Cooperative Game-based Learning in the English as a Foreign Language Classroom

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Author Note

Some data reported in this article comes from the first author's doctoral dissertation (Bado, 2014).

Abstract

Cooperative learning has been used in various settings across disciplines and has been shown to contribute to improving learning outcomes. With the recent development of new information and communication technologies there is a need to understand how these tools support or challenge existing principles of cooperative learning in the classroom.

The present study sought to gain insights into the nature of cooperation between high school students to play an educational video game for learning English as a Foreign Language (EFL). It also aimed to elicit information on the perceived impact of the game on EFL learning outcomes. Forty-seven (47) high school students from Burkina Faso interacted with an educational video game designed for EFL learning over a period of four weeks and took part in focus-group interviews to discuss their experiences.

The results of the study indicated that effective cooperation took place in various teams during gameplay. The majority of the participants reported that interacting with the game in small teams contributed to improving their EFL vocabulary and writing knowledge as well as their motivation. Recommendations are made for structuring cooperative game-based language learning.

Keywords: *Cooperative learning, educational games, English as a Foreign Language, Burkina Faso*

The development of computer technology and the Internet has affected almost all sectors of life including government, business, socialization and leisure. Education is one of the areas undergoing a metamorphosis as a result of technology. Web 2.0 tools, social media and games have found their way into education (Casey, 2013; Li, Bado, Smith, & Moore, 2013; Tabor & Minch, 2013). Today, the issue is no longer whether or not to adopt these technology tools in education, but of how to better take advantage of them to improve learning.

Research suggests that games have the potential to improve learning outcomes and motivation in education (Gee, 2007; Squire, 2006). The potential of games to improve

foreign language education has been recognized in various areas such as listening and speaking (Liu, 2009; Suh, Kim, & Kim, 2010) vocabulary acquisition (deHaan, Reed, & Kuwada, 2010; Rankin, Morrison, McNeal, Gooch, & Shute; 2009), pragmatics (Sykes, 2008), intercultural communicative competence (Struppert, 2010) and communicative language competence (Garcia-Carbonell, Rising, Montero, & Watts, 2001). Collaboration and interaction between players in gaming spaces have been recognized as important factors susceptible of promoting foreign language acquisition and motivation (Thorne, 2008; Thorne, Black & Sykes, 2009).

There is, however, a paucity of studies that examined the nature of the cooperative learning that takes place between students in a face-to-face game-based language learning situation. The present study aimed to understand the nature and dynamics of cooperation in game-based EFL learning as well as the perceived impact on EFL acquisition.

The findings of the study contribute to a better understanding of how to structure cooperative learning in a game-based foreign language classroom for optimal results. It offers practical suggestions to instructors on how to implement cooperative learning in their classroom. The following research questions guided the study:

1. What is the nature of the cooperation between students to play *Trace Effects*?
2. What is the perceived impact of collaborative play of *Trace Effects* on EFL learning outcomes?

The paper is divided into five major sections: The first section reviews the literature pertaining to game-based cooperative language learning; the second section describes the data collection and analysis method; the third section presents the findings of the study; the fourth section discusses the findings in relation to previous studies and makes practical suggestions for structuring game-based cooperative language learning; and the last section presents the conclusions and limitations of the study.

Literature Review

Cooperative learning has the potential to promote deep learning (Chiong & Jovanovic, 2012; Zhang, 2012). The importance of cooperation in second and foreign language learning has been stressed in various studies (Bradley, Lindström, Rystedt, 2010; Kessler, Bikowski, & Boggs, 2012).

The distinction between collaborative and cooperative learning has been subject to discussion among researchers. This issue is due to the fact that both concepts overlap in many ways. Both collaborative and cooperative learning involve two or more people working together to achieve a common goal (Dillenbough, 1999). The only major difference between the two resides in the role of the instructor in the learning process.

Cooperative learning tends to require more instructor intervention in structuring the groups and learning activities as opposed to collaborative learning where the instructor functions more as a facilitator (Dillenbourg, Baker, Blaye, & O'Malley, 1996; Johnson & Johnson, 1999; Kozak, 2010; Lee, Huang, Liu, & Wu, 2011).

The present study adopted the cooperative learning framework by Johnson and Johnson, (1994). According to this framework, cooperative learning is broadly defined as an instructional situation where small groups of students work together to achieve a shared goal (Johnson & Johnson, 1994).

Principles of Cooperative Learning

Various studies suggest that the success of cooperative learning depends on the structure of the activity (Johnson & Johnson, 1989; Johnson & Johnson, 1994; Laurel, 2000). Johnson and Johnson (1994) postulate that there are five main principles that characterize successful cooperative learning situations. These principles are: Positive interdependence, face-to-face promotive interaction, individual accountability and personal responsibility, interpersonal and small group skills, and group processing (Johnson & Johnson, 1994).

Positive interdependence according to Johnson and Johnson (1994) means that group members are bound to succeed or fail together. One individual cannot succeed without the group. Each member of the group must contribute to the group effort in order to achieve the common goal. In other words, there should not be any free riders.

Face-to-face promotive interaction refers to the support and encouragements that team members give to each other in order to achieve the common goal. Participants share ideas and resources and interact, support or challenge each other's decisions in order to achieve success.

The third element of cooperative learning according to Johnson and Johnson (1994) is individual accountability and personal responsibility. The contribution of each member of the group should be clearly identified. This ensures that group members are empowered and can complete the task by themselves.

Interpersonal and small group skills refer to the need for developing effective communication and trusting relationship and support between group members. The fifth, and final, element of effective cooperative learning is group processing. Group members should reflect on how the group is functioning in order to improve its performance.

Empirical Studies on Game-based Cooperative Language Learning

Thorne (2008) found that collaborative gameplay contributed to Russian acquisition. The researcher studied an American and a Russian who collaborated to play the *World of Warcraft.* The findings of the study revealed that collaborative dialogue and corrective feedback took place during the collaboration between the two players. The researcher

also reported that the collaboration contributed to increasing the motivation of the American student to learn Russian so that he could play with the Russian player.

Wong, Hsu, Sun and Boticki (2013) suggested that flexible grouping of elementary students to play a computer game on mobile devices had a positive effect on the students' learning of Chinese characters. The researchers conducted a study that involved 15 elementary school students who were learning Chinese as a Second Language in Singapore. The participants played a computer game called *Chinese-P-P* in single and multiple group modes. Focus group and observational data analyses showed positive results in terms of language learning and self-esteem. The researchers also reported that both low and high-achieving students assumed leadership positions during gameplay

Studies conducted on English language learning arrived at the same conclusion as the ones reported on Chinese and Russian. Ranalli (2008) reported that playing the Sims in pairs contributed to improving vocabulary acquisition among English as a Second Language (ESL) learners. Nine (9) intermediate level ESL university students took part in the study. The participants played the game and interacted with some supplemental website materials. Pre-test and posttests results showed that the participants recalled a significantly higher number of vocabulary words from the game. Most importantly, the findings indicated that the participants enjoyed playing the game in pairs and thought it was helpful. The participants stated that they spoke English during gameplay.

Another study conducted using 17 elementary students in Greece arrived at the same conclusions (Dourda, Bratitsis, Griva, & Papadopoulou, 2014). The participants were randomly assigned to teams of three or two to play a detective video game called Whodunit for a period of eight weeks. The results of pretest, posttest, observational data and analyses of student journals indicated that playing the game in teams contributed to improving the participants' English language skills in the areas of vocabulary, reading and language learning strategies. The researchers also noted that collaboration was effective during the entire gameplay period as the students assumed different roles such as computer user, team manager and journal keeper.

A review of the literature revealed that cooperative gameplay has the potential to improve foreign language acquisition. There is however, a dearth of studies that examine cooperative learning patterns within groups during gameplay. The present study sought to understand the nature of cooperation between high school students to play a video game designed for EFL learning and the perceived impact of the game on their EFL skills.

Method

The present study adopted a case-study design to gain in-depth insights into high school students' experiences cooperating to play an educational video game designed to teach EFL. Case study design is an appropriate design for a study when its purpose is to gain in-depth insights into a phenomenon (Patton, 2002). Case study design was deemed appropriate for investigating participants' experiences interacting with the video game

because it had the potential to yield in-depth insights into the nature of game-based cooperative learning.

Purposive Sampling

A purposive sampling technique (Patton, 2002) was used to select one public high school in a suburban area of Ouagadougou, Burkina Faso for participation in the study. The availability of a computer lab equipped with computers was the criterion that contributed to the selection of the school. The study involved having the participants play a video game. Therefore, it was important to ensure that the school had computers for playing the game.

Case

The case that was the object of study was a public high school located in a suburban area of Ouagadougou the capital of Burkina Faso. The school served students from diverse socio-economic and ethnic backgrounds. It followed the public school curriculum of Burkina Faso. Students in Grade 12 receive three hours of EFL instruction per week. One 12^{th} grade class participated in the study. The choice of a 12^{th} grade class was motivated by the fact that they had a higher level of English proficiency, which was necessary for the participants to benefit from the game.

Participants

Forty-seven (47) 12^{th} grade students aged between 18 and 21 took part in the study. The mean age of the participants was 19 years old (*SD* = .85). Females represented 49 % and males 51% of the study group. All the participants had basic computer skills, defined as being able to check one's e-mail. There was a wide variation in the computer experience of the participants. The median computer experience reported by the participants was 12 months (one year), with a minimum one month and a maximum of 84 months (seven years).

Game

Trace Effects (United States Department of State, 2012) was used in the study. It is an educational video game designed to support EFL learning. The game was developed by a team of English as a Second/Foreign Language professionals and the Super Group. Game development was sponsored by the United States Department of State.

Trace Effects is an adventure game. The player enters the game playing the role of Trace. Trace, the main character finds himself in the future through time travel, and needs help in order to return home in the present. To receive the help he needs, Trace has to help a variety of people in each chapter of the game. The game is divided into seven chapters dealing with community activism, gender empowerment, environmental protection, science and innovation, and American culture (American English, 2012).

Trace Effects is played using a computer keyboard and a mouse to select pre-made

dialogues. Figure 1 shows the main interface of *Trace Effects*. Players have to think about the phrases or sentences they select both in terms of grammatical correctness as well as appropriateness. Players lose points for selecting inappropriate or rude responses. The game designers intended it to teach English vocabulary, speaking, reading, pragmatics and American culture (Hanson-Smith, 2013).

Trace Effects can be played individually or in small groups. The goal of the player or team of players is to accumulate as many points as possible. A higher score on the game is an indication of the player's EFL skills.

Figure 1: Interface of *Trace Effects*

Instruments

Focus group interviews and participant observations were used as main data collection instruments. Semi-structured interview guides were designed for the focus group interviews. The interview questions focused on the participants' experiences cooperating to play *Trace Effects* and the perceived impact of cooperative gameplay on their EFL knowledge.

In addition to the focus group interviews, participant observations were used. Gameplay sessions were videotaped for analysis after gameplay. The observations focused on participants' interaction during gameplay in order to elicit information on the nature of their cooperation.

A short biographical questionnaire was designed to collect biographical information from the participants. Information collected included age, gender, technology experience and gaming experience.

Data Collection Procedure

Data collection proceeded in four steps: questionnaire completion, training, gameplay and interviews. Prior to conducting the training sessions the participants completed the biographical questionnaires.

The second step in data collection was training. Since the participants had no prior experience with *Trace Effects*, training was necessary in order to introduce them to the game content and get them familiar with the game technology and the basics of gameplay. For that reason, a two-hour session was devoted to training.

The third step consisted of gameplay. After training, four gameplay sessions were arranged for the participants to play *Trace Effects*. Gameplay sessions were spread over a period of one month. Each session lasted at least two hours. The participants interacted with the game in groups of four. The participants selected their own groups without any intervention on the part of the researcher.

The last step in data collection was interviewing. Ten (10) students were randomly selected from the participants to participate in a focus group interview to share their experiences with cooperative gameplay and how it related to EFL acquisition. There were five males and five females in the focus group. Focus group interview was deemed appropriate in this context because group dynamics such as contradictions, contrarieties and agreements could allow the truth to emerge (Acocella, 2012). The interview was conducted in French and was audio-recorded. French is the official language of Burkina Faso. It is the language in which the participants' felt most confortable expressing themselves. In addition to conducting the interviews, gameplay sessions were videotaped in order to observe the participants' interaction in the teams during gameplay. The interview lasted one hour.

Researchers' Roles

The first author of the paper was the only person directly involved with data collection. His role in the data collection procedure was limited to implementing the training sessions, providing technical and linguistic assistance during gameplay and conducting the focus group interviews and observations. During gameplay the researcher encouraged the participants to discuss any issues related to gameplay, technology and EFL with their team members before asking for his assistance.

Data analysis

The focus-group interview data was transcribed and translated from French into English. It was then coded and analyzed for themes and patterns related to principles of cooperative learning (Johnson & Johnson, 1994) and EFL acquisition.The videos of gameplay sessions were reviewed in order to identify themes related to collaboration

and EFL learning.

Data Triangulation

Method triangulation (Patton, 2002) was used to improve the credibility of the findings of the study. Method triangulation according to Patton (2002) refers to the use of multiple data collection methods in a study. Data from interviews and participant observations was triangulated in order to better understand the nature of student cooperation during gameplay and the perceived impact of *Trace Effects* on EFL acquisition.

Findings

The present study set out to understand the nature of students' cooperation to play *Trace Effects* and the perceived impact of the game on their EFL knowledge. Interview and observational data was collected and analyzed in order to provide answers to the research questions. This section reports the findings of the study.

Descriptive Statistics

An analysis of the background information collected from the participants revealed that the majority (93%) does not own a personal computer. Furthermore, it was found that most of the participants (62%) had never played a computer game before. However, most participants indicated that they had some experience using computers and the Internet.

Nature of Cooperation

Interview results.

After completing approximately eight hours of gameplay, ten (10) participants were randomly selected to participate in a focus group interview to share their experiences in order to shed light on the nature of cooperation in their groups. The majority of the students in the focus group perceived their cooperation with their teammates during gameplay to be enjoyable and effective.

Student 2 (S2) indicated that he valued the discussion and exchange of ideas during cooperative gameplay.

> I like playing in teams because if you are stuck your classmates can help you. However, if you are alone and you are stuck no one can help you. Playing in groups allowed us to exchange ideas. People don't have the same ideas. Playing in groups allowed us to improve compared to playing alone.

Another student from the focus group supported her classmate's comment concerning cooperative gameplay. When asked to describe her experience cooperating with

teammates to play *Trace Effects,* S6 made the following statement:

> I think it depends on who your group members are. If you find good partners to play the game with, you learn a lot. I had one partner who always consulted us before selecting an option. For example when George [one of the characters in *Trace Effects*] speaks, he would ask us what George was saying. If someone in our group did not know the answer he would explain it and sometimes translate it into French for us. Then, he would ask our opinion on what responses to choose. During the entire gameplay session he would ask us if we understood everything. If we said 'no' he would explain everything in French and English. When you are with Salomo (a pseudonym) you learn.

The above statement from S6 indicated that she had a positive experience playing *Trace Effects* in her team. The comment further suggested that Johnson and Johnson (1994)'s principles of cooperative learning such as positive interdependence, face-to-face promotive interaction, individual accountability and personal responsibility, interpersonal and small group skills, and group processing were observed to some extent during gameplay.

Observation results.

The results of observation data supported the focus group interview results. An analysis of the video clips of gameplay sessions showed several teams of students engaged in serious discussion about what game decision to make. More capable students took the lead to explain the game to their peers and solicited their input. The discussion was mostly conducted in English, but occasionally there were some instances of French and local language.

Cooperation challenges.

The findings of the study indicated that effective cooperation took place between the participants during gameplay. However, one team experienced difficulties because one member tried to take control of the game and play without cooperating with other team members. The exchange below illustrates the issue.

> S1: S3 did not cooperate with us. He was moving in the game environment and playing alone without consulting us. We were just watching him. At the end of the game we got 93 points and he said 'we got 93' but he should rather have said that he got 93 because he was the only one playing.
>
> S3: I know. In reality I should not be doing this [playing alone without consulting the other group members] but given that it was a competition I had to move quickly to earn more points so that our team could win [against the other teams]. We didn't have enough time to move slowly at everybody's rhythm.

The above exchange between these two students who were part of the same team during gameplay illustrates the challenge of cooperation in game-based learning situations.

According to the explanation given by S3, he was playing without consulting other teammates because he wanted to move quickly in order to secure a victory for his team. He clearly sacrificed within-team cooperation for between-team competition, which is against the principles of cooperative learning.

Perceptions of the Impact of Cooperative Gameplay on EFL Acquisition

Interview results.

The findings of the study showed that the participants perceived *Trace Effects* to have had a positive impact on their EFL knowledge. When asked the question "What have you learned after playing *Trace Effects*?" S4 made the following comment, which sums up the participants' perceptions of the impact of the game on their EFL knowledge:

> 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. Another important aspect of the game is the themes. After playing the game, I learn 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

This statement from S4 indicated that the game contributed to improving their EFL vocabulary knowledge and gave them useful ideas for argumentative writing. Another important theme from the statement is motivation. *Trace Effects* is perceived to have the potential for motivating students to learn.

Another student (S2) went further to suggest that the non-verbal behavior of characters in the game contributed to improving their understanding of English.

> S2: I think that the gestures are very important for learning English. The fact that the characters accompany their conversations with gestures made it easier for me to understand them. For example when the characters are asking questions, their gestures make it easier for me to understand what they want and to select an appropriate response to their request.

The above statement highlights the potential of *Trace Effects* to promote learning not just from the written and spoken content of the game but also from the character's non-verbal behavior such as their body language and facial expression.

Observation results.

Observation data results support the interview findings, which showed perceived improvement in EFL learning outcomes as a result of participants' interaction with *Trace Effects*. The video clips of gameplay sessions showed students checking the meaning of

vocabulary words in their bilingual dictionaries and writing the words in their notebooks.

Major Themes

The following major themes emerged from an analysis of the interview and observation data:

Nature of cooperative learning during gameplay.

- Effective cooperation between participants in most teams during gameplay,
- Discussion between participants during gameplay,
- Scaffolding within teams
- Challenges in balancing within-group cooperation and between-group competition

Perceived impact of cooperative gameplay on EFL acquisition.

- Improvement in EFL vocabulary knowledge,
- Potential improvement in argumentative writing skills,
- Improvement in motivation to learn EFL

Discussion

The findings of the study indicated that there was an effective cooperation between the participants to play *Trace Effects*. The teams displayed evidence of positive interdependence, face-to-face promotive interaction, individual accountability and personal responsibility (Johnson & Johnson, 1994) during gameplay. Team members discussed linguistic options and game strategies during gameplay to ensure everyone was on board. This finding constitutes evidence of the relevance of the cooperative learning principles (Johnson & Johnson, 1994) to cooperative game-based language learning situations.

The findings also indicated that some team members struggled to balance competition and cooperation during gameplay. Games are mostly about competition and winning while cooperative learning is about working together. The ideal is to promote within-team cooperation and between-team competition during gameplay. However, the conciliation of these two requires training. Other scholars such as Romero et al. (2012) have already drawn attention to the issue. Sometimes the drive to secure victory for their teams can lead some group members to take over gameplay at the risk of reducing teammates to passive observers.

The findings of the study indicated that during cooperative gameplay, expert peers took the lead to scaffold for their non-expert peers. Participants indicated that some of their classmates explained to them what characters in the game were saying and sometimes translated their language from English into French for them. Vygotsky (1978) recognizes the importance of grouping expert learners with non-expert peers so that they can scaffold for them.

The results of the study revealed that the participants perceived *Trace Effects* to have contributed to improving their EFL vocabulary knowledge, comprehension and motivation to learn. The finding concerning the contribution of *Trace Effects* to improving vocabulary knowledge is consistent with findings of previous studies (deHaan et al., 2010; Ranalli, 2008).

Recommendations for Structuring Cooperative Game-Based Language Learning

Based on the findings of the study the following recommendations are made in order to assist educators in getting the most out of cooperative game-based foreign language learning:

- **Grouping:** Assign students to heterogeneous teams based on language and game proficiency. In the present study, students were given the freedom to select their own teams. It was observed that heterogeneous teams cooperated more effectively than homogeneous ones. As a result, it is recommended that the instructor forms teams of students with different abilities.

- **Principles of cooperation:** Provide clear guidelines on the principles of cooperation (Johnson & Johnson, 1994). As an instructor, you should clarify your expectations in terms of cooperation between students and provide guidelines on how to make it happen.

- **Cooperation and competition**: Discuss the necessity for within-group cooperation and between-group competition with students. Students need to understand that cooperation within their teams is a priority over competition against other teams. However, the two are not necessarily incompatible (Romeo et al., 2012). The between-group competition is useful because it creates an additional layer of motivation for students.

- **Leadership:** Require students to take turns controlling the keyboard during gameplay. In a cooperative gameplay situation there is a risk that one student will take over the computer keyboard and turn other team members into passive observers. In order to prevent that from happening it is recommended that students take turns controlling the keyboard. That has the merit of ensuring that all participants take an active role in gameplay thereby improving their leadership, technology, and language skills.

- **Discussion:** Encourage students to engage in discussion with their peers during gameplay. When it is their first time playing an educational game in teams, students may not know exactly what is expected of them. Those who are not controlling the keyboard may get the wrong impression that their role is to sit back and watch. It is important for them to know that they are expected to discuss language and game issues and challenge each other when necessary.

- **Use of target language:** Encourage students to use the target language during gameplay. In a foreign language context where almost all the students share the same native language they tend to speak their native language during gameplay. Encouraging students to use the target language during gameplay will go a long way in improving their speaking skills.

Conclusions

The present study set out to gain insights into the nature of cooperation between high school students to play *Trace Effects* and the perceived impact of the game on EFL acquisition. The findings indicated that effective cooperation is characterized by collaborative interdependence; individual accountability and face-to-face promotive interaction took place between participants in most teams during gameplay. Further, it was found that the students perceived *Trace Effects* to have had a positive impact on their EFL knowledge and motivation.

Limitations and Future Studies

The present study adopted a case study approach to gain deep insights into the nature of cooperation between high school students to play *Trace Effects*. The study also investigated the perceived impact of *Trace Effects* on EFL learning outcomes. The findings reported here remain exploratory in nature. Therefore, more confirmatory studies are needed in order to better understand the nature of cooperative game-based language learning.

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