) argue that gameplay improves foreign language learners’ pragmatic competence. The researchers conducted a study that investigated the impact of video games on English learners’ ability to make polite requests. Fifteen university students enrolled in an ESL program at a Southwestern University in the United States interacted with a pragmatics video game for about 45 minutes and completed a questionnaire. The findings of the study showed a significant improvement in the learners’ ability to make appropriate requests in English.

Similarly Rankin et al. (2009) found that playing a video game with native speakers of English improves English learners’ ability to produce appropriate greetings, closings and requests. Eighteen English learners participated in the study along with eight native speakers of English. The participants were randomly assigned to three groups. One group attended a traditional class, one group played the game called *EverQuest II* by themselves; and the third group played the game with native speakers of English. An analysis of chat log transcripts from the three groups showed that the group that played the game with native speakers of English produced more appropriate greetings, closings and requests than the other groups.

The effect of video games on pragmatic competence has been investigated in other languages as well. Sykes (2008) found that video games improve Spanish learners’ perceived ability to make requests and apologies. In her study that involved 53 university
students in the United States, the researcher set out to investigate the impact of a video game called *Croquelandia* on learners’ ability to make requests and apologies in Spanish. The results of pre-tests and posttests showed that the game improved the learners’ perceived ability to make requests and apologies but not their actual ability.

Educational games are not the only types of games that have the potential for improving pragmatics knowledge. Palmer (2010) sustains that commercial multiplayer games contribute to the development of pragmatic competence. After conducting an ethnographic study that examined the development of pragmatic competence in the *World of War Craft*, Palmer (2010) found that complex linguistic exchanges take place in multiplayer online games. The researcher concluded that players acquire the ability to perform appropriate greetings, leave-takings, invitations, refusals and conversation closings as result of playing the game. Both commercial and educational video games have the potential to improve foreign language pragmatic competence. Pragmatic competence is but only one aspect of sociolinguistic competence. The other aspects include the broader concept of intercultural communicative competence.

Guillén-Nieto and Aleson-Carbonell (2012) reported that gameplay has a significantly positive effect on intercultural communicative competence. The authors conducted a study that involved 50 students from the English department at the University of Alicante in Spain. The participants were introduced to a video game named *It’s a Deal!* The game was designed to facilitate intercultural communicative competence between Spaniards and Britons. The participants took a pre-test, played the game and took a posttest. The findings of the study showed that the students’ intercultural
communicative competence, intercultural knowledge and intercultural awareness improved significantly after playing the game.

The findings of case-study research conducted by Struppert (2010) confirm Guillén-Nieto and Aleson-Carbonell’s (2012) results. The researcher conducted a study involving middle school students in the United States, Australia and Switzerland in order to understand the effect of gaming on their intercultural communicative competence. One hundred and thirty middle school students from the three countries participated in the study. The students played a video game called RealLives. An analysis of interview and observational data collected from the participants showed that they gained some intercultural knowledge from the game.

The findings of the studies reviewed show that video games improve language learners’ reading, writing, speaking and listening skills. It was found that video games contribute to the acquisition of vocabulary knowledge as well as to the development of communicative competence.

So far, the discussion of video games and language learning has focused on the game environment. There is a growing interest in the interaction between game players in physical and online spaces outside of the game environment and how it affects language learning (Gee, 2007b, Gee & Hayes, 2011a; 2011b; Ryu, 2011).

**Language learning in affinity spaces.** When discussing video games and learning, there is a tendency for game scholars to focus on what takes place in the game environment. Learning goes beyond the game environment. Salen and Zimmerman (2004) have provided a comprehensive framework for the study of video games that
identifies three main aspects: rules, play and culture. The rules refer to the game mechanics that define players’ interaction; play occurs as a result of player interaction with the game rules. Finally, culture refers to the physical environment where the interaction between the player and the game takes place. The interaction between players in the physical environment has been the object of interest to Salen and Zimmerman (2004).

Gee and Hayes (2011a; 2011b) have taken the issue of environment further. They argue that both the physical and online environments should be considered in the study of games. The authors refer to these environments as ‘affinity spaces’. Affinity spaces refer to physical or online spaces where game players of different ages, genders, nationalities and language backgrounds meet to discuss a game. The physical environment can be schools, homes, bus stations or malls where gameplay takes place. Online spaces include blogs, forums, wikis, listservs, groups and fun clubs. Players use these spaces to discuss games and share expert knowledge on gameplay and game design.

According to Gee and Hayes (2011a; 2011b), serious language learning takes places in online affinity spaces. Players develop their own complex jargon for discussing video games in online forums and wikis. Gee and Hayes (2011a) do not discuss foreign language acquisition specifically. Their focus is mostly on first language acquisition.

Other scholars have focused on foreign language learning. According to Thorne et al. (2009), game players develop complex foreign language skills in affinity spaces devoted to the discussion of games. Thorne et al. (2009)’s study even though it has the
The true empirical study that has examined foreign language acquisition in online spaces devoted to games comes from Ryu (2011). The researcher conducted an ethnographic study involving interviews and participant observations of 20 English learners in order to understand the impact of beyond-game forums on their language skills. All the participants were registered with civfanatics.com, a forum dedicated to the discussion of the Civilization game. The findings revealed that the type of interaction that took place between native and non-native speakers of English in the forum had a positive impact on the participants’ English language skills. Ryu (2011) argues that native speakers sometimes assumed the position of experts and corrected non-native speakers’ mistakes.

Even though the actual game environment is important when studying the impact of video games on language learning, game researchers should consider going beyond the game environment to examine the nature and quality of linguistic interaction that takes place in the physical and online spaces surrounding the game. A few studies have examined the language used by gamers in online affinity spaces (Gee & Hayes, 2011a; 2011b; Ryu, 2011; Thorne et al., 2009) and revealed the potential of such spaces for improving language skills. More remains to be done in terms of research on the nature and form of language learning that takes place in the physical environment surrounding games.
This section reviewed empirical studies that examined the relationship between video games and language learning. The findings suggest that video games have the potential to improve learning outcomes and motivation in the second and foreign language classroom. The next section of the chapter provides an overview of the major teaching approaches that have dominated the field of ESL and EFL instruction over the years and how they relate to technology use.

An Overview of Second and Foreign Language Teaching Approaches

A variety of teaching approaches have been used in second and foreign language instruction over the years (Celce-Murcia, 1991; Richards, 2006; Richards & Rogers, 2001). The major ones are: The grammar-translation approach, the direct approach, the reading approach, audiolingualism and the communicative approach. Each one of these approaches emphasizes a specific language skill sometimes at the expense of others.

The grammar-translation approach is one of the oldest foreign language teaching approaches. It was inspired by the methods used to teach classical languages such as Latin and Greek (Celce-Murcia, 1991). In this approach, instruction focuses on grammatical structures at the expense of speaking (Celce-Murcia, 1991). Typical activities in a grammar-translation classroom include translation of isolated sentences and reading of difficult passages (Celce-Murcia, 1991). Grammar rules are explained in the students’ native language. There is little opportunity for students to use the language for communication in a grammar-translation classroom (Celce-Murcia, 1991).
The direct language teaching approach was an attempt to address the shortcomings of the grammar-translation approach (Celce-Murcia, 1991). As a result, the direct approach targeted speaking more than any other foreign language skill. According to this approach, instruction must be conducted in the target language and there is no room for the use of the students’ native language. Instruction is more like a conversation between the teacher and students in the target language. The direct approach has been considered impractical, especially in the foreign language context where language teachers and their students are not proficient enough in the target language to be able to use it exclusively during instruction (Celce-Murcia, 1991).

Then comes the reading approach, which emphasizes reading comprehension at the expense of speaking. That takes away the pressure of being able to communicate in the target language from teachers and students. Typical activities in the reading approach classroom include reading comprehension activities, vocabulary study and translation from the target language into the students’ native language.

Audiolingualism came as a reaction to the reading approach criticized for its lack of attention to listening and speaking skills. These skills are the focus of the audiolingualism approach (Celce-Murcia, 1991). Typical activities in the audiolingualism classroom include listen-and-repeat drills, which are sometimes not practiced in a meaningful context. Memorizations and imitations are very important, as it is believed that language learning is habit-formation. That approach is deeply rooted in behaviorism (Skinner, 1957).
The most recent foreign language teaching approach is communicative language teaching, which was inspired by the work of Hymes (1972), Canale and Swain (1981) and Bachman and Palmer (1996). According to the communicative language teaching approach, the goal of foreign language instruction is to be able to communicate in the target language (Celce-Murcia, 1991; Richards & Rogers, 2001). Both the target language and its culture become important targets of instruction. Typical activities in the communicative language-teaching classroom include group discussion, information gap activities, role-plays, and the use of authentic materials. Instruction is student-centered and the instructor’s role is reduced to that of a facilitator of communication. Even though the communicative language teaching approach places a great emphasis on speaking, it also encourages the teaching of reading, writing and listening as well.

Over the years the use of different technologies in foreign language teaching has been associated with different foreign language teaching approaches. According to Warschauer and Meskill (2000), the use of chalk and the blackboard was associated with the grammar-translation approach while tapes were suited for the audiolingualism approach. The authors noted that the use of the Internet, games and simulations in foreign language teaching is suited for the communicative language teaching approach, which emphasizes learners’ interaction and knowledge construction rather than teacher-fronted teaching.

Other scholars in foreign language pedagogy supported Warschauer and Meskill (2000) claim by suggesting that the use of games and simulations in second and foreign language teaching is compatible with the communicative language teaching approach.
(García-Carbonell et al., 2001). According to García-Carbonell et al. (2001), games and simulations have the potential to develop students’ communicative language competence because they promote student-centered learning, interaction between students and expose students to a great deal of authentic target language input from native speakers.

This section has provided a description of the major language teaching approaches that have dominated the field of second and foreign language instruction and the technologies that have been associated with them. The literature suggests that the use of games and simulations in the second and foreign language classroom seems to be compatible with the communicative language teaching method. The next section is devoted to the description of the research context.

Even though some of the foreign language teaching approaches such as the grammar-translation and audiolingualism have fallen out of fashion, they continue to be used today depending on the context of instruction. It is important to note that these approaches are not necessarily mutually exclusive as some instructors may combine elements of different approaches in their classrooms.

**Research Context**

In the qualitative paradigm, the findings of a study are as important as the thick and rich description of the setting where the study is conducted (Patton, 2002). The description of the setting allows readers to understand how the participants and the setting interact and affect each other and the phenomenon under investigation (Patton, 2002). The present study was conducted in Burkina Faso, West Africa. This section
provides a brief overview of the current situation of technology use in education in Sub-Saharan Africa and provides some background information on Burkina Faso.

**Technology in education in Sub-Saharan Africa.** Africa is one of the continents that are still lagging behind in terms of technology use in education. While some developed nations have made significant progress in integrating technology into the teaching and learning process, many African countries are still struggling to provide access and basic computer skills to instructors and students (Hennessy & Onguko, 2011; Karsenti & Ngamo, 2007). This section reviews the literature on the level of technology use, obstacles that have constrained its integration into teaching and learning and discusses various efforts in favor of technology use in education.

**Level of technology use in education.** There is little evidence in the literature suggesting technology integration into actual teaching and learning in education in Sub-Saharan Africa. When access is provided, technology use in education in most Sub-Saharan African countries is limited to teaching technology as a subject rather than using it as a tool to teach academic content (Hennessy & Onguko, 2010; Karsenti & Ngamo, 2007). Hennessy and Onguko (2010) conducted an extensive review of the literature on technology use in secondary education in Tanzania, Kenya and Uganda. The researchers came to the conclusion that technology was taught as a subject, but its integration into the teaching and learning process was slow to pick up. The study reported that the students learned basic computer skills such as Microsoft Office, PowerPoint and Internet browsing. Little evidence of technology use to teach or learn academic content such as mathematics, science or languages was reported. Karsenti and Ngamo (2007) confirmed
that finding after they conducted a multi-case study in central and West Africa. The study sought to gain insights into the level of technology use in secondary education. Forty schools participated in the study. Students, teachers and school administrators were surveyed and interviewed on how they used technology in the classroom. The findings of the study confirmed the conclusions of Hennessy et al. (2010). The researchers found that 80% of technology uses in the schools surveyed focused on teaching basic computer skills while only 17% concerned the use of technology for teaching and learning academic content. The low level of technology integration into teaching and learning in Sub-Saharan Africa is due to several barriers.

**Barriers to technology use in education.** Access and training are among the major factors that hinder the integration of technology into teaching and learning. Most of the studies reviewed are unanimous that the lack of technology hardware and Internet connection is a major problem in Sub-Sahara African schools (Farrell & Trucano, 2007; Hawkins; 2002; Hennessy, Harrison, Wamakote, 2010; Moster & Nthetha, 2007). Even in places where Internet connection is available, Moyo (2003) suggests that narrow bandwidth can be a hindrance especially for the delivery of distance education.

The second major problem that negatively impedes on technology integration in education is training. Evoh (2009) argues that providing teachers with technology equipment is not enough to guarantee its successful integration into teaching. Access needs to be followed by training. According to the author, teachers need to be trained on how to weave technology into the curriculum. Howie and Blignaut (2009) echo Evoh (2009)’s claim. After conducting a study that investigated the use of technology in the
secondary science and mathematics curriculum in South Africa the authors concluded that training is needed in order to enable teachers to effectively integrate technology into their teaching. Kpangban and Adomi (2010) also stressed the need for skilled human resources in order to facilitate technology integration in secondary education in Nigeria. In a more recent study conducted on the use of technology in mathematics education in Ghana, Agyei and Voogt (2012) confirmed that teachers are not adequately prepared to take on the challenge of integrating technology in their teaching.

Training on the technical features of technology may not be enough to guarantee its effective use in teaching. Teachers need to be trained not only on the technical aspects of technology but also on the pedagogy that goes with it. Okojie (2006) suggests that some pedagogical practices that are currently implemented in classrooms in Sub-Saharan Africa may not be compatible with technology use in teaching. According to Tchombé (2009), some pedagogical training on socio-constructivist teaching and learning may be needed in order to facilitate the integration of technology into teaching. The author suggests that technology use in teaching may require that African educators move from teacher-centered methodological approaches to learner-centered ones. Hennessy, Harrison and Wamakote (2010) add that teachers need to move from knowledge transmission pedagogical approaches to more interactive and participatory ones.

Positive signs. Despite this bleak picture of the technology situation in education in Sub-Saharan Africa, there is room for hope. Most Sub-Sahara African countries have policies in place to promote the use of technology in education (Farrell & Trucano, 2007); efforts are being made to integrate technology into teaching and learning (Boakye
& Banini, 2008; Louw, Brown, Muller & Soudien, 2009); and attitudes towards technology use in education are positive (Govender, 2006; Sarfo & Ansong-Gymah, 2010; Tella, Tella, Toyobo, Adika & Adeyinka, 2007).

**Efforts in favor of technology use in education.** Local and regional initiatives are also being taken to facilitate technology use in teaching and learning (Farrell & Trucano, 2007). Most Sub-Saharan African countries have official policies in place to promote the use of technology in education. Initiatives exist at the regional and continental levels as well. The African Virtual University and the New Partnership for African development have programs in place to promote the integration of technology into education.

In addition to policies and initiatives in favor of technology use in education, some evidence of technology use to improve learning has been reported in higher education and in some experimental secondary schools. University professors in South Africa have started using course management systems (Louw, Brown, Muller & Soudien, 2009). Another study by Boakye and Banini (2008) suggests that some Ghanaian secondary school teachers use computer technology to prepare their course materials. The same findings are reported for some secondary school teachers in Kenya (Kiptalam & Rodrigues, 2010) and in West and Central Africa (Karsenti & Ngamo, 2007). Goorden, Stanton and Traore (2009) reported that after taking part in training on technology use in education, some secondary school teachers in Burkina Faso started developing teaching materials such as CD-ROMs and websites for use in their classes. Positive attitudes towards technology may be considered as early signs of a bright future for technology integration in education.
Positive attitudes towards technology use in education. Findings of studies conducted in various countries across Sub-Saharan Africa suggest that teachers, students and administrators perceive technology to be useful for improving teaching and learning. Tella et al. (2007) surveyed 700 secondary school teachers in Nigeria on their perception of the usefulness of technology in teaching and learning. The findings suggest that the majority of the teachers surveyed believe that technology has the potential to improve their teaching by making the lessons more diverse, enjoyable and motivating for students. Similar results were obtained in South Africa (Govender, 2006) and Ghana (Sarfo & Ansong-Gymah, 2010). Govender (2006) found that 92% of teachers surveyed in South Africa believe that computer technology has the potential to enhance their job performance. Sarfo and Ansong-Gymah (2010) came to similar conclusions after conducting a study that investigated students’, teachers’ and administrators’ perceptions of technology use in education. Most participants believe that technology has the potential to improve teaching and learning. There was a divergence of opinions among the participants in regards to the role of the teacher in the learning process using technology. Students believed that technology could help them learn better without the assistance of a teacher, while the teachers and administrators surveyed believed that the presence of a teacher is necessary in order to facilitate the learning process.

Technology use in education in Sub-Saharan Africa is still at a beginner stage. The lack of adequate technology infrastructure and skilled human resources are among the major factors constraining the integration of technology in education. However, efforts are being made at national and international levels to promote technology use in
education in Sub-Saharan Africa. These efforts coupled with the positive attitudes of
students, teachers and administrators constitute positive signs for the future of technology
in education in the region. The next section describes the political, social and educational
context of Burkina Faso, the country where the inquiry took place.

**Burkina Faso.** This section describes the country profile of Burkina Faso and
provides some background information on the educational system and the current state of
technology infrastructure and use in education.

**Country profile.** Burkina Faso, formerly known as Upper-Volta is a former
French colony that gained independence on August 5, 1960 (Ministry of Foreign Affairs
and Regional Cooperation, 2011). The country was renamed ‘Burkina Faso’ in 1984 by a
revolutionary regime led by President Thomas Sankara who felt that the name ‘Upper –
Volta’ did not mean anything to the people of Burkina Faso (Ministry of Foreign Affairs
and Regional Cooperation, 2011). The new name ‘Burkina Faso’ means ‘land of
integrity’ in two local languages.

Burkina Faso is a landlocked country inhabited by approximately 16,967,800
people (United Nations Development Program, 2011). The country spans over an area of
274, 300 square kilometers. On the southern side, it borders Ghana, Togo and Benin; on
the eastern side is Niger; in the north is Mali; and in the southwestern part is the Ivory
Coast.

The current political system of Burkina Faso is a semi-presidential system with a
president, a prime minister and a national assembly. The president is elected by direct
votes for a five-year term renewable once. The current President of Burkina Faso is Blaise Compaore and the prime minister is Luc Adolphe Tiao.

In terms of development, Burkina Faso is one of the least developed countries in the world. With a human development index of 0.343, the United Nations Development Program (2012) has ranked Burkina Faso 183 out of 187 countries in terms of development. Burkina Faso scored low on the three major sectors of development that play an important role in the United Nations Development Program’s ranking system. These areas are income, health and education. Its education index (0.196) is the lowest of all three areas. This does not come as a surprise given that the literacy rate of people aged 15 and older is 28.3% for all genders combined and 21% for women (National Institute of Statistics and Demography, 2007). The economy of Burkina Faso is based mostly on agriculture. Its major exports are cotton and gold.

From a linguistic perspective, French is the official language of Burkina Faso. It is the language of government, business and education. In addition to French, the country is rich with 68 local languages (Summer Institute of Linguistics, 2009). The major languages are Moore, Jula, and Fulfulde. Some of those local languages are written but are not used as media of instruction in school, except in a few experimental bilingual schools (Lavoie, 2008; Ilboudo, 2003).

**Educational system of Burkina Faso.** Despite major reforms undertaken by the government to make education relevant to the lives and needs of the people, the educational system of Burkina still shares the same structure as the French system. It is divided into three major levels: Primary education, secondary education and higher
education. This section provides an overview of the different grades that each level comprises, the curricula, exams, diplomas, teacher training and the administration.

*Primary education.* According to the Ministry of National Education and Literacy of Burkina Faso (2011), the net primary school enrolment was 60.9% for the academic year 2010-2011. The net enrollment for females was 59.1% for the same year. The primary school system has six grade levels and children typically enter first grade at age seven. Primary school subjects include mathematics, reading, writing, science, history, geography, civics, recitation and physical education (Ministry of National Education, 2012). The students sit for the primary school exam (‘Certificat d’Etudes Primaires’) in sixth grade. They have to pass that exam in order to be able to move on to middle school. Students who fail the exam have to repeat sixth grade and try again the following year. They are allowed only two chances to pass the exam. Those who don’t pass the exam the second time are expelled from the school. Parents may arrange for their children to attend another school.

As far as teacher training is concerned, primary school teachers are trained for two years at one of the National Schools of Primary School Teachers known by their French names ‘Ecoles Nationales des Enseignants du Primaire (ENEPs)’. There are five such schools in the country. Candidates must hold a middle school diploma (‘Brevet d’Etudes du Premier Cycle’) and pass a national competitive exam in order to gain admission to the school. Once admitted, they are trained for two years on theory; and practice and have to pass certification exams before being assigned to a school in the country.
In terms of administration, primary education in Burkina Faso is governed by the Minister of National Education and Literacy. Figure 2 describes the basic structure of primary education administration from the minister of national education down to the primary school director.

![Diagram of primary education administration in Burkina Faso]

*Figure 2. Basic administrative structure of primary education in Burkina Faso.*


*Secondary education.* The net enrollment rate for secondary education is 18.1% (Ministry of Secondary and Higher Education, 2011). Female enrollment is 15.7%. Secondary education comprises middle school and high school.
Middle school goes from grades seven through 10. The middle school curriculum includes subjects such as mathematics, life and earth sciences, history, geography, French, English and physical education (Ministry of Secondary and Higher Education, 2012). Physics and chemistry are taught only in 9th and 10th grades. Five hours are devoted each week to EFL instruction in 7th and 8th grades. The content of the lessons focuses on reading aloud, grammar and vocabulary. In 9th and 10th grades, the amount of time devoted to EFL instruction is reduced to three hours per week. The content of the lessons focuses on reading comprehension, grammar and vocabulary. Students take the middle school exam commonly known by its French name ‘Brevet d’Etudes du Premier Cycle (BEPC)’ at the end of middle school. Students have to pass the exam in order to pursue high school studies. Like the primary school exam, students are allowed two chances to pass the middle school exam.

The second cycle of secondary education is high school. It goes from grades 11 through 13. The common core of the high school curriculum includes subjects such as mathematics, philosophy, French literature and English. Depending on their area of specialization, students take additional courses. Students who specialize in the hard sciences take physics, geography, chemistry, life and earth sciences while those who specialize in the humanities and social sciences take history, English and German. The depth with which subjects are dealt with, their number of hours of instruction and their weigh on students’ overall grade point average depend on the area of specialization of the student. Three hours per week is devoted to EFL instruction in all high school grade levels and areas of specialization. This does not concern technical and vocational schools.
In 13\textsuperscript{th} grade, which marks the end of high school, students sit for the baccalaureate exam that they must pass in order to enter college.

Secondary school teachers are trained in three institutions: 1) The University of Ouagadougou, 2) the Normal Superior School that is a teacher training college housed at the University of Koudougou and 3) the Institute of Sciences. Training at the University of Ouagadougou and the University of Koudougou is complementary. Each institution focuses on a different aspect of teacher training. Training in the content area such as in mathematics, physics, chemistry, life and earth sciences, English, French, German and philosophy is mainly conducted at the University of Ouagadougou. On the other hand, pedagogical training is conducted at the teacher training college at the University of Koudougou. Some content area training is provided at the teacher training college at the University of Koudougou, but most of the courses focus on pedagogy. The Institute of Sciences is the only institution that provides comprehensive training to middle school pre-service teachers both in the content and pedagogical areas. However, this institution focuses only on training mathematics and science teachers.

Training for middle school teachers in Burkina Faso proceeds from two major routes depending on the subject one intends to teach. Pre-service middle school teachers in the humanities and social sciences are trained at the University of Ouagadougou and the University of Koudougou (Traore, 2012). There are three main conditions that middle school teachers in the humanities and social sciences have to fulfill in order to become teachers. First, they have to successfully complete two years of training in their content area at the University of Ouagadougou or any other accredited institution of higher
education; second, they have to pass a competitive exam for admission to the teacher training college at the University of Koudougou; and third, they have to successfully complete two years of pedagogical training at the teacher training college and pass certification exams.

Mathematics and science teachers have two options: They can either be trained through the University of Ouagadougou and the University of Koudougou or solely at the Institute of Sciences. Middle school teachers trained through the University of Ouagadougou and the University of Koudougou follow the same exact route as teachers in the humanities and social sciences. The trajectory is a little different if teacher candidates choose to be trained at the Institute of Sciences. Unlike the teacher training college at the University of Koudougou, admission to the Institute of Science does not require completion of two years of college. It only requires the baccalaureate diploma (Traore, 2012). It is important to note that middle school teacher training whether at the University of Ouagadougou and the University of Koudougou or at the Institute of Sciences all boils down to the same four years of training. The only difference is that in the first case the four years are divided between two institutions while in the latter situation pre-service teachers spend all four years at the same institution.

Training for high school teachers lasts five years in total. Pre-service high school teachers spend three years at the University of Ouagadougou or any accredited institution of higher education training in their content area. Then, they must pass a competitive exam in order to gain admission to the teacher training college of the University of Koudougou where they are trained for two years manly in pedagogy. They must pass a
certification exam before they can be sent out to teach in a high school. High school teachers are trained for a total of five years. Middle school teachers who are interested in teaching at the high school level must pass a professional exam and undergo two years of training in their content area and pedagogy at the Normal Superior School of the University of Koudougou (Traore, 2012). That training provides them with the content and pedagogical knowledge they need to teach at high school level.

In terms of administration, secondary education is governed by the Minister of Secondary and Higher Education. Figure 3 describes the basic structure of the administration. At the top level is the minister of secondary and higher education. Then follow the regional director of secondary and higher education and the provincial director of secondary and higher education. The principal is the top official at the school level. He or she is aided by the vice-principal who is in charge of academic affairs, the bursar in charge of financial affairs and the school supervisor in charge of discipline issues at the school.
Higher education. According to the Ministry of Secondary and Higher Education of Burkina Faso (2010) 47,755 students were enrolled in public and private institutions of higher education during the academic year 2008-2009. Of those students, 32.02% were females. There are four major public universities in Burkina Faso: The University of Ouagadougou I, the University of Ouagadougou II, the University of Bobo Dioulasso and the University of Koudougou. The student population of the University of Ouagadougou was 20,615 during the academic year 2008-2009 (Ministry of Secondary and Higher Education of Burkina Faso, 2010). The female students comprised 27.7% of the total student population according to the same source. The University of Ouagadougou and the University of Bobo Dioulasso offer both undergraduate and graduate education. The major departments at the University of Ouagadougou I and the University of
Ouagadougou II include the Faculty of Humanities and Social Sciences, The Faculty of Letters, Arts and Communication, the Faculty of Law and Political Science, The Faculty of Economics and Management, the Faculty of Health Sciences, the Faculty of Exact and Applied Sciences and the Faculty of Life and Earth Sciences (Ministry of Secondary and Higher Education of Burkina Faso, 2010).

University professors and lecturers must have a doctoral or master’s degree in their area of specialty. An accredited institution of higher education must have awarded their degree. Training for University professors is conducted at the University of Ouagadougou I, the University of Ouagadougou II and the University of Bobo Dioulasso. The University of Ouagadougou I offers doctoral degrees in mathematics, physics, linguistics, philosophy and medicine.

In terms of administration, higher education is part of the Ministry of Secondary and Higher Education. The president of the University is the top official at the University level. The president of the University is appointed upon recommendation by the Minister of Secondary and Higher Education.

Primary, secondary and higher education in Burkina Faso is governed by the Ministry of National Education and Literacy and the Ministry of Secondary and Higher Education. All levels of education are characterized by low enrolment rates and gender disparities. Teacher training is conducted at the National Schools of Primary School Teachers, the University of Ouagadougou I, the University of Koudougou and the Institute of Sciences. Training focuses both on content area knowledge as well as pedagogical knowledge. However, no training on technology integration into teaching is
offered to pre-service teachers at any of the teacher training institutions. The description of the educational system provided in this section concerns only public education. However, there are many private institutions of primary, secondary and higher education in Burkina Faso. The structure is almost the same as public education and students take the same national exams.

*Technology in secondary education.* Burkina Faso is one of the first African countries to be connected to the Internet. According to Poda, Murry and Miller (2006), the first Internet connection in Burkina Faso was established in 1989; however, since then progress has been slow. This section provides an overview of the current state of technology infrastructure in Burkina Faso and reviews the literature on technology use in secondary education.

Burkina Faso has 10 Internet service providers and registers about 20,000 customers (Fall, 2007). Even though the number of active Internet service providers has not changed much over the last five years, the number of people who signed up for Internet services has increased exponentially. According to recent statistics provided by the Authority for the Regulation of Electronic Communications and Postal Services (ARCEP) (2011) this number was estimated at 340,025 people. This represented a significant increase from 2007. The major Internet service provider in Burkina Faso was the national telecommunication company (ONATEL), which registered 31,186 customers (ARCEP, 2011). The statistics reported above reflect the number of people who signed up for Internet services but not the number of users. The number of Internet users was higher than the number of customers because many people accessed the internet.
Internet in cybercafés. High-speed Internet connection was available but remained a luxury for the majority of the population.

In addition to the major Internet service providers, cellphone companies offered Internet connection to their customers via Enhanced Data rate for GSM Evolution (EDGE) and General Packet Radio Service (GPRS) technology. According to ARCEP (2011), there were 47.28 cellphones for every 100 people in Burkina Faso and this number had been increasing since 2010. The major cellphone companies were: Airtel, Telecel and Telmob. These three companies used the Global System for Mobile Communication (GSM) network and offered Internet connection to their customers via EDGE or GPRS technology. Some companies such as TELECEL offered Wi-Fi connection. Starting in 2013 Airtel, TELECEL and TELMOB offered 3\textsuperscript{rd} Generation (3G) Internet connection to their customers.

The development of technology infrastructure in Burkina Faso had been supported by international and national initiatives. Many International organizations were actively involved in supporting the development of technology in Burkina Faso either by providing equipment or training. The International Institute for Communication and Development (IICD), World Links Burkina Faso and the New Partnership for African Development are some of the major organizations involved in technology projects in Burkina Faso. Besides the support of international organizations, local initiatives to promote the use of technology for development were growing. One such initiative was the National Internet Week (SNI) that had been celebrated every year since 2004. As part
of the celebration is ‘A Day without Paper.’ During that special day, people are encouraged to only use technology to do whatever daily tasks they have to do.

Despite all these initiatives to promote the use of technology in Burkina Faso, it is safe to argue that the level of technology use remained low compared to the situation in many other African countries. Among the major obstacles to the wide adoption of technology were infrastructure and access (Fall, 2007). Internet access had been a major problem in Burkina Faso especially in rural areas where there is no electricity.

Access to technology in secondary education in Burkina Faso was problematic. According to IICD (2008), only 2% of all secondary schools in Burkina Faso had access to any form of computer technology. In the last decade, IICD had partnered with local organizations to develop and implement technology projects in secondary schools in order to improve access. The Information and Communication Technology for Education in Burkina Faso (TICE-Burkina) project is one such initiative. The project which was initially implemented in 2004 provided technology equipment and training to teachers and students in 12 secondary schools in rural and urban areas of Burkina Faso (Goorden et al., 2009; IICD, 2008).

Local educators were active in the promotion of technology use in secondary education. TIC-EDUC, a local network of secondary school teachers who shared the same passion of using technology to improve teaching and learning had been active in recent years. The group provided training to teachers on the use of technology in the classroom and produced reports on the state of technology use in secondary education in Burkina Faso. The latest report of the group showed that technology use in secondary
education is slow but picking up (TIC-EDUC, 2010). According to the report, both teachers and school administrators were using technology to improve their job performance. Teachers used it to communicate with students and parents as well as to prepare class materials. School administrators used technology to manage student information. The report mentioned a piece of locally developed software called Ben Scolarité that administrators used to manage student information. Another example of technology software used in school administration was Veneem. This program was used to manage students’ transcripts and produce grade reports.

Chapter Summary

This chapter reviewed the major game design theories and critically examined the literature pertaining to the impact of video games on learning outcomes and motivation in foreign language education. Furthermore, the chapter provided an overview of instructional approaches used in the field of foreign language instruction and reviewed the literature on technology integration in education in Sub-Saharan Africa. The chapter closed with a description of the political, economic and social context of Burkina Faso as well as the current state of technology use in secondary education.

Gap in Literature

The literature suggested that video games have the potential to improve learning outcomes and motivation in the foreign language classroom. However, little empirical evidence was found concerning education stakeholders’ perceptions of games in high school EFL acquisition. Furthermore, there is a paucity of empirical evidence on the pedagogical integration of video games in high school EFL education.
The present study aimed to investigate students’ and teachers’ perceptions of *Trace Effects* in achieving EFL acquisition in high school EFL education in Burkina Faso. The study also sought to elicit information on the pedagogical integration of *Trace Effects* into the EFL classroom. The next section provides a detailed description of the research design and methodological procedures that were followed in order to investigate the issue.
Chapter 3: Methodology

The present study adopted a qualitative approach to gain deeper insights into the integration of a video game into high school EFL education in Burkina Faso. Patton (2002) and Glesne (2006) recommend the use of the qualitative method when the goal of the study is to gain deeper insights into a phenomenon, for which little is known. The study was guided by the following research questions:

1. What are students’ and teachers’ perceptions of *Trace Effects* in achieving EFL acquisition?
   a. What are students’ and teachers’ perceptions of the design of *Trace Effects*?
   b. What are students’ and teachers’ perceptions of the impact of *Trace Effects* on EFL acquisition?

2. How do teachers integrate *Trace Effects* into their pedagogy when the game is required?

This chapter describes the research setting, design, the participants, data collection instruments and procedures and discusses data analysis procedures and ethical guidelines pertaining to research on human subjects.

Research Setting

The present study took place in Ouagadougou, the capital of Burkina Faso. Ouagadougou is located in the Central Region of Burkina Faso and is home to most government offices including the president’s office and the Ministry of Secondary and Higher Education. More background information was provided on the educational system, curriculum and technology infrastructure of Burkina Faso in Chapter 2.
Multiple-Case Study Design

The present inquiry adopted a multiple case-study design (Stake, 1995; Yin, 2003) to understand the implementation of a video game in high school EFL education in Burkina Faso. The choice of a multiple case-study design to guide the study was motivated by the desire to improve its credibility. According to Baxter and Jack (2008), multiple-case studies can be costly and time-consuming, but they are worth conducting because they provide robust and reliable findings. A multiple-case study allows the researcher to analyze the data within individual cases as well as across cases in order to identify similarities and differences between them (Baxter & Jack, 2008; Stake, 2006; Yin, 2003).

Description of Cases

Four public high schools in Ouagadougou, Burkina Faso constituted the cases that were studied in order to gain insights into perceptions of the design and integration of Trace Effects into EFL pedagogy. This section provides a description of each school. The schools are named A, B, C and D.

School A. School A was located in the heart of Ouagadougou and served students from various parts of the city and from diverse socio-economic and ethnic backgrounds. It was one of the largest public high schools in Ouagadougou. School records indicated that there were 1,859 students enrolled during the school year 2012-2013. The percentage of males in the school was 51.81% while that of females was 48.19%. The school had 27 classrooms where 73 full-time teachers were conducting instruction. Of those teachers, 41 were males and 32 females. The school had eight full time
administrators; three males and five females. These administrators were aided in their
daily tasks by support staff.

In terms of technology, the school had a computer laboratory (computer lab)
equipped with 15 computers and one Liquid-Crystal-Display-Television (LCD TV). Of
the 15 computers available in the lab, only four were fully functional. They were all
Hewlett Packard (HP) computers, with 1 Gigabyte of Random Access Memory (RAM),
runtime windows XP operating systems. Both cable and wireless Internet connections
were available in the computer lab. The LCD TV of SHARP brand had a satellite
reception with access to many international TV channels available mostly in Europe.

An interview with the principal of the school revealed the origin of the equipment
and its intended purpose. The principal stated that the computers and the TV were
provided to the school by the Goethe Institute, specializing in the promotion of the
German language and culture at the international level. The equipment was provided to
the school in order to support German instruction. The teachers and students could use
the computers for German classes and the TV to watch German TV channels.

**School B.** School B was located in a sub-urban area of Ouagadougou. It was a
public school that served students from various socio-economic and ethnic backgrounds.
According to enrollment records, 1,924 students were enrolled in the school during the
school year 2012-1013. The males made 52.85% of the student population, while 47.15%
were females. Instruction was conducted by 75 full-time teachers. Forty eight teachers
were males and 27 were females. The administration was composed of 40 employees; 10
males and 20 females. That number included the core and support staff.
In terms of technology, School B had a computer lab equipped with 25 desktop computers with wired and wireless Internet connection. Out of the 25 computers, 14 were fully functional. The school also had an LCD projector. Two additional desktop computers, a printer and a copying machine were available in the administrative building for administrative work. In terms of technical specifications, the computers in the lab were Dell OptiPlex Gx620. They had 2 GB RAMs and ran Windows XP operating systems. The principal indicated in an interview that Burkina Faso-Tambe, an association of Burkinabé residing in Spain, donated the computers to the school. The school received the computers on November 23, 2011, which was approximately a year prior to the beginning of this project. A schedule was made for students to use the computer lab. There are dates and times for each class to use the lab. A lab assistant was available to monitor student activities and make sure that they were using the lab only when they were supposed to use it.

School C. School C was the largest public high school among the four schools where the study was conducted. It was located in the center of Ouagadougou and was accessible to students from all social, economic and religious backgrounds. Data obtained from the school’s records indicated that 2,933 students were enrolled in the school during the school year 2012-2013. The majority of the students (53.39%) were males while 46.61% were females. A team of 100 teachers carried out teaching duties. There were 40 men and 60 women. The administration of the school was composed of 40 staff members. There were 13 men and 27 women.
In terms of technology, School C did not have any computer lab or equipment for students and teachers’ use. There were three computers that were used for administrative purposes at the school. The computer lab that was used for the study belonged to Junior Achievement Africa, an organization working to promote youth entrepreneurship. Students from any school in Ouagadougou could technically have access to the computer lab. That included students from School C. The Junior Achievement Africa/Burkina computer lab that was used for the study had seven computers, cable Internet connection and one set of speakers. There were four gateway computers running windows XP. The computers had RAMs that were less than 1GB. The CD drives did not work. The Trace Effects Software was copied on a flash drive for installation. After installation was complete, the researcher tried to run the game on the four computers but it failed. Only blurred pinkish images appeared on the screen and there was audio coming out. The video cards and RAMs of the computers were too small to run the game. The three remaining computers were Dell OptiPlex GX60 running windows XP. The computers had 2GB of RAM each. The game software was successfully installed on those computers and it ran successfully. In short, only three computers were fully functional and could be used for the project in School C. The researcher loaned his personal computer to participants increasing the number of computers to four. A total of four computers were used to conduct the project in School C.

School D. School D was a public high school located in the central part of Ouagadougou. The students who attended the school came from diverse socio-economic and ethnic backgrounds. The total number of students attending the school during the
school year 2012-2013 was 2,364. Males represented 48.30% of the student population and females represented 51.70%. The teacher population at the school was 116. Sixty-four (64) of them were males and 52 females. There were four main administrative staff at the school; one male and three females. Support staff aided them.

In terms of technology, School D had a computer lab equipped with 25 computers, one printer, one scanner and cable Internet connection. Of the 25 computers available in the lab, only 11 were fully functional and were used for the project. There were six Dell OptiPlex GX620 and five HPs. All 11 computers had 1GB RAMs and were running windows XP. The printer was an HP LaserJet 1100 and the scanner an HP Scanjet 6300c.

In an interview, the principal indicated that their partners in France donated the equipment to the school. From the interview, it seems that the principal rarely visits the computer lab. He asked me if the computers in the lab were functional. After I told him that some of them were not working, he replied that he was not surprised to hear that because most of the equipment that they receive from their partners was junk.

**Research Participants**

A total of 113 12th grade students, four English teachers and four principals took part in the study. Table 2 shows the number of student participants per school and gender. The students, teachers and principals all came from the four schools participating in the study. This section describes the participants from each school. Pseudonyms are used to refer to the teachers and principals. The students are referred to using number
identification. More detailed descriptions of the participants are provided in the results chapter.

Table 2

Student Participants by Gender

<table>
<thead>
<tr>
<th>Schools</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>24</td>
<td>23</td>
<td>47</td>
</tr>
<tr>
<td>C</td>
<td>14</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>D</td>
<td>11</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>54</td>
<td>113</td>
</tr>
</tbody>
</table>

Participants from school A. A total of 15 students from a 12th grade class participated in the study in School A. There were 10 males and five females. That was 66.67% males and 33.33% females. All the students were in 12th grade during the academic year 2012-2013 and were at least 18. The mean age of the participants was 18.60 years (SD = 0.91). The participants had at least some basic computer skills. The mean computer experience was 40 months (SD = 39.19). That was approximately three years and half of computer experience.

Mr. Adouabou (a pseudonym), a 35 year old English teacher participated in the study along with his 12th grade students in School A. Mr. Adouabou had been using computers for nine years. The principal of School A was Mr. Ouedraogo, a pseudonym
given to him for the purpose of the study. He was a 56 year old man who totaled 13 years of computer experience.

**Participants from school B.** Forty-seven (47) students took part in the study in School B. The males represented 51.06% and the females 48.94%. The mean age of the participants was 19 years old \((SD = 0.85)\). The mean computer experience was 23.46 months \((SD = 23.67)\). The students had been using computer for approximately two years at the time of the study.

The teacher who participated in the study in School B was Mr. Nikiema (pseudonym). He was 46 years old and had one year of computer experience. Mr. Simpore, as we would call him, was the principal of the school. He was 51 years old and had been using computers for 18 years.

**Participants from school C.** Twenty-three (23) students in a 12\(^{th}\) grade class participated in the study in School C. The gender break down of the participants showed that 60.87% were females and 39.13% were males. The mean age of the students was 19.56 years \((SD = 1.53)\). The mean computer experience was 11.69 months \((SD = 9.66)\).

Mrs. Lankouande (pseudonym), a 41 year old English teacher participated in the study from School C. She had 10 years of experience using computers. The principal of School C was Mr. Zongo (pseudonym). He was 57 years old and had been using computers for 13 years.

**Participants from school D.** Twenty-eight (28) students took part in the study in School D. There were more female participants (60.71%) than males (39.29%). The mean age of the students was 18.85 years \((SD = 1)\). Their mean computer experience was 26.03
months ($SD = 22.49$). The students had a mean computer experience a little over two years.

Mrs. Sanou (pseudonym), a 36 years old English teacher participated in the study from School D. She had four years of computer experience. We would call the principal of School D Mr. Bako. He was 48 years old and had been using computers for six years.

**Research Instruments**

This section describes the instruments that were used to gather data in the study and their translation from English into French. Three types of instruments were used to collect data from the participants: Biographical questionnaires (Appendix A), interview guides (Appendix B) and an observation checklist (Appendix C).

**Biographical questionnaires.** Three short questionnaires were developed in order to gather biographical information from the participants. A slightly different questionnaire was used for each group of participants. The student questionnaire collected information such as the participants’ gender, age, and technology and gaming experience. The teacher questionnaire gathered the same information as the student questionnaire and additional information on teaching experience. The principals’ questionnaire collected information on the participants’ gender, age, level of education, administrative experience and technology and gaming experience.

**Interview guides.** The second type of instruments used in the study was the semi-structured interview guide (Glesne, 2006; Patton, 2002). A list of questions was prepared before the interview. The wording of each question followed Patton’s (2002) and Glesne’s (2006) recommendation that each question be clear, unambiguous, open-ended
and non-threatening for the participants. The interview questions were adapted from Keller’s (2010; 2000) ARCS model to elicit the constructs of attention, relevance, confidence and satisfaction. Three semi-structured interview guides were developed for students, teachers and principals.

**Interview guide for students.** The student interview guide was designed to elicit information on the participants’ perceptions of the design of *Trace Effects* (Questions 1-5) and their perceptions of EFL learning outcomes as a result of interacting with the game and participating in the lesson integrating it (6-7).

**Interview guide for teachers.** The interview guide for teachers addressed their perceptions of the design of *Trace Effects* as a game for learning (questions 1-5). The interview guide contained questions aimed at eliciting information from the participants on their experience integrating *Trace Effects* into their teaching and the perceived effect that the game had on students EFL knowledge (questions 6-7).

**Interview guide for principals.** The interview guide for principals was intended to collect detailed and reliable information that served the purpose of describing the school. The questions focused on technology use in general and addressed training of English teachers on technology integration into teaching (questions 1-2), availability of technology at the school (question 3), and school demographic information (questions 4-6). No questions about *Trace Effects* were asked to the principals because they did not play the game and that was something that the researcher expected because of their busy schedules.
Observation checklist. An observation checklist was developed to guide the observation of lessons in order to understand how the integration of *Trace Effects* into EFL lessons affected pedagogy. The observation checklist included a list of classroom activities that are associated with different types of foreign language teaching approaches such as the communicative, audiolingual, direct and grammar-translation approaches (Celce-Murcia, 1991; Richards & Rogers, 2001).

Instrument translation. The interview guides and questionnaires used in the present study were originally designed and developed in English and were then translated into French by the researcher. French is the official language of Burkina Faso where the study was conducted. The participants had some knowledge of English but were not proficient enough to engage in a serious discussion about gaming and language learning. Therefore, it was necessary to translate the instruments into French, the language that the participants felt most comfortable speaking.

Whenever a study involved translation of instruments, it raises concerns on the equivalence of instruments in the source and target language. According to Harkness and Schoua-glusberg (1998), it is almost impossible to render the exact meaning of concepts in both languages. The author indicated that the quality of translation depends on the degree of equivalency between instruments in the source language and the target language.

Back translation was used to ensure quality in the translation of questionnaires and interview guides in the study. Back translation is the translation of a translated text. It consists of translating a translated text back into the source language (Harkness &
Back translation is a recommended technique for assessing the quality of the translation of instruments (Brislin, 1986; Werner & Campbell, 1970). It allows comparison of the two texts to determine the degree of equivalence between them. The questionnaires and interview guides used in the present study were first developed in English and then translated into French by the researcher. Copies of the French translations were sent to a professional translator for translation back into English. The original text was then compared with the translated text. Inconsistencies were discussed and resolved in order to finalize the final French versions of the instruments that were used in the study.

**Data Collection Procedures**

The present study used a multiple-case study design to gain deeper insights into the implementation of a video game in high school EFL education in Burkina Faso. The selection of the schools, steps taken to gain access to them, sampling procedures, the implementation of the game in the classrooms, the post-game interviews, observations and document analyses are described in this section.

**School selection.** A purposive sampling technique (Patton, 2002) was used to select four public schools in Ouagadougou as cases for study. According to Miles and Huberman (1994, p. 4), three types of cases can be selected using a purposive sampling technique: Typical cases, deviant cases, negative or disconfirming cases. Typical cases are normal cases. Deviant cases are cases where the phenomenon under study manifests itself in an unusual way and negative cases are exception to the rule.
The four schools selected for participation in the study were typical cases of public high schools in Burkina Faso. The structure, curriculum and demographics of the schools resemble most public schools in Burkina Faso. Students from diverse socio-economic, ethnic and religious backgrounds attended the schools.

Apart from the fact that the four schools were typical high schools in the region, they had computer labs. The presence of a computer lab and the availability of electricity were important criteria that motivated the selection of those particular schools. This was due to financial constraints. The researcher did not have enough resources to conduct the study in schools that did not have electricity and computer labs. That would have required the researcher to purchase computers and bring electricity to the schools before starting the project.

**Gaining access.** Gaining access to the research site is one of the steps that are critical to the successful completion of a research study (Devers & Frankel, 2000; Glesne, 2006). In order to gain access to the schools, the researcher had to obtain permission from two officials. He first obtained permission from the Regional Director of Secondary Education in charge of the Central Region. Permission was granted in the form of a letter. The permission letter was then taken to the principals of the target schools to request permission to conduct the study in their schools. The researcher described the research project to the principals, answered their questions, showed them the letter from the Regional Director and requested permission to conduct the study in their schools. After making copies of the letter for their records, all principals gave their permission for the study. The principals then introduced the researcher to 12th grade English teachers in their
schools. The researcher got in touch with the English teachers who in turn introduced him to their students to get the project started.

**Sampling of participants.** Convenience and random sampling techniques (Patton, 2002) were used to select teachers and students respectively for the study. Convenience sampling was used to select English teachers from the four schools for participation in the study. The researcher met with the principal of each of the participating schools in the study and requested to be introduced to 12th grade English teachers. The principals arranged for him to meet with the 12th grade English teachers at their schools. The first teacher who agreed to participate in the study in each school was selected to take part in the study along with his/her students. One teacher was selected from each one of the four schools.

Each one of the four teachers introduced the researcher to their 12th grade English class. The researcher described the research project to the students and solicited their participation. In order to take part in the study the students had to meet the following criteria: be at least 18 years old, possess basic computer skills defined as ability to check one’s E-mail, and be willing to participate. A blank sheet of paper was passed around for students who met the criteria for participation and were willing to participate to write their names. In some schools (School A and B), all students who qualified for the study and agreed to participate did participate. However, that was not the case in schools with large classes and a limited number of computers (Schools C and D). In those schools a random sampling technique was used to select an appropriate number of participants based on the number of computers available at the school.
Implementation. The game Trace Effects was implemented in four 12\textsuperscript{th} grade classrooms in the four schools that participated in the study. This section first describes the training that took place in order to prepare the teachers and students for gameplay and the actual implementation of the game as part of a lesson in the classroom.

Training and gameplay. Given that the teachers and students involved in the study had little to no prior experience with video games, training was a critical component of the study. The researcher led one training session for each class. Each training session lasted approximately two hours. The purpose of the training sessions was to get the teachers and students familiar with the game content and technology. After the training sessions, four gameplay sessions were arranged in each school in order for the participants to interact with Trace Effects. The researcher was available during all gameplay sessions in all schools to assist participants who were having technical difficulties with the game and to answer any questions that they might have. The researcher did not play any active role guiding participants during gameplay.

The training and gameplay sessions were spread over a month period of time and were conducted during the students’ free time. Class time could not be used for training and gameplay because the project did not involve all students in the class. Some students did not meet the requirements for participation in the study and were excluded. Gameplay was conducted in small groups of three or four students depending on the availability of computers.
Lessons. After training and gameplay sessions were completed, each one of the four teachers who took part in the study was asked to prepare and teach an English lesson that integrated Trace Effects. No further instructions were given to the teachers. They were free to choose the EFL skill (reading, writing, speaking or listening) that they wanted to teach and the game chapter that they found suitable for teaching that skill.

The implementation of the lesson took place in the week following completion of gameplay sessions when scheduling allowed. In some schools it was delayed until the second week because of teacher union strikes. The lessons lasted between one and two hours.

Interviews. Focus group and individual interviews were conducted with the participants in order to elicit information on their perception of Trace Effects and its integration into teaching. Focus group interviews were conducted with the students and individual interviews with the teachers.

Focus group interviews. Focus group interviews were conducted with the students in order to understand their perceptions of the design of Trace Effects and its impact on learning. Liamputtong (2009) defines focus group interview as a qualitative method that gathers people from the same socio-cultural background and with the same experience for the purpose of discussing a topic. According to the author, a focus group interview is beneficial because it allows the truth to emerge out of contrasts. Arranging for a group of six to 10 participants to confront their opinions and experiences in regard to a given phenomenon enables the truth about this phenomenon to emerge (Liamputtong, 2009). Therefore, focus group interview was an appropriate method for
gaining deeper insights into the students’ perceptions of *Trace Effects* in relation to EFL acquisition.

A stratified purposeful sampling technique (Patton, 2002) was used to select 10 students from each class in each school to participate in a focus group interview. This number is in compliance with the recommendations of Glesne (2006), Liampittong (2009) and Patton (2002). The stratified sampling technique was used to ensure an equal representation of both genders in the focus groups. Five participants in each group were males and five were females. One female participant failed to show up at the focus group interview in School C because her motorbike broke down and she had no other means of transportation. Apart from that, all students who were sampled to participate in the focus group did participate. The interviews took place in a classroom after completion of the lesson. The interviews elicited information from the participants on their perceptions of the design of *Trace Effects* and the impact of the game on EFL learning outcomes. The interview guide in Appendix E was used during the interview.

**Individual interviews.** Individual interviews were conducted with the teachers and principals. Individual interview is defined as a specific conversation between an interviewer and an interviewee to generate knowledge on a specific topic (Liamputtong, 2009). Interviews are useful for capturing participants’ thoughts, perceptions, feelings and experiences (Liamputtong, 2009).

Individual interviews were conducted with teachers in order to gain a deeper understanding of their perceptions and experiences using *Trace Effects* in an EFL lesson. The times and locations of the interviews were negotiated with the participants. All
interviews were conducted in a quiet and closed location where the participants felt comfortable talking. The interview guide in Appendix F was used to guide teacher interviews. The researcher made sure that all questions in the interview guide were asked but the order of some questions was not respected. Furthermore, the researcher probed for more information by asking additional questions that were not in the interview guide. The questions were open-ended, clear, and neutral as Patton (2002) advises. The researcher did not show any sign of judgment or surprise when the participants mentioned something unexpected. At the end of the interview, the researcher asked the participants if there was any comment they would like to make before closing the interview as recommended by Glesne (2006). The researcher thanked participants for their time and efforts before closing the interview. The interview with the principals took place in their offices and focused on teacher training, the availability of technology resources at their schools and school demographics.

Both the individual and focus group interviews were audio-recorded and lasted between one and two hours. The participants were reminded at the beginning of each interview that they would be audio-recorded. All the interviews were conducted in French, except those with three teachers. Those teachers chose to do their interviews in English.

**Participant observations.** In addition to the interviews, participant observations were used as data collection methods in the study. Glesne (2006) defines a participant observation as a systematic observation and recording of information about the setting, events and participants’ interaction and behavior in that setting.
The researcher observed the setting of the study and teachers’ and students’ behavior and their interaction during the entire research process and took detailed field notes. Participant observations were used as the main data collection method to gain insights into the pedagogical integration of *Trace Effects* into EFL lessons. The observations aimed to understand pedagogical changes, if any, associated with the integration of *Trace Effects* into EFL teaching. The observations focused on regular classroom instruction and lessons that integrated *Trace Effects*. The first observations took place in all four 12th grade classrooms and documented the routines of regular classroom instruction (without the use of the game). The researcher observed instructional activities and students’ interaction. The purpose of these initial classroom observations was to obtain baseline data on instructional methods and activities before the implementation of the game.

The second observations concerned the lessons that involved the use of the game *Trace Effects*. All lessons were videotaped. Detailed handwritten notes were taken during the course of the lesson. The researcher reviewed the videos and field notes immediately after each observation session and expanded his field notes by filling in supporting details for themes. The observation checklist (Appendix C) was used to guide observation of the lessons.

In addition to observations of lessons, the researcher observed gameplay sessions. Those observations aimed to capture data on students’ engagement and interaction during gameplay sessions in order to supplement interview data. Gameplay sessions were
videotaped and videos reviewed later. In addition to videotaping the sessions, the researcher took handwritten field notes.

**Document analyses.** Documents as a method of qualitative research can be defined as written, audio or visual materials that allow a researcher to understand a social phenomenon (Patton, 2002). Various documents were collected and analyzed in order to understand the participants’ perceptions of *Trace Effects* in relation to EFL acquisition. Lesson plans, handouts, students’ written assignments as well as documents on school demographics were collected.

**Data Analysis**

Quantitative and qualitative procedures were applied to data analysis. The *Statistical Package for Social Sciences Version 18* (IBM, 2012) was used to analyze participants’ demographic data such as age, gender, technology experience and experience with video games.

Qualitative data analysis procedures were applied to the qualitative data collected with interviews and observations. The audio-recorded interview data was transcribed and translated from French into English by the researcher. The translated transcripts were given to a professional translator for translation back into French. The researcher then compared the translated transcript to the original version in order to ensure accuracy. The videos of gameplay sessions and lessons were reviewed and detailed notes were written based on their content. Interview transcripts, along with observational field notes, video transcripts and written documents such as lesson plans and students’ written assignments constituted most of the data that was collected and analyzed in order to answer the
research questions. Table 3 matches the data collected with the corresponding research questions.

Table 3

Matrix of Research Questions and Data

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Methods</th>
<th>Participants</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interviews</td>
<td>Teachers, students</td>
<td>-Interview transcripts</td>
</tr>
<tr>
<td></td>
<td>Observations</td>
<td>Teachers, students</td>
<td>-Video clips of gameplay sessions and lessons,</td>
</tr>
<tr>
<td>1. What are students’ and teachers’ perceptions of</td>
<td>Document analyses</td>
<td>Teachers, students, principals</td>
<td>-Handwritten field notes</td>
</tr>
<tr>
<td>Trace Effects in achieving EFL acquisition?</td>
<td></td>
<td></td>
<td>-Lesson plans, Handouts, Written assignments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Official documents on school demographics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Technology inventories</td>
</tr>
</tbody>
</table>

Table 3: Continues
Table 3: Continued

<table>
<thead>
<tr>
<th>Method</th>
<th>Data Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview</td>
<td>Teachers, students</td>
<td>Interview transcripts</td>
</tr>
<tr>
<td>Observation</td>
<td>Teachers, students</td>
<td>Video clips of regular lessons with and without the game</td>
</tr>
<tr>
<td>Documents</td>
<td>Teachers, students</td>
<td>Handwritten field notes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Completed observation checklists</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lesson plans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Handouts</td>
</tr>
</tbody>
</table>

2. How do teachers integrate *Trace Effects* into their pedagogy?

The data was coded and analyzed inductively with the qualitative data analysis software *ATLAS.ti 7* for themes and patterns related to perceptions of *Trace Effects* in achieving EFL acquisition. The analysis was performed both at the case level and across cases. The data for each school was first analyzed individually and then cross analyzed with other schools to identify salient themes and patterns.
Theoretical models and sensitizing concepts in foreign language pedagogy, game design, and instructional design served as guiding frameworks for analyzing the data. The data on game design was examined within the lenses of Keller (2000; 2010)’s ARCS model. The ARCS model has been widely used to guide game design and study (Chuang & Chen, 2009; Yamakawa, Ohshiro, Matsushita, Mackin, & Nunohiro, 2010; Ying & Yang, 2013). The observational data on the lessons was analyzed in light of foreign language teaching approaches such as the communicative language teaching approach, the direct approach, audiolingualism and the grammar-translation approach (Celce-Murcia, 1991; Richards, 2006; Richards & Rogers, 2001). The next section discusses measures taken to improve the credibility of the study.

Credibility

According to Patton (2002) the quality of an inquiry depends on the quality of the data collected, which in turn depends on methodological rigor, sensitivity and integrity. Creswell (1998) suggests that triangulation, peer review and debriefing, clarification of research bias, member checking, and thick and rich description can be effective techniques for establishing trustworthiness in a qualitative inquiry. Devers and Frankel (2000) and Glesne (2006) suggest that rapport may also be an important technique for improving the credibility of a study. This section describes credibility techniques used in the present study.
**Triangulation.** Triangulation refers to the use of multiple methods, data sources, investigators or theoretical perspectives in order to shed lights on a phenomenon (Creswell, 1998; Patton, 2002). Methods triangulation and data triangulation were used in the present inquiry.

**Methods triangulation.** In terms of methods triangulation, observations, interviews and document analyses were used to gain deeper insights into the implementation of *Trace Effects* in an EFL classroom in a high school setting in Burkina Faso. Interviews were used to gain insights into participants’ perceptions of *Trace Effects* in terms of EFL acquisition and its integration into EFL teaching.

Participant observations were used as a validity check to determine if the teachers’ and students’ behaviors and interaction in the classroom matched what they said during the interview. Glesne (2006) recommends the use of observation as a validity check for interview data. Gameplay sessions were videotaped in order to observe student engagement and interaction with each other.

In addition to participant observations, document analyses were used to determine if the written documents and artifacts produced by the participants matched their words and behaviors. The use of method triangulation allowed the researcher to identify consistencies and inconsistencies in the data.

**Data source triangulation.** Data source triangulation refers to the use of data from different sources or participants in order to understand a phenomenon (Patton, 2002). Triangulation of data sources was used to improve the trustworthiness of the findings of the study. Data was obtained from teachers, students, and principals.
Interview data from both students and teachers was used to shed light on participants’ perceptions of the design of *Trace Effects* and their perceptions of the impact of the game on learning.

**Reflexivity.** Reflexivity is a critical reflection on the interaction between the researcher, the participants, the setting and the phenomenon under investigation (Glesne, 2006). That reflection plays a significant role in strengthening the credibility of the study because it allows the researcher to determine how their presence in the research setting might have influenced the findings of the study. According to Patton (2002), the qualitative inquirer should not only observe participants but also observe themselves in order to recognize their own perspective and bias.

In order to acknowledge his own bias and limit its effects on the credibility of the study, the researcher maintained a reflection journal during fieldwork. Patton (2002) suggests that a personal journal can be effective in helping to document a researcher’s bias and deal with it. The study was conducted in the researcher’s home country. The fact that he and the participants are from the same country could be a potential source of bias. Another potential source of bias was the researcher’s involvement with the *Trace Effect* game project as a beta tester. Maintaining a reflection journal was a means for the researcher to document his bias, question and challenge his assumptions when necessary.

**Member checking.** One of the major goals of a qualitative inquiry is to capture the truth about a phenomenon from the perspectives of the protagonists. In that regard, the credibility of a qualitative inquiry depends on the extent to which it represents participants’ views accurately. Member checking is a technique that consists for the
researcher to check with the participants in order to ensure that the findings and interpretations represent them accurately (Creswell, 1998).

In order to ensure the accuracy of the findings of the study, the researcher shared preliminary draft of the final report of the study with the participants and solicited their feedback on the accuracy of the statements and interpretations. The participants’ feedback was integrated into the final report.

**Rapport.** Finally, the credibility of a qualitative inquiry depends to some extent on the degree of rapport that exists between the researcher and the participants (Devers & Frankel, 2000; Glesne, 2006). This is based on the assumption that no matter the quality of a research design and the amount of time a researcher spends in the field, the data collected and the findings may be less credible if the researcher did not succeed in building some degree of trusting relationship with the participants. Glesne (2006) clarifies the definition of ‘rapport’ by stating that rapport does not mean friendship but trusting relationship with participants. Glesne (2006) suggests that in order to build rapport, the researcher should behave in a culturally appropriate manner in order to show respect to the participants and their culture.

In the present study, the researcher shared some important cultural background with the participants, which facilitated the building of trust during the study. The researcher was born and raised in Burkina Faso. He completed his elementary, secondary and part of his undergraduate education in Burkina Faso before traveling to the United States for further studies. Being a national of Burkina Faso and having gone through its educational system has given the researcher some solid background information about the
setting and the participants. That facilitated the research process of gaining access to the schools and building rapport. Nonetheless, it was necessary for the researcher to become familiar with policies that were specific to each school and to comply with these policies during the entire research process.

It is worth noting that the researcher did not share any particular relationship with the participants in the study. The researcher neither attended any of the schools that participated in the study, nor did he know any of the students, teachers, and principals involved in the study.

**Transferability**

Transferability refers to the degree to which the findings of a qualitative study apply to other participants and settings (Hellstrom, 2006). According to Lincoln and Guba (1985), the transferability of the findings of a study from one context to another depends on the degree of congruency between the two contexts. Unlike in quantitative studies where the burden of generalization lies on the shoulders of the researcher, in qualitative research transferability is the responsibility of the reader (Hellstrom, 2006). It is the reader who must decide the degree of congruency between the case they are reading about and cases to which they are generalizing.

The findings reported in this study apply to the population of 12th graders, their teachers and principals who took part in the study and the game *Trace Effects*. Readers may transfer the findings to classrooms and schools in other contexts when appropriate. They may transfer the results of the present study to other games. They should do so with caution by examining the similarities and differences between the two contexts or games.
In order to assist readers in this task, a thick and rich description of the research setting, participants and procedures has been provided. An adequate description of the game was also provided. The next section describes the procedures that have been followed to ensure ethical behavior in the conduct of this study.

**Ethical Research**

In compliance with Ohio University’s ethical guidelines for research, the researcher has obtained approval from the Institutional Review Board (IRB) of Ohio University prior to beginning field work, obtained permissions for the game and theoretical models that have been used in the study, and observed rules of equity and fairness during fieldwork.

**Institutional review board.** The researcher took the necessary measures to ensure that this research was conducted in compliance with the prescribed guidelines of ethical research. Before conducting the study the researcher obtained the approval of the IRB of Ohio University (Appendix D). All participants in the study were at least 18 years old and signed the informed consent forms. Before signing the consent forms the study was described to the participants and potential risks and benefits were explained to them. The participants were also informed that they would be audio-recorded and videotaped during the course of the study. Furthermore, measures taken to protect their privacy and to ensure confidentiality were communicated to the participants before they signed the consent forms. Finally, all participants were informed that participation in the study was voluntary.
**Permissions.** The researcher obtained permissions from various authorities and researchers prior to implementing the study. These permissions can be found in Appendix E. Permission was obtained from the Ministry of Secondary and Higher Education of Burkina Faso prior to conducting the study. Professor John Keller graciously granted the researcher permission to use his ARCS model in the study. Finally, Mr. Rick Rosenberg, head of the Office of English Language Programs at the United States Department of State was generous to grant the researcher permission to use the *Trace Effects* game in the study. He also provided the researcher with free copies of the game.

**Minimizing risk of discomfort.** During the implementation process of the study the researcher took the necessary measures to ensure that the participants felt comfortable. During gameplay, the participants were informed that they could take breaks at any time if they felt the need to do so.

**Equity and fairness.** In addition to the training provided to the teachers and students who participated in the study, the researcher took the necessary steps to provide gameplay training to other teachers and students who expressed interest. However, no data was collected from them.

**Chapter Summary**

This chapter described the research setting, participants, instruments, implementation and data collection and analysis procedures. Credibility measures and ethical guidelines pertaining to the conduct of the study were also discussed. The next chapter reports the findings of the study.
Chapter 4: Findings

The present study used a multiple-case study design to investigate students’ and teachers’ perceptions of *Trace Effects* in improving EFL acquisition. The study took place in Ouagadougou the capital of Burkina Faso in West Africa, and involved 12th grade students, English teachers, and principals from four public high schools. Data was gathered by means of questionnaires, interviews, participant observations and document analyses. The data was coded and analyzed qualitatively. This chapter reports the findings of the study. The findings are presented at the school level and across schools.

School A

This section presents the findings of the study in School A. It first presents the descriptive statistics and then the main findings of the study pertaining to the participants’ perceptions of *Trace Effects* in achieving EFL acquisition and the pedagogical integration of the game into teaching.

**Descriptive statistics.** The descriptive statistics for student participants, the teacher and principal are presented in this section. Table 4 presents the descriptive statistics concerning the students’ technology ownership, use and experience. The majority of the students in School A had some gaming experience and had used the computer and the Internet to do school work. However, only a small percentage of the participants reported that they had participated in formal training on how to use the computer for learning. In terms of technology ownership, very few students owned a personal computer or had a family computer and Internet connection at home.
Table 4

**Descriptive Statistics on Students in School A**

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming Experience</td>
<td>15</td>
<td>86.66</td>
<td>13.34</td>
<td>100</td>
</tr>
<tr>
<td>Used Internet for School Work</td>
<td>15</td>
<td>73.33</td>
<td>26.67</td>
<td>100</td>
</tr>
<tr>
<td>Used Computer for School Work</td>
<td>14</td>
<td>85.71</td>
<td>14.29</td>
<td>100</td>
</tr>
<tr>
<td>Training on Using Computer for Learning</td>
<td>15</td>
<td>46.66</td>
<td>53.34</td>
<td>100</td>
</tr>
<tr>
<td>Computer Ownership</td>
<td>15</td>
<td>13.33</td>
<td>86.67</td>
<td>100</td>
</tr>
<tr>
<td>Family Computer Ownership</td>
<td>15</td>
<td>46.66</td>
<td>53.34</td>
<td>100</td>
</tr>
<tr>
<td>Internet Connection at Home</td>
<td>15</td>
<td>13.33</td>
<td>86.67</td>
<td>100</td>
</tr>
<tr>
<td>Cellphone Ownership</td>
<td>15</td>
<td>93.33</td>
<td>06.66</td>
<td>100</td>
</tr>
<tr>
<td>Smartphone Ownership</td>
<td>15</td>
<td>33.33</td>
<td>66.67</td>
<td>100</td>
</tr>
</tbody>
</table>

The 12th grade class in School A was taught by Mr. Adouabou, a 35 years old teacher. He graduated from the University of Ouagadougou with a master’s degree in English. Mr. Adouabou had 10 years of teaching experience at high school and middle school levels in Burkina Faso and had been teaching in School A for two years. Mr. Adouabou owned a laptop computer and had a modem Internet connection through one of the local cellphone companies in Burkina Faso. He owned a cellphone, but no smartphone. Mr. Adouabou had nine years of computer experience and had played a
computer game at least once. He also stated that he had used computers and the Internet to search for teaching materials and to prepare his English courses. He reported that he had no experience using computers in teaching, nor had he been trained on how to do so.

Mr. Ouedraogo was the principal of School A. He earned a master’s degree from the University of Ouagadougou, and totaled 13 years of experience as principal. He had been serving as principal of School A for 6 years. Mr. Ouedraogo had a desktop computer in his office, owned a personal laptop computer and a cellphone. He had 13 years of computer experience and had participated in some formal training on how to use computers to perform his administrative duties. Mr. Ouedraogo further reported that he had used the computer and Internet to perform some administrative tasks related to his work as principal. Mr. Ouedraogo had never played a video game.

The next section reports the data that answered the main research questions that guided the study. The research questions were:

1. What are teachers’ and students’ perceptions of Trace Effects in achieving EFL acquisition?
2. How do teachers integrate Trace Effects into their pedagogy?

**Perceptions of Trace Effects in achieving EFL acquisition.** This section focuses on answering the first research question which was:

What are teachers’ and students’ perceptions of Trace Effects in achieving EFL acquisition? For the sake of providing a comprehensive answer to the question it was further broken down into two sub-questions that were:

a. What are students’ and teachers’ perceptions of the design of Trace Effects?
b. What are students’ and teachers’ perceptions of the impact of Trace Effects on EFL acquisition?

**Perceptions of the design of Trace Effects.** Keller (1983; 2000; 2010)’s attention, relevance, confidence, satisfaction (ARCS) model was used as a framework for analyzing the data collected to elicit information on the participants’ perception of the design of Trace Effects as an educational game for EFL learning. For a detailed review of the ARCS model, refer to Chapter 1. The choice of the ARCS model over other instructional design and game design models stems from the fact that it effectively combines game design and instructional design elements. The results of the data analysis for School A showed that the participants perceived Trace Effects to be motivating.

**Attention.** Attention refers to perceptions of design elements that capture and sustain learners’ attention (Keller, 2000). According to Keller (2000), designers can achieve the goal of captivating learners’ attention by using design elements that appeal to learners’ perceptual arousal and stimulate their curiosity, and by varying instruction. In the context of the present study the participants were interviewed in order to elicit information on their perceptions of aspects of Trace Effects that captured their attention and made them want to keep playing.

An analysis of the focus group interview results in School A showed that the participants perceived the pictures to be one of the most important aspects of the game that caught their attention. That finding was illustrated in the comment of Student 1 below.

Question (Q): What aspects of Trace Effects caught your attention?
Student 1(S1): I think the pictures are nice. They are the major success of the game.

S2: The dialogues and the adventures attracted my attention.

Mr. Adouabou, her English teacher, confirmed the statement from Student 1. When asked what caught his students’ attention in *Trace Effects*, his response was straight to the point.

I think what captivates the students’ attention are the images. For example in Chapter 4, nature has been well represented. The town has been well drawn, and the people also. I think this alone can be of great interest to the students.

Chapter 4 of *Trace Effects* focuses on environmental activism. The game environment shows a park with trees and a town bordered by a river that is polluted. Trace’s mission in that chapter consists of helping George Runningwater, a photographer and environmental activist to clean the river. That is the chapter Mr. Adouabou referred to in his comment.

**Relevance.** Relevance refers to perceptions of the usefulness of the instructional content (Keller, 2000, 2010). Learners are more likely to be motivated to interact with an instructional material if they perceive its content to be useful for their learning needs (Keller, 2000; 2010). In the present study, relevance referred to the students’ and teachers’ perceptions of the usefulness of the content of *Trace Effects* in relation to EFL learning. The findings of the focus group interview showed that the students in School A believed that *Trace Effects* could contribute to improving their knowledge of English vocabulary, spelling, pronunciation and pragmatics. The students’ comments during the focus group interview are reported below.
Q: How useful is *Trace Effects* for English learning?

S9: It can contribute to vocabulary acquisition. You can easily learn the new vocabulary words that you collect in the game environment.

S6: It can help to improve English pronunciation. Just by listening to the conversation helps improve my pronunciation.

S4: It can help improve our spelling. Sometimes you know a word; you can pronounce it, but you don’t know how to spell it.

S6: The game can help us understand what language is appropriate. I notice that when you use language that is inappropriate you lose points. So, I try to choose language that is appropriate.

The comments from the students speak for themselves to the relevance of the game to their English language learning needs. S6’s comment concerning appropriateness of language use relates to pragmatics. This is evidence that the participants found the game useful for improving their pragmatic knowledge.

Mr. Adouabou, the classroom teacher concurred with his students that *Trace Effects* could contribute to improving his students’ vocabulary knowledge and pronunciation.

Mr. Adouabou: I think that the students can learn some vocabulary words. They can acquire some knowledge through the software [*Trace Effects*]. It is a piece of software that allows the students to look for some words and to apply them. For example, they pick up words and go to “action” to use them. In addition, there is the pronunciation. The students can improve their pronunciation through the
software. In this software the pronunciation is different from other software that we are used to. We have a native speaker pronunciation, which gives the student the feeling of being in another civilization.

Mr. Adouabou perceived *Trace Effects* to be useful for improving his students’ pronunciation and vocabulary knowledge. He expressed the opinion that there was room for improvement in the selection of themes developed in *Trace Effects*. He stated that some of the themes developed in the game may not appeal to many African students because they were disconnected from their realities. His concern is expressed clearly in the following statement:

Some students may prefer to see topics related to Africa. Topics such as the Band of Andre that is playing to raise funds to help a school may not be well understood in African context. For example in African context, ‘a griot’ [a traditional praise singer] does not play to raise funds to help a school. African students like stories and tales with wild animals as characters. These types of stories would be more appealing to the students.

Mr. Adouabou’s concern that some of the game themes and characters may not appeal to all students was not confirmed by his students.

*Confidence.* Confidence in Keller (2000)’s model refers to expectations for success, success opportunities and personal responsibility. According to Keller (2000; 2010), the difficulty level of the instruction can affect learners’ expectations for success and thereby their motivation. In that regards, the instruction should be neither too difficult nor too easy. Instruction that is too difficult may negatively affect learners’
motivation. In this study, confidence referred to the students’ expectations for successfully completing *Trace Effects*. The participants were interviewed on their perceptions of the level of difficulty of *Trace Effects*. The study sought to elicit information on the participants’ perceptions of personal responsibility in the game.

The findings of the study pertaining to School A showed that most participants perceived *Trace Effects* to be too difficult. They made positive statements concerning personal responsibility. In the focus group interview, the students reported that they were not very confident in their ability to successfully complete a chapter of *Trace Effects* the first time they played it. The students reported that the first time they played the game they found it very difficult.

Q: How confident were you in your ability to successfully complete a chapter of *Trace Effects* the first time you were introduced to the game?

S6: I was not very confident in my ability to complete the game. When I first played Chapter 3 of the game and was told to look for Andre [one of the characters in the game] I was not confident in my ability to find him. They [the game designers] didn’t give any indications as to where he was. I didn’t know where to go. I was about to quit the game when I couldn’t find Andre.

S7: It would be good if the game designers could include hints concerning the location of the characters. For example, they can include arrows pointing to the location of characters and we would just follow the arrows to find them.

S10: I don’t think it is a good idea to include arrows. If they include arrows pointing to the locations of the characters, we would just follow the arrows to find
the character without talking to other characters. That’s not good. Because talking to other characters in the game can help to improve our English.

S4: I think they can for example include a map and we can use the map to find the characters.

In the above exchange, S6 expresses her concerns about the level of difficulty of some of the missions in Chapter 3 of *Trace Effects*. She perceived the missions in Chapter 3 to be very difficult. S7 and S4 implicitly agreed with her and suggested things that the game developers could have done to make the missions less difficult, thereby increasing players’ confidence. S10 however, cautions against making the game’s missions too easy as it would have negative consequences in terms of learning gains.

Data from participant observations conducted during gameplay showed findings that were consistent with the interview results. There was frustration on students’ faces as they tried unsuccessfully to complete some chapters of *Trace Effects*. Many students were stuck and asked for help in order to move on.

The students perceived the point system in *Trace Effects* to be useful for improving their confidence, especially in terms of personal responsibility. Personal responsibility according to Keller (2000; 2010) refers to design elements that help learners realize that success is based on their efforts and abilities but not luck. The comment below from S6 suggested that she was clearly aware that her game score depended on her efforts and abilities but not luck.

Q: What do you think about the point system in *Trace Effects*?
S6: It allows us to determine what sentence is appropriate. For example, when you select a strange sentence, you will see the word ‘confused’ next to the character you are talking to and your points will drop. That tells you that you chose something inappropriate. So, when that happens, next time you pay attention to what sentence you select.

Mr. Adouabou shared his students’ perception that *Trace Effects* might be a little too difficult for them. He did not perceive the game missions to be difficult for his students. Mr. Adouabou believed that linguistic and technical difficulties negatively affected his students’ confidence. He argued that his class was made of students with different levels of competence in English and computer technology. For that reason, a one-level game such as *Trace Effects* can pose confidence problems.

Q: To what extent were your students confident in their ability to successfully complete *Trace Effects*?

Mr. Adouabou: I think the technical skills and English proficiency of African students has not been taken into account in the conception of the game. I think that can be a problem. The game could have been conceived for different levels of proficiency. For example, there could be a game for beginners, one for intermediate level and another for advanced levels. That would have been an innovation. The beginner level game would be easier and the intermediate one would be a little difficult and the advanced one would be more complicated. That way the student would have a feeling that he is progressing. That way, if the student gets to the advanced level and finds the vocabulary very difficult he
would still think that he has achieved a certain level of competence. Designing the
game with different levels would have shown that the game has been designed for
children as well as for adults.

I think this game would work perfectly in an American context, but here the
students do not have the same access to computers as their peers in America. The
lack of technical skills can also be a demotivating factor. The student finds
himself in front of a tool that they do not master. Most of the students here know
how to use game consoles but not computers.

On the issue of personal responsibility, Mr. Adouabou’s opinion was consistent
with that of his students. He believed that the points in *Trace Effects* could help students
learn that their game scores are a reflection of their efforts. His statement is presented
below.

*Q: What do you think about the point system in *Trace Effects*?*

Mr. Adouabou: I think the point system is like feedback that helps the students
see the results of their work. If a student is playing well he gets more points. If he
is not playing well he loses points. It’s not lottery.

*Satisfaction.* Satisfaction in Keller (1983, 2000)’s model refers to learners’
perceptions of positive feelings about their accomplishments. Internal or external rewards
can contribute to harnessing these positive feelings in learners (Keller, 2000; 2010). In
the present study the participants were interviewed in order to understand their
perceptions of rewards and satisfaction in *Trace Effects*. The overall findings of the
study in relation to satisfaction indicated that the participants perceived the points in *Trace Effects* to be important rewards for their efforts.

Q: How do you feel about the points in *Trace Effects*?

S8: They are important. For example when you are playing in groups and you want to see which group gets the most points, it can be interesting. Only, when you are playing by yourself that they don’t seem to be important.

S8 considers the points to be important rewards for achievement in the game. He even goes further to suggest that these rewards are even more important when there is a competition between groups.

Mr. Adouabou perceived the points in *Trace Effects* to be important rewards for students’ achievement. “I think the point system is useful given that the students are used to grades. Students like competition and winning”, he stated.

The findings of the study indicated that the students and their teacher in School A perceived *Trace Effects* to be motivating. The participants believed that the game met the major conditions that are necessary for motivation to take place, namely attention, relevance, confidence and satisfaction. Many participants perceived the game missions, language and technology to be difficult.

*Perception of the impact of Trace Effects on EFL acquisition.* This section addresses the participants’ perceptions of *Trace Effects* in achieving EFL learning outcomes. The following research question was answered:

What are participants’ perceptions of the impact of *Trace Effects* on EFL acquisition?
An analysis of the data from focus group interviews in School A indicated that the participants believed that *Trace Effects* contributed to improving their EFL vocabulary knowledge and pronunciation.

Q: What do you think about *Trace Effects* and the lesson that integrated the game?

S4: When we play and hold discussions based on the game, I think it is interesting.

Q: What did you learn from playing the game and participating in the lesson?

S4: Vocabulary

S6: Vocabulary and pronunciation.

The above exchange indicated that the participants perceived *Trace Effects* to have contributed to improving their EFL vocabulary knowledge and pronunciation.

Observational data collected through videotaping of gameplay sessions confirmed the finding according to which *Trace Effects* may have contributed to improving the students’ EFL pronunciation. The video clips showed students repeating conversations after some characters in the game. During the gameplay session that focused on Chapter 3 of *Trace Effects*, one participant kept repeating the dialogue after Olivia, one of the characters in the game. After Trace gives a bicycle to Olivia, she thanks him by stating “Thank you so much Trace.” The female participant repeated that statement after Olivia while giggling and smiling. Many other instances of repetitions of characters’ verbal responses were recorded during gameplay sessions.
Mr. Adouabou recognized that his students acquired some vocabulary knowledge from *Trace Effects*, but his discussion focused more on the affective domain. He stressed the important role that *Trace Effects* played in motivating students in the class.

Q: What did your students learn from *Trace Effects* and the lesson that integrated the game?

Mr. Adouabou: During the informal evaluation which consisted of oral questions to the students I found that the students understood the lesson. They learned vocabulary words related to pollution and understood the importance of waste management and recycling.

Q: How would you describe your experience integrating *Trace Effects* into your teaching?

Mr. Adouabou: I think the students were excited. There was an active participation of the students in the lesson. They have actively listened to the lesson.

Q: What is the difference between that lesson and your regular lessons?

Mr. Adouabou: When I teach a regular lesson, I don’t present it the way I presented the lesson with a game. In a regular classroom, I have to first motivate the students and put them in a good mood before I present the lesson. But with the game I don’t have to do that. The game can be a source of motivation and warm-up by itself.
From the above comment, it is obvious that Mr. Adouabou considered *Trace Effects* to be a powerful tool for motivating his students to learn EFL. His comment supported statements by his students in the focus group interview according to which gameplay followed by a discussion was ‘interesting’.

Mr. Adouabou goes even beyond the linguistic and affective domains to suggest that *Trace Effects* contributed to improving his students’ problem-solving skills. I think the advantage of using the game is that they [students] learned problem-solving skills. They understood that for every problem that they encounter in life there is a solution. They have to search for the solution and ask people for help.

The findings of the study in School A suggested that the participants perceived *Trace Effects* to have contributed to improving their EFL vocabulary knowledge, speaking skills and motivation. The findings suggested that the perceived learning outcomes go beyond the EFL linguistic domain to include problem-solving skills.

*Trace Effects* and EFL pedagogy. The second research question in the study was: How do teachers integrate *Trace Effects* into their pedagogy? In specific terms, the study sought to understand any pedagogical changes associated with the use of *Trace Effects* in EFL teaching and learning. That research question was answered mainly with observational data and document analyses. Both regular English lessons without the use of *Trace Effects* and lessons that integrated the game were observed. Data from the two observations was analyzed and compared in order to identify any changes in pedagogy associated with the use of *Trace Effects*. Data analysis and interpretation was conducted within the framework of existing second and foreign language teaching approaches.
(Celce-Murcia, 1991; Richards & Rogers, 2001). This section describes the lessons and reports the results of the study concerning pedagogical changes in School A.

An observation of a regular EFL class was conducted. The lesson took place on a Wednesday morning from 11AM to 12PM. Mr. Adouabou began class by greeting his students. Then, he asked his students to take out the reading passage that they had been working on since the previous week. The title of the passage was ‘Jenner Studies Smallpox’ and was excerpted from Potts (1950). The reading passage described the process through which the English scientist Edward Jenner went through in order to discover the vaccine against smallpox. After the students took out their texts, Mr. Adouabou asked two volunteers to read the text aloud.

After the reading aloud activity, he put the students in groups of five to answer five reading comprehension questions. Each group was to answer one question. The students were given 10 minutes to write an answer to the question. Then, each group chose a reporter to write their response on the board. After all responses were written on the board, the teacher asked each reporter to read what they wrote. The reporters read their answers aloud for the entire class. The students from other groups were invited to orally critique their peers’ answers. The teacher intervened to moderate the discussion, elaborate on students’ responses or to clarify them. After the discussion, Mr. Adouabou asked his students to list other eruptive diseases that they know in today’s world. A few students raised their hands and listed other diseases. After one hour of instruction, the teacher dismissed class.
An informal interview was conducted with Mr. Adouabou after class in order to further understand his classroom routines. This interview was necessary in order to understand whether the lesson was a typical one but not something new that she tried only on that particular day. In the interview, he explained that most of his classes followed a structure similar to the one that was observed. Below is his response.

Twelfth grade English classes in Burkina Faso follow the same general structure. I usually bring a text to class and have the students read it silently first and then aloud. After the reading aloud, we discuss vocabulary and the students answer comprehension questions. Of course every teacher can add their own little things, but the overall structure of English lessons is the same. I teach grammar sometimes, but only if my students have problems.

The second observation focused on the lesson integrating *Trace Effects*. In the lesson that integrated *Trace Effects*, the teacher had the students play Chapter 4 of the game in groups of three the day before class. When they came to class, he opened Chapter 4 of the game on a TV monitor connected to a laptop computer with speakers. He opened the game environment showing the main characters and began class by greeting his students. Mr. Adouabou began by throwing cans of soda around in the room. Then, he turned around and asked his students if what he was doing was good. The students shook their heads. Then he asked them “What should I do with the soda cans?”

One student responded by saying: “recycle.” Then, Mr. Adouabou wrote the word ‘recycle’ on the board. That was his way of introducing the topic. He used an interactive approach of question-response to elicit vocabulary information from his students. He
asked his students to define pollution. Students attempted a definition of pollution, and identified water pollution as the type of pollution that was the focus of Chapter 4 of *Trace Effects*. The teacher elaborated on students’ responses by identifying other types of pollution such as noise pollution, soil pollution and air pollution.

Then Mr. Adouabou asked his students to list the causes of pollution in *Trace Effects*. The students listed newspapers, plastic bags and water bottles. He then asked his students to work in small groups of three to identify solutions to pollution. They were given 15 minutes to complete the activity. After the time expired the teacher asked each group to report its solutions and explain why they thought those solutions were effective.

The lesson integrating *Trace Effects* and the one without the game were similar in the sense that both incorporated some form of group work. However, some differences were noted between both lessons. The first difference was that the lesson integrating *Trace Effects* involved more speaking than the one without the game. In the lesson integrating the game Mr. Adouabou asked his questions orally and his students produced responses orally and spontaneously without writing down their responses. On the other hand, the regular lesson without *Trace Effects* involved more writing than spontaneous speaking. The students were given time to prepare written responses to questions and then they wrote their responses on the board before discussing them with their classmates.

The second research question in the present study sought to understand how teachers integrated *Trace Effects* into their pedagogy. The findings showed changes in EFL pedagogy associated with the use of *Trace Effects* in teaching. The findings
suggested that the teacher used more speaking activities involving spontaneous language production when *Trace Effects* was used. The regular lesson was dominated by reading comprehension activities.

This section reported the findings of the study in School A. The findings of focus group and individual interviews with the students and their teacher suggested that the participants perceived *Trace Effects* to be motivating in terms of design. Furthermore, the participants believed that the game contributed to improving their EFL knowledge, motivation and problem-solving skills. The results of participant observation data and document analyses revealed that the integration of *Trace Effects* into an EFL lesson was associated with more speaking activities that generated spontaneous language production on the part of the students.

**School B**

This section reports the findings of the study in School B. It begins by presenting descriptive statistics on the participants’ technology ownership, use, and experience before focusing on the research questions.

**Descriptive statistics.** The results of the analysis of data collected with biographical questionnaires in School B indicated that the majority of the students who participated in the study had never played a computer game. The majority of the students had not participated in any formal training on how to use the computer for learning. Most of them had learned how to use the computer from friends. They however indicated that they used the computer and Internet to do school work. The findings further indicated that the majority of the participants did not own any personal computer but an
overwhelming majority of them owned a cellphone. Table 5 provides a summary of the descriptive statistics on the students’ technology experience, ownership and use.

Table 5:

Descriptive Statistics on Students in School B

<table>
<thead>
<tr>
<th>Items</th>
<th>Responses</th>
</tr>
</thead>
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<tr>
<td></td>
<td>N  Yes (%)</td>
</tr>
<tr>
<td>Gaming Experience</td>
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</tr>
<tr>
<td>Used Internet for School Work</td>
<td>47  70.21</td>
</tr>
<tr>
<td>Used Computer for School Work</td>
<td>46  76.08</td>
</tr>
<tr>
<td>Training on Using Computer for Learning</td>
<td>47  27.65</td>
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<tr>
<td>Computer Ownership</td>
<td>46  6.52</td>
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<tr>
<td>Family Computer Ownership</td>
<td>46  19.56</td>
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<tr>
<td>Internet Connection at Home</td>
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<tr>
<td>Cellphone Ownership</td>
<td>47  91.48</td>
</tr>
<tr>
<td>Smartphone Ownership</td>
<td>47  27.65</td>
</tr>
</tbody>
</table>

Mr. Nikiema the English teacher who took part in the study in School B is a 46 year old graduate of the University of Ouagadougou. He had been teaching English in middle and high schools for 14 years. He had been teaching in School B for 12 years. Mr. Nikiema had been using computers for a year. He owned a personal laptop computer and a cellphone. He purchased his computer at about one month after the start of this research
project. He said that the project was the main motivation behind his purchase of the laptop because he hoped to learn to use the computer through the project. He had no family computer or Internet connection at home. Mr. Nikiema indicated that he had no experience playing computer games. He had never used the computer or Internet to teach or to prepare course materials. He had never been formally trained on how to use the computer for teaching.

Mr. Simpore was the principal of School B. He was 51 years old, graduated from the University of Ouagadougou with a master’s degree, and had been principal for 14 years. He had been the principal of School B for six years. Mr. Simpore owned a personal computer, a family computer with Internet connection and a cellphone. He had been using computers for 18 years. He had been trained on how to use the computer and Internet in his administrative work as principal and had used them to perform some administrative work. Mr. Simpore indicated that he had never played a computer game.

**Perceptions of *Trace Effects* in achieving EFL acquisition.** This section reports the findings of the study pertaining to the first research question. Data on participants’ perceptions of the design of *Trace Effects* and their perceptions of the game in improving EFL acquisition is presented.

**Perceptions of the design of *Trace Effects*.** This section examines the findings of the study with regards to the participants’ perceptions of the design of *Trace Effects* as an educational game for learning EFL. The attention, relevance, confidence, satisfaction model (Keller, 2000; 2010) guided data analysis and interpretation.
Attention. Focus group interview results showed that the students perceived *Trace Effects* to have a potential for capturing their attention. The participants in the focus group interview pointed out that the images and the themes of *Trace Effects* were the major aspects of the game that caught their attention.

Q: What captured your attention in *Trace Effects*?

S1: The themes captured my attention. In the game, there are themes such as pollution, water pollution and nature.

S2: The images are what got my attention in the game. They make me feel like I am in the real world.

Mr. Nikiema, the students’ English teacher confirmed their statements concerning the role of the images in capturing and maintaining their attention. He stated that the visuals in *Trace Effects* caught his students’ attention.

Q: What aspects of *Trace Effects* caught your students’ attention?

Mr. Nikiema: Right. The game was very interesting and motivating for the students. The images were very helpful in keeping the students’ attention. We have an old method of teaching where we use texts. As you know it is not the best way to teach. With the game and images the students were engaged. You worked with them. You could see yourself that the students were very interested.

Relevance. The participants in the study perceived the content of *Trace Effects* to be relevant to their EFL learning needs. The students believed that the game was useful for improving their vocabulary knowledge as well as their listening and speaking skills. When asked the question “How useful is *Trace Effects* for learning English?” S5 was
quick to reply: “It can allow us to enrich our vocabulary.” S1 elaborated on S5’s responses by stating:

I think the transcription of what the characters are saying makes it easier for me to learn new vocabulary words. For example; if a character in the game says a word and I don’t know how to spell the word I cannot look it up in the dictionary. But with the transcription I get the spelling of the word and look up its meaning in the dictionary. It really allows us to enrich our vocabulary.

Vocabulary was not the only English language skill that was mentioned by the participants. S4 suggested in her comment below that *Trace Effects* had the potential to improve EFL speaking skills.

Q: What other aspects of English can *Trace Effects* improve besides vocabulary?

S1: Speaking. I think the way the characters speak is interesting. I find myself repeating the conversations after the characters. It is my only exposure to Americans’ way of speaking.

In the individual interview that followed gameplay, Mr. Nikiema stated that *Trace Effects* had the potential to improve listening, speaking and vocabulary skills. His opinion is consistent with the opinions expressed by his students in the focus group interview.

Q: How useful is *Trace Effects* for English learning?

Mr. Nikiema: Right, I think the most important language skill that this game improves is the speaking. The speaking, because here [in *Trace Effects*] the students get familiar with native speakers. They get the correct pronunciation and the correct accent which they can try to imitate; without not forgetting the
vocabulary. But what is really important for me here is the pronunciation of native speakers. This is very important because we are not native teachers; we haven’t got the right pronunciation. Not forgetting the listening; the speaking and the listening.

Confidence. The participants were interviewed in order to elicit information on their perceived confidence in relation to *Trace Effects*. The interview questions addressed both the participants’ perceptions of the level of difficulty of the game and their perceptions of personal responsibility. The findings of the focus group interview showed that most students had little confidence in their ability to successfully complete *Trace Effects* the first time they were introduced to it. They perceived the game to be difficult during their first encounter with it.

Q: How confident were you in your ability to successfully complete a chapter of *Trace Effects* when you were introduced to the game the first time?

S1: The first time that I saw the game we were not sure that we would be able to complete it successfully.

S3: Please, say ‘I was not sure’ [Smiling]

S1: I was not confident in my ability to play the game because I am not an expert of computers.

S5: And we didn’t even understand the words. We were stressed out. But later on things worked out well and the game became very interesting.
S6: For me, it was my first time playing a video game and it was in English. So, I said to myself that it would be very difficult to complete this game. Our English is not advanced. We only know ‘good morning’.

The above exchange between the students during the focus group interview suggested that their perceived low level of English proficiency, their perceived lack of computer skills and lack of exposure to video games were the major factors that negatively affected their confidence.

Some students stated that they were confident in their ability to successfully complete *Trace Effects* no matter how difficult the game was. S3 is one of them.

S3: On the first day of the training I came late. The training was already underway. So, when I arrived I challenged one of my classmates by telling him that even though I missed the beginning of the training I would beat him in the game. So, I was determined to understand the game and beat my classmate by getting the highest score. The second reason why I was confident relates to the fact that the game is in English. English is my favorite subject. I am interested in anything that is in English. I was really excited to begin the game.

S3’s comment suggested he had a positive attitude towards English and he was self-motivated to learn the language. Informal interviews with his classmates and the teacher revealed that S3 was one of the top students in the class in English. That finding implied that he might have been more proficient in English than the other members of the focus group. His high level of English proficiency and his positive attitude towards English
might contribute to explaining his perceived high level of confidence in his ability to successfully complete *Trace Effects*.

In regards to the contradicting opinions of the students concerning the difficulty level of *Trace Effects* more probing was necessary in order to understand the issue of language difficulty. It was important to determine whether the game was perceived to be difficult for all members of the 12th grade class in School B or just a few students who were lagging behind their peers in terms of English proficiency.

Q: What do you think about the level of English in *Trace Effects*?

S6: I think the level of English is appropriate for us.

S1: It depends. If the students do not consider English to be important and neglect their English classes, they will find the game difficult. Otherwise, it is appropriate for students in grade 12 who pay attention to English.

From the responses above, it became clear that the level of English used in *Trace Effects* was appropriate for 12th grade students in Burkina Faso who were performing to grade level in English. The students who found the game vocabulary difficult were probably lagging behind their peers in English.

As far as personal responsibility was concerned, the findings of the study revealed that the participants had positive perceptions of the scoring system in *Trace Effects*. They believed that the points that they earned were a reflection of their efforts.

Q: What do you think about the point system?

S3: I see the point system as a punishment for those who do not play well. If you don't play well, you lose points. And that tells you that you should pay attention
to what you do and avoid selecting inappropriate options when playing. That helps the player improve in their English.

S1: The points system is important because it allows us to determine whether we are choosing the correct options or not. When you choose an incorrect option your points will decrease.

Mr. Nikiema, the classroom teacher said that some of his students were not confident in their ability to complete the game because of their low level of computer skills.

Q: To what extent were your students confident in their ability to successfully complete a chapter of *Trace Effects* the first time they were introduced to it?

Mr. Nikiema: Some of them were not very confident. You could see yourself. They panicked because they are not used to computers. But I am sure that if the students are given the opportunity of learning with games regularly they will be very interested and it will be very easy. At the beginning they may have difficulties but later they can overcome their difficulties.

Mr. Nikiema believed that the points in *Trace Effects* had the effect of encouraging personal responsibility in his students.

Mr. Nikiema: When the student sees that he is playing well and getting some points he is more motivated. In case his performance is not good he loses some points. The students can see that it is up to them to work harder if they want to improve their scores. I think teachers should also encourage students to try harder.
Satisfaction. The findings of the focus group interview revealed that most students derived some degree of satisfaction from the points that they earned in *Trace Effects*. The points served as some form of rewards for the students’ hard work. The students were competing to see who would get the highest score in the game.

Q: How do you feel about the points in *Trace Effects*?

S6: I think the points make the game interesting because people can compete. Last time when we were playing the game in the computer lab we got 150 points and the group next to us got 93. Simon told them ‘You guys are losers. We got 150 points while you got 93 only.’ We were so happy that we won.

Observation data collected during gameplay supported the focus group interview findings concerning students’ perception of satisfaction in *Trace Effects*. The video clips show one group of students celebrating after completing Chapter 4 of *Trace Effects*. They stood up and shouted: “We’re done. We got 103 points.”

Mr. Nikiema agreed that the points in *Trace Effects* could serve as rewards for students’ efforts just like grades. He made it clear in the following statement: “Yeah, right; what makes learning motivating, is the rewards that the students get. Here, the kind of rewards can be the points, the marks.”

This section reported the findings of the study concerning the participants’ perception of the design of *Trace Effects*. The results showed that the participants perceived the game to be motivating. They believed that *Trace Effects* included some design elements that addressed the major motivation conditions of the ARCS model. Some participants found *Trace Effects* difficult. The difficulty was not inherent in the
game itself but was due to the participants’ lack of appropriate level of English, technology and gaming proficiency.

**Perceptions of the impact of Trace Effects on EFL acquisition.** This section reports the findings of the study pertaining to the participants’ perceptions of the impact of Trace Effects on EFL acquisition. The findings showed that the participants perceived Trace Effects to have contributed to improving their EFL vocabulary knowledge, listening, writing and problem-solving skills. It was found that the game was perceived to have positive contributions to students’ motivation.

When asked how they would describe their experience playing Trace Effects and participating in the lesson that integrated the game, the students responded that they found the lesson to be the easiest.

S2: I think that learning with the game was a very good experience. I found the lesson integrating the game to be the easiest of all lessons. Before coming to class for the lesson, we already had the ideas from the game.

In this comment the student is implicitly acknowledging that she learned something from playing Trace Effects when she stated that she “had ideas from the game” before coming to class. S2 and S3 provide more insights into what the students learned from Trace Effects.

S2: The game made it easier to understand the lesson. It was action and words. When actions are combined with words, things become easier to understand.

S3: There was an option in the game that let you listen to the conversations as many times as you like. So if I didn’t get what someone was saying I would click
on it and listen several times. That was a good thing. It allowed me to really understand what the people were saying.

The comments above suggested that the participants perceived *Trace Effects* to have contributed to improving their vocabulary knowledge and listening skills. S2 was referring to the tool in *Trace Effects* that allows students to collect words and use them to perform actions in the game environment.

S4’s comment below confirmed the finding on the perceived contribution of *Trace Effects* to not only vocabulary acquisition but also argumentative writing.

S4: After playing the game, I learned interesting ideas that can be useful in writing an argumentative essay in favor or against something. For example the chapter on pollution is useful for us. There are ideas on the causes of pollution and how to eradicate it. There is important vocabulary that can also be useful in writing an essay on pollution.

In addition to EFL vocabulary acquisition, listening and writing skills the students believed that *Trace Effects* contributed to improving their problem-solving skills.

S3: In the game, they give you the opportunity to explore a problem and find solutions to it. For example in the chapter on pollution, you find the causes of the problem and you walk around trying to convince people to stop pollution. After playing the game I feel like if I walk out of the classroom and find someone who is throwing bottles around, I can take the risk of telling them to recycle their bottles.
In addition to the perceived cognitive benefits of *Trace Effects*, the findings of the study showed that *Trace Effects* contributed to improving the students’ motivation. That finding was explicit in S4’s statement that follows. “I think the simple fact that it is a game is a source of motivation for me. By playing I am learning at the same time. We learn and have fun at the same time.”

The focus group interview data was supplemented with observation data. An analysis of observation data from gameplay session showed some students taking notes. The students were writing down new vocabulary words that they encountered during gameplay and checking the meaning of the words in their bilingual dictionaries.

In Mr. Nikiema’s opinion, he and his students learned from the experience of integrating *Trace Effects* into the teaching and learning process.

Q: What did your students learn from the process of playing *Trace Effects* and participating in the lesson?

Mr. Nikiema: We have learned a lot and we have seen that there are other more interesting methods that we can use to learn the language simply, easily and quickly. I wish that in the future we will be able to get the opportunity to use video games in our teaching and learning regularly.

Mr. Nikiema stressed the idea that the use of *Trace Effects* as a learning tool contributed to making EFL learning easier and motivating. When asked what was the difference between teaching with *Trace Effects* and teaching without *Trace Effects* he pointed out that teaching with the game was more interesting, motivating and introduced a positive atmosphere in the classroom.
Q: What is the difference between teaching with *Trace Effects* and teaching without it?

Mr. Nikiema: Teaching without the game is a traditional method that we have been using for a long time because we have no choice. The difference [between using the game and the traditional teaching] is that using the game is more interesting. Yes really. Using *Trace Effects* is positive. You could notice it yourself. Because not only it’s amazing for the students, they are also motivated and interested in learning through the video game. And another difference is that using the video game *Trace Effects* brings another atmosphere, a very good atmosphere. It makes things easier. Yes really, easier and more interesting.

The findings of the study in School B indicated that the participants perceived *Trace Effects* to have contributed to improving their EFL vocabulary knowledge, listening, writing, problem-solving skills and motivation. The participants also believed that using *Trace Effects* in the lesson made learning easier and interesting.

*Trace Effects and EFL pedagogy.* The second research question in the study focused on *Trace Effects* and EFL pedagogy. The question sought to understand changes if any in EFL pedagogy that were associated with the use of *Trace Effects*. Two participant observations were conducted in School B in order to shed light on the issue: One focused on a regular lesson and the other on a lesson that integrated *Trace Effects*. This section provides a detailed description of the lessons and reports the findings of the study related to changes in pedagogy.
The first observation was conducted on a Tuesday morning from 9 to 10 AM. Mr. Nikiema came to class at 9:30. As soon as he entered the classroom the students stood up to greet him. He greeted them.

Mr. Nikiema: Good morning class.

Students: Good morning Sir.

Mr. Nikiema: How’re you?

Student: I’m fine, and you?

Mr. Nikiema: Fine. Sit down.

Mr. Nikiema told the students that the lesson of the day would focus on grammar and proceeded to tell them that he was going to teach them how to properly use ‘Though’ versus ‘although’, ‘despite’ versus ‘in spite of’, and ‘because’ versus ‘because of.’ He began by writing a sentence on the board. The sentence contained the word ‘because’. He asked a volunteer to read it aloud. One student volunteered to read the sentence. Then, Mr. Nikiema asked for another volunteer to transform the sentence containing the word ‘because’ into another sentence containing the phrase ‘because of’ while keeping the meaning of the sentence intact. After a few students had volunteered to try but failed to give the correct sentence one student finally got it right. Mr. Nikiema wrote the sentence with ‘because of’ under the first one. Then, he asked his students to examine both sentences carefully and find the difference between them. He succeeded in getting the students to understand that the changes in syntactic structure between the two sentences.
Mr. Nikiema repeated the same process with ‘despite’ versus ‘in spite of’ and ‘though’ versus ‘although’. Then, he read all the sentences on the board and had the students repeat after him. After the listen-and-repeat session it was time for practice.

Mr. Nikiema gave the students some practice activities. He gave them sentences containing ‘because’, ‘though’ and ‘despite’. The students were given 10 minutes to work individually to transform the sentences into new sentences containing the phrases ‘because of”, ‘although’ and ‘in spite of” without altering the original meaning of the sentences. When the students were done, the teacher corrected the exercise. He first asked the students to read their responses aloud. Classmates had the opportunity to give feedback on whether the student got the correct grammatical structure or not. In the event a student got a sentence wrong another student was called upon to come to his or her rescue. If all students failed to provide the correct grammatical structure, Mr. Nikiema provided the correct structure.

After all the sentences in the exercise were corrected Mr. Nikiema asked his students if they had any questions. He closed the lesson by reminding the students that they would continue to practice in the next class.

After class, the researcher had an informal talk with Mr. Nikiema and asked him a few questions about the lesson that I had just observed. The purpose of that informal interview was to determine if the lesson that was observed was a typical lesson in his 12th grade class or not.
Q: What is the 12th grade English curriculum like?

Mr. Nikiema: Right. The curriculum of 12th grade English here is more about reading comprehension. I usually give them a text on topics such as smoking, teen pregnancy, the environment etc…. They read the text and we discuss it. There is also a translation. I give the students one paragraph from the reading passage to translate into French. I don’t like the translation part, but I have to teach it because there is translation in the baccalaureate exam that the students will take next year.

Q: What about grammar?

Mr. Nikiema: I only teach grammar when I see that the students have difficulties with a grammar point. I teach it so that they can use the knowledge to write their essays during exams. But grammar is not part of the 12th grade curriculum.

From the interview, I learned that Mr. Nikiema did not teach grammar lessons very often. My observation happened to coincide with some of those rare occasions on which he taught a grammar lesson because his students had difficulties with it.

The second observation focused on the lesson integrating Trace Effects. The lesson took place in the regular classroom, not in the computer lab where gameplay was conducted. The day before the lesson, Mr. Nikiema took his students to the computer lab and instructed them to play Chapter 4 of Trace Effects. That was the chapter that focused on pollution. It was their second time playing that chapter. The students interacted with the game chapter for about one hour in teams of three.
On the day of the lesson Mr. Nikiema came to class at 9 AM. The students stood up to greet him and he told them to sit. The teacher began by asking his students the following question:

Mr. Nikiema: What is Chapter 4 of *Trace Effects* about?

One student: Chapter 4 is about pollution.

Mr. Nikiema: What kind of pollution?

Another Student: Chapter 4 is about water pollution.

Mr. Nikiema: Good.

Then, Mr. Nikiema followed the same interactive question-response approach during the entire lesson. He asked the students to name two other types of pollution besides water pollution. Then, he discussed the causes, consequences of pollution. He then asked his students to brainstorm some ideas on how to control pollution. The students’ responses were written on the board. Some students suggested that polluters be put in prison while other said that the government should make garbage cans available in all street corners.

After the brainstorming activity, he asked his students to pretend like they were the mayor of Ouagadougou, the capital of Burkina Faso, and to identify measures that they would take to reduce pollution in the city. Some students volunteered to share their ideas with the class. The teacher called on other students who seemed to be hiding. The students tried hard to say something meaningful in English. Some of them spoke a mixture of French and English because they could not find the exact English words they were looking for. After that activity, Mr. Nikiema asked the students if they had any questions. They shook their heads. Class was dismissed.
An analysis of Mr. Nikiema’s two lessons revealed some similarities and
differences between them. Both lessons used an interactive question-response approach
where the teacher asked a question and the students answered it orally. However, there
were significant differences between the two lessons. The regular classroom lesson
without the game made use of drills. Mr. Nikiema read the sentences on the board and
had all the students repeat after him. On the other hand, no drill was observed in the
lesson that integrated *Trace Effects*. The other difference related to the context. In the
lesson without the game, the teacher wrote isolated sentences on the board without
context and used them to teach the grammatical structures while the game lesson had a
meaningful context. Another important difference between the two lessons is that the one
integrating *Trace Effects* involved more spontaneous speaking activities. In the last part
of the lesson, the students tried their best to speak spontaneously without having to write
sentences down and then read them aloud.

The findings of the study in School B showed that the students and their teacher
found *Trace Effects* to be motivating in terms of design. The participants also believed
that the game contributed to improving their EFL linguistic knowledge, problem-solving
skills and motivation. The findings of the study indicated that the lesson that integrated
*Trace Effects* involved more spontaneous and meaningful speaking activities than the one
without the game.

**School C**

This section presents descriptive statistics on data collected from participants in
School C and reports the main findings of the study. The study sought to understand the
participants’ perceptions of *Trace Effects* in EFL acquisition and the pedagogical integration of the game into EFL teaching.

**Descriptive statistics.** Table 6 reports the data on the students’ technology ownership, experience, and use. The majority of the participants in the study from School C had no gaming experience and had not participated in any training on how to use the computer to access learning materials. However, the findings indicated that most of the participants had used the computer or the Internet to do some school related work.

Table 6

*Descriptive Statistics on Students in School C*

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<td>Smartphone Ownership</td>
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The English teacher in charge of the 12th grade classroom that participated in the study was a 41 year old female. We call her Mrs. Lankouande. She earned her bachelor’s degree in English from the University of Ouagadougou and had been teaching for 10 years. Mrs. Lankouande totaled six years of teaching experience in School C. In terms of technology ownership, she owned a cellphone, a personal laptop computer, and a family computer with Internet connection at home. She however said that she did not own a smartphone. She had used the computer and Internet in the preparation of course materials but not in actual teaching. Mrs. Lankouande also indicated that she had never participated in any formal training on how to use the computer in teaching and had never played a computer game.

Mr. Zongo was the principal of School C. He was a 57 year old male who earned a master’s degree from the University of Ouagadougou. He had 20 years of experience as principal; seven of those years were spent in School C. He had been using computers for 13 years. Mr. Zongo had a regular cellphone, a smartphone and a family computer with Internet connection. He noted that he never used his smartphone. His daughter did. Mr. Zongo had a work computer in his office but had no personal computer. He indicated that he had taken part in formal training on how to use the computer in his work as principal and had used the computer and the Internet to perform some of his administrative duties. He however reported that he had no experience with computer games.

**Perceptions of Trace Effects in achieving EFL acquisition.** This section describes the students’ and teacher’s perceptions of Trace Effects in achieving EFL acquisition. The results of the study pertaining to this research question are divided into
two subcategories. One focused on the participants’ perceptions of the design of Trace Effects and the other on their perceptions of the game in achieving EFL learning outcomes.

*Perceptions of the design of Trace Effects.* This section reports the findings of the study on the participants’ perceptions of the design of Trace Effects as an educational game for EFL learning. The findings of the study were analyzed using Keller (2000; 2010)’s ARCS model.

*Attention.* The findings showed that the participants perceived the images and sounds to be the most important parts of Trace Effects that captured their attention. S1’s comment better summed up the students’ opinions on the issue. When asked the question “What aspects of Trace Effects if any caught your attention?” S1 gave the following response: “Given that the game has audio and video, even if you don’t want to play the game the images make you want to play.”

The students’ opinions were backed by Mrs. Lankouande, the classroom teacher. She stated that the images were the major components of Trace Effects that caught her students’ attention before adding that the simple fact that it was a game made the students interested.

Q: What aspects of Trace Effects if any do you think caught your students’ attention?

Mr. Lankouande: I think it’s the images. The students become more interested when they can see things rather than learning abstract ideas. Even the simple fact that it was a game was enough to catch their attention. The same students who are
participating in the project and are excited about it sleep through most of my regular lessons. But as soon as they heard it was a game, they became excited.”

The students’ and their teacher’s opinions converged to suggest that the images in *Trace Effects* had the potential to contribute to catching the students’ attention.

**Relevance.** The results of the study indicated that the participants perceived *Trace Effects* to be relevant to their English language learning needs. The students made it clear that the game had the potential to improve EFL pronunciation, vocabulary knowledge and knowledge of American culture.

Q: How useful is *Trace Effects* for English learning?

S2: I think that given that it is an audio-visual, it helps us learn English, especially English pronunciation.

S4: As she [S2] said, it improves our vocabulary and our English skills.

S1: The game gives us an idea of what America looks like, their culture, how they behave in relation to other people.

Mrs. Lankouande echoed her students’ comments by stating that *Trace Effects* had the potential of improving her students’ oral skills, vocabulary knowledge, and their intercultural communication. She added that Chapter 3 of *Trace Effects* could improve the students’ persuasive skills.

Q: How useful is *Trace Effects* for learning English?

Mrs. Lankouande: It’s very useful. Yes.

Q: What English skills do you think *Trace Effects* can improve?
Mrs. Lankouande: There is the oral skills; and then there is the fact that the kids learn the proper way to meet and exchange with people of a different culture. They also learn to persuade people. For example in Chapter 3 of the game the students are expected to find the members of Andre’s band and try to convince them to come back and play with Andre. So, they learn persuasive skills, but there are also some vocabulary words that they acquire in the process.

The students and their teacher perceived *Trace Effects* to be useful for improving EFL vocabulary, pronunciation, persuasive skills and intercultural communicative skills.

*Confidence.* Most participants in the focus group interview and their teacher in School C perceived the missions and level of English in *Trace Effects* to be difficult. The participants believed that *Trace Effects* was effective in harnessing their sense of personal responsibility. The exchange below illustrates the students’ perceptions of the level of difficulty of *Trace Effects*.

Q: How confident were you in your ability to successfully complete a chapter of *Trace Effects* when you were first introduced to it.

S3: I was confident in my ability to complete the game because it was interesting. I didn’t even notice that time was flying.

S4: I found the game a little difficult on the first day. The vocabulary was difficult. The game objectives that I was asked to complete were also difficult. However, I later learned the vocabulary words and improved.

S1: I came late on the first day of training. I found the game difficult. Two or three people completed the chapter before us [S1 and his team members]. I was a
little disappointed. I was asking myself “Why is this?” “Is it because I don’t know how to play or what?” This affected my confidence but later I liked the game. The day before yesterday I was here [in the computer lab] playing. Sometimes in the objectives they ask you to find Emma [a character in Trace Effects] or something like that. You walk around and look everywhere, you don’t find the person. That can be frustrating. But as soon as you find the person the rest of the game starts to roll. For example in the game there were times I walked around but couldn’t find the person.

S3: If you can’t find the person you can ask other people in the game.

S1: That’s right. But I like to try to find the person myself first before asking.

The above comments from the participants in School C suggested that some students found the vocabulary and missions of Trace Effects difficult. That perception of difficulty affected their confidence. The participants were unanimous on the fact that they perceived Trace Effects to be effective for developing their personal responsibility.

S1: The points motivate us to do more. But what is discouraging is that you can earn 58 points and then a few minutes later you see that you have 51.

S3: This is because you didn’t choose the right answers.

S1: But why don’t they just keep my score the same if I select the wrong options?

S3: No. That’s not good. I like it when they reduce your points for choosing wrong options.

S1: Why?

S3: Because it makes you look hard and think hard before selecting any response.
S1: I guess you’re right. It’s a lesson that they make you learn so that next time you become careful.

S3: That’s it. They don’t want you to play randomly.

S2: You have to be focused if you want to earn more points.

The above exchange between S1, S2 and S3 showed that the participants clearly understood that there was a connection between the efforts they put into gameplay and their game scores. Winning was not a matter of luck but a matter of “looking hard” “thinking hard” and “being careful.” At first, S1 did not see the connection but he was persuaded by other members of the focus group.

Mrs. Lankouande believed that the vocabulary in *Trace Effects* was not hard for his students, but she stated that her students experienced difficulties completing the game missions because they were not used to playing games.

Q: To what extent were your students confident in their ability to successfully complete *Trace Effects*?

Mrs. Lankouande: I think they can understand the game language and vocabulary, but some of them had difficulties completing the missions. That is because they are not used to playing games.

As far as personal responsibility was concerned Mrs. Lankouande perceived *Trace Effects* to be useful for helping her students see that success or failure depended on them.

Q: What do you think about the point system in relation to students’ confidence?

Mrs. Lankouande: The points can improve the students’ confidence, especially when they’re earning points. But losing points can discourage some students.
They will think that they are not good. But after all, I think it’s good that way because the students can see that their success or failure depends on them. If they work hard, they can earn points.

The findings of the study suggested that some participants perceived the missions and vocabulary in *Trace Effects* to be difficult. The students found the scoring system to be useful for developing their personal responsibility.

*Satisfaction.* The participants in School C perceived the points in *Trace Effects* to be some forms of rewards that they got for their performance. They reported feelings of satisfaction for accumulating many points.

Q: How do you feel about the points in *Trace Effects*?

S1: Who speaks of a game speaks of points. It’s a competition and everyone wants to be the best. Everyone wants to get the maximum points.

S1: Without the points there is no reason for playing.

S2: Our goal is to accumulate the maximum points. Without the points playing would not make any sense.

Mrs. Lankouande’s opinion is consistent with her students’. She believed that the points in *Trace Effects* play the same role grades play in the classroom. The points are rewards for the students’ performance.

Q: How do your students feel about the point system in *Trace Effects*?

Mrs. Lankouande: The points are rewards for the students’ efforts. That’s what we do in school when we grade students. We evaluate their oral expression skills and their ability to convince. Through this evaluation we give points and the points
bring a competition between students which encourages them to do better. So, I think the point system is important.

The students and their teacher in School C perceived *Trace Effects* to be motivating. The major design requirements that improve the motivational appeal of the game have been met. Some participants found the game missions and language difficult. However, they believed that the design of *Trace Effects* can help to harness their personal responsibility.

**Perceptions of the impact of Trace Effects on EFL acquisition.** This section presents the findings of the study in relation to the perceived effects of *Trace Effects* on the students EFL knowledge. The findings of the study in School C suggested that the participants perceived *Trace Effects* to have contributed to improving their EFL linguistic knowledge, motivation and social skills.

Q: Can you describe your experience playing *Trace Effects* and participating in the lesson?

S1: If all our English classes could be like the one we participated in today it would be very very interesting. It gives us freedom of expression. We learned the basic structure of a story, and we learned how to tell a story in English.

S2: I like the lesson because it gives us the opportunity to speak and to improve our level of English.

The students’ comments converged towards the idea that the lesson integrating *Trace Effects* was interesting and that it contributed to improving their speaking skills.
However, there was a need for more probing to understand what other English skills the game and lesson contributed to improving.

Q: What did you learn from playing Trace Effects and participating in the lesson?
S3: We learned new words.
S4: As she [S3] said, it improves our vocabulary and our English skills, our computer skills. We learned a lot about the game, the computer and English.
S2: The game allowed us to improve our level of English. And also, Chapter 4 gave us some ideas on pollution. If we are given a topic on pollution on our exam we will have an advantage over those who did not play the game because we already have some ideas to write an essay on.

The results of the focus group interview suggested that the students perceived some improvement in their speaking skills and vocabulary knowledge as a result of interacting with Trace Effects and participating in the lesson that integrated the game.

The finding related to vocabulary acquisition was consistent with the results of observation data. Participant observations of gameplay sessions showed two students checking the meaning of words in their French-English bilingual dictionaries.

The students reported that Trace Effects motivated them to learn English because it combines play and learning. The participants believed that when play and learning are combined it makes learning exciting.

S7: I also think that… we like English, and we want to speak English like Americans. But it is also important to note that we like to play. Given that this is a game and it allows us to improve our English skills, I find it motivating. When
you play while learning it helps you learn better. Even if the training sessions
were spread over the entire school year, I would still attend all of them.

In addition to the perceived cognitive and affective benefits mentioned above, the
results of the study indicated that playing *Trace Effects* in small teams contributed to
improving the participants’ social skills. The following statement from S1 illustrated the
issue.

S1: I think that in terms of friendship, the game allows us to meet and interact
with people that we had never had a chance to talk to. It’s true that we are in the
same class but we don’t get a chance to talk to each other. Had the game brought
together two different classes it would even be better. It would have been an
opportunity for friendship and networking. It would have allowed us to know
each other better, to exchange ideas and to collaborate. In life you need
collaboration.

The motivational power of *Trace Effects* was confirmed by the classroom teacher.
Mrs. Lankouande stated that the use of *Trace Effects* in her teaching was important for
motivating the students to attend English classes. She believed that her students learned
something from their interaction with the game during the gameplay sessions.

Q: What do you think about *Trace Effects* and the lesson that integrated the game?
Mrs. Lankouande: The game? It’s good. I could see that the students were
learning something from gameplay. That’s why they kept attending the sessions. I
can also say that the game motivated the students to attend the lesson. In my
regular classes, half of the class is empty on certain days. The game is good for motivation. But using it in my lessons on a regular basis can pose problems.

Q: What problems can it pose?

Mrs. Lankouande: Ahh, you know the problem is, when you came into our classroom didn’t you notice that there are no power outlets?

I: Yes, I did.

D: That is the first problem that I see. The second problem is that we don’t have computers. Then, we have the problem of power outages. It’s good. It’s good, but it will pose a certain number of problems here.

The participants in School C perceived *Trace Effects* to have contributed to improving their EFL vocabulary knowledge, speaking skills and motivation. They also reported some benefits in terms of social skills.

*Trace Effects and EFL pedagogy.* The second research question in the present study aimed to understand the pedagogical integration of *Trace Effects* into the EFL classroom. A regular English lesson and a lesson that integrated *Trace Effects* were observed in order to gain insights into pedagogical changes related to the integration of *Trace Effects* into EFL teaching. This section describes the lessons and reports the findings of the study in School C.

The first observation focused on a regular English class in School C. Mrs. Lankouande taught the class. It was a one-hour class session that went from 10 to 11 AM on a Wednesday morning. I arrived five minutes earlier to meet Mrs. Lankouande before class. We walked together into the class and she gave me a chair to sit in the back of the
room. As soon as we walked in the students stood up to greet us and she told them to sit. Mrs. Lankouande began class by distributing copies of a reading passage to her students. The passage was excerpted from a 2005 United Nations Children Fund (UNICEF)’s report and focused on child poverty. She told her students to take 10 minutes to read the text silently. Then, she asked a few volunteers to read the text aloud. One student read the first two paragraphs and another picked from there. After ten students had read the text aloud, Mrs. Lankouande decided that it was enough and moved to vocabulary study.

Before coming to class she had made a list of four difficult words from the text for study in class. She wrote all four words on the board. She read the first word and asked her students what it meant. Some students attempted a definition of the word but she was not totally satisfied with the students’ definitions. She wrote the English definition of the word in front of it. After Mrs. Lankouande had realized that some students were still not getting the meaning of the word, she asked one student to translate the word into French, which the student did correctly. Mrs. Lankouande proceeded the same way until she finished all the words. Then, she read the words aloud one at a time while her students repeated after her.

After the vocabulary presentation, Mrs. Lankouande asked her students if they had questions. Almost half of the class had their hands up. She gave the floor to a few students to speak and all of them asked the meaning of additional vocabulary words that were not part of the vocabulary list. After explaining the meaning of some of the words, Mrs. Lankouande told the students to look up the meanings of the remaining words at home as part of their homework. She also gave her students reading comprehension
questions to think about while reading the text at home. She dismissed class and promised to discuss the reading comprehension questions in the following class.

In an informal conversation with Mrs. Lankouande after class she reported that the class that was observed was a typical one. She said that she usually studied reading passages with her students but she would occasionally present grammar lessons or select a topic for her students to debate in class.

Mrs. Lankouande: Generally, in my twelfth grade class we study texts, and I also sometimes present some grammar lessons; I also give them topics to debate from time to time. I have an old topic that I like students to debate and I bring the topic every year either before or after the celebration of the International women’s day. The topic is: “Should a woman earn more money than a man?” This topic gets them talking.

The second observation focused on a lesson that integrated *Trace Effects*. The lesson was taught in the computer lab where the training session took place and only involved the students who participated in the study. The two hour lesson was presented on a Friday afternoon from 3 to 5 PM. Mrs. Lankouande began her lesson by having the students play Chapter 4 of *Trace Effects* in small groups of three for 30 minutes to refresh their memory. The students had already played the chapter before and were already familiar with its content before the lesson.

After playing the chapter for 30 minutes, Mrs. Lankouande asked her students to stop playing. She then put the students into five groups for a speaking activity. There were three groups of five and two groups of four. Before coming to class the teacher
wrote five short stories based on major events that occurred in Chapter 4 of *Trace Effects*. For example, one of the stories focused on how Trace helped the Walkers learn to recycle their bottles. Another story focused on how Trace helped Sydney to reuse her plastic bag. After writing the stories, the teacher printed and cut out the different sentences in each story. She then put the sentences for each story into a plastic bag. There were five bags in total. The teacher asked a member of each group to choose one plastic bag. After each group had chosen a bag, Mrs. Lankouande gave her students 30 minutes to work in their group to reconstruct the original story from the sentences in the bag. There was a great discussion among members of each group as they struggled to reconstruct the story. After the time expired, each group was asked to orally tell the story that they had reconstructed. All members of the group spoke during that activity.

Towards the end of the lesson, all the groups came together and Mrs. Lankouande asked volunteers to tell the entire story of Chapter 4 based on what each group had reported to the class. Some students volunteered and attempted to tell the story while their classmates helped them. It was 5PM when Mrs. Lankouande dismissed class.

The two lessons taught by Mrs. Lankouande were different in many ways. The lesson without *Trace Effects* focused on reading comprehension, involved some drills and translation from English to French. In that lesson, the teacher played an active role in the teaching-learning process. The lesson was teacher-centered.

On the other hand, the lesson that integrated *Trace Effects* was student-centered and featured collaborative work and opportunities for students to speak. The students played *Trace Effects* in small groups, worked together to reconstruct the story and told
the story orally to the entire class. The teacher’s role in that lesson was reduced to that of a facilitator.

The study sought to gain insights into the participants’ perceptions of Trace Effects in relation to EFL acquisition and its integration into EFL teaching. The findings in School C indicated that the participants found *Trace Effects* motivating and believed that interacting with the game contributed positively to their EFL speaking vocabulary and motivation skills. The results of the study also showed that the integration of the game into the EFL classroom in School C was associated with an increased use of student-centered collaborative speaking activities.

**School D**

This section begins by reporting descriptive statistics on the participants before attempting to answer the main research questions that guided the study. The focus of the study was on the participants’ perceptions of the design of *Trace Effects*, their perceptions of the impact of the game on EFL learning as well and the pedagogical integration of the game into teaching and learning.

**Descriptive statistics.** Descriptive statistics on the students’ technology ownership, use and experience are reported in Table 7. A little over half of the students who participated in the study in School D indicated that they had played a computer game at least once in their lives. The majority of them had used the computer and the Internet to do some school work. Very few students have however participated in any formal training on how to use the computer for learning. Only a small percentage of students in School D stated that they owned a personal computer, a family computer or
had Internet connection at home. That was not the case with cellphone ownership. An overwhelming majority of the students who participated in the study from School D indicated that they owned a cellphone.

Table 7

*Descriptive Statistics on Students in School D*

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The English teacher in charge of the 12th grade class that participated in the study in school D was a 36 year-old graduate of the University of Ouagadougou. Mrs. Sanou, as we called her, had a bachelor’s degree from the University of Ouagadougou and a secondary school English teacher certification from the University of Koudougou. She
had eight years of teaching experience, one of which was spent in School D. Mrs. Sanou owned a personal computer, and a smartphone. She however had no family computer and Internet connection at home. Mrs. Sanou had been using computers for four years. She indicated that she had used the computer and the Internet to search for information related to her English courses and to prepare course materials. She had never played a computer game before the study. Mrs. Sanou also indicated that she had never attended any formal training on how to use the computer to teach and had never used it to do so.

The principal of school D was a 48 year-old male who graduated from the University of Ouagadougou with a bachelor’s degree in History and Geography. Mr. Bako had four years of experience as principal of School D which happened to be his first principal position. He owned a cellphone and a personal computer. He had been using computers for six years and had some experience with computer games. Mrs. Bako indicated that he had been formally trained on how to use the computer to perform his duties as principal and he had been using it to do so. Mr. Bako did not have any family computer or Internet connection at home.

**Perceptions of Trace Effects in achieving EFL acquisition.** The first research question addressed the participants’ perceptions of *Trace Effects* in achieving EFL acquisition. The question is divided into two parts. The first part deals with the participants’ perceptions of the design of *Trace Effects* as an educational video game to support EFL acquisition. The second part deals with the participants’ perceptions of *Trace Effects* in terms of its impact on EFL acquisition.
**Perception of the Design of Trace Effects.** This section focuses on the participants’ perceptions of the design of *Trace Effects.* The ARCS model (Keller, 1983; 2000; 2010) provided a framework for guiding data analysis. The participants in school D were interviewed to elicit information on their perceptions of attention, relevance, confidence and satisfaction in *Trace Effects.*

*Attention.* The students who participated in the focus group interview believed that the images were the major aspects of *Trace Effects* that caught their attention. When asked the question “What aspects of *Trace Effects* if any caught your attention?” one student stated the following: “The images are beautiful.” Another student added that the game stories caught his attention. Mrs. Sanou, the English teacher in charge of the class confirmed that finding by stating that the images contributed to catching her students’ attention.

Q: What do you think caught your students’ attention in *Trace Effects?*

Mrs. Sanou: Definitely the images. The characters are well drawn and the students can identify with them. It would even be better if half of the characters in the game were black.

*Relevance.* The students perceived *Trace Effects* to be useful for meeting their English language learning needs. According to the participants, the game can contribute to improving their English speaking, listening as well as their knowledge of American culture.
Q: In what ways can *Trace Effects* contribute to improving your English skills?

S3: I think this game is educational because it allows us to learn how Americans speak English, which is a bit different from what we are used to. It can also allow us to better speak English.

S4: I think we can learn how to interact appropriately with people. It can also allow us to learn English better. When we listen we are able to capture certain words. It also allows us to speak with appropriate intonation and pronunciation.

S5: As one of my classmates said, I think the game allows us to improve our listening skills. Secondly, the game teaches us about American culture. We learn how Americans behave and how they are. That's what I think.

Mrs. Sanou echoed her students’ comments on the perceived value of *Trace Effects* in terms of EFL acquisition, by stating that *Trace Effects* was particularly useful for improving EFL vocabulary, speaking and listening skills.

Q: How useful is *Trace Effects* for English learning?

Mrs. Sanou: The game can improve vocabulary skills, speaking skills, and pronunciation; and even reading; and listening of course. I don’t think writing is stressed here.

The results of the focus group interview with students and the individual interview with the teacher in School D revealed that the participants perceived *Trace Effects* to be useful for improving EFL vocabulary, speaking and listening skills as well as knowledge of American culture.
Confidence. The participants in School D were interviewed to understand their perceptions of the level of difficulty and personal responsibility in Trace Effects. The findings of the study indicated that some participants found Trace Effects difficult. However, it was found that the game was effective for nurturing the students’ perception of personal responsibility.

Low level of computer skills, lack of familiarity with the American accent and the perceived numerous numbers of game missions were among the factors that affected the participants’ confidence.

Q: How confident were you in your ability to successfully complete the first chapter of Trace Effects when you were first introduced to it?
S2: At the first gameplay session I didn’t even know how to use the keyboard very well. Then, I opened the game and realized that I had too many missions to complete. Then I asked myself whether I could complete all those missions in the first chapter of the game. But as I kept moving through the game I realized that they were doable.
S6: The first time I was introduced to the game I found it a bit difficult because of the American accent. I couldn’t get all the words that were spoken in the game. But after playing the game several times, the language became accessible.
S2: I think the game was well designed. The English words used in the game were accessible to us. I could understand most of the conversations in the game. This is to say that the game corresponds to our level of English.
Some participants found Trace Effects difficult the first time they played it.
That was not the case in terms of personal responsibility. Most of the participants seemed to agree that *Trace Effects* provided them with some level of personal responsibility. They believed that there was a clear link between their game score and the efforts they put into the gameplay process. One student commented on this issue by stating the following:

S8: I think the points are very helpful. I discovered that when I select appropriate answers to questions or appropriate conversations I earn more points. If I select wrong answers I lose points. I think the points are useful for telling us to think before selecting a response.

Mrs. Sanou supported her students’ opinion by stating that *Trace Effects* could be a little challenging for students who were not used to games and computers. Concerning the level of English, she believed that most of her students could understand the English used in the game.

Q: How confident were your students in their ability to successfully complete *Trace Effects* when they were first introduced to the game?

Mrs. Sanou: Some of the students were not confident because of technical difficulties. It was their first time playing a computer game. Also, they didn’t know how to use the computer very well. Maybe you noticed it during the training. I have the same problem anyway. It’s mainly the use of the computer. The level of English in the game was ok.
Satisfaction. The students perceived the points in *Trace Effects* to be rewards for their achievement. These rewards were the main source of motivation for the students to continue playing *Trace Effects*. This finding was well articulated in S2’s comment:

The points are useful because when you play you want to earn more points. You look for the appropriate answers to earn points. If there were no points I wouldn’t even bother to look for the right options. I would just select any answer and move on.

Mrs. Sanou was of the opinion that her students wanted to be rewarded for their performance. According to her, the points fulfilled that need. “I think the points are very important. It’s motivating. Everybody wants to get something when doing something,” she stated.

The results of the focus group and individual interviews with students and their teacher in School D showed that the participants perceived *Trace Effects* to be motivating. Some participants perceived the game to be difficult because of their lack of familiarity with the American accent and their low levels of computer skills. The participants believed that the design of *Trace Effects* adhered to the requirement personal responsibility.

**Perception of the impact of Trace Effects on EFL acquisition.** The study aimed to elicit information from the participants on their perceptions of the impact of *Trace Effects* on their EFL knowledge. The results in School D indicated that the game and the lesson contributed to improving the participants EFL listening and speaking skills and most importantly their motivation to learn English.
Q: Can you talk about your experience playing *Trace Effects* and participating in the lesson that integrated the game?

S1: Personally, on the first day of gameplay I didn’t think I could complete even one objective. But as I moved through the game I became competent. Honestly, when I look back at the first day I can see that I learned a lot.

This statement showed that the participants believed that they ‘learned a lot’ from *Trace Effects*. However, what was it that they learned? S1 and S2 have answers to that question:

S1: We learned from the game how to interact appropriately with people. Second, we learned pronunciation.

S2: I think that learning a language involves speaking, and listening to native speakers of the language and also learning to write it. However, in class we only learn how to write in English. Everything is based on writing. This morning we listened to some dialogues from the game and filled in the blanks with missing words. If we could replace our teaching methods by something of that kind I think we would learn English better.

The statements from S1 and S2 suggested that the participants’ perceived some improvements in their EFL vocabulary, listening and speaking skills.

Other students focused more on the affective outcomes suggesting that *Trace Effects* contributed to improving their attitudes towards English and their motivation to learn the language. S6 and S4 are among those students.
S6: I think that the simple fact of changing the teaching methods motivated us and got us interested in the lesson and in English. Sometimes we find our regular English classes boring. Not interesting at all. But bringing something new like the game into the classroom motivated us to pay attention to the lesson.

S4: I think that in order to learn a language you must like the language first. But sometimes the way English is taught does not motivate us to like it. The lesson this morning focused on that. It motivated us to like English and made us want to learn the language. If we could have more of those lessons it would be helpful.

Mrs. Sanou supported her students’ opinions by stating that the use of *Trace Effects* in the lesson contributed to improving her students’ vocabulary knowledge. She also stated that the game contributed to catching and holding her students’ attention from the beginning of the lesson to the end; something that a regular lesson could not do.

Q: What is your opinion about *Trace Effects* and the lesson that integrated the game?

Mrs. Sanou: It is the lack of means; otherwise it would be good to use this game in all of our lessons. The lessons are boring. Yeah. This one [lesson integrating *Trace Effects*] caught their attention from the beginning to the end. They were free. It allowed them to improve their vocabulary, to keep some words because they had been used in context. They didn’t even need to check the meaning of some words as they could guess the meaning through the actions in the dialogues and pictures.
Mrs. Sanou indicated that the use of *Trace Effects* in the lesson promoted student-centered learning, which was better than her regular lesson.

I think this game is even better than our reading comprehension or listening comprehension in the classroom because it is student-centered. They have to act.

Findings from the focus group and individual interviews with the students and their teacher in School D indicated that *Trace Effects* contributed to improving their EFL linguistic and affective skills. In terms of linguistic knowledge, the participants indicated that the game and lesson contributed to improving their EFL listening, speaking and vocabulary knowledge. On the affective domain, the participants believed that *Trace Effects* contributed to improving their attitudes towards English and motivation to learn it. Their teacher supported the students’ opinions and added that *Trace Effects* promoted student-centered learning.

**Trace Effects and EFL pedagogy.** The second research question in the present study aimed to understand how teachers’ integrated *Trace Effects* into their pedagogy. Two observations were conducted in order to shed light on that issue. One observation focused on a regular English class without the use of *Trace Effects* and the other one focused on the lesson that integrated *Trace Effects*. Data from these two observations was analyzed in order to identify any change in pedagogy when the teachers’ moved from a lesson without a game to one that integrated *Trace Effects*.

The regular lesson observed focused on reading comprehension and was taught on a Thursday morning from 10:30 to 12. I came to School at 10. That was break time for the students. I met Mrs. Sanou to chat before class. At 10:30 we walked to class and the
students stood up to greet us. Mrs. Sanou greeted the students and told them to sit. She started by talking about International women’s day as a warm-up to get the students interested in the lesson. Then, she handed a reading passage over to the students. Each student took one text and passed the other ones around. The reading passage was about women’s rights during armed conflicts.

Mrs. Sanou gave her students 10 minutes to read the text silently. Then, she wrote five words extracted from the reading passage on the boards. The five words were placed on the left-hand side column of a table. On the right-hand side were five synonyms of the words. Mrs. Sanou asked for a volunteer to come to the board and draw a line connecting the first word on the left hand-side column to its synonym on the right-hand side column. One student volunteered and went to the board to connect the first word to its synonym. The same process was repeated until all words were correctly matched with their synonyms. The students got two of them wrong and the teacher had to intervene to explain the meaning of those words.

After the synonym matching activity, Mrs. Sanou conducted another activity called ‘True or False.’ She wrote six statements on the board and asked the students to state whether these were true or false statements based on their understanding of the reading passage. The students were given 10 minutes to complete the task by writing in their notebooks. After the time expired, Mrs. Sanou asked the students to volunteer to give their answers. She read the first statement out loud and asked a student to say whether the statement was true or false based on the information in the text. One student
hesitated and raised her hand. She said “False.” She was correct. That process was repeated for all six statements.

After the ‘True or false’ activity it was time to read the text aloud. Mrs. Sanou asked a few students to volunteer to read the text aloud. One student read the first two paragraphs and another one picked it from there until the end of the text. Besides asking for volunteers, she also randomly picked on students to read the text. She occasionally stopped the students during the reading activity to correct pronunciation mistakes.

After the reading aloud, the teacher wrote reading comprehension questions on the board and asked her students to read the text at home while trying to find answers to the questions. Class was dismissed after the students had copied the questions in their notebooks.

After class, an informal interview was conducted with Mrs. Sanou in order to ascertain that the lesson observed was a typical lesson. She stated that it was a typical lesson. She suggested that in addition to reading comprehension she occasionally taught listening.

Q: Was that a typical lesson for your English class?

Mrs. Sanou: Yes. I usually teach reading comprehension which is a text to be read and there are no illustrations in the text. It’s really boring. Reading comprehension; I even don’t like teaching reading comprehension. At the end of the lesson, I don’t know what he pupils retain.

Q: What do you do exactly?
Mrs. Sanou: In my reading comprehension class as its name indicate I try to motivate the students, to warm them up before ending out the texts. After that, we match synonyms. Then, I ask them true or false questions. It is the kind of what we call skimming; just to go through the text quickly to check some information. Then, there are scanning questions to check for detail information in the text. After that, I ask the students one or two questions on a theme related to the text. This is what I usually do. But sometimes I do listening activity. Instead of the students reading, I read the text to them. They listen and complete some gaps and missing words. But that activity is not usual. I prefer reading comprehension because they really have problems with reading comprehension.

The lesson integrating *Trace Effects* focused on listening. It was a one hour lesson that took place in the regular classroom on a Tuesday morning from 9 to 10AM. Mrs. Sanou went to class with handouts, a laptop computer and speakers. The handouts were prepared with transcripts of the dialogues in Chapter 3 of *Trace Effects*. Mrs. Sanou copied a few lines of dialogue and deleted some words from the text to create a gap activity. She greeted her students and distributed the texts to them. Then, she set the laptop computer on her desk and connected the speakers to it. She opened Chapter 3 of *Trace Effects* which was about music in New Orleans. She played the game dialogues twice while the students listened actively. Then, she asked them to listen and fill in the blanks in the handouts with the missing words. She then played the dialogue twice while the students completed the worksheets. Mrs. Sanou played the dialogue one more time for the students to double-check their answers.
She then proceeded to correct the exercise. She asked her students what the first missing word in the handout was. One student volunteered to go to the board to write the word “Hi”. It was the correct response. The same procedure was followed to complete all the gaps. The mean score of the students on the listening task was 9 out 14 possible points ($SD = 1.92$). A sample of the students’ work is included in Appendix F.

After all the correct words were identified and written on the board, Mrs. Sanou pronounced each word or phrase and asked her students to repeat after her. After that, she played the dialogue while the students followed in order to check the pronunciation of the words they missed. That marked the end of class.

The regular classroom lesson and the one integrating *Trace Effects* exhibited some differences in terms of pedagogy. The major difference was that the lesson integrating *Trace Effects* focused on listening while the one without the game was a reading comprehension lesson.

The present study aimed to investigate students’ and their teacher’s perceptions of *Trace Effects* in achieving EFL acquisition. The findings in School D indicated that the participants perceived *Trace Effects* to be motivating. They indicated that their interaction with the game and their participation in the lesson integrating it contributed to improving their EFL vocabulary, listening, speaking and motivation. It was also found that the lesson that integrated *Trace Effects* focused more on listening while the one without the game focused on reading comprehension.
The findings of the study were reported for each school that participated in the study. In each case, descriptive statistics were reported followed by the main findings of the study. Data concerning the participants’ perceptions of the design of *Trace Effects*, their perceptions of the effect of the game on their EFL knowledge and insights on the pedagogical integration of the game into EFL teaching were reported in each case. The next section reports the results of a cross-case analysis in order to identify salient themes and patterns that emerged from all four schools.

**Cross-case Analysis**

The previous sections presented the results of the study in each school. Cross-case analyses were then performed on the data collected from the four schools in order to identify salient themes. This section presents the descriptive statistics of all the schools combined and the themes that emerged from the cross-case analyses.

**Descriptive statistics.** This section reports the descriptive statistics for the students, teachers and principals who participated in the study. Data on the participants’ demographic information, technology experience, technology use, and technology ownership is reported.

**Students.** A total of 113 students participated in the study from the four schools. The gender break down was 46.90% females and 53.10% males. The mean age of the students was 19.02 ($SD=1.09$). The mean computer experience was 23.90 months ($SD=25.08$). Table 8 reports the descriptive statistics of the students on all four schools combined. The findings of the study indicated that the majority of the students in all schools combined had never played a computer game but has been using computers and
the Internet to do some school related work. A comparison across schools however showed a wide variety of student gaming experience. The percentage of participants who had played a video game at least once is higher in Schools A (86.66%) and D (57.10%) compared to B (38.29%) and C (26.08%).

It was also found that the majority of the participants had never taken part in any formal training on how to use the computer for learning but had been using the computer and Internet in connection with learning. Most participants across all four schools had no personal computer or Internet connection at home. However, the overwhelming majority of the students across all schools reported cellphone ownership.
Table 8

*Descriptive Statistics for All Schools Combined*

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming Experience</td>
<td>113</td>
<td>46.90</td>
<td>53.10</td>
<td>100</td>
</tr>
<tr>
<td>Used Internet for School Work</td>
<td>113</td>
<td>75.22</td>
<td>24.78</td>
<td>100</td>
</tr>
<tr>
<td>Used Computer for School Work</td>
<td>110</td>
<td>80.91</td>
<td>19.09</td>
<td>100</td>
</tr>
<tr>
<td>Training on Using Computer for Learning</td>
<td>112</td>
<td>29.46</td>
<td>70.54</td>
<td>100</td>
</tr>
<tr>
<td>Computer Ownership</td>
<td>113</td>
<td>12.39</td>
<td>87.61</td>
<td>100</td>
</tr>
<tr>
<td>Family Computer Ownership</td>
<td>110</td>
<td>27.27</td>
<td>72.73</td>
<td>100</td>
</tr>
<tr>
<td>Internet Connection at Home</td>
<td>111</td>
<td>18.92</td>
<td>81.08</td>
<td>100</td>
</tr>
<tr>
<td>Cellphone Ownership</td>
<td>113</td>
<td>93.81</td>
<td>6.19</td>
<td>100</td>
</tr>
<tr>
<td>Smartphone Ownership</td>
<td>113</td>
<td>27.43</td>
<td>72.57</td>
<td>100</td>
</tr>
</tbody>
</table>

**Teachers.** Four 12th grade English teachers participated in the study from all four schools. There were two males and two females. The participants’ ages ranged from 35 to 46. All the participants had at least a bachelor’s degree and at least eight years of teaching experience.

As far as technology use in teaching was concerned, the participants consistently reported across all schools that they had never participated in any formal training on how to use the computer in teaching and had never done it. The principals confirmed that finding in interviews. They indicated that no computer technology equipment existed in
the classrooms at their schools. The principals reported that their schools did not offer any training to teachers on how to use technology in teaching, and that technology was not used in actual teaching in the classroom.

In terms of gaming and technology experience, all the teachers who participated in the study except the teacher from School A, reported that they had never played a computer game. The teachers from Schools A, C and D reported that they used the computer and Internet to prepare course materials. Only the teacher from school B indicated that he had not used the computer or Internet to prepare course materials. That was probably due to the fact that he had just bought his first computer a few weeks after the study began at his school. In an Interview, Mr. Nikiema reported that he did not know much about computers but hoped to learn the basics through the project.

The cross-case analysis results also indicated that all the teachers across all schools owned a personal computer and a cellphone. Only the teacher in School D reported smartphone ownership.

**Principals.** Four principals from the four schools participated in the study. All principals were males and their ages were comprised between 48 and 57. They had at least a bachelor’s degree and four years of experience as principals.

The principals of Schools A and C had 13 years of computer experience. The principal of School B had 18 years of computer experience and the one from School D had six. All the principals but the principal of School D, indicated that they had never played a computer game.
In terms of training, all the principals indicated that they had been trained in how to use the computer and Internet in connection with their work as principals. They also indicated that they used the computer to perform administrative tasks.

In terms of technology ownership, all the principals who participated in the study reported that they had an office computer and a personal computer except the principal of School C who reported no ownership of personal computer. All the principals indicated that they owned a cellphone.

**Major themes across schools.** The present study sought to understand students’ and teachers’ perceptions of *Trace Effects* in relation to EFL acquisition. The study aimed to gain insights into the process of integrating *Trace Effects* into EFL teaching. The major themes that emerged from the study in all four schools are reported in Table 9. The results of the cross-case analysis are reported in this section.
Table 9

Summary of Themes in All Schools

<table>
<thead>
<tr>
<th>Perception of the Design of Trace Effects</th>
<th>Perception of Learning</th>
<th>Pedagogical Integration of Trace Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td><strong>Cognitive outcomes</strong></td>
<td><strong>Lessons integrating Trace Effects</strong></td>
</tr>
<tr>
<td>- Pictures and stories of Trace Effects</td>
<td><strong>EFL Linguistic Knowledge</strong></td>
<td><strong>Communication approach</strong></td>
</tr>
<tr>
<td></td>
<td>- Vocabulary</td>
<td>- More speaking activities</td>
</tr>
<tr>
<td></td>
<td>- Pronunciation</td>
<td>- Spontaneous production of English</td>
</tr>
<tr>
<td></td>
<td>- Listening skills</td>
<td>- Student-centered</td>
</tr>
<tr>
<td></td>
<td>- Speaking skills</td>
<td>- Group activities</td>
</tr>
<tr>
<td></td>
<td>- Argumentative writing skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Problem solving skills</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td><strong>Affective outcomes</strong></td>
<td><strong>Lessons without Trace Effects</strong></td>
</tr>
<tr>
<td>- Trace Effects perceived to be useful</td>
<td>- Increased motivation</td>
<td><strong>Reading approach</strong></td>
</tr>
<tr>
<td>for improving English vocabulary,</td>
<td>to learn EFL</td>
<td>- More writing</td>
</tr>
<tr>
<td>pronunciation, spelling,</td>
<td>- Positive attitudes</td>
<td>- Drills</td>
</tr>
<tr>
<td>pragmatics, speaking,</td>
<td>towards English</td>
<td>- Manipulation of grammatical</td>
</tr>
<tr>
<td>listening</td>
<td></td>
<td>structures in isolated sentences.</td>
</tr>
<tr>
<td><strong>Confidence</strong></td>
<td><strong>Social outcomes</strong></td>
<td>- Teacher-centered</td>
</tr>
<tr>
<td>- Low expectation for success in Trace</td>
<td>- Improved social</td>
<td>- Translation</td>
</tr>
<tr>
<td>Effects due to perceived difficulty of</td>
<td>skills</td>
<td></td>
</tr>
<tr>
<td>game missions, lack of familiarity with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American accent, low computer and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gaming proficiency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Scoring system in Trace Effects</td>
<td><strong>Technical skills</strong></td>
<td></td>
</tr>
<tr>
<td>perceived to be useful for developing</td>
<td>- Improved computer</td>
<td></td>
</tr>
<tr>
<td>personal responsibility</td>
<td>technology skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Points in Trace Effects perceived as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>important rewards for efforts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Perceptions of the Design of Trace Effects.** The findings of the study related to the participants’ perceptions of the design of *Trace Effects* are organized according to Keller (2000; 2010)’s ARCS model. According to the ARCS model, perceived attention, relevance, confidence and satisfaction constitute the major design requirements for motivation to take place. The overall results of the study indicated that the participants perceived *Trace Effects* to be motivating.

**Attention.** The students and teachers who took part in the study consistently reported across all four schools that the images in *Trace Effects* were visually appealing and caught their attention. For some participants, they were part of the most important aspects of the game. Participants in some schools also reported that the game story and adventures caught their attention.

**Relevance.** Relevance referred to the perceived usefulness of *Trace Effects* for EFL learning. The participants perceived *Trace Effects* to be useful for improving their EFL knowledge in the following areas: vocabulary, speaking, listening, pragmatics, intercultural communication and American culture.

Even though there was an agreement among most participants that *Trace Effects* was useful for EFL learning, one teacher believed that there was room for improvement in the themes developed in the game. He stated that topics such as holding a concert to raise funds for a school may not be relevant to African students’ experiences. Instead, he believed that the game should have included stories with wild animals. However, that finding was not confirmed by students or teachers at other schools.
Confidence. Confidence referred to the participants’ perceived expectancy for success in *Trace Effects*. The themes that emerged from the study in relation to the participants’ perceived confidence related to difficulty and personal responsibility. In terms of difficulty, the findings indicated that some participants across all four schools perceived *Trace Effects* to be difficult. They reported that they found the game missions and the level of English difficult. These problems were compounded by the participants’ perceived low level of computer and gaming proficiency.

Most participants across all schools perceived *Trace Effects* to be effective for developing personal responsibility. They believed that earning or losing points was a matter of how much effort one put into gameplay. The participants felt that they had some degree of control in the game.

Satisfaction. Satisfaction referred to the perceived rewards that the students got by playing *Trace Effects*. The findings indicated that the participants perceived the points to be important rewards for their performance. Some students even went further to suggest that they would not play the game if there were no points involved. The teachers across all schools also stressed the importance of the points as rewards. One teacher’s comments summed up their opinion nicely when she stated: “everybody wants to get something when doing something.”

Perception of *Trace Effects* and Learning. The present study sought to understand the integration of *Trace Effects* into Teaching and Learning and the perceived impact of the game on EFL acquisition. The findings of the study revealed a perceived
positive effect of *Trace Effects* on EFL acquisition. The findings are categorized into
cognitive, affective and technical outcomes.

*Cognitive outcomes.* The participants in the study perceived some positive
cognitive outcomes as a result of interacting with *Trace Effects* and participating in the
lesson integrating the game. The participants reported cognitive gains in EFL vocabulary
and speaking skills. In addition to these most salient themes, most participants across all
schools indicated that the game improved their EFL listening, pragmatics and
intercultural communication skills. Some findings from the study transcend the field of
linguistic. The participants reported that *Trace Effects* contributed to improving their
problem-solving skills.

*Affective outcomes.* The affective outcomes pertain to the participants’ motivation
and attitudes towards EFL. The results of the study across all four schools revealed a
perceived positive impact of *Trace Effects* on motivation. Most participants were
unanimous that the game contributed to improving their motivation to learn English.
Some participants in one school indicated that interacting with *Trace Effects* and
participating in the lesson also improved their attitudes towards EFL.

*Computer Technology Skills.* In addition to the cognitive and affective outcomes,
some participants reported improvement in their computer skills. Some students in one
school reported that playing *Trace Effects* improved their computer skills.
Social Skills. Finally, the participants in the study reported social benefits related to their interaction with Trace Effects. The students believed that playing Trace Effects gave them the opportunity to meet, socialize and collaborate with classmates they had not had a chance to interact with before.

Trace Effects and EFL pedagogy. The second research question in the present study aimed to understand the integration of Trace Effects into the EFL classroom. The study attempted to elicit information on any changes in teacher pedagogy that were associated with the integration of Trace Effects into EFL lessons.

The findings across all four schools indicated that the teachers tended to use more speaking and listening activities in the lessons that integrated Trace Effects while reading and writing dominated the lessons without the game. When speaking activities were used in the lessons without the game they were in the form of reading aloud, listen-and-repeat drills or pre-planned spoken responses to reading comprehension questions. On the other hand, the speaking activities used in the lessons that integrated Trace Effects involved collaborative activities that encouraged spontaneous use of English. Furthermore, there was a significant change in pedagogy in School C as the teacher moved from a teacher-centered teaching approach in the regular class to a student-centered one when the game was used.

Chapter Summary

The present chapter reported the findings of the study related to the integration of Trace Effects into 12th grade EFL education in Burkina Faso. The findings of the study indicated that the participants perceived Trace Effects to be motivating. The game
seemed to have adhered to Keller (2000; 2010)’s motivational design requirements such as attention, relevance, confidence and satisfaction.

Furthermore, the participants believed that their interaction with *Trace Effects* and their participation in the lessons integrating the game resulted in positive cognitive and affective gains. The participants reported improvement in their EFL vocabulary knowledge, speaking, listening and their problem-solving skills. In terms of affective skills the participants believed that their interaction with *Trace Effects* contributed to improving their motivation and attitudes towards English.

In terms of pedagogy, the results of the study suggested that the integration of *Trace Effects* into EFL teaching led to some pedagogical changes. More speaking and listening activities were observed in lessons that integrated *Trace Effects* compared to the ones that did not. The speaking activities involved collaborative work and encouraged spontaneous use of the English language. It was observed that the teachers moved from teacher-centered pedagogical approaches to student-centered ones when *Trace Effects* was used. The next chapter discusses the findings reported in this chapter.
Chapter 5: Discussion

The present study aimed to gain deep insights into students’ and teachers’ perceptions of *Trace Effects* in achieving EFL acquisition and the pedagogical integration of the game into the EFL classroom. A total of 113 12th grade students, four EFL teachers and four principals from four high schools in Burkina Faso participated in the study. The participants in each class interacted with the game for about one month. In addition to playing the game, the teachers were asked to plan and teach EFL lessons that integrated *Trace Effects* in their 12th grade classes. Data was collected with interviews, participant observations and document analyses. The findings of the study indicated that the participants perceived *Trace Effects* to be motivating in terms of design. The participants also perceived the game to have contributed to improving their EFL knowledge and motivation. The results of observational data revealed that the integration of *Trace Effects* into EFL instruction was associated with changes in the teachers’ EFL pedagogy. This section discusses the findings of the study and situates them within the larger context of educational game design theories and EFL pedagogy.

Technology Integration into EFL Teaching and Learning in Sub-Saharan Africa

The results of data collected with observations, questionnaires and individual interviews with the teachers and principals at the four schools indicated that computer technology was not integrated into EFL teaching and learning. All the teachers who participated in the study indicated that they had never participated in any formal training on how to use technology in teaching and learning. They also reported that they had never used computer technology in their EFL teaching. The principals from all schools
confirmed that result. This finding was consistent with the results of studies that reported very limited technology integration into actual teaching and learning in most Sub-Saharan African schools (Hennessy et al., 2010; Karsenti & Ngamo, 2007). According to these scholars, technology use in teaching and learning in most schools is limited to teaching students how to use technology rather than using technology to improve learning.

The results of the study suggested that the problem was mainly due to the lack of adequate technology infrastructure in the schools as well as the lack of training on technology use in teaching and learning. In the four schools where the study was conducted, there were 32 functional computers for a student population of 9,080. That gave an approximate ratio of 284 students per computer. No computer equipment was found in any classroom in the four schools. The few computers available were kept in the computer labs. In addition to the shortage of computers, Internet connection was sporadic in all four schools. Power outages were very recurrent especially in the hot months of April, May and June. Other studies conducted on technology integration into secondary education in Sub-Saharan Africa have reported the same results concerning the lack of adequate technology infrastructure (Farrell & Trucano, 2007; Hawkins; 2002; Hennessy, Harrison, Wamakote, 2010; Moster & Nthetha, 2007).

As far as training is concerned, the findings of the study indicated that most of the teachers and students who took part in the study had never participated in any formal training on how to use computer technology in teaching or learning. They either taught themselves how to use the computer or learned it from friends and colleagues. Previous studies have drawn attention to the need for teacher training on technology use in
teaching in Sub-Saharan Africa. (Agyei & Voogt, 2012; Evoh, 2009; Harrison & Wamakote, 2010; Kpangban & Adomi, 2010; Okojie, 2006; Tchombé, 2009)

While it is possible to acquire some basic computer skills without participating in any formal training, integrating technology into teaching requires a significant amount of training. Teachers need technical and pedagogical training on how to locate, evaluate, and use technology resources in their lessons. The TESOL Technology Standards (Healey et al., 2008) provides a useful framework for teacher training by outlining technology and English language standards for teachers and students. Without training, an effective integration of technology into teaching will remain a challenge.

In the particular context where the study took place, characterized by the lack of technology infrastructure and training, it was no surprise that technology in general and computer games in particular were not used in teaching and learning. The next section discusses the main results of the study.

**Perceptions of Trace Effects in Achieving EFL Acquisition**

The first research question in the study was:

What are students’ and teachers’ perceptions of Trace Effects in achieving EFL acquisition?

The question was broken down into the following sub-questions:

a. What are students’ and teachers’ perceptions of the design of Trace Effects?

b. What are students’ and teachers’ perceptions of the impact of Trace Effects on EFL acquisition?
Perceptions of the design of Trace Effects. The potential of educational video games to achieve positive learning outcomes depends to some extent on the effectiveness of their design. However, the design of video games for learning can be a daunting task because of the need to attend both to game design theories and learning theories. The present study examined the participants’ perception of the design of Trace Effects. Keller (2000; 2010)’s ARCS model was deemed an appropriate framework for guiding the study.

The findings of the study indicated that the participants perceived Trace Effects to be motivating in terms of attention, relevance, confidence and satisfaction. In terms of attention, the participants indicated that the images in Trace Effects were visually appealing and motivated them to continue playing the game. According to Keller (2000; 2010) in order for an instructional material to be motivating it has to include some elements that capture and hold learners’ attention. The same argument was made by Garris et al. (2002) when discussing sensory stimuli. The researchers suggested that sound effects and dynamic visuals can contribute to grabbing learners’ attention.

The findings of the study indicated that the participants perceived the content of Trace Effects to be useful for EFL learning. The participants perceived Trace Effects to be useful for learning EFL vocabulary, pronunciation, speaking, listening, pragmatics and intercultural communication. According to Keller (2000; 2010) the perceived relevance of the content of instruction to learners’ needs can contribute to increasing the motivational aspects of instructional materials. Relevance is probably one of the most important contributions of Keller’s model to the design of educational video games.
Game design models such as Malone and Lepper (1987) and Garris et al. (2002) do not pay enough if any attention to instructional content. Garris et al. (2002) mentioned instructional content broadly under ‘input’ in their model without going into details as to the nature of the content of an instructional video game.

As far as confidence is concerned, the findings of the study revealed that some participants perceived Trace Effects to be difficult. They indicated that the game’s missions and level of English were difficult. The participants’ perceived inadequate computer technology and gaming proficiency contributed to their perceptions of Trace Effects as being difficult. Most participants perceived Trace Effects to be effective in developing their sense of personal responsibility. Keller (2000; 2010) indicated that in order for an instruction to be motivating for learners, they have to perceive it to be at an optimal level of difficulty. In that regard, instruction that is perceived to be too difficult is likely to kill learners’ motivation and one that is perceived to be too easy may be boring for learners (Keller, 2010). Malone and Lepper (1987) and Garris et al. (2002) made the same argument when they indicated that there need to be an appropriate level of challenge in a game for it to be motivating for players.

When discussing level of difficulty, Keller (2000, 2010) refers to the content of instruction. The findings of the present study suggested that both the level of difficulty of the content of instruction and the technology used could affect learners’ confidence. Some participants in the present study reported that they had a low expectancy for success in Trace Effects because of their perceived lack of adequate computer and gaming skills.
As far as personal responsibility is concerned, Keller (2000; 2010) believes that for an instruction to be motivating for learners they need to perceive success as being the result of personal effort rather than good luck. In other words, the learners are more likely to put efforts into gameplay if they know that doing so will lead to success. Malone and Lepper (1987) and Garris et al. (2002) also referred to that idea by using the term ‘control.’ In order for a game to be motivating for players they need to feel that they have some control over it. They need to know that winning or losing depends on their efforts, skills and game strategy rather than luck. In short, the players need to perceive a clear link between their actions and their consequences.

In terms of satisfaction, the results of the study indicated that the participants perceived the points that they earn in *Trace Effects* to be important rewards that can provide them with some degree of satisfaction over their accomplishments. According to Keller (2000; 2010) and Garris et al. (2002), internal or external rewards can contribute to increasing the motivational aspects of an instruction. In other words, learners are more likely to complete an instruction if they perceive some rewards associated with it.

The results of the present study indicated that the participants perceived the design of *Trace Effects* to be motivating. According to the participants, the design of the game addressed the issues of attention, relevance, confidence and satisfaction reasonably well. These conditions according to Keller (2000; 2010) contribute to improving the motivational aspects of a design.
Perceptions of the impact of *Trace Effects* on EFL acquisition. The present study aimed to gain a deeper understanding of the participants’ perceptions of the impact of *Trace Effects* on EFL acquisition. The findings of the study indicated that the participants perceived some cognitive, affective and social outcomes associated with their interaction with *Trace Effects*.

**Cognitive outcomes.** The findings of the study indicated that the participants perceived *Trace Effects* to have contributed to improving their EFL linguistic and problem-solving skills. The participants in the study indicated that *Trace Effects* contributed to improving their EFL vocabulary, speaking, listening, pragmatics and intercultural communicative skills. The finding concerning the impact of games on EFL vocabulary acquisition has been consistent in the literature (deHaan et al., 2010; Rankin et al., 2009; Yip and Kwan, 2006). Holland et al. (1999) reported similar findings concerning Arabic vocabulary. The results of the present study are consistent with the findings of previous studies suggesting that video games contribute to improving EFL speaking and listening skills (Green et al., 2011; Liu & Chu, 2010).

In terms of pragmatic knowledge, the results of the present study indicated that the participants perceived *Trace Effects* to have had a positive impact on their EFL pragmatic knowledge and intercultural communication skills. The finding on pragmatic knowledge is consistent with the results of other studies that looked at the impact of video games on Spanish pragmatics (Sykes, 2008) and ESL pragmatics (Yang & Zapata-Rivera; 2010). Guillén-Nieto and Aleson-Carbonell (2012) and Struppert (2010) also
found that video games have the potential for improving intercultural communicative competence.

**Affective outcomes.** The results of the study indicated that there was some perceived improvement in the participants’ affective skills as a result of playing *Trace Effects* and participating in the lesson that integrated it. The participants reported an increased motivation to learn EFL and a positive attitude towards the language. Many studies conducted on the impact of games on language acquisition have reported similar results (Connolly et al., 2011; deHaan, 2011; Oldaker, 2010; Yang & Zapata-Rivera, 2010).

**Social outcomes.** The results of the study also indicated that *Trace Effects* contributed to improving the students’ social skills. The students who participated in the study reported that playing *Trace Effects* in small groups with their classmates provided them with an opportunity for socialization and collaboration.

**Computer technology skills.** The results of the study showed that the participants believed that playing *Trace Effects* contributed to improving their computer technology skills. The participants indicated that playing *Trace Effects* improved their knowledge of English and the computer. That aspect of game-based learning has received little attention in the developed world because most students grow up with computers. However, in the situation of Burkina Faso where students have little opportunity to interact with computers on a daily basis, it is an important finding. That finding should be situated within the larger context of CALL education. The TESOL Technology Standards (Healey et al., 2008) have outlined both technology and language learning outcomes for
students. The goal of introducing computers into the foreign language classroom is for students to develop competence in the foreign language while learning basic computer operation.

The findings of the study indicated that the participants perceived the design of Trace Effects to be motivating. The findings also indicated that the participants perceived some improvements in their EFL knowledge, motivation, social and computer technology skills as a result of their interaction with Trace Effects.

Trace Effects and EFL pedagogy. The present study aimed to gain deep insights into EFL pedagogical changes associated with the integration of Trace Effects into teaching. The findings of the study indicated that teaching without Trace Effects was more teacher-centered while teaching with Trace Effects was more student-centered. Furthermore, it was found that the regular lessons without Trace Effects were centered on reading comprehension, writing, grammar, vocabulary and involved translation and drills. On the other hand, the lessons that integrated Trace Effects focused on speaking and listening and involved more spontaneous production of English and group activities.

An analysis of the activities that were observed during the lessons revealed that the lessons without Trace Effects adopted a combination of the reading and audiolingual approaches while the ones that integrated Trace Effects were leaning more towards the communicative language teaching approach (Celce-Murcia, 1991, Richards, 2006; Richards & Rogers, 2001). Student-centered learning, group activities and an emphasis on speaking are characteristics of the communicative language teaching approach (Celce-Murcia, 1991). That finding is consistent with the view expressed by scholars in foreign
language pedagogy according to whom the use of games and simulations in the second and foreign language classroom is consistent with the communicative language teaching approach (García-Carbonell et al., 2001; Warschauer & Meskill, 2000). This is because video games put learners in authentic learning situations where they get a chance to communicate with native speakers of the language (García-Carbonell et al., 2001).

Chapter Summary

This chapter discussed the major findings of the study. The results of this inquiry were situated within the broad context of technology integration into teaching and learning in Sub-Saharan Africa, game-design theories (Garris et al., 2002; Malone & Lepper, 1987), instructional design theories (Keller, 1983; 2000) and game-based second and foreign language learning and pedagogy. The next chapter presents the conclusions of the study and makes recommendations for future studies.
Chapter 6: Conclusions

The results of various studies suggested that video games have the potential to improve second and foreign language learning (Rankin et al., 2009; Shih & Yang, 2008; Struppert, 2010) and motivation (Connolly et al., 2011; deHaan, 2011; Yang & Zapata-Rivera, 2010). The design of foreign language learning games and their integration into teaching and learning in the classroom has been a thorny issue among scholars of game-based foreign language learning.

The present study aimed to investigate students’ and teachers’ perceptions of Trace Effects in achieving EFL acquisition. It sought to elicit deep insights into pedagogical changes associated with the integration of Trace Effects into EFL teaching and learning. Data was collected with interviews, participant observations, and document analyses in four high schools in Burkina Faso and involved 113 12th grade students, four English teachers and four principals. Qualitative data analysis procedures were applied to the data in order to identify themes and patterns that were salient across all schools. The results of the study were reported in Chapter 4, followed by a discussion in chapter 5. This chapter presents the conclusions of the study, its limitations, reports some difficulties encountered during fieldwork, and makes recommendations for further studies.
Conclusions of the Study

This section reports the major conclusions of the study.

**Technology integration into teaching and learning.** The results of descriptive data collected with questionnaires from the students, the teachers, and the principals suggested that technology integration into EFL teaching and learning in the public schools studied in Burkina Faso is still at an embryo stage. The students reported that they used computers and the Internet to access learning materials online. The teachers indicated that they use the computer and Internet to search for course materials and prepare their courses. However, no technology use in actual teaching and learning was reported by any of the participants.

**Perceptions of the design of Trace Effects.** The interview, observation, and document analyses data point to the conclusion that *Trace Effects* was perceived by the participants to be motivating. The design of the game appears to adhere reasonably well to the requirements of motivational design, namely attention, relevance, confidence, and satisfaction (Keller, 2000; 2010). Some participants found *Trace Effects* difficult, but the difficulty was mostly due to the participants’ lack of familiarity with computers and games.

**Perceptions of the impact of Trace Effects on EFL acquisition.** *Trace Effects* contributed to perceived improvements in EFL cognitive and affective outcomes. Areas of perceived EFL improvements included vocabulary, listening, speaking, pragmatics, intercultural communication and motivation.
Trace Effects and EFL pedagogy. The results of participant observation data collected on regular EFL lessons without a game and lessons that integrated Trace Effects led to the following conclusion: The integration of Trace Effects into teaching was associated with a shift in EFL teaching approach from a focus on the reading and audiolingualism approaches to a focus on the communicative language teaching approach. The lessons without the game included more reading comprehension, reading aloud, vocabulary lists, and drills which are characteristics of the reading and audiolingual approaches. On the other hand, the lessons integrating Trace Effects involved more group discussions, and other speaking activities that encouraged EFL production.

Implications of the Study

The study has several implications for game design for foreign language learning as well as their integration into the classroom. The present study used a motivational design to examine perceptions of game design. Based on the findings of the study, one may argue that the use of motivational design models (Keller, 2010) for guiding the design of educational video games for foreign language learning might be a path worth exploring. The advantage of using The ARCS model is that it includes both game design and instructional design elements.

The results of the present study revealed that the difficulty level of the language used in the game was not the only aspects of the game that had the potential of affecting learners’ motivation. Computer skills and gaming proficiency were also found to play an important role in improving or reducing learners’ motivation. Some participants had low
expectations for success in the game because of their perceived lack of computers skills or gaming proficiency. The implication of that finding is that game designers and developers need to make explicit the language proficiency, gaming proficiency, and computer technology skills needed for success in the games they develop. That will go a long way in helping instructors prepare their students for learning with the game and will reduce frustrations and anxiety among the students.

The study has implications in terms of game-based foreign language pedagogy. The findings of the study showed a shift in EFL pedagogy from reading and audiolingual approaches to the communicative language teaching approach. The practical implication of that finding is that teacher training on game-based foreign language pedagogy needs to integrate the communicative language teaching approach.

Another implication of the study concerns gaming platforms. The results of the present study showed that an overwhelming majority of the students who took part in the study owned cellphones but not so many had computers. That finding may imply that the future of educational gaming in Sub-Saharan Africa resides in mobile gaming. Designing for mobile devices might constitute a viable alternative for overcoming the lack of computers.

**Contributions and Limitations of the Study**

The contribution of the study to the design and development of educational video games for foreign language learning and their implementation in the classroom are discussed in this section. The limitations of the study are outlined.
Contributions of the study. The present study contributed to a better understanding of students’ and teachers’ perceptions of educational video game design for EFL learning by using a motivational design model (Keller, 2010) as a framework. It also elicited information on the participants’ perceptions of the impact of Trace Effects on their EFL learning outcomes and motivation. The study contributed to gaining deeper insights into the pedagogical integration of Trace Effects into the EFL classroom and the pedagogical changes that ensued.

In addition to its contribution to theory, the present study has contributed to the practice of language game design and pedagogy. In terms of game design and development for second and foreign language learning, the following practical suggestions may be useful:

- Game technology: In terms of input system, developing games that are played using the computer keyboard and mouse seems to be an effective approach in the situation of second and foreign language learning in developing nations. That approach achieves the dual purpose of developing the students’ language skills as well as their computer technology skills. Another aspect of the game technology worth paying attention to is the possibility of repetition. The participants in the present study appreciated the fact that they could listen to the game dialogues as many times as they liked. Since foreign language learners do not live in the native speaker country, it takes them a while to get used to the native speaker accent and start to understand it. For that reason, being able to replay game dialogues can be helpful.
• Game content: In terms of game content, game designers and developers should consider four main aspects: the themes developed in the game, the target language skills, language difficulty, and content alignment with standards. Select themes that are appealing to your target audience. In terms of language skills, you may need to decide whether your game is intended to teach reading, writing, speaking, listening, vocabulary or any other language skill. That decision influences the type of technology you use. Pay attention to the level of difficulty of the game language. Try to match the game content to levels of language proficiency. The TESOL Technology Standards (Healey et al., 2008) may be useful for that purpose. That will go a long way in helping teachers decide whether the game is appropriate for their class or not. Another important aspect of the content is alignment with standards. When designing an educational game for language learning, make sure the themes and skills that the game is intended to teach are aligned with the standards for the target grade level in the context where the game will be used. If your game is not aligned with standards, its chances of getting into the classroom are slim even if it is a good game. Very often, education stakeholders such as principals, parents and teachers make the decision to adopt or reject a game based solely on whether it is aligned with standards or not.

• Game characters: When designing for an international audience, think about diversity. Trace Effects tries to address the issue of diversity by including characters of different race, ethnicity and nationalities. Students enjoy stepping
into the shoes of characters from other cultures, but it also helps when some of the characters are from their own culture or nationalities.

As far as pedagogy is concerned, the following tips might prove useful for teachers who intend to use games in their second and foreign language classes:

- **Pre-gaming:** Prepare your students for success. Before you use a game in your class, you might want to prepare your students in terms of technology and language skills in order to benefit from the game. You might give them an informal assessment in order to determine if their language proficiency matches the proficiency level required for the game. Just because students are in the same class does not necessarily mean that they have the same level of proficiency in the second or foreign language. Some students may lag behind their peers and it is your responsibility to make sure they are adequately prepared for the game.

- **Gameplay:** Have students play the game in pairs or teams of three. Make sure the teams are made up of students of different abilities so that the experts can scaffold for their peers. Make it a requirement that students take turns controlling the keyboard. That will prevent some students from taking over the whole gameplay while other team members are reduced to the passive role of watchers. Encourage students to talk to their group members and take notes during gameplay. A gameplay guide that highlights linguistic features to focus on during gameplay may be useful. Encourage students to use the target language in their discussion during the entire gameplay session.
Post-game: Always arrange for a debriefing session at the end of the game. This was recommended by Garris et al. (2002). Knowing that there is debriefing at the end of gameplay makes students pay more attention to the content of the game. It works well when the students work in small teams to organize their ideas and report to the entire class.

The present study contributed to the theory and practice of educational video game design for second or foreign language learning. Those contributions should not overshadow its limitations.

**Limitations of the study.** The study employed a multiple-case study design. As a result, the findings are only limited to the cases that were studied and the game that was used. The findings are not generalizable to other schools or games.

Furthermore, the findings reported in the study are perceptions of design and perceptions of learning. The multiple-case study design does not permit the investigation of actual learning.

**Difficulties during Data Collection**

A certain number of challenges encountered during fieldwork for the present study are worth reporting. The following were the major ones:

- Insufficient number of computers: The computer labs where the study was conducted were equipped with computers. However, most of them were not functional, which caused some difficulties in the implementation of the study.
- Computer overheating: Computer overheating and sudden shutoffs or restarting were recurrent problems during the entire study in most schools, especially in the
hot months of April, May and June. That issue caused some frustrations among
the students who in most cases lost their game scores and had to start over.

- Power outages: Power outages were frequent during the study. Several training
  sessions were postponed because of those issues.

- Strikes: Student and teacher union strikes affected data collection. Gameplay
  sessions, lessons, interviews and classroom observations were cancelled or
  postponed due to those strikes.

**Recommendations for Future Studies**

The present study adopted a multiple case study design to investigate students’
and teachers’ perceptions of *Trace Effects* in EFL acquisition. The study also examined
pedagogical approaches associated with game-based EFL learning. Future studies should
consider using randomized-controlled trials to investigate the impacts of games on EFL
acquisition. Future studies should consider comparing learning outcomes in team
gameplay to individual gameplay situations. In terms of pedagogy, more studies are
needed in the area of game-based foreign language pedagogy in order to identify foreign
language teaching approaches that seem to be more compatible with game-based foreign
language learning. Longitudinal studies are needed to shed light on the long-term impact
of games on foreign language acquisition.
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Appendix A: Biographical Questionnaires

Biographical Questionnaire for Students

Please, *fill in* the appropriate information or *circle* the option that applies to you. Your personal information will be used only for the purpose of this research and will NOT be shared with any third party.

| Pseudonym:........................................................................................................ |
| Your gender: Male........Female:.............Email Address:................................. |
| Your age:......................................Your grade level:....................................... |

How long have you been using computers..................Years..................Months

Have you played a video game (computer game) before? ........Yes...................No

Have you used the Internet to search for information related to any of your classes?
   ....Yes....No

Have you used the computer to work on any class project?..........Yes............No

Have you received any training on how to use the computer to access learning materials? ......................Yes. ..................No

Do you have any personal computer? .........................Yes..................No

Do you have any computer at home? (Family computer) ............Yes.............No

Do you have any Internet connection at home? ....................Yes..................No

Do you have any cellphone? ..................................Yes..................No

Do you have any smartphone........................................Yes..................No
Thank you for taking the time to fill this questionnaire!!

Translation

Questionnaire pour les Elèves

Instructions: Veillez remplir le questionnaire avec les informations nécessaires ou encercler la réponse qui s’applique à vous. Vos informations ne seront utilisées que dans le cadre de l’étude et ne seront pas partagées avec une tierce personne.

| Pseudonyme: | .......................................................... |
| Sexe: Masculin: | Féminin: | Adresse Email: |
| Age: | Classe: | .......................................................... |

Depuis combien de temps utilisez-vous les ordinateurs ? ..........Ans.............Mois.

Avez-vous déjà joué à un jeu vidéo (jeu vidéo a l’ordinateur) ? ........Oui..........Non

Avez-vous déjà utilisé l’Internet pour rechercher des informations relatives à vos cours ? ....Oui......Non


Avez-vous suivi une formation sur l’utilisation de l’ordinateur pour accéder à des ressources utiles à l’apprentissage ..........Oui.......Non.

Avez-vous un ordinateur personnel ..........oui..........Non

Avez-vous un ordinateur à la maison (ordinateur familial) ..........oui........Non.

Avez-vous une connexion Internet à domicile ..........Oui..........Non.

Avez-vous un téléphone portable ..........Oui........Non

Avez-vous un Smartphone ..........Oui..........Non
Merci pour votre temps !
Biographical Questionnaire for Teachers

Instructions: Please, fill in the appropriate information or circle the option that applies to you. Your personal information will be used only for the purpose of this research and will NOT be shared with any third party.

Pseudonym: .......................................................... ..........................................................

Your gender: Male............Female:.............Email Address:.................................

Your age:.................................Class you teach:...............................

Highest Level of education Achieved:..............................................................

How long have you been teaching English in secondary schools?............Years.....Months

How long have you been teaching English at this particular school?......Years.....Months

How long have you been using computers? .................Years..........Months

Have you played a video game (computer game) before? ....Yes.................No

Have you used any computer technology in your teaching?.........yes.................No

Have you used any computer to prepare course materials?..........yes.................No

Have you used the Internet to search for course materials online? ...Yes...............No

Have you received any formal training on the use of computer technology for teaching?......yes......No

Do you have any personal computer? .........................Yes.....................No

Do you have any computer at home? (Family computer) .......Yes.....................No

Do you have any Internet connection at home? ..................Yes.....................No

Do you have any cellphone? ........................................Yes.....................No
Do you have any smartphone……………………………………Yes………………......No

Thank you for taking the time to fill this questionnaire!

**Translation**

**Questionnaire pour Professeurs**

**Instructions:** Veillez remplir le questionnaire avec les informations nécessaires ou encerclez la réponse qui s’applique à vous. Vos informations ne seront utilisées que dans le cadre de l’étude et ne seront pas partagées avec une tierce personne.

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<td>Masculin………….Féminin:………….Adresse Email:........................................</td>
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<td>Age:</td>
<td>........................................Classe ou vous intervenez:..............................</td>
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<td>Niveau d’éducation :</td>
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Depuis combien de temps enseignez-vous l’anglais au secondaire ?…Ans………….Mois
Depuis combien de temps enseignez-vous l’anglais dans cet établissement ?…Ans…Mois
Depuis combien de temps utilisez-vous les ordinateurs ? ………Ans……………Mois
Avez-vous déjà joué à un jeu vidéo (jeu vidéo a l’ordinateur) ? ………Oui………..Non
Avez-vous déjà utilisé l’outil informatique dans vos cours ?.............Oui…………Non
Avez-vous déjà utilisé l’ordinateur dans la préparation de vos cours ? ……Oui………Non
Avez-vous déjà utilisé l’Internet pour rechercher des documents relatifs à vos cours ?.....Oui....Non
Avez-vous déjà suivi une formation sur l’utilisation des ordinateurs dans l’enseignement ?...Oui…Non
Avez-vous un ordinateur personnel ?.....Oui…..Non.
Avez-vous un ordinateur à la maison (ordinateur familial) ?…….oui……..Non.
Avez-vous une connexion Internet à domicile ?.............Oui………..Non.
Avez-vous un téléphone portable ? ........Oui...........Non
Avez-vous un Smartphone ?......Oui..........Non

Merci pour votre temps !
**Biographical Questionnaire for Principals**

**Instructions:** Please, fill in the appropriate information or circle the option that applies to you. Your personal information will be used only for the purpose of this research and will NOT be shared with any third party.

| Pseudonym: | .......................................................... |
| Your gender: Male | Female | Email Address: |
| Your age: | .......................................................... |
| Highest Level of education Achieved: | .......................................................... |

- How long have you been a principal? ..........Years...................Months
- How long have you been principal at this school? ......Years.........Months
- How long have you been using computers? .............Years.........Months
- Have you played a video game (computer game) before? ........Yes........No
- Have you used any computer technology in your administrative work? ........yes.....No
- Have you used the Internet to search for information related to your administrative tasks? ..............................Yes...No
- Have you received any training on the use of computer technology for administrative work? …Yes…No.
- Do you have any work computer? ........................................Yes..................No
- Do you have any personal computer? .................................Yes..................No
Do you have any computer at home? (Family computer) …………..Yes………….No
Do you have any Internet connection at home? ………………….Yes…………………No
Do you have any cellphone? ……………………………………..Yes…………………No
Do you have any smartphone……………………………………Yes………………......No

Thank you for taking the time to fill this questionnaire!

**Translation**

**Questionnaire pour Proviseurs**

Instructions: Veillez remplir le questionnaire avec les informations nécessaires ou encerclez la réponse qui s’applique à vous. Vos informations ne seront utilisées que dans le cadre de l’étude et ne seront pas partagées avec une tierce personne.

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<td>Sexe: Masculin…………Féminin:…………….</td>
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<td>Age:………………………………………………………</td>
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<tr>
<td>Niveau d’éducation : …………………………………………………………..</td>
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Depuis combien de temps êtes-vous proviseur? ……Ans………….Mois
Depuis combien de temps êtes-vous proviseur de cet établissement ? ……Ans…….Mois
Depuis combien de temps utilisez-vous les ordinateurs ? ……..Ans……………Mois
Avez-vous déjà joué à un jeu vidéo (jeu vidéo a l’ordinateur) ? ………Oui………..Non
Avez-vous déjà utilisé l’outil informatique dans vos tâches administratives ?..Oui….Non
Avez-vous déjà utilisé l’Internet pour rechercher des informations relatives à vos tâches administratives ?…….Oui……. Non
Avez-vous déjà suivi une formation sur l’utilisation des ordinateurs dans vos taches administratives ?...Oui…Non

Avez-vous un ordinateur de travail au bureau ? .....Oui……Non

Avez-vous un ordinateur personnel ?.....Oui…..Non.

Avez-vous un ordinateur à domicile (ordinateur familial) ?……oui……Non

Avez-vous une connexion Internet à domicile ?............Oui………..Non

Avez-vous un téléphone portable ? ............Oui………..Non

Avez-vous un Smartphone ?......Oui………………Non

Merci pour votre temps !
Appendix B: Interview Guides

Interview Guide for Students (Adapted from Keller, 2010)

1. What aspects of Trace Effects caught your attention if any?
2. How useful is Trace Effects for English language learning?
3. How confident were you in your ability to complete Trace Effects successfully when you were first introduced to it?
4. How do you feel about the points in Trace Effects?
5. If you were to redesign Trace Effects, what would you do differently to make the game better?
6. How would you describe your experience playing Trace Effects and participating in the lesson integrating the game?
7. What did you learn from playing Trace Effects and participating in the lesson integrating it?
8. What would you like to mention about Trace Effects or the lesson integrating the game before we close this interview session?

Thank you for your time!

Translation

Guide d'Entretient Pour les Elèves

1. Quels aspects du jeu vidéo Trace Effects ont retenu votre attention?
2. En quoi le jeu vidéo Trace Effects est-il utile à l'apprentissage de la langue anglaise?
3. Combien confiant étiez-vous en votre capacité à terminer le jeu vidéo *Trace Effects* avec succès lorsqu’il vous a été présenté pour la première fois?

4. Quels sentiments avez-vous concernant les points dans le jeu vidéo *Trace Effets* ?

5. Si vous devriez reprendre la conception du jeu vidéo *Trace Effects*, que feriez-vous de différent pour l’améliorer ?

6. Comment décririez-vous votre expérience avec *Trace Effects* et la leçon l’intégrant ?

7. Qu’avez-vous appris après avoir joué *Trace Effects* et pris part à la leçon l’intégrant ?

8. Quels commentaires aimeriez-vous faire au sujet de *Trace Effects* ou de la leçon avant de clore cette séance d'entretien ?

Merci pour votre temps!
Interview Guide for Teachers (Adapted from Keller, 2010)

1. What aspects of *Trace Effects* caught your students’ attention if any?
2. How useful is *Trace Effects* for English language learning?
3. How confident were your students in their ability to complete *Trace Effects* successfully when they were first introduced to it?
4. What do your students feel about the points in *Trace Effects*?
5. If you were to redesign *Trace Effects*, what would you do differently to make the game better?
6. How would you describe your experience playing *Trace Effects* integrating *Trace Effects* into your teaching?
7. What did your students learn from playing *Trace Effects* and participating in the lesson integrating the game?
8. What would you like to mention about *Trace Effects* or the lesson before we close this interview session?

Thank you for your time!

Translation

Guide D’Entretient Pour Professeurs

1. Quels aspects du jeu vidéo *Trace Effects* ont retenu l’attention de vos élèves?
2. En quoi le jeu vidéo *Trace Effects* est-il utile à l’apprentissage de la langue anglaise?
3. Combien confiant étaient vos élèves en leurs capacités à terminer le jeu vidéo *Trace Effects* avec succès lorsque le jeu leur a été présenté pour la première fois?
4. Quels sentiments vos élèves ont-ils concernant les points dans le jeu vidéo *Trace Effets* ?

5. Si vous devriez reprendre la conception du jeu vidéo *Trace Effects*, que feriez-vous de différent pour l’améliorer ?

6. Comment décririez-vous votre expérience de jeu et d’intégration de *Trace Effects* dans votre leçon?

7. Qu’est-ce que vos élèves ont appris après avoir joué *Trace Effects* et participé à la leçon l’intégrant ?

8. Quels commentaires aimeriez-vous faire au sujet de *Trace Effects* ou de la leçon avant de clore cette séance d’entretien ?

Merci pour votre temps!
Interview Guide for Principals

1. What training do secondary school teachers receive on the integration of technology into teaching in Burkina Faso?

2. What training do English teachers get on the integration of technology into teaching at your school?

3. What technology is available at your school to support teaching and learning?

4. How many students are in your school?

5. How many teachers are in your school?

6. How many administrative staff is in your school?

7. What would you like to mention about technology in secondary education before we close this interview session?

Thank you for your time!

Translation

Guide d’Entretien Avec les Proviseurs

1. Quelle formation reçoivent les professeurs des lycées et collèges du Burkina Faso en matière d’intégration des nouvelles technologies de l’information et de la communication dans l’enseignement ?

2. Quelle formation reçoivent les professeurs d’anglais de votre établissement en matière d’intégration des nouvelles technologies de l’information et de la communication dans l’enseignement ?

3. Quels outils technologiques sont disponibles dans votre établissement pour appuyer l’enseignement et l’apprentissage ?
4. Combien d’élèves compte votre établissement ?

5. Combien de professeurs compte votre établissement ?

6. Combien de personnel administratif compte votre établissement ?

7. Quels commentaires aimeriez-vous faire au sujet des jeux vidéo dans l’enseignement secondaire avant de boucler cet entretien ?

Merci pour votre temps !
Appendix C: Lesson Observation Checklist

School ID….Teacher Pseudonym………………………………………………………………………..
Date…………….Time:…………………..Class:………………………………..

<table>
<thead>
<tr>
<th>Activities</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Gap Activities</td>
<td></td>
</tr>
<tr>
<td>Role-plays</td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>Group work</td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
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<tr>
<td>Drills</td>
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<tr>
<td>Translation</td>
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<tr>
<td>Grammar</td>
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<tr>
<td>Reading</td>
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<tr>
<td>Speaking</td>
<td></td>
</tr>
<tr>
<td>Speaking</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D: IRB Approval

The following research study has been approved by the Institutional Review Board at Ohio University for the period listed below. This review was conducted through an expedited review procedure as defined in the federal regulations as Category(ies):

Project Title: Video Games and English as a Foreign Language Education in Burkina Faso

Primary Investigator: Niamboue Bado
Co-Investigator(s):

Faculty Advisor: Teresa Franklin

Department: Education

Rebecca Cale AAB, OIR
Office of Research Compliance

Approval Date: 01/07/13
Expiration Date: 01/06/14

This approval is valid until expiration date listed above. If you wish to continue beyond expiration date, you must submit a periodic review application and obtain approval prior to continuation.

Adverse events must be reported to the IRB promptly, within 5 working days of the occurrence.

The approval remains in effect provided the study is conducted exactly as described in your application for review. Any additions or modifications to the project must be approved by the IRB prior to implementation.
Appendix E: Permissions

Permission from the Ministry of Secondary and Higher Education (Burkina Faso)

Letter to the Ministry of Secondary and Higher Education

Niamboue Albert Bado
Doctoral Student
Ohio University
Athens, OH 45701
Email: nb276105@ohio.edu

October 17, 2012

Request for permission
to conduct research in
public secondary
schools in the Central
Region

To
The Regional Director of
Secondary and Higher
Education for the Central
Region

Dear Director,

First of all let me introduce myself. My name is Niamboue Albert Bado. I am doctoral student at Ohio University.

I am writing to request your permission to conduct research for my doctoral dissertation in public secondary schools in the Central Region of Burkina Faso. The study will be conducted in four secondary schools. The purpose of the study is to understand how video games can be used to improve English education.

The participants will be 12th grade students, English teachers and principals. English teachers and their 12th grade students will be invited to participate in training on the use of a video game specifically designed for English learning. At the end of the training teachers will be asked to use the game in classroom instruction. After the implementation of the game in the classroom interviews will be conducted with the teachers and their
students to discuss their experiences. Interviews will also be conducted with principals to get on their opinions on the use of games in high school English education in Burkina Faso. The project will last a few months. During the course of the study the researcher will work with the school administrations to minimize any disruptions in the normal course of academic activities.

**Risks and Discomforts**
No risks or discomforts

**Benefits**
The project may be beneficial to students in the sense that it may improve their English language and technology skills. It may also contribute to improving teachers’ knowledge of how to incorporate technology into teaching.

**Confidentiality**
All information collected in the schools will only be used for the study and will not be shared with any third party. In order to protect participants’ identities, their names will be replaced with pseudonyms in the final report.

Sincerely

Albert

---

By signing below, you agree to the participation of your school in this research project.

Signature___________________________________________Date_________________

Name_________________________________________________________
Response from the Ministry

MINISTERE DES ENSEIGNEMENTS
SECONDAIRE ET SUPERIEUR
---------------------------
REGION DU CENTRE
---------------------------
DIRECTION REGIONALE
---------------------------
SERVICE PERSONNEL
---------------------------

BURKINA FASO
Unité-Progress-Justice

Ouagadougou, le 23 oct 2012

Le Directeur régional
Il.

Monsieur BADO Niamboué,
Etudiant en fin de Cycle à l'Université
d'Ohio (USA)

-OUAGADOUGOU-

Objet : Autorisation de mener des enquêtes

J'ai l'honneur de vous informer que dans le cadre de votre thèse, je marque mon accord à votre demande d'autorisation d'effectuer des travaux de recherche au sein des établissements de la Région du Centre.

Aussi je vous invite à entrer en contact avec les chefs d'établissement pour les modalités pratiques de votre intervention dans lesdits établissements.

Je souhaite plein succès à votre recherche.

Pour le Directeur régional en mission,
Le chef de service du Personnel
Chargé de l'Ingenierie

[Signature]
Translation of Response

Burkina Faso
Unity-Progress-Justice

MINISTRY OF SECONDARY AND HIGHER EDUCATION
CENTRAL REGION
REGIONAL OFFICE
HUMAN RESOURCE OFFICE
Number: 2012/00771/MESS/RCEN/DR/SP
October 23, 2012 in Ouagadougou

The Regional Director

To
Mr. Bado, Niamboue
Doctoral Student
Ohio University
USA

Object: Permission to Conduct Research

I am delighted to inform you that I approve your request for permission to conduct research in secondary schools in the Central Region of Burkina Faso for your doctoral dissertation.

I urge you to get in touch with the principals of the schools in order to work out the practical details of your interventions.

I wish you success in your research.

Signature
Odette COULIBALY/SOME
Human Resource Officer
On Behalf of the Regional Director
Permission for the Use of the ARCS Model

RE: Permission to Use IMMS
John Keller (jkeller@fsu.edu)

You replied on 9/9/2012 2:22 PM.

Sent: Sunday, September 09, 2012 12:12 PM
To: Bado, Nimrouz
Attachments: Keller 2010 ARCS Model.pdf (4.3 KB)

Dear Albert,

Your research topic sounds very interesting and you are welcome to use the IMMS. I have attached an excerpt from my book that explains how it can be modified to fit a specific situation and also contains psychometric information.

If you wish to have copies of any articles that you are having trouble finding, please let me know and I will send them if I have electronic copies.

Sincerely,
John Keller

John M. Keller, Ph.D.
Professor Emeritus
Educational Psychology and Learning Systems
Florida State University

9705 Waterside West Drive
Tallahassee, FL 32312-9746
Phone: 850-294-3908

Official ARCS Model Website: http://arcmodel.com
Professional Website: http://keller.fsu.edu/~jkeller/JohnHome/

--------Original Message--------
From: Bado, Nimrouz (nimrouz@fsu.edu)
Sent: Sunday, September 09, 2012 12:00 PM
To: jkeller@fsu.edu
Subject: Permission to Use IMMS

Dear Prof. Keller,

I am writing to request your permission to use/modify your Instructional Material Motivation Survey (IMMS) for my dissertation research. My dissertation research will focus on the impact of video games on foreign language learning outcomes and motivation. I found your ARCS model and its IMMS appropriate for investigating the motivation aspect of my topic.

I look forward to hearing from you.

Sincerely,

Albert Nimrouz Bado
Doctoral Student
Instructional Technology
The Patton College of Education
Ohio University
Athens, OH 45701
Permission to Use the Arcs Table

On Mon, Jan 6, 2014, 2:39 PM, Bado, Niamboue <ckb@ohio.edu> wrote:

Dear Professor Keller,

I am writing to request your permission to adapt a table on the ARCS model for use in my dissertation. The table is entitled "Modified Subcategories of the ARCS Model" and appears on page 41 of the paper cited below.


My dissertation research focuses on applying the ARCS model to educational video game design.

I look forward to hearing from you.

Sincerely,

Albert Niamboue Bado
Doctoral Candidate
Instructional Technology
The Patton College of Education
Ohio University
Athens, OH 45701

Re: Permission to Adapt ARCS Table

John Keller [jkellersan@gmail.com]

You replied on 1/13/2014 7:00 AM.

Sent: Monday, January 13, 2014 6:54 AM
To: Bado, Niamboue

Dear Albert,

Your table looks fine to me and I am pleased to see that you gave an appropriate attribution in the footnote.

I know that I have produced tables almost exactly like this one, but I could not find one. However, yours is fine.

Best wishes for success with your study!

Sincerely,

John K.

John M. Keller, Ph.D.
Professor Emeritus
Educational Psychology and Learning Systems
Florida State University
Permission for Use of *Trace Effects* Game

Dear Mr. Rosenberg,

My name is Albert. I am a doctoral student in Instructional Technology at Ohio University. I am writing to request your permission to use your game (*Trace Effects*) for my dissertation research. I am interested in investigating the impact of the game on learning outcomes and motivation in learning a Foreign Language. The participants will be high school students in Spain. Official permission is required for my dissertation proposal. I would like to mention that even if permission is granted, I understand that actual field work for my research cannot begin prior to the official release of the game.

I look forward to hearing from you.

Sincerely,

Albert Niambouse Sado
PhD Student
Instructional Technology
Ohio University
Email: ams625@ohio.edu

Dear Mr. Sado,

I am very pleased to hear about your project. Thank you for considering *Trace Effects* as a subject of your dissertation. Consider this response to be the official permission necessary once we have the official launch on October 15.

I would like to hear more about your project and the students who would be taking part in this study and to give you the contact information of the nearest Regional English Language Office or American consulate so we can send you copies of *Trace Effects*.

All the best and kind regards.

Rick Rosenberg

---

Riek Rosenberg
Director of Educational Technology
Office of English Language Programs
U.S. Department of State
2201 E Street, NW
Washington, DC 20520
Phone: 202-663-2909
nas-english-language-programs.state.gov

---

Permission to Study Game

Dear Mr. Rosenberg,

My name is Albert. I am a doctoral student in Instructional Technology at Ohio University. I am writing to request your permission to use your game (*Trace Effects*) for my dissertation research. I am interested in investigating the impact of the game on learning outcomes and motivation in learning a Foreign Language. The participants will be high school students in Spain. Official permission is required for my dissertation proposal. I would like to mention that even if permission is granted, I understand that actual field work for my research cannot begin prior to the official release of the game.

I look forward to hearing from you.

Sincerely,

Albert Niambouse Sado
PhD Student
Instructional Technology
Ohio University
Email: ams625@ohio.edu
Appendix F: Documents Collected

Sample Student Listening Task in school D

Trace meets Andre

Trace: (1) Hi, I'm Trace.
Andre: Hi, I'm Andre. (2) Nice to meet you.
T: You're very good!
A: Thanks.
T: Why is the music (3) sad?
A: I'm sad. (4) They are going to stop teaching music in school.
T: Can they (5) study music in school? Not now.
A: LaMothe Elementary School (6) need money to teach music.
T: Do you play by yourself?
A: I used to have a (7) band.
T: How many people were in your band? There were (8) five of us.
A: If you have a band, you can play for (9) money.
A: Yes, but I (10) need to get my band together.
T: (11) Where are the musicians?
A: They still live here in (12) Wisconsin.
T: Can I help you get the band together? You (13) could do a concert!
A: You can talk to the musicians. See if they (14) want to play together.
Instructions for Playing Trace Effects

Move forwards

Left Turn

Right Turn

Move backwards

Press "E" to interact with characters and objects in the game.

Four steps for performing an action

1. Click on "Actions"
2. Click on the first "choose" on the left to select a word or phrase to use
3. Click on the second "choose" on the right to select an object to use
4. Click on "Do Action" to perform the action

What to do when you are stuck?

- Make sure you have tried all the dialogue options available
- Make sure you collected all the required words
- Make sure you have performed all the actions required in order to move on
Lesson Plans

Thème: Pollution
Leçon: Story of Trace

1. Warming up: Playing Trace Effects
2. Group exercise: Pupils are divided into groups to discuss story
3. Group tells story of Trace
4. Summarize story of Trace in the Chapter 4.
5. Questions
6. Conclusion.
Lesson Plan without Game

Text: Jenner Studies Smallpox

- Pre-reading questions
- Reading silently
- Reading aloud
- Vocabulary
- Reading comprehension questions
- Post-reading questions