OPEN ACCESS

CONTEMPORARY EDUCATIONAL TECHNOLOGY

ISSN: 1309-517X (Online) 2022, 14(2), ep351, https://doi.org/10.30935/cedtech/11526

Research Article

Improving Students' Narrative Skills through Gameplay Activities: A Study of Primary School Students

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Received: 28 Oct 2021 Accepted: 25 Dec 2021

Abstract

This paper aims to explore the impact of freeform digital games on primary school students' narrative skills, in terms of linguistic cohesion and semantic coherence, compared to other digital media, such as formally structured digital games and movies. A total of 128 Year 6 Primary school students participated in this research. Initially, students were divided into three groups. In all three groups, an educational intervention programme was applied. At the end of this phase, each student was asked to produce a narrative discourse (pre-test) about Crusoe's survival on the mysterious island. Subsequently, students of each group were involved in activities with different digital material. At the last part of the research, students were asked to produce a narrative discourse (post-test) which was compared to the pre-test discourse, to determine whether there had been an improvement in the narrative discourse produced by the students of the three groups. The results presented in this paper show that the narrative discourses of students who played with the freeform digital game showed statistically significant improvement in cohesion and coherence compared to the discourse of students who played with the formally structured digital game and the students who watched the film.

Keywords: freeform digital games, structured digital games, narrative skills, primary school

INTRODUCTION

Since their first appearance in the early 1970s, digital games have become "the most frequently used interactive media" (Beentjes et al., 2001, p. 95). School-age children are increasingly spending time playing with them. The impact of digital games on children's everyday lives and activities has aroused debate regarding their potential for language learning (Ranalli, 2008, p. 441). The games' ability to create realistic and attractive environments has been the subject of much discussion, which focuses on how these environments should engage students and urge them to use either their first/native or a second/foreign language in order to communicate with their classmates and their teachers and finally to learn from this process.

Play is described as a pleasurable, voluntary, intrinsically driven activity that includes free choices/free will and is inherently fascinating (Sutton-Smith, 1997).

Roger Caillois (2001), proposed two different forms of play, paidia and ludus. Ludus has structure, rules, objectives, and limitations, while paidia is unstructured and spontaneous, though not compulsory; it's free of punishments or limitations other than space and time constraints. Ludus and paidia are two categories that lie at different points along the continuum of play. The rules get harsher and more influential as play

moves closer to the ludus end of this continuum. Paidia-based play, which is on the opposite end of the continuum, foregoes tight formal structures in favour of more freeform play.

Caillois' (2001) idea was developed further by Frasca (2003). He noticed that that some games are built more clearly for a ludus dimension in their layout; the games have a winning or losing plot and provide the players with specific goals throughout the game. On the other hand, games with open goals, exploration, experimentation, and improvisation may be more possibly to encourage paidia-based play.

In an attempt to define what play is, Salen and Zimmerman (2004) split the concept of play into three types: "game play", "ludic activity" and "being playful". "Game play" is a structured activity with a set of predefined rules. A game should contain both rules and structure that restrict how participants can partake to be considered this type of play. If a "game play" has no rules, it falls into the second type of "ludic activity". There are no explicit rules for "ludic activities", yet they do require organization. Because the experience has such a fundamental framework, it may be copied and replayed. If the participants like the action, they may simply repeat it and re-enter the Magic Circle linked with it. The third type, "being playful" is the widest of the three, encompassing all play types. It encompasses not just traditional activities of play, but additionally the concept of "being playful", in which a playful mood is infused into another activity.

Juul (2005) claimed that there are two types of digital games: game of emergence and game of progression. Games of emergence are defined as games with a set of predefined rules combined to produce a large variety of game variants, which the players must then deal with by devising tactics. Games of progression are less engaging than a game of emergence. In a game of progression, players should accomplish predetermined tasks to win. Furthermore, players are simply faced with a succession of tasks, each with its own set of possibilities and answers that is all spelled out in the rules of the game. The fact that games of progression can be completed indicates that their re-playability is limited.

Whilst many digital games place an emphasis on the rules, goals, and structures of game play (known as ludus by Caillois (2001)), Mitgutsch (2008) noted that there are other digital games that place an emphasis on the unstructured, spontaneous, and free act of play (known as paidia by Caillois, 2001). He coined the phrase "digital play-based learning," which he defined as "a phenomenon that relates to a circular rather than a linear process of learning and the unstructured act of play in games". These digital games aim to teach students to re-evaluate their preconceived notions and concepts by highlighting their past experience horizons. This perspective of game-based learning is not a replacement for Prensky's (2007) Digital Game-Based Learning, but it does focus on a distinct component of learning and playing.

This view suggests that digital game categories lie at different points along the axis of play between totally freeform activity and formally structured goal-driven activities:

The "formal" end of the axis is concerned with game-related issues including rules, goals, and structures. "Structured" digital games are games with a definite set of winning and losing rules, pre-determined and clear goals. structured designer-generated activities with linear gameplay and instant feedback, letting players know whether what they've done in the game is good or bad for them, whether they're following the rules or breaking them, whether they're getting closer to the goal or further away, and how they're doing compared to the competition.

The "free" end of the axis focuses on the game-dimension, including unstructured, spontaneous, and free actions of play. "Freeform" digital games are those that have no pre-determined set of rules, no pre-determined goal, no winning or losing plot, and nonlinear gameplay.

Based on our previous research effort (Kirginas & Gouscos, 2016a, 2016b, 2017), we suggest that freeform games produce more positive experiences and less negative emotions than formally structured ones. Furthermore, there is a serious concern about students' poor writing performance. Students feel writing prompts boring and meaningless. According to U.S. National Assessment of Educational Progress 3/4 of eighth and twelfth graders in USA lack proficiency in writing (Schneider, 2008). Thus, many educational interventions have been designed and implemented in the school context aiming at improving the writing skills of students (Englert et al., 1988; Ferrari et al., 1998; Graham & Harris, 1992; Warren, 2006). These

educational interventions have emphasized both the learning of the specific structure of the texts and the teaching of the techniques for writing effective narrative discourses. The results of these research efforts showed that even the weakest students showed significant improvements in their discourse.

So far, this research aims to combine all issues which have been raised above, in order to explore the impact of freeform digital games on primary school students' narrative skills, in terms of linguistic cohesion and semantic coherence, compared to other digital media, such as formally structured digital games and movies.

The Impact of Digital Games on Students' Learning and Improving Narrative Skills

In recent years, many studies have been published reporting the positive impact of digital games on students' learning in a variety of subjects, including language art, maths, sciences, history, etc. In their meta-analysis Karakoc et al. (2020) revealed an overall impact of digital game-based learning on students' learning. Chen et al. (2018) explored the efficacy of digital game-based vocabulary acquisition in their meta-analysis research. The data revealed an increase in vocabulary acquisition for the participants. McCarthy et al. (2018) conducted a research on the implementation of digital games on students' early mathematics learning. They reported an increase in students' mathematical comprehension and skills from pre to post assessment. Chen et al. (2020) conducted their research to find that students, particularly low and medium achievers, learned chemical topics with significantly more satisfaction, confidence, and less frustration and stress than their control group peers.

There have been very few studies aiming at the impact of digital games on improving students' writing skills. In one of these studies, using pre-test/post-test design Warren et al. (2008) examined the impact of Anytown, an activity zone within Quest Atlantis, on student achievement in standardized writing. As a result, the experimental group demonstrated statistically significant gains in motivation and language-arts scores on standardized tests. However, their teachers experienced a decrease in time spent explaining and re-describing directions. Although the learning gains were not consistent across individuals or topics, they appeared to result from a complex situated interaction of learner and game.

In another study conducted by Barab et al. (2012) over 90% of students of the 7th graders enrolled in the study were eligible for free-and-reduced meals. The game-based unit included 18 boys and 15 girls, while the story-based unit had 17 boys and 15 girls randomly selected from the three classrooms. According to the teachers, no differences in ability were found. During this study, students participated in a game-based curricular unit called Plague: Modern Prometheus. Twelve classroom periods were spent in this unit, nine taking place in the computer lab and three involving writing and teacher-led discussion in the classroom. In the game, students are introduced to the inhabitants of a town who are afflicted by a terrible plague. It is likely that the plague could be cured by a doctor, but the process will involve creating a creature. In their efforts to convince game characters to share their perspectives, students are required to use persuasive writing skills to grapple with ethical dilemmas that result. However, students in the game-based classroom demonstrated significantly greater gains than students in the traditional classroom. Additionally, students who participated in the game-based unit reported significantly higher levels of engagement, different goals motivating their participation, and fewer reprimands received from the teacher for failing to complete the assignment.

Using the video game entitled "UNCHARTED 2: Among Thieves" and four students, Bing (2013) conducted a study. The students were asked to write narrative discourses about their experiences after playing the game for three weeks. Based on the study's findings, video game's narrative structure has a significant impact on students' narrative discourses, mostly by incorporating three basic narrative elements, such as flashbacks, double-climax and orientation.

Last but not least, Busuttil et al. (2016) discuss a set of activities incorporating Minecraft that were introduced to seven year olds students in a Maltese school to introduce a number of curricular topics. By using Minecraft, the students were able to visualize the imagined Graffalo abode by creating it in Minecraft and this led to the students writing detailed sentences about the place where the Graffalo lives.

Table 1. Participants

Student groups	Male	Female	Total
Experimental Group 1	20	23	43
Experimental Group 2	21	23	44
Control Group	18	21	39
Total	59	67	126

Considering what we have discussed above, we can conclude that many studies have shown that digital games have potential benefits for teaching and learning in different subject areas both in primary and secondary education. Despite this, there are few studies that examine the impact of digital games on students' writing skills. Even more impressive is that there are fewer studies examining the impact of digital games on their narrative skills. Thus, the results of this study demonstrate both the value and significance of this study in addition to its contribution to construct scientific knowledge in the areas of digital games and students' narrative skills.

RESEARCH METHODOLOGY

Research Focus and Hypotheses

a. The narratives of students who played with freeform digital game would be statistically larger improvement in their extent and complexity in relation to texts of students who played with the structured one and with texts of the students who watched the movie.

b. The narrative texts of students who played with freeform digital game would show statistically greater improvement in terms of vocabulary and their grammatical coherence in relation to the texts of the students who played with the structured one and with the texts of the students that watched the movie.

c. Their narrative texts students who played with the freeform digital game would present statistically greater improvement in the conjunction than texts of students who played with the structured one and with texts of the students who attended the film.

d. The narrative texts of students who played with the freeform digital game will show statistically greater improvement in their coherence with the texts of the students who played with structured one and with students' texts set watched the movie.

Participants

A total of 128 5th-grade students of three primary schools in Athens participated in this research. As **Table 1** shows, the students were divided randomly into three groups: two experimental groups (EG1 and EG2) from the first and the second primary school and one control group (CG) from the third primary school.

Procedure

Initially, in all three groups, an educational intervention programme was applied based on (a) an extensive excerpt from the book of Daniel Defoe "The Life and Adventures of Robinson Crusoe" and (b) the teaching of techniques for writing effective narrative discourse. At the end of this phase, each student was asked to produce a narrative discourse (pre-test) about Crusoe's survival on the mysterious island. Subsequently, students were involved in activities with different digital material:

a. The students of the control group (CG) watched the film "Robinson Crusoe" (Hardy & Miller, 1997) (**Figure 1**).

b. The students of the first experimental group (EG1) played with the formally structured digital game Robinson Crusoe: The Game (**Figure 2**).

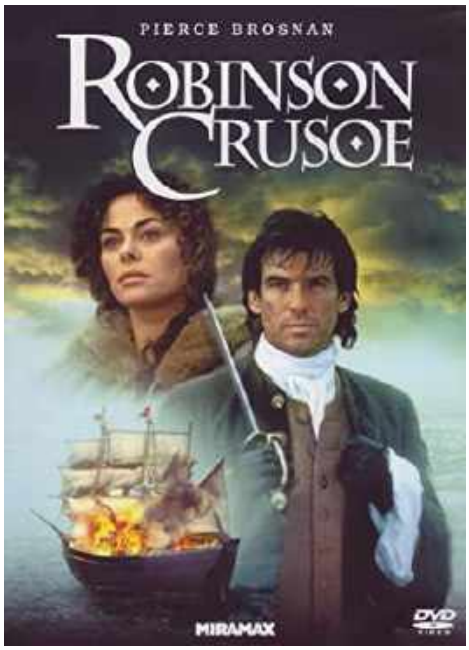

Figure 1. Poster of the film Robinson Crusoe

Figure 2. Screenshot from Robinson Crusoe: The Game

c. The students of the second experimental group (EG2) played with the freeform digital game Minecraft (Mojang, 2011), embodying the role of "Robinson Crusoe" who tries to build his house and survive (**Figure 3**).

At the last phase of the research, each student was asked to produce a narrative discourse (post-test) which was compared to the pre-test discourse, to determine whether there had been an improvement in the narrative discourse produced by the students of the three groups.

Selection Criteria for the Digital Games Used in the Research

As there are so many freeform and formally structured games, we used the following selection criteria, that have been extensively evaluated in our previous studies (Kirginas & Gouscos, 2016a, 2016b, 2017), to help us choose the best ones:

a. games with nonlinear plot vs. games with linear plot,

b. games that provide a variety of alternative solutions to challenges vs. games that provide one and only solution to challenges,

Figure 3. Screenshot from Minecraft

c. games with unstructured sequence of activities vs. games with structured sequence of activities, and

d. games with undefined set of challenges vs. games with pre-defined set of challenges.

Two digital games with diverse features and gameplay were chosen and employed in this study based on the above criteria.

1. Minecraft (https://minecraft.net/)

Minecraft according to the model evaluation of freedom of choice which created by the research so far is classified in category of freeform games, i.e., has features of free play (play-dimension), such as non-pre-designed rules, or not pre-planned plot and existence multiple routes.

2. Robinson Crusoe: The Game

Robinson Crusoe: The Game according to the model evaluation of freedom of choice which created by the research so far is classified in the category of formally structured games, i.e., as analysed in Introduction, have features of the structured game-dimension, such as rules, objectives, and specific structure.

Data Collection Methods

Thus, students' narrative discourses were evaluated quantitatively in terms of:

1. Cohesion; more particularly
    a. Five variables were used to assess the extent and complexity (the amount of words, the total amount of T-units, the ration of the amount of words to the total amount of T-units, the total amount of complex T-units, and the ratio of the total amount of complex T-units to the total amount of T-units).
    b. Three variables were used to measure the grammatical cohesion (reference, ellipsis, and substitution).
    c. Four variables were used to measure the lexical cohesion (repetition, synonym, superordinate, and general word).
    d. Five variables were used to measure the conjunction (temporal clauses, purpose clauses, result clauses, relative clauses, and conditional clauses).
2. Coherence with the use of a three-point Likert scale and more particularly
    a. Five variables according to Labov's (2013) and Labov and Waletzky's (1967) narrative pattern were used to measure the coherence (orientation, complicating action, evaluation, resolution, and coda).

b. Two variables, which are considered essential for the construction of coherent narratives, were used (commitment to the main idea and time inconsistencies).

FINDINGS AND RESULTS

First, an ANOVA test was performed, which showed that the students of all three groups (CG, EG1, and EG2) had equivalent narrative skills before their exposure to activities with the digital material, as no statistically significant differences were found both for the variables of cohesion ($F=0.930$, $p=0.397>0.01$) and coherence ($F=2.857$, $p=0.061>0.01$).

Subsequently, a one-way ANOVA test revealed the presence of significant statistical differences between the averages of all variables in the narrative discourse produced by the students in the three different groups, except for the variables of orientation ($p=0.022$), commitment to the main idea ($p=0.032$) and time inconsistencies ($p=0.125$). It should be noted that narrative discourses of EG2's children showed greater improvement in all variables compared to ones produced by the students of the other two groups. Also, the narrative discourses of EG1's children showed greater improvement in all variables compared to ones produced by the children of CG.

Furthermore, the Tukey post-hoc showed that the discourses of EG2's students showed improvement in several areas; more particularly, in

1. Cohesion

   a. Discourses were improved in extent and complexity (**Figure 4**), as there are four variables which show the positive effect of the freeform digital game compared to the formally structured game and the movie. Thus, in their discourses, students who played with freeform game significantly increased the total amount of words (122.25±30.98 words, $p=0.000$), the total amount of T-units (5.70±5.31 T-Units, $p=0.004$), the total amount of words to the amount of T-units (6.24±7.56 words to the amount of T-units, $p=0.000$) and the total amount of complex T-units to the total amount of T-units (0.04±0.16 of complex T-units for the total amount of T-units, $p=0.000$) compared to the students who played with the formally structured game or watched the movie.

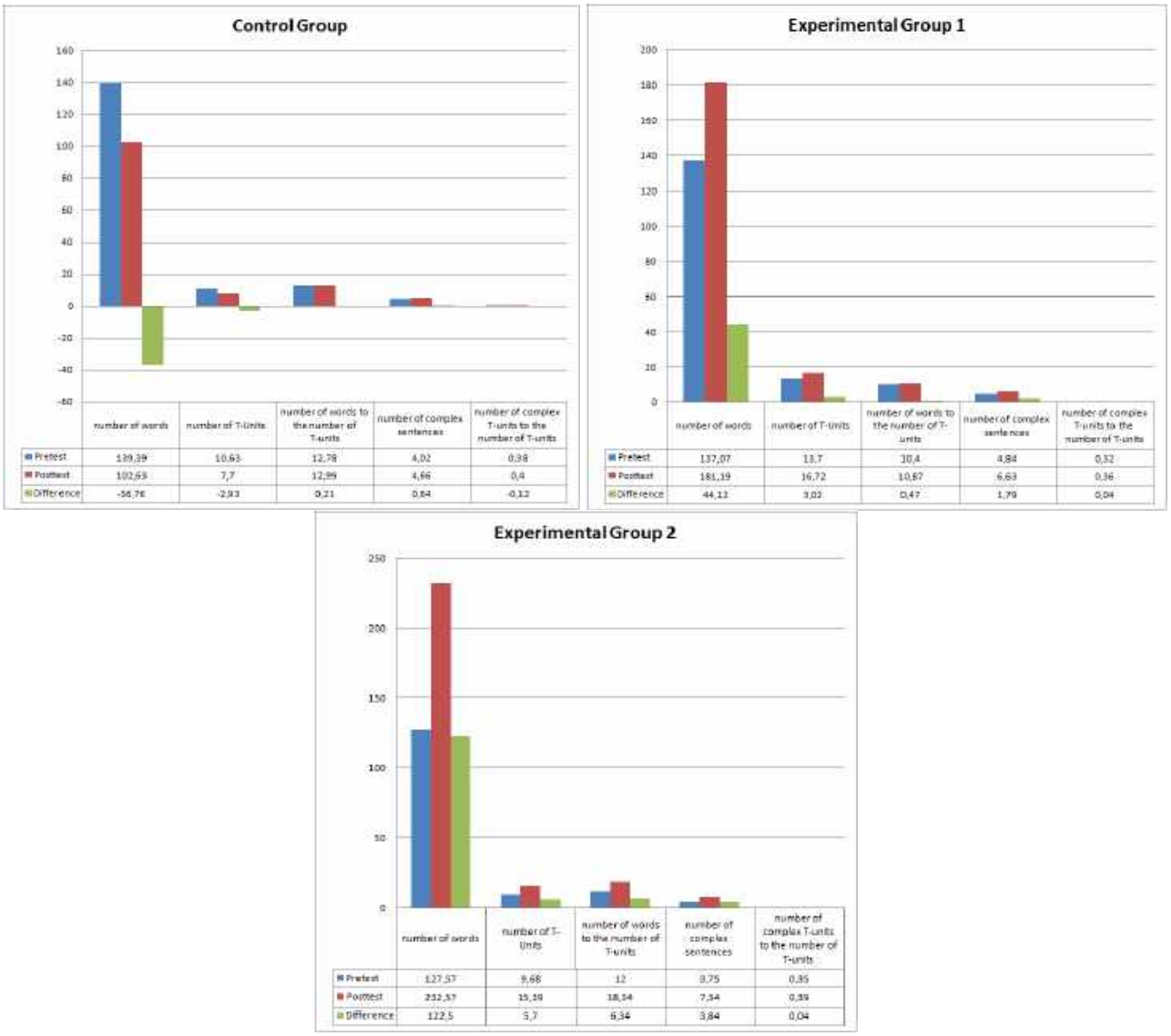

Figure 4. Pre-test/post-test comparison of extent and complexity by bar charts

b. Discourses were improved in the grammatical and lexical cohesion (**Figure 5**), as there are five variables which show the positive effect of the freeform digital game compared to the formally structured game and the movie. Therefore, the students who played with freeform game significantly increased the total amount of references (7.14±5.82 references, p=0.001), the total amount of repetitions (4.48±5.82 repetitions, p=0.001), the total amount of ellipsis (1.02±1.11 ellipsis, p=0.000), the total amount of superordinates (0.11±0.13 superordinates, p= 0.000), the total amount of general word (0.12±0.41 general words, p=0.000) compared to the students who played with the formally structured game or watched the movie.

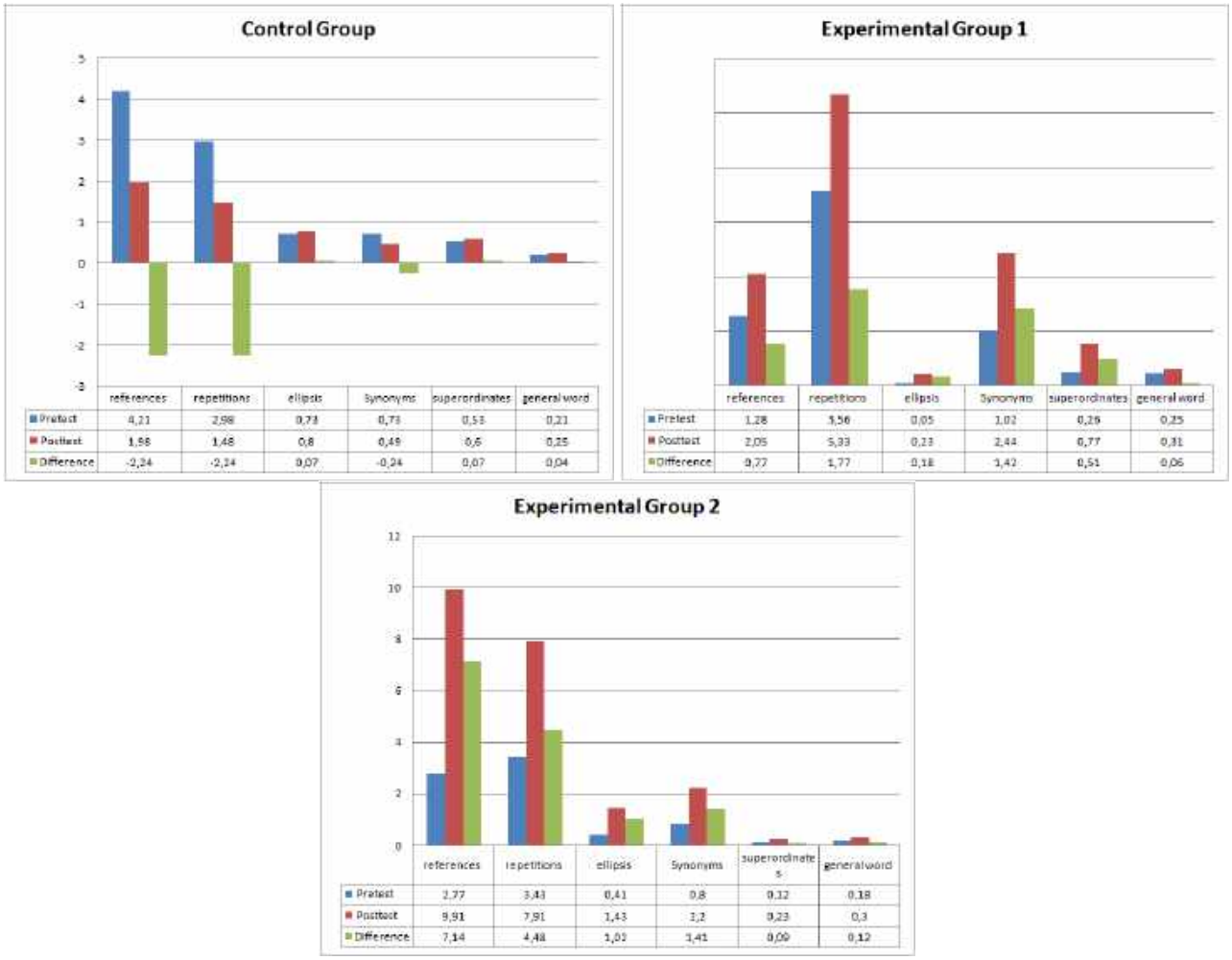

Figure 5. Pre-test/post-test comparison of grammatical and lexical cohesion by bar charts

c. Discourses were improved in the conjunction (**Figure 6**), as there are two variables which show the positive effect of the freeform digital game compared to the formally structured game and the movie. Thus, the students who played with freeform game significantly increased the amount of temporal clauses (2.93 temporal clauses, p=0.000) and the amount of purpose clauses (3.52 purpose clauses, p=0.000). At the same time, students who played with freeform game significantly increased the amount of result clauses (0.02 result clauses, p=0.000) compared to EG1; students. Finally, there are two variables which show the positive effect of the freeform digital game compared to the movie, as EG2's students significantly increased the amount of relative clauses (1.38 relative clauses, p=0.000) and the amount of conditional clauses (0.21 conditional clauses, p=0.008).

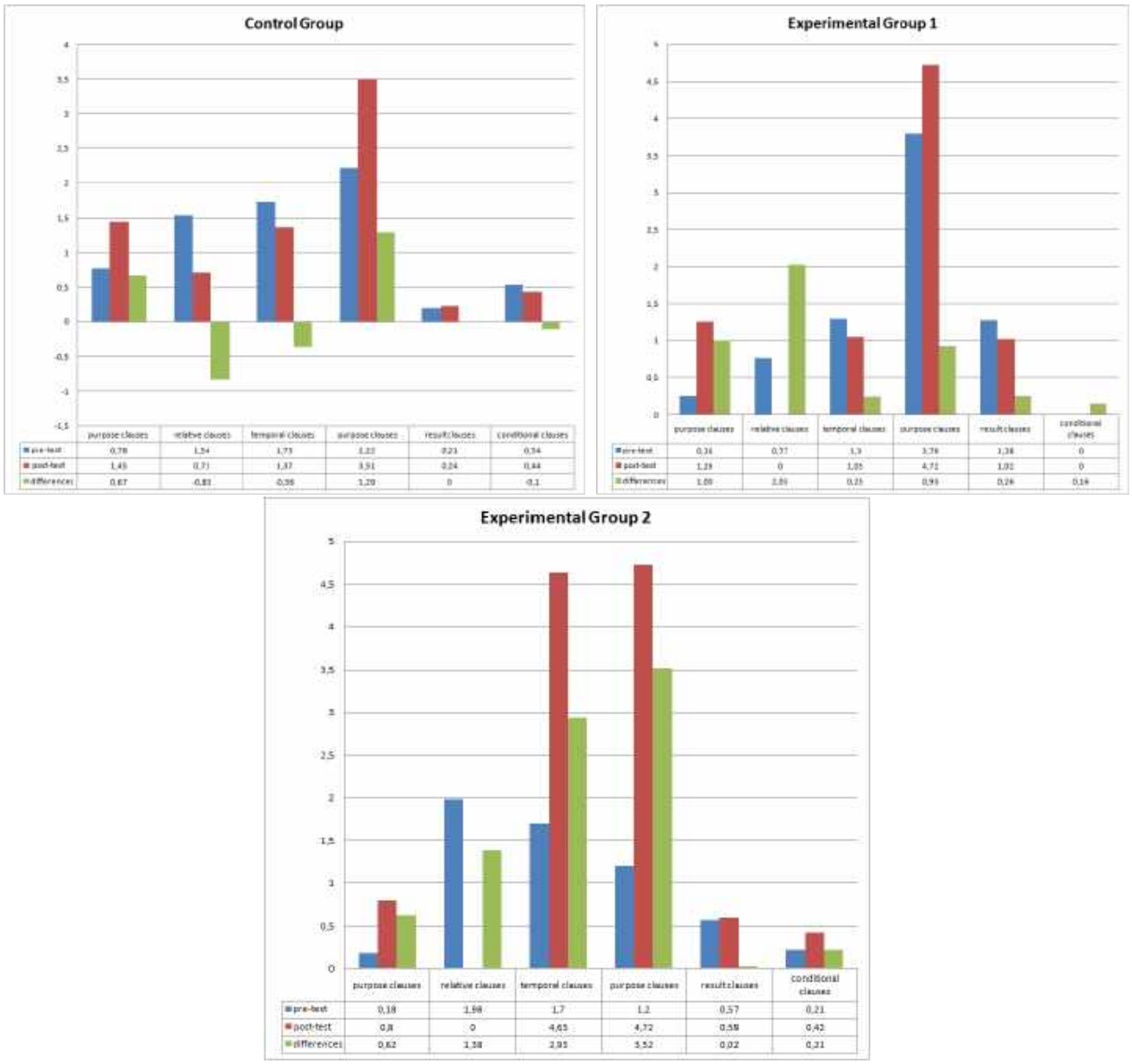

Figure 6. Pre-test/post-test comparison of the conjunction by bar charts

2. Coherence (**Figure 7**): The EG2's students significantly increased the variables of evaluation (0.52, p=0.000) and coda (1.68, p=0.000) compared to EG1's and CG's students as well as the variable resolution (0.54, p=0.002) compared to CG's students.

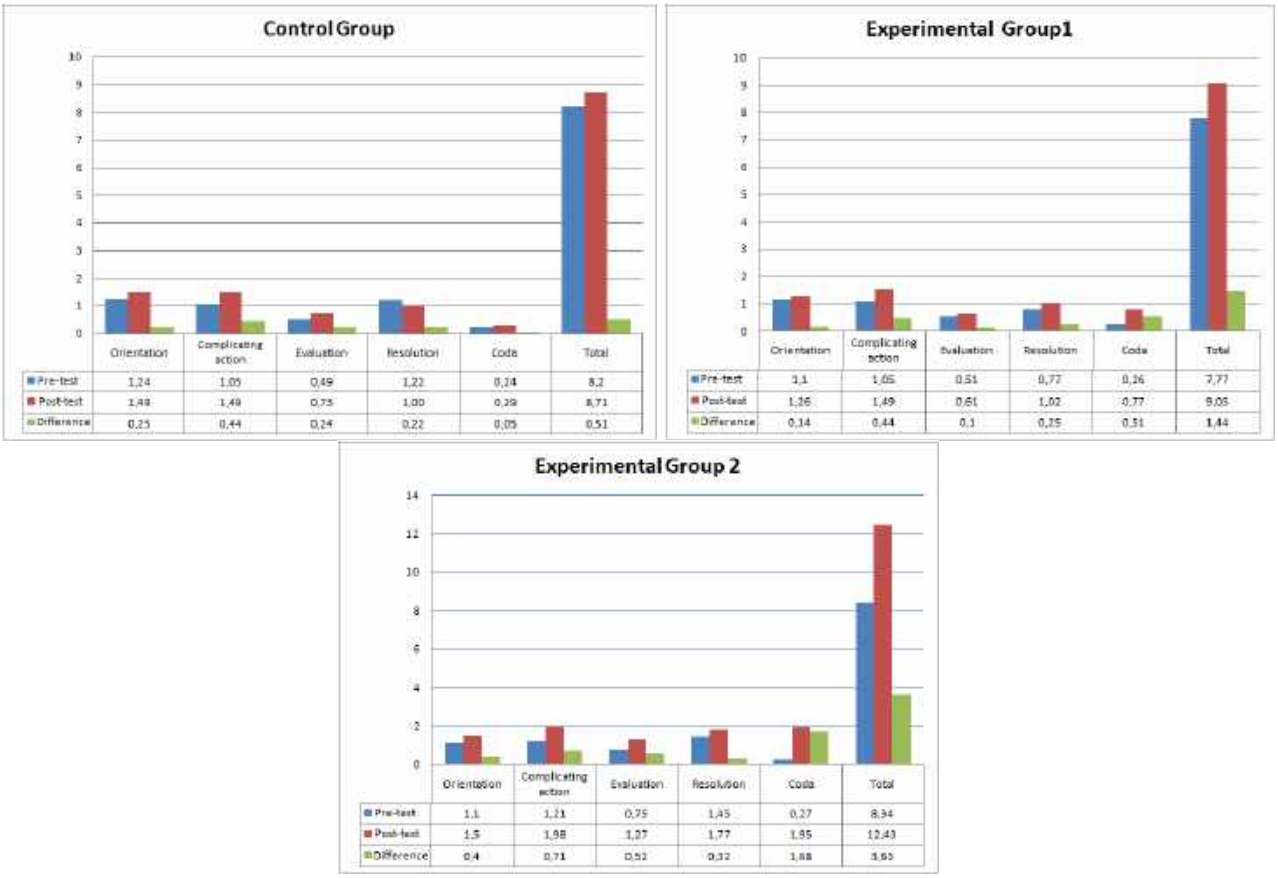

Figure 7. Pre-test/post-test comparison of coherence by bar charts

DISCUSSION

The results presented in this paper reveal that the narrative discourses of students who played with the freeform digital game showed statistically significant improvement in cohesion and coherence compared to the discourse of students who played with the formally structured digital game and the students who watched the film, as they increased

a. discourses' cohesion (the total amount of words, the total amount of T-units, the total amount of words to the amount of T-units, the total amount of complex T-units to the total amount of T-units (0.04±0.16 of complex T-units for the total amount of T-units, the total amount of references, the total amount of repetitions, the total amount of superordinates, the total amount of general word, amount of temporal clauses and amount of purpose clauses) and

b. coherence (variables of evaluation and coda).

These results highlight the significant impact of freeform digital games on primary school students' narrative skills. The methodology for the use of freeform digital games proposed in this research can be a useful tool

a. for students, to improve their narrative skills and
b. for teachers, to design and implement educational intervention programmes for enhancing their students' narrative skills.

Considering the findings of this research, the general conclusion is that the positive impact of freeform digital games on students' narrative skills is significant due to their positive gaming experience. By engaging in a digital environment, students are given the opportunity to engage in challenging activities; they have the control of the main character, and play games at their own pace, which keeps them motivated by putting them at the centre of learning and involving them actively. Freeform digital games have the potential to

involve students in the process of learning transferrable knowledge and skills necessary to succeed in the 21st century, such as discovery learning, experiential learning, collaborative learning, creative thinking, problem-solving skills, and the ability to make decisions effectively are among them.

Although generalizing the results of this study is difficult, it presents an opportunity to examine the potential of digital freeform games to improve narrative skills in school-aged children, as well as to extend these findings to other textual genres (descriptive, argumentative, persuasive, expository, informative etc.) that cover not only the written, but also the oral speech (reading, speaking, listening).

In essence, such an approach can be applied better to the paratexts. These are texts players produce around their experiences with games, talking on online forums, writing comments on blogs or websites, narrating their gaming experiences in groups, writing reviews in magazines and related websites, writing game guides and instructions, describing the main characters, the setting, the backstory and the plot of the games, writing about the game walkthrough or recording and uploading or live streaming the game walkthrough to the internet, etc.

As a result of the above, we can conclude that the more interesting, enjoyable and motivating a game is the more reasons for discussion it gives among students, as well as the richer body of paratext is created around it. Thus, the freedom of choice in digital games leads to a better gaming experience and richer body of paratext, therefore to more opportunities for students to produce written texts.

CONCLUSIONS

In conclusion, this research provides strong evidence that the impact of playing with digital games, regardless whether they are freeform or structured ones, on students' narrative skills is greater than watching the film. However, one of most significant conclusion of this research is that the narrative discourses of students who played with Minecraft (freeform digital game) showed statistically significant improvements in their extent and complexity, lexical and grammatical cohesion and coherence than the narratives of the students who played with "Robinson Crusoe: The Game" (a formally structured digital game).

Although the results of the present study are promising, it should be admitted that the generalization of the research findings reported has limitations. Firstly, limited samples of two digital games were employed in this study from a fairly large number of available freeform and formally structured digital games. Secondly, there exist other factors apart from cohesion and coherence that could, possibly, affect the quality of narrative discourses, like intentionality, acceptability, informativity, situationality, and intertextuality.

Further research in along these lines should address issues such as

a. using games which differ only in the freedom of choice, in order to explore whether the one with the greatest freedom of choice will lead to more cohesive and coherent narrative discourses,
b. examining the impact of factors such as intentionality, acceptability, informativity, situationality, and intertextuality on the quality of students' narrative discourse and
c. studying the potential impact of freeform digital games on other types of writing such as expository writing, persuasive writing, descriptive writing, etc.

Funding: The author received no financial support for the research and/or authorship of this article.

Acknowledgements: The author would like to thank his PhD advisor Spiros Moschonas, Associate Professor of Linguistics and the Philosophy of Language at the National and Kapodistrian University of Athens, for his guidance and support.

Declaration of interest: Author declares no competing interest.

Data availability: Data generated or analysed during this study are available from the authors on request.

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