



Article

# Analysis of the impact of serious games on the development of writing skills in intermediate-level students learning French as a foreign language.

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**Abstract**

One of the essential aims of foreign language teaching is to improve students' writing skills, particularly in academic contexts. Learning to write in French among middle cycle learners is one of primary missions of Algerian schools, where French occupies a prominent place as the second language after Arabic. It is a language of daily communication for a large part of the population. However, little research has explored the use of educational serious games to reinforce these skills, particularly in subjects such as French. These games can be an effective complementary tool for improving learners' written production. In this research, a quasi-experimental approach is proposed, based on educational games, to enhance the motivation of learner-players in order to maximize their potential in written production. The participants were 35 secondary school students aged between 12 and 15, divided into a control group and an experimental group. The experimental group of 20 learners used the Motiv-Product game, which is designed to teach written production in French to middle school learners in Algeria. while the control group of 15 learners followed the traditional program without the game. Students' written production skills were assessed using pre- and post-tests, including tasks such as writing short essays. The results confirm that the use of an educational game can improve the written production of learner-players, underlining the value of educational games in language learning.

## 1. Introduction

Writing represents a real challenge for children, offering them the opportunity to reflect, to acquire knowledge in all disciplines and to develop a critical mind, which is also essential for their life outside school: integration into the world of work, cultural openness, but it requires a complex mastery, encompassing the act of writing, spelling, text composition, imagination and creativity [1]–[2]. One of the essential aims of foreign language teaching is to improve students' writing skills, particularly in academic contexts [3]. Learning to write in French is one of the

most important tasks of the school, which calls on all the skills acquired and those taught in schools in North Africa[4]. This research is motivated by the challenges encountered in teaching writing skills for non-native language writers who face several difficulties, such as linguistic challenges, particularly in terms of vocabulary [5]–[2], and socio-cultural difficulties of students that influence their learning processes and engagement in classroom activities [6]. In Algerian 4th grade middle school classes, it has been observed that the majority of learners lack motivation for written production and prefer to express themselves orally. Moreover, there is a general inability to produce simple written work, and written production is often approached uniformly in class, in line with official programs. This probably translates into a lack of teaching techniques that can support learners in acquiring writing skills.

[7]–[8]–[9] say that serious games, and learning games in particular, are one of the most innovative teaching tools of recent years in terms of pedagogical practice. In [10]–[11] it was recognized that educational games have an enormous advantage in boosting and improving learner motivation, and in particular learning games are seen as video games developed with a purpose that goes beyond mere entertainment. They exploit new technologies to communicate a message in a captivating way and with a serious purpose.

Serious educational games can be used to teach a wide range of subjects [7]–[12]–[8]–[13] including mathematics, science, history, geography, psychology as well as language arts, social sciences, etc.

This research embodies our commitment to seriously examine the challenges associated with lack of motivation in the EFL classroom, particularly in relation to written production. With this in mind, it seems appropriate to explore various strategies to stimulate learners' enthusiasm for writing, so that everyone can enjoy expressing themselves in writing.

This work proposes to incorporate ludic activities, in particular serious educational games, as a means of motivation to improve written production. The aim is to examine whether the learner is attracted by the pedagogy and scenario of the proposed activity. This approach could open up new learning perspectives with regard to written production in French as a foreign language.

Taking all these considerations into account, the question that arises is:

Does the serious educational game improve the written production of learners in the 4th year?

It would then be interesting to explore the repercussions of using the game, such as motivation in learning to produce written work by learners in the 4th year. This question will be addressed by answering the following research question:

Will the use of serious educational games lead learners to develop the skills needed to improve their written work in French as a foreign language?

It is therefore necessary to understand what happened during the game in order to identify the learner's behavior and performance.

This leads us to the following hypothesis:

The use of serious educational games could motivate learners to maximize their potential according to their profiles.

The following section provides an overview of similar work in the field of teaching written production, as well as the results of studies on the use of educational games in various fields.

Section III presents Learning game MOTIV-PRODECT, dedicated to learning written production in French for middle school students in Algerian education. Section IV presents the proposed approach in detail, describing our sample and the methods used for data collection. Section V describes the experiment carried out. Section VI presents the results obtained and discusses them. Finally, Section VII concludes our work.

## 2. Related works

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This section deals with the different approaches to foreign language teaching in Algeria and the place of the written word in these approaches. It then discusses the concepts of serious games, taking into account the context in which learning games are used and the analysis of learning through games. She also discusses the motivation of learners in written production and the link between motivation and learning.

### 2.1 Approaches to teaching written production

There are a variety of approaches to teaching written production, each with its advantages and disadvantages. The direct approach, where the teacher spoke only in a foreign language and the learner had to make a great personal effort to understand. Writing activities generally included exercises such as reproducing and rewriting stories read in class, dictation, as well as free composition exercises. Learners can then express their thoughts in free form [14]–[15]. However, the traditional methodology was imposed, where in this pedagogical framework knowledge is mainly held by the teacher, creating a dynamic where classroom interaction was unidirectional, from the teacher to the learners. The latter adopted a passive role, with no opportunity for interaction or questioning, and the emphasis was on mastering the written language [15].

In the communicative approach, the learner is expected to be more active, taking a full part in classroom activities. In this approach, the emphasis is on the communicative activity of writing, i.e. the ability to write in order to announce, denounce, transmit information, express opinions or interact with other people. Teaching by didactic units promotes writing (comprehension and production) in communicative approaches [16]–[17].

In the competency-based approach, written production is indicated by the integration situation in which the student must develop their competence in carrying out personal written work. The statement and the instructions play an essential role in this activity because they provide clear information and precise indications of what the learner is expected to produce in writing [17]–[18]–[19]– [20].

In the genre-based approach, the teacher focuses on the study and production of different textual genres such as argumentative texts, narratives and descriptive texts [21]. In the reflective approach, the emphasis is on reflection on the writing process, which requires a great deal of individual support [22].

A number of methods for teaching written production were presented. Table 1 below summarizes these different methods, and also gives the role of the teacher and the advantages and disadvantages of each method.

**Table 1.** Synthesis of methods for teaching written production

Teaching methods	Teacher's preference	Learner's situation (in writing)	Advantage of approach	Disadvantage of approach
Direct methodology	<ul style="list-style-type: none"> <li>- He only used the foreign language and did not translate into his mother tongue.</li> <li>- He used mimicry and gestures to facilitate understanding.</li> <li>- He asked questions and directed the explained reading.</li> <li>- He made a lot of oral effort in class.</li> </ul>	<p>The activities of the essay are generally:</p> <ul style="list-style-type: none"> <li>- free composition exercises</li> <li>- Dictation.</li> <li>- The learner is expected to reproduce and rewrite stories read in class.</li> </ul>	<ul style="list-style-type: none"> <li>- It emphasizes the direct use of the foreign language</li> <li>- it encourages learners to express themselves and write in French from the start of their course</li> <li>- the direct approach encourages the development of fluency in written expression and helps learners to improve their fluency and speed of production.</li> </ul>	<p>Learners encounter many difficulties when writing, which can be seen from several angles: linguistic, didactic and pedagogical.</p>
Traditional methodology	<ul style="list-style-type: none"> <li>- He completely dominated the class.</li> <li>- He had knowledge and authority.</li> <li>- He asked the questions and corrected the answers.</li> </ul>	<ul style="list-style-type: none"> <li>- The learner is passive</li> <li>- The learner is completely considered as a receiver of information and subject to the teacher.</li> <li>- writing activities focus on imitating and correcting errors in learners' written work</li> </ul>	<ul style="list-style-type: none"> <li>- This approach builds on solid foundations such as grammar, vocabulary and syntax, enabling learners to develop their basic knowledge of the foreign language.</li> </ul>	<ul style="list-style-type: none"> <li>- The importance given to correcting grammatical errors can lead to anxiety among learners.</li> </ul>
Communicative approach	<p>The teaching focuses on the communicative function of writing, i.e. developing the ability to write in order to communicate.</p>	<ul style="list-style-type: none"> <li>-The learner is more active in this approach, taking a full part in classroom communication activities.</li> <li>- The learner is motivated to engage in interactive activities that encourage written communication.</li> </ul>	<ul style="list-style-type: none"> <li>- Develops learner motivation by placing them in real writing situations.</li> <li>- Encourages interaction and collaboration.</li> </ul>	<ul style="list-style-type: none"> <li>- This approach requires orderly planning of the situation and the subject to be written about.</li> <li>- It also requires learners to have a good command of the language.</li> </ul>
Skills-based approach	<p>The teacher focuses on the development of specific writing skills, such as sentence composition and construction, text homogeneity, time management in written production, and so on.</p>	<p>learners are active, autonomous and responsible for their own learning</p>	<ul style="list-style-type: none"> <li>- written production is indicated by the integration situation in which the learner must exercise his/her skills in producing a personal work.</li> <li>- provides a better understanding of the aims of writing</li> <li>- encourages the development of linguistic skills</li> </ul>	<ul style="list-style-type: none"> <li>- The complexity of classroom implementation which can create rigid teaching</li> <li>- difficult to maintain balance between language skills</li> </ul>
Approach by text genre	<p>The teacher uses the study and production of different textual genres</p>	<p>learners are provided with a rich environment of text types, which helps them to develop their writing skills effectively</p>	<ul style="list-style-type: none"> <li>- It gives learners a better understanding of the specific features of each type of text</li> <li>- this method offers a wide variety of ways of learning to write</li> </ul>	<p>learning and producing several types of text can represent a cognitive overload for learners</p>

In addition to the approaches mentioned above, it is possible to affirm that no perfect approach to teaching written production exists, of course, there are other specific approaches such as the project approach, the writing tools approach and the writing process approach, among others. However, the choice of an approach best suited to the learners depends on a number of factors, such as the level of the learners, their needs, their expectations, their characteristics and the teacher's preferences, so it is important to combine several approaches in order to offer a rich and varied learning experience.

## 2.2 The Contribution of Serious Games

The "serious game" was born in the United States [23], and is an interesting tool that allows for a more effective learning experience through practical situations in the game [24]–[25]–[12].

In recent years, major groups have also shown a growing interest in serious games as a tool for fun, training, communication [26] and recruitment [27]. Today, serious games are making a remarkable entry into personalized learning, which is much more effective than learning in a classroom [28]. A number of studies have been carried out into the classification of serious games, and [29] has defined seven classes of serious games based on their areas of use: defense, training and simulation, education, health, civil security, communication and game-based evaluation. A recent study [30] shows that Serious Games for educational purposes can improve the quality of learning in many contexts, but the use of educational games in schools is still minimal. This study also shows that this lack of interest is partly due to the problem of visibility of educational SG. the author proposes JEN-Planet, a catalogue designed to help teachers find existing educational SG adapted to their needs. Some examples of serious educational games (Edutainment) dedicated to education are presented below. According to the work of [31] It is noted that among the educational games listed, there are few games dedicated to foreign language education.

These serious games have an educational purpose. They can be used for traditional (school) education, or as part of a support program for children [32] , in[33], for example, the serious educational game "Be (the) 1: Challenge", which is a serious game for learning English in Colombia, is based on strategies that encourage the development of various written and oral gamified activities. in [6], the authors propose a set of factors and characteristics (socio-cultural origins and commitment) to be considered for analyzing the behavior and progress of learners during the game. This study shows that using the SG Be (le) 1 Challenge in the classroom has a positive impact on learner engagement. The limitation of this study lies in the paucity of parameters.

In [34] The integration of gamification into mobile language learning (MALL) has been explored in educational contexts. These tools have been reported to improve a range of skills, including reading strategies, writing skills and collaboration. The learning potential offered by these tools is significant.

A recent study conducted[35] a systematic investigation into the use of games and game elements in the teaching of writing. This review analyzes 22 empirical studies and reveals that various types of games, including digital and non-digital educational games, have been used to create authentic, interactive learning environments. These games provide opportunities for writing practice and assess students' writing skills. The results also show that game elements such as points, leaderboards, scenarios and role-playing were integrated to develop playful activities, enhancing student motivation and engagement. These findings confirm the effectiveness of the game-based approach to developing writing skills, particularly in diverse educational contexts.

The authors propose the PuzzWorld Game, which contains a variety of teaching materials adapted to the needs of students, particularly in writing skills. It is used to maintain progress

and attract the attention of learners. there is room for improvement in terms of design, pedagogical depth and feedback[36].

Another article deals with the affective, emotional and psychological characteristics of learners and their ability to work in different ways [37]. The work [3] is part of the study of the impact of educational game (eg), reading-writing-games (rwg), and reading-writing-application (rwa), on learners' skills towards the science course, social attitudes and their position towards school. The results were significant in improving the social skills of students in both central and rural areas as learners practice social skills in behaviors such as sharing their ideas, expressing their thoughts freely, supporting their friends, following rules, making friends and strengthening friendships while playing games and working in groups.

[9] presents learner monitoring in a serious game called "GraphoLearn", the aim of which is to analyze, categorize and group learners using a method. The game aims to develop links between speech sounds and writing. The proposed grouping method aims to categorize learners into profiles based on the learner's trace during play. According to the results, this approach of tracking learners for categorization may be beneficial for identifying children at risk of reading difficulties and represents a promising new method for analyzing trace data from these learners.

The work [38] presents the results of an exploratory study on the practices of playing and learning a second language in the daily lives of young Chinese in East Asia. Based on information from game sessions, stimulated recall, group discussions, individual interviews and online discussion forums, players develop their autonomy by managing their games as both leisure and learning activities from a variety of perspectives (place, formality, locus of control, pedagogy and trajectory).

The results confirm that activities in these areas encourage independent, community-based learning of a second language.

Finally [8] presents a summary based on an analysis of the reasons for the growing popularity, the characteristics of successful serious games and the current trend in the use of serious games in environmental education over 56 articles (from 2009 to 2023). Over the past five years, thirty-five publications have been published, demonstrating the growing interest in this field. This could be a way forward for developing learners' knowledge and skills.

### 3. The Motiv-Prodect learning game

As part of the current research project, Motiv-Prodect, a learning game dedicated to written production in French, is being used with middle school learners. Motiv-Prodect was developed at our Salhi Ahmed Naama University Centre, in accordance with the Algerian national education program. Motiv-Prodect aims to encourage and reinforce the acquisition of skills for consolidating and developing written production by offering scenarios (learning activities/play activities) that encourage the acquisition and memorization of knowledge.

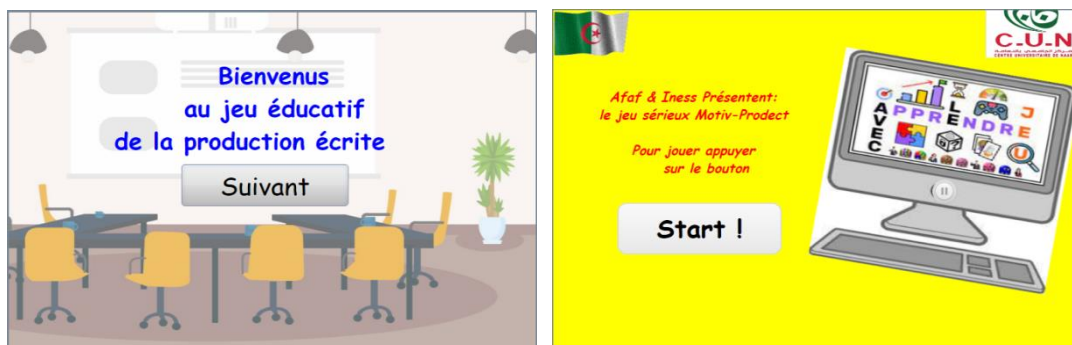


Figure 1. The Motiv-Prodect learning game interface

Figure 1 shows the interface for the proposed educational game. The educational game features an interface that combines educational and fun aspects. The game's pedagogy is structured around three independent chapters, presented in 'French'. What makes the game enjoyable includes attractive, colorful graphics, a user-friendly interface that is adaptable and compatible (PC, tablet, smartphone), and progressive challenges adapted to the level of users. In addition, the game incorporates motivating rewards for each success, interactive and immersive scenarios that encourage exploration, and feedback mechanisms to reinforce learning. These elements contribute to an engaging and motivating game experience, encouraging active learning by learners.

### 3.1 The Pedagogy of Motiv-Product

The educational context of Motiv-Product was created by a French teacher in line with the Algerian national education curriculum. The activities in the game are aimed at learners in the 4th year of secondary school. In our game, learning to produce written work is divided into three phases, as follows:

#### 3.1.1 The Meeting with the Teacher

Before the game begins, a playful scenario has been integrated to make it more fun: the learner-player meets an avatar representing his teacher. This avatar greets the learner and indicates the actions to be taken in the next step (Figure 2). The learner-player begins by choosing an avatar to represent his or her teacher, a customization that promotes immersion in the game. This choice allows players to connect with the experience in a more personal way. They can opt for a teacher they particularly like, an influencer they follow on social networks, or even a comedic personality. This strengthened personal connection prepares players to engage more deeply in the subsequent stages of the game. After choosing their avatar, players are faced with another significant choice: which topic to tackle. This choice plays a key role in sustaining their curiosity and giving them a sense of control over their learning, both of which are essential elements in building lasting engagement.

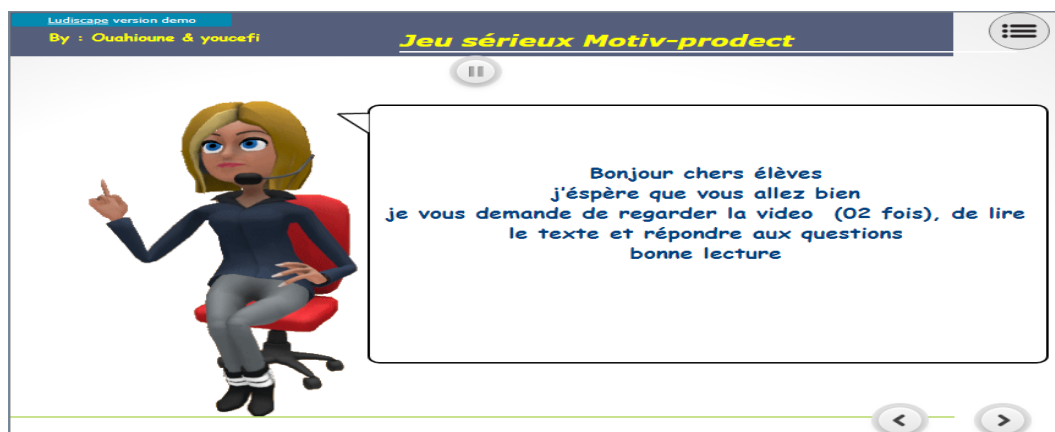


Figure 2. The meeting the teacher

The work of Malone and Lepper[39]underlines the importance of these aspects in creating a motivating gaming experience. In their view, control, curiosity and challenge are key factors in player engagement. These principles are integrated into the game's design through timed and graded quizzes, which introduce measurable challenges. This combination of immersion, personal choice and progressive challenges helps create a learning environment that is both stimulating and enjoyable, in line with Malone and Lepper's [39] theories of intrinsic motivation.



### 3.1.2 The Meeting with the Teacher

The subjects vary according to the learner's choice, and the learner must manipulate a character to choose the subject of the written production (Figure 3) in the beta version of the game.

Videos and text have been compiled for each topic. In this case, the subject of racism was chosen for analysis. One video contains a story about a little girl, Jeanne, in the 4th year of secondary school. This little learner was the victim of racism on the part of her school friends because she is of foreign nationality and has black skin (Figure 4).

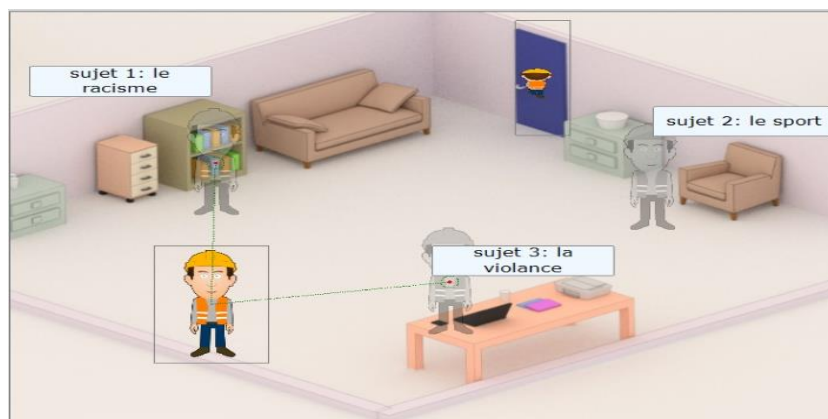


Figure 3. Choosing the subject



Figure 4. Teaching the Motiv-Product learning game

Videos can be an effective method of engaging learners and providing them with knowledge about complex subjects[40]. Video has the potential to provoke empathy in learners and encourage them to learn more about racism. After meeting with the teacher, the learner-player can listen to and watch videos (the story of little Jeanne), then read a text summarizing the story. To facilitate comprehension of the text, the learner-player can click on difficult words to obtain definitions or contextual explanations. The aim of this function is to provide immediate support and facilitate comprehension by offering explanations of difficult vocabulary. Its aim is to enhance the learner's understanding of the text without disrupting the flow of reading. By integrating this interactive element, the system supports autonomous learning and helps learners to navigate independently through complex content. The determination of difficult words is based on a prior analysis of learners' linguistic needs and in collaboration with expert teachers in the field. (Figure 5).



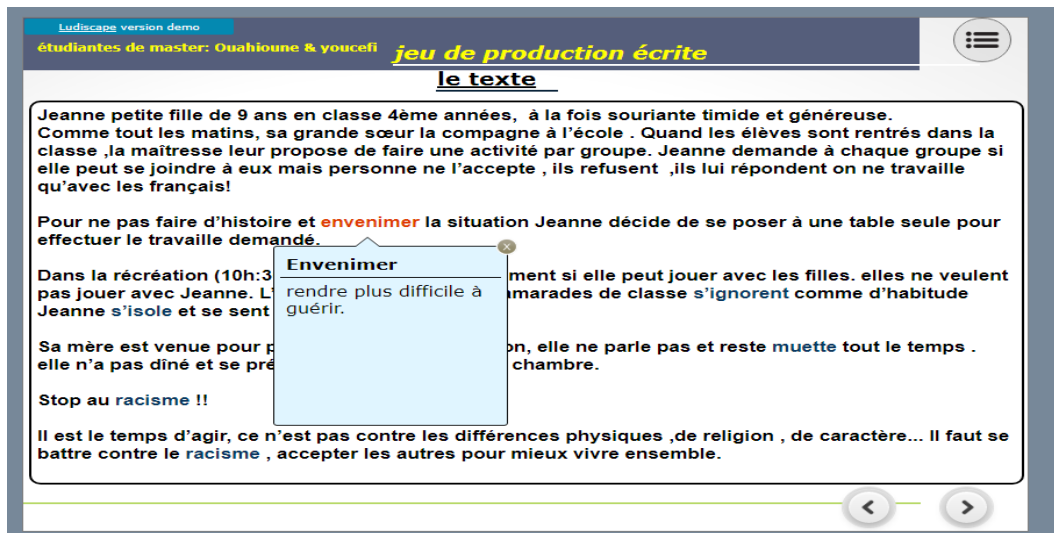


Figure 5. The text summarizing the story of the little learner

It is also a good idea to include suggestions in the text for learners with vocabulary problems. This can help learners to understand the text and acquire new knowledge.

### 3.1.3 The global quiz

After the learner-player has read the text, he or she must answer five multiple-response questions (quizzes) to enrich his or her own knowledge and to get a score, so he or she will be assessed on the correct answers. In the first two questions of the quiz, the learner-player plays and answers freely with no time pressure. In questions three and four, the learner-player must answer these two questions within a limited time (2 minutes maximum). The response time for the fifth question is (1 minute maximum) (Figure 6).

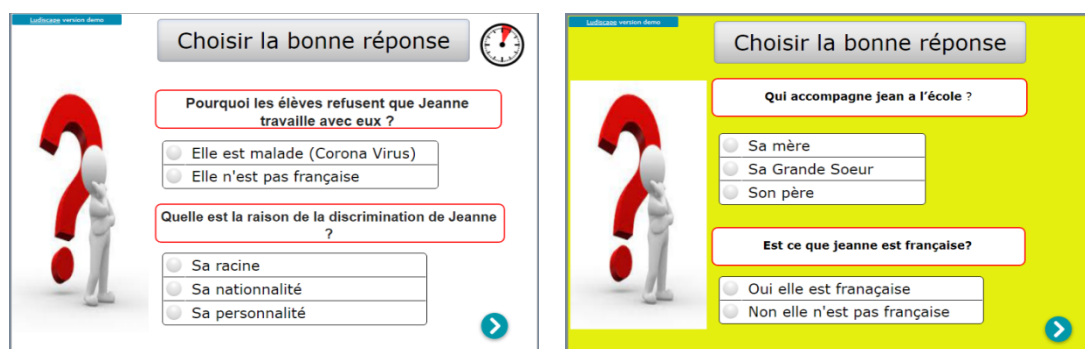


Figure 6. The learning Game's Quiz Questions

The design of the quiz is also an interesting way of assessing learners' knowledge and encouraging them to learn.

The distinction between the first two questions and the last three is to create a sense of urgency and challenge. The first two questions allow learners to familiarize themselves with the quiz and become comfortable with the format. The last three questions are more difficult and require greater concentration and reflection.

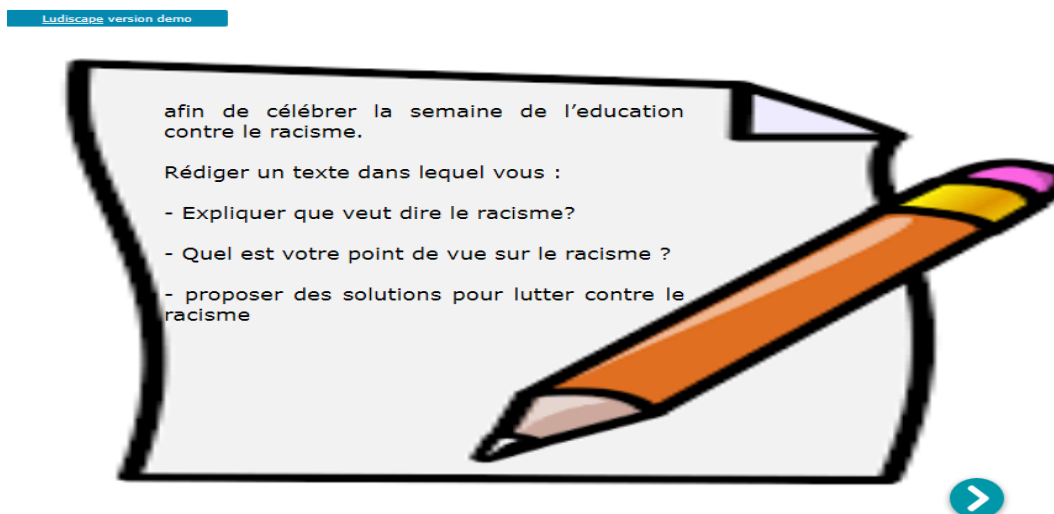
The last two questions last two minutes, adding pressure and suspense, encouraging learners to get involved and give their best. Question types were diversified to maintain learner interest, including multiple-choice, short-answer, long-answer and ranking questions. In addition, questions of different levels of difficulty have been incorporated to meet the varied needs of learners (Figure 7).



**Figure 7.** The learner's results in the learning game

At the end of this section, a performance evaluation is provided, measuring the quiz's effectiveness in terms of engagement and relevance to different levels of learners, ensuring that the quiz remains both stimulating and adapted to users' needs.

At the end of the game, the learner-player is given an assessment, and then asked to produce a written report on racism on a sheet of paper. Asking them to produce a written report at the end of the game can create a sense of achievement and give learners the opportunity to consolidate their knowledge. This can also help learners to reflect on what they have learnt during the game and encourage them to think critically (Figure 8).



**Figure 8.** Written production request message

Learners were given clear instructions aligned with the requirements of the Algerian national curriculum for middle school learners concerning the writing of a production. These included specific instructions on text structure, including an introduction, a multi-paragraph development, and a conclusion. Learners were encouraged to use the vocabulary, expressions and concepts they had learned during the game, while expressing their ideas coherently and respecting the rules of grammar and conjugation. Additional guidance was provided to emphasize the importance of spelling and punctuation, ensuring the clarity of the text. Instructions were concise and easy to understand, to help learners apply what they had learned from the game to produce a quality text.

### 3.2 Tools for creating the Motiv-product learning game

When developing serious games, it is essential to select the digital tools used for learning. It would be preferable to study the software upstream, as it is always frustrating for a learner-player not to be able to use the game due to a lack of sufficient skills in the software, especially as the design has not been exposed or explained to the user. The LUDISCAPE tool was used to create the learning game.

#### 3.2.1 The LUDISCAPE tool

Ludiscape enables teachers to design:

Online modules, Role-playing games and quizzes, all creations are compatible with computers, tablets, smartphones and e-learning platforms quickly. With its user-friendly, intuitive software interface, Ludiscape will enable us to run our training courses and distribute entertaining media for computers, tablets and smartphones.

Each page is displayed on the content design screen, where you drag and drop objects. It is simple and effective to use, and requires no specific technical knowledge (Figure 9).



**Figure 9.** The ludiscape software interface

The free version of ludiscape has been downloaded from the official ludiscape website (<https://www.ludiscape.com/>). Ludiscape is easy to use for novices and powerful for experts, allowing users to create their own e-learning content independently.

The aim of this presentation was to provide an in-depth understanding of the different facets of serious games in order to design a game. The design of an educational game mainly raises the question of how to integrate the message to be conveyed in a way that is consistent with the game world, without altering its playful dimension.

In our view, educational games in schools have many benefits for learners. The animations in serious learning games create long-term memories in students, making them responsible for their own learning. What's more, they encourage the student to admit failure and ignore the fear that began when they were very young. For example, asking a student to write an expression in class can cause enormous stress. However, thanks to the game, they learn to win and lose, as well as getting an idea of the written work they are going to produce. The child is constantly motivated to write and is ambitious to overcome defeat.

## 4. Experiments

An experiment with Motiv-Product was carried out at the Kamel Mohammed Remdhan secondary school in Mécheria, wilaya of Naama, Algeria, for 4th year learners (Figure 10).



**Figure 10.** Kamel Mohammed Remdhan middle school

## **4.1 Methodology section**

### *4.1.1 Participants*

The time our children spend using electronics and computers is very important, especially when it comes to playing online video games. But instead of our children spending their free time with "useless" online video games that are intended for entertainment purposes only, they can devote themselves to serious educational games to consolidate what they have learnt in class while having fun at the same time. In this concept, the study was carried out with middle school learners (aged 12 to 15) in a state school in Algeria. The study involved a total of 35 students, divided into two groups: the experimental group (20 students), including 10 girls and 10 boys, who took part in the learning game "Motiv-Product", and the control group (15 students), including 8 girls and 7 boys, who followed traditional French as a foreign language course. The students were randomly assigned to each group after obtaining the consent of their teachers.

### *4.1.2 Intervention*

Motiv-Product, originally designed for computers, can be easily ported to smartphones using the Ludiscape platform. This platform allows games to be adapted to different devices, making the learning experience accessible and flexible for mobile users. The learning game designed to develop the writing skills of secondary school learners. The game is based on the following features: The game has been created with the aim of generating motivation and interest, while improving learners' written production. Students are rewarded for their efforts using gamification elements such as points, badges and rankings.

## **4.2 Progress**

The experiment took place as follows:

In a traditional classroom with 20 learners (group 1), the written production lesson on "Racism" with the same content proposed in Motiv-Product was presented by a French teacher, following the usual approach for using a written medium. The learners read the text silently for a few minutes, followed by a reading aloud. The learners were allowed to ask questions, and the teacher asked the same questions proposed in the quiz game and observed the learners taking part, statically collecting the correct answers to the questions asked. At the end of the session, the teacher asked the learners to write an expression on the subject of "Racism".

Motiv-Product was then tested in a computer room (Figure 11) with other learners of the same level, from a different class, who had no knowledge of the written production course on



the subject of "Racism". The number of learners in the computer room is 15 (group 2). The learners listen to their teacher's explanation of how the Motiv-Product works.

The course covered in the game is the same "Racism". At the end of the game, the learners are asked to write an expression on "Racism".



Figure 11. learners play with the Motiv-Product learning game

At the end of the session, the learners' written work in the computer room was collected (who were using Motiv-Product) and compared it with the written work of the learners in the traditional room. We thought of reinforcing our experiment with a questionnaire distributed to the learners in Group 2 (who use Motiv-Product) to see the degree of satisfaction and their reaction to Motiv-Product (Figure 12).

*Questionnaire : Dans le cadre d'une recherche de master « didactique FLIE » qui porte sur « Le développement de la compétence de l'écrit chez les apprenants du français langue étrangère » nous vous prions de bien vouloir répondre à ce questionnaire.*

**FRANÇAIS**

1- Aimez-vous le français ?  😊  😐  😞

2- Aimez-vous l'expression écrite ?  😊  😐  😞

3- Etes-vous satisfait (es) du jeu éducatif proposé ?  😊  😐  😞

4- Préférez –vous utiliser le jeu dans la séance de la production écrite ?  😊  😐  😞

5- Le jeu éducatif vous aide à améliorer votre production écrite ?  😊  😐  😞

***Merci pour votre collaboration***

Figure 12. Questionnaire completed by a learner in group 2

#### 4.2.1 Data collection and analysis

Information was collected throughout and after the intervention. Measures of writing proficiency included learner-player interactions with Motiv-prodict, written production tasks, and questionnaires completed by learners. Descriptive and inferential statistical analysis of the data was then carried out. The results obtained from the two classrooms (traditional and computer-based) are presented in the following section.

## 5. Results and discussion

A preliminary assessment of the French language skills of students in both groups was carried out prior to the start of the study. This assessment, conducted by the French teachers, consisted of a series of written and oral comprehension tests. The written tests included reading exercises followed by multiple-choice questions, text summaries, and open-ended questions assessing the students' ability to analyze and interpret literary passages. Oral tests involved listening comprehension exercises, where students had to listen to audio recordings and then answer questions, as well as oral production tasks such as short presentations and dialogues. The results of these tests were then carefully analyzed to ensure that the language skills of students in the two groups were comparable, thus guaranteeing fairness in the study.

The results obtained from the two classrooms (traditional and IT) are set out below:

### 5.1 Evaluation of learners in the traditional classroom (Group 1)

According to the teacher, the number of questions asked by learners about difficult words is extremely small.

In order to assess the learners' understanding of the course content, The rate of learners who correctly answered the questions asked by the teacher during the session in the main room was measured. Less than 35% of the answers were correct.

The teacher then collected the written work of the learners in group 1 in the traditional classroom. The teacher assessed the learners according to their written expression, using the evaluation grid required by the Algerian Ministry of Education, which is based on (appropriateness of the production to the communication situation, textual coherence, mastery of the language tools, and presentation of the document). The results obtained in the traditional class are illustrated in Figure 13.

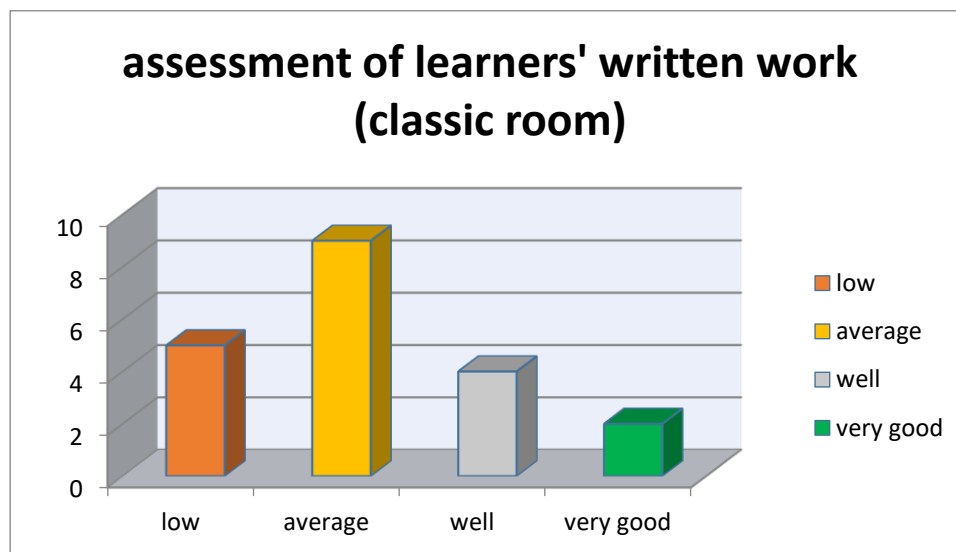


Figure 13. Questionnaire completed by the learners in group 2

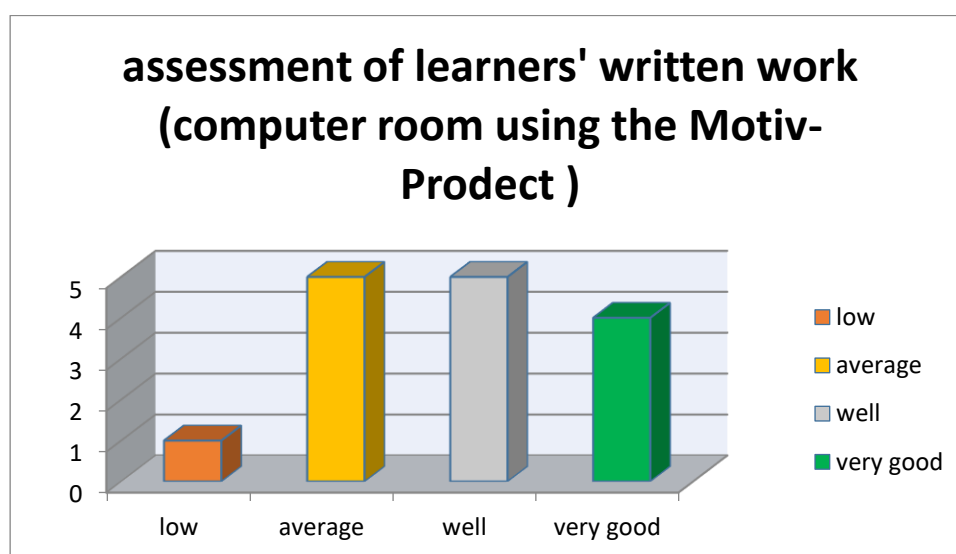
This assessment highlights the learners' overall level of written production in a traditional classroom using the usual method for using a written medium.

## 5.2 Learner's evaluation using Motiv-Prodict (group 2)

The proposed Motiv-Prodict enables us to extract satisfactory results depending on the desired objective to be achieved. These results are discussed below.

It was observed that the number of interactions with the game related to difficult words in the text was very high, where learners explored difficult words in order to obtain explanations. To assess the learners' understanding of the course content, The percentage of learners who correctly answered the questions in the Motiv-Prodict quiz was evaluated. Over 80% of correct answers were recorded.

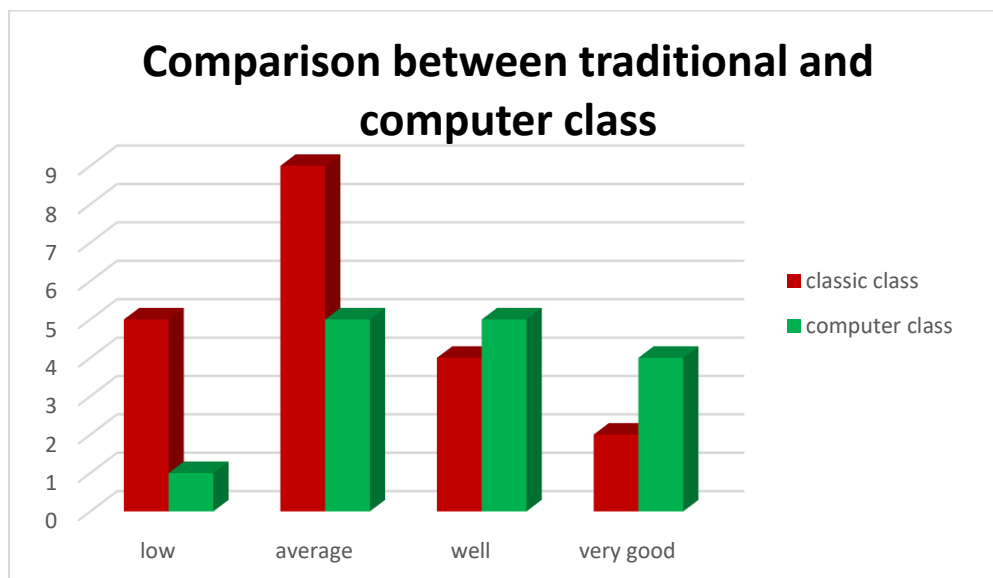
We then collected the written work of the learners in group 2 in the computer class using Motiv-Prodict. The written work was evaluated by the teacher using the same evaluation grid required by the Algerian Ministry of Education. Figure 14 shows the results obtained in the computer class using Motiv-Prodict.



**Figure 14.** Assessing learners in the computer room using the Motiv-Prodict game

It is remarkable that motivation was high and dominant in the computer room among the learners who used Motiv-Prodict. Figure 15 shows the results obtained comparing the quality of the learners' written work between the learners in the traditional classroom using the traditional method and the learners in the computer classroom using the method based on Motiv-Prodict.





**Figure 15.** Learners assessment in the traditional classroom VS Computer classroom

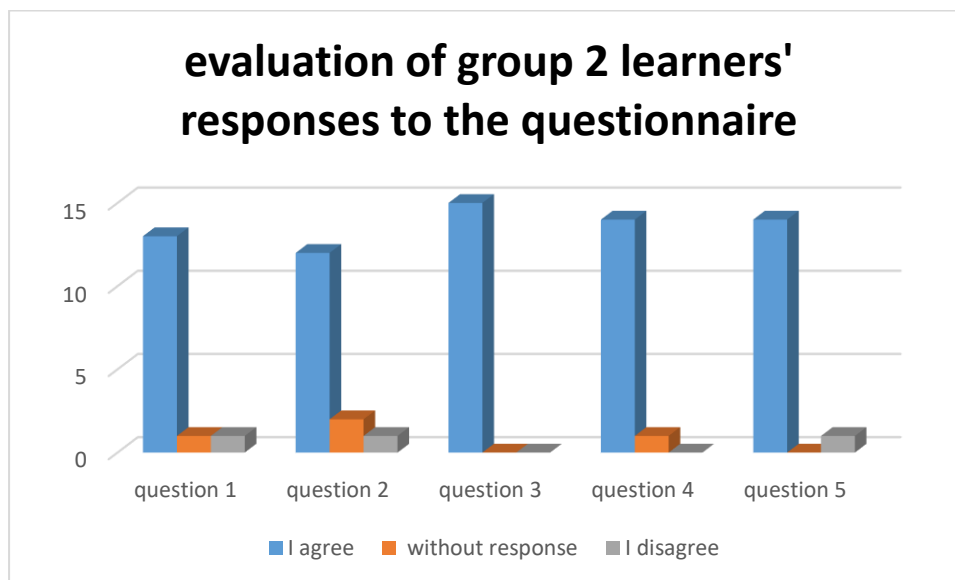
It was found that learners scored higher on the game quiz than on the questions proposed by the teacher in the traditional method, indicating the effectiveness of the game for learning course content. What's more, the writing produced by learners who took part in the game proved to be of better quality than that of the traditional class, particularly in terms of the appropriateness of productions to the communication situation and textual coherence.

The game's impact on suitability for the communication situation can be seen in the learners' improved ability to adapt their discourse to the context and purpose of the written production. The quiz exercises integrated into the game, as well as the inspiring paragraphs proposed, encouraged learners to structure their message in line with teachers' expectations.

In terms of textual coherence, the writing of learners in the experimental group showed a more logical and fluid organization of ideas. The model paragraphs of the educational game served as a reference, providing learners with concrete examples of the effective use of logical connectors and thematic continuity.

By using these models, combined with quizzes that reinforce these skills, students have been able to maintain a clear and consistent progression in their texts, improving the clarity and effectiveness of their written production.

Figure 16 shows how the learners in group 2 rated the written production and Motiv-Product. It is remarkable that all the learners in (group2) liked Motiv-Product.



**Figure 16.** Assessment of the Motiv-product learning game by learners in (group2)

Serious educational games play a very important role in individualized learning, providing fun and knowledge, and stimulating learner-players by increasing their motivation and knowledge.

The results of our study are in line with research highlighting the effectiveness of serious games in improving middle school students' writing skills. For example, [41] have demonstrated that serious games can create authentic and motivating learning environments, facilitating writing practice. Similarly, in [42] shows how combining traditional learning with game elements can significantly improve students' argumentative writing skills. It provides empirical evidence to support the use of this combined approach.

The results obtained are very satisfactory and confirm the idea that an educational game can be used to increase the degree of motivation of learner-players according to their behavior.

## 6. Conclusion

The aim of this study was to explore the impact of an educational game, Motiv-Product SG, on improving written production among Algerian middle school students, in response to the lack of educational games specializing in civic subjects. The central questions of this research concerned Motiv-Product's ability to motivate learners and develop their writing skills in a foreign language context.

The results obtained show that Motiv-Product had a positive impact on the written production of learner-players, comparable to that of traditional teaching methods employed by expert teachers of the French language. These results confirm that educational games can play a crucial role in reinforcing writing skills, not only by arousing learners' interest, but also by actively engaging them in the learning process.

The study thus met its initial objectives by demonstrating that the Motiv-Product educational serious game is an effective tool for improving written production, while highlighting the need to integrate intercultural collaboration exercises and automate the recording of game traces to optimize the user experience.

On a theoretical level, this research provides further evidence of the potential of educational games in language learning, particularly in contexts where learner motivation can be a challenge. On a practical level, it offers prospects for the development of educational games tailored to the needs of learners in less-represented subjects such as civic studies.

For future research, it would be relevant to explore in greater depth the specific mechanisms by which educational games influence motivation and written production. In addition, the adaptation of games to individual learner profiles, as well as the integration of intercultural practices, are areas for improvement that deserve to be explored to maximize the effectiveness of these pedagogical tools.

## 7. Perspectives

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Like any other study, the limits of the work carried out throughout this article will be improved in subsequent work such as:

- Real-time adjustment of the pedagogical and game path according to the profile deduced from the learner-player in order to maximize the knowledge to be acquired in a game scenario.
- It is essential to broaden the list of characteristics and behaviors to be studied in order to accurately describe the behavior of learner-players, such as response time (speed), decision-making, caution.

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