A Constructivist Approach to Game-Based Instruction: Experimental Evidence from Blooket in Moroccan EFL Classes

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Abstract— *This paper aims to explore the impact of Blooket, a web-based platform, on enhancing high school students' vocabulary acquisition in the Moroccan EFL context. It also examines how this educational language tool contributes to effective classroom practices and fosters interactive learning among students. To achieve this, the study employs an experimental research design, utilizing the experiment as a practical method for data collection. An independent sample t-test was used to analyze the collected data. The participants included 46 Moroccan high school students from Human Sciences classes. They were divided into two groups: the control and experimental groups. The control group received traditional teaching methods, while the experimental group used Blooket-based instruction over three weeks. The findings revealed that Blooket significantly improved vocabulary retention, engagement, and motivation compared to conventional tools, indicating a statistically significant difference between the two groups. Unlike the control group, participants in the experimental group scored higher and were more active in the classroom. The results also indicated that students responded positively to the integration of Blooket and valued its role in enhancing their vocabulary learning. This suggests that adopting a constructivist approach to language learning and encouraging students to actively participate in knowledge building can be effective. The obtained results have important implications for English language teachers who seek to improve their classroom practices through digital game-based instruction. Therefore, it is essential to rethink our teaching practices and adapt our methodologies to align with the interests of twenty-first-century learners by emphasizing their needs for social interaction, creativity, collaboration, and critical thinking. However, the findings of the study cannot be generalized because of the small sample size and the short intervention period (three weeks).*

Keywords— *Constructivism, Blooket, Games, Interaction, Language Learning.*

I. INTRODUCTION

In recent years, educational practitioners have begun to rethink their classroom practices and teaching methods in response to the growing demands of the twenty-first century, especially in English language learning contexts. English language teachers have become more reflective about their teaching choices, pedagogies, and learning theories to improve their classroom instruction and connect their language input to real-world situations. This shift indicates a strong tendency to enhance the teaching and learning process. It helps learners develop the skills needed to communicate effectively and function meaningfully in today's globalized world.

Because the international landscape is constantly evolving, language learners are required to demonstrate not just communicative competence but also significantly higher levels of critical thinking. Creativity, collaboration, critical thinking, and communication are essential twenty-first-century skills and serve as prerequisites for meaningful engagement with the world [1]. They play a crucial role in supporting a productive teaching and learning process, particularly in universities and should be the outcome of a constructive education [2]. Therefore, language instruction should not solely rely on traditional methods centered on memorization, repetition, and passive reception of knowledge; instead, it should draw on learning theories and approaches that emphasize learner-centeredness and foster an interactive educational environment.

One of the most influential learning theories that effectively addresses the interactive and language needs of learners is constructivism. It is based on the idea that learners actively participate in the learning process. It emphasizes the importance of learners' experiences and reflections. Constructivists such as Piaget [3] and Vygotsky [4] believe that learners can build knowledge by making connections between what they already know and new information to develop their understanding of the material. This enables

them to personalize their learning and share their perceptions of reality [5] .

Constructivism is a broad term that encompasses many sub-theories, including Piaget's individual constructivism and Vygotsky's social constructivism. While there are slight differences among these theories, most share core beliefs. In this context, constructivists assume that learners actively create meaning and knowledge. They are not just passive receivers of information but active participants in learning. Additionally, constructivism holds that learners are not blank slates; instead, they bring prior knowledge into new learning situations and apply it to new contexts. This means learners can develop their understanding of the world with guidance from the teacher, whose primary role is to facilitate interaction [6]. Therefore, these perspectives emphasize the social dimension of learning as a constructive act.

The constructivist approach emphasizes learners' interactions not only with the knowledge being taught but also with their social environments. Students are given significant opportunities to find meaning from various contexts and build their understanding step by step. The teacher's role is mainly to guide and support the process of knowledge construction by providing diverse and real-world situations [7]. Constructivist proponents argue that this approach is difficult to implement successfully in traditional classrooms. Adopting constructivism in teaching young children may be ineffective because they cannot often infer meaning from context, especially in the early stages of learning [8].This indicates that constructivism works best in interactive settings where students have substantial prior knowledge. Overall, the constructivist approach can be effective only if an appropriate context and learning environment are promoted.

Since Constructivism focuses on building an interactive environment, where students socialize and engage meaningfully with the language content, teachers have started to incorporate more technological tools and educational platforms that support these types of interactions. In this regard, game-based instruction tools have gained significant attention among language teachers, as they allow for better learning opportunities where students can develop critical thinking, collaboration, and problem-solving skills, as core elements of constructivist learning.

Digital game-based learning reflects the main principles of constructivism because it places the learner at the heart of the teaching-learning process and promotes meaningful knowledge construction. It also enhances an interactive learning atmosphere where learners share their experiences and exchange opinions. In game-based instruction, learners participate actively in the learning process, as they are not perceived as passive recipients of knowledge. There are two different approaches to digital game-based instruction: The instructional approach and the constructivist approach. With the instructional approach, students play or use games prepared by teachers or experts in the field to practice a particular language component or recycle unit-related vocabulary. The constructivist approach gives primacy to students' personal learning experiences as the essence of the teaching-learning process. Besides, this approach promotes creative learning, develops critical thinking, increases engagement, intrinsic motivation, flow experience and provides better language practice [9] It focuses on learning by doing, where students contribute to the building of the lesson effectively and interact more with the language input. The constructivist approach to game environments caters for the cognitive and social needs of students because it helps them scaffold their learning and enhances their problem-solving skills in multiple situations [10]. It also allows students to connect meaningfully with each other and respond to their multiple individual learning preferences in a meaningful environment [11]. This means that digital game-based learning often encourages an interactive atmosphere that targets both the cognitive and social needs of students. However, one shall note that the effectiveness of this learning approach may vary based on the context and integration process.

As constructivism aims to enhance a learner-centred learning atmosphere and support learners' interactive experiences, digital tools have emerged as a robust supplement to traditional instruction. One such essential educational tool that aligns with the fundamental objectives of the constructivist view is Blooket. It was first developed by Tom Stewart and Ben Stewart in 2018. They are two practitioners who have been interested in interactive educational tools that can both teach and entertain. This online platform is widely used by more than 10 million users in the world. It is recognized at the Ed Teck Awards as the most useful website [12]. Blooket has revolutionized the sphere of education, especially English language teaching and learning. It offers unlimited educational games that target various topics and themes relating to different school

subjects. These games are organized and classified in terms of the lesson's type, level of users and the topic area. Blooket is meant to help teachers assess their students' performance and prepare appropriate exercises for meaningful practice. It encompasses multiple gamified elements, such as leaderboards, points, levels and badges. These special qualities stimulate students' attention, arouse their intrinsic motivation and satisfy their learning needs [13]. On this platform, the teacher hosts the game and displays questions on the screen, while students are expected to answer using computers or mobile phones. It comprises different forms of games that make learning more interactive [14]

It is very useful since it works better with all types of lessons and addresses the needs of students, be they low, average or high achievers. That is, the host (teacher) can select the game mode that suits the cognitive potential of students and serves their learning interests. Blooket makes it easier for students to personalize their game experience. On this platform, the players can design their profiles by creating the avatar they like and typing the nickname that represents them better [15]. Recent studies on the advantages of Blooket as an instructional tool have shown that most language learners perceive it positively. Incorporating this educational game contributes significantly to the development of students' intrinsic motivation. The study also revealed that inserting fascinating icons like badges and points into Blooket boosts the participation level in the classroom [16]. The game was found to be effective in vocabulary retention and practice, as emphasized by [17]. In investigating students' perceptions of Blooket to enhance vocabulary retention in Senior High School, [18] reported that the adopted educational tool had an impactful role in supporting students' vocabulary acquisition. They felt more focused and engaged in the lesson compared to traditional-based instruction. In a different context, Blooket was used for vocabulary instruction at Santo Antonius Middle School in East Jakarta. Both the experiment and interviews were used for data collection. The Data demonstrated that the integration of Blooket significantly contributed to vocabulary mastery. The researchers concluded that fun activities help create an enjoyable learning atmosphere, engaging learners in meaningful and positive interaction with the learning material [19]. Thus, the findings indicate that Blooket helps in vocabulary learning and engages students effectively in the lesson, which aligns well with the tenets of the constructivist approach.

While Blooket has recently been investigated as a crucial language tool in various international contexts, its incorporation into the Moroccan educational context remains unexplored. Examining the literature review relating to educational classroom practices in Morocco indicated the lack of empirical studies regarding the impact of the Blooket game on English language learners' vocabulary development. Therefore, this study aims to measure the Impact of Blooket on developing Moroccan students' vocabulary retention in English language classes. It also examines their perceptions of game-based learning as an innovative approach to language teaching and learning. In other words, this empirical research attempts to compare game-based instruction with traditional methods and determine their role in enhancing students' language learning. Besides, this study explores students' reactions to the incorporation of the Blooket platform. By addressing this research gap, we aim to contribute to the accumulation of human knowledge and provide valuable insights into how technological tools can foster interactive learning and promote learner-centeredness.

This study is guided by two main hypotheses. The null hypothesis states that there is no significant difference in vocabulary retention between students who use Blooket and those receiving traditional instruction. Conversely, the alternative Hypothesis proposes that the incorporation of Blooket is more likely to develop students' vocabulary retention compared to traditional instruction.

II. RESEARCH METHODOLOGY

A. Study Design and Participants

This study employs an experimental research design to assess the impact of the Blooket game on students' classroom interaction, dynamism, and vocabulary learning. It also aims to compare the effectiveness of this educational platform to traditional instruction. This research investigates the relationship between different variables: One independent variable and two dependent variables. The independent variable is the incorporation of Blooket in English classes, while the dependent variables relate to enhancing students' vocabulary retention and classroom interaction. Vocabulary improvement was measured through the comparison of students' scores in the pre- and post-tests. As for classroom interaction, it was operationalized through observing some aspects such as classroom participation, engagement and level of motivation during the experiment. Selecting this design helped us investigate the impact of Blooket integration on high school students' language learning, compare different groups (the control and experimental groups), test hypotheses and make clear conclusions. Since experimental research follows an objective procedure to achieve systematic results and reduce bias, we prepared a scientifically focused design to minimize the influence of other external factors and obtain reliable empirical data. The experimental design as "a process of carrying out research in an objective and controlled fashion

so that precision is maximized and specific conclusions can be drawn regarding a hypothesis statement [20]. It is about making predictions and conducting experimental research to test their validity. This study adopts a true experimental design because students were randomly selected for the control and experimental groups. By so doing, we wanted to ensure that any change or difference in students' learning behaviors in both groups is due to the effect of Blooket rather than other factors. Therefore, the focus of this design is to investigate the cause-and-effect relationship between Blooket-based learning and students' classroom dynamism in English classes.

The experiment's sample included 46 students from Elhassan Eddakhil High School in Guercif. The participants were second-baccalaureate students belonging to two Human Sciences classes. Their ages ranged between 16 and 19 years old, with a balanced gender distribution approximately 22 males and 24 females). Students were not exposed to the Blooket platform before to ensure that any improvement in vocabulary learning can be attributed to the incorporation of the tool rather than their familiarity with it. The sampling represented students of varying learning levels and abilities, including low and average achievers. By selecting these categories, we aimed to investigate how these students react to the instructional methods and activities incorporated in the experiment. Their involvement was meant to help them prepare for the national English exam as they were engaged in various tasks and exercises. It was also a way to provide them with more practice regarding a critical theme (Cultural issues and values) in the language program and enhance their vocabulary retention. The participants were divided equally into two groups: 23 students in the control group (receiving traditional instruction) and 23 in the experimental group (following an ICT game-based instruction). By choosing the same number of participants in each group, we sought to make the results comparable and, thus, draw reasonable conclusions. Therefore, the experiment sampling focused more on students with English language learning deficiencies and excluded high achievers.

B. Data Collection – The Instrument

To collect data from the experiment, a vocabulary test was administered to students to examine the impact of Blooket on students' language learning before and after the intervention. Before manipulating any variable, students in the control and experimental groups took the same pre-test in similar conditions. The objective was to develop an understanding of the group's vocabulary level before the treatment period. It was also necessary to ensure that any changes in students' vocabulary levels could be attributed to the adopted teaching methods. A post-test was administered to both groups to measure the impact of both Blooket and traditional instruction on developing students' language and vocabulary learning. This instrument helped in comparing and contrasting the achievement of the control and experimental groups.

C. Procedure

To describe the procedure followed in experimenting, three main steps were considered, including the pre-test, the treatment period and the post-test. What follows is a detailed report of the process:

1) Pre-test

Before the intervention period, a pre-test was administered to students in the control and experimental groups. It aimed to evaluate their background knowledge and prior vocabulary relating to the theme of culture. Two human sciences classes were chosen to take part in the experiment and were divided into two groups; each group comprised 23 students ranging from average to low achievers. The rationale behind targeting these categories was to encourage them to make an effort, prepare for the exam, and increase active participation. As reported by most Moroccan ELT teachers, human sciences students are said to score less and achieve unsatisfactory results. They go for this stream because they have less motivation for language classes, such as French and English. Therefore, it was necessary to select students from these classes to benefit from the experience. The same test was administered to both the control and experimental groups to test their initial language levels and ensure fairness among the participants. Each group was allotted 30 minutes to complete the test under the same conditions to reduce the impact of any extraneous factors. After that, the tests were collected, corrected and ranked from the highest to the lowest scores. The groups' results were then compared with the post-test scores to explore the impact of the instructional methods adopted in the experiment.

2) The Treatment Period

Both the control and experimental groups received a three-week treatment. Students in the control group were instructed using the textbook (Ticket to English) and other supplementary worksheets. The textbook consisted of five exercises and activities targeting culture-related vocabulary. As for the worksheets, they combined matching, gap-filling and opinion exercises, allowing the participants to practice and use more vocabulary. This intervention period was organized on Monday and Friday for three weeks. The rationale behind this was to give the participants more time to grasp the language content and make sense of what they learned. It was also an opportunity for them to use vocabulary outside the context of the experiment. Besides, the participants benefited from six classes; each class lasted

for 40 minutes. All the sessions took place from 10:35 a.m. to 11.15 a.m. The purpose was to reduce the impact of other uncontrolled factors (students' readiness, time choice, environmental factors, etc) and ensure consistent results. Only English was used as a medium of instruction during three weeks although the group included a significant number of low achievers. The process was challenging because many students faced difficulties in performing tasks and understanding instructions.

Participants in the experimental group benefited from an ICT game-based instruction (Blooket). The game included several questions like true/ false, multiple choice and matching questions. Five minutes were devoted to explaining the objective of the activity and what students were expected to do. The experiment participants were divided into five groups; each group consisted of five to six members. They were arranged in round tables so that they could discuss questions, share information and prepare appropriate answers. Each team encompassed students with mixed learning abilities and different personality characteristics. Shy and introverted students were grouped with sociable and extroverted ones to increase their learning motivation, promote interactive learning and develop their social skills. The experiment was held on Monday and Friday mornings during the three weeks, as in the control group. At first, it was difficult to launch the interactive game due to technological issues and students' inability to understand the questions. However, with more clarifications and the use of body language, the participants could engage effectively with the content and have a fruitful learning experience. Moreover, the participants' scores were displayed on the screen after every question, which created a competitive atmosphere in the classroom and encouraged the groups to perform better in the next questions. The winner was rewarded at the end of the activity as a form of motivation.

3) Post-test

A different test was administered to participants of the control and experimental groups. The included exercises ranged from gap-filling and defining to matching exercises. Students took the test simultaneously in two separate classrooms. They were allotted 30 minutes to complete their tests in a relaxing environment. No clarifications or explanations were provided to ensure objective scores and reliable findings. Students were well invigilated with the help of a colleague teacher. Students' sheets were later corrected and classified. This post-assessment was very necessary because it enabled us to compare the participants' results before and after implementing the teaching methods. We could also compare the control and experimental groups and comment on their performance in English classes.

D. Data Analysis

A T-test method was adopted to analyze the experiment's findings and generate statistics. Researchers use it to compare the average achievement of two distinct groups in a particular experiment. The T-test is usually utilized in hypothesis testing [21]. When the objective is to determine the impact of an independent variable on another dependent variable in an experimental group, the T-test is the most appropriate tool. In the present experiment, for instance, we attempted to measure the effect of Blooket on students' classroom interaction and English language learning. The purpose was to investigate how this ICT-oriented game provides students with better learning opportunities and fosters their dynamism in the classroom. This T-test is parametric because it tests the differences between groups. This means that the same assumptions are made about the collected data. It is mainly employed when the data are "independent, normally distributed and have a similar amount of variance within each group being compared" (21). In this experiment, the control and experimental groups were observed in different classes to achieve consistent results and reduce the effect of any extraneous variables, such as the teaching style, the learning atmosphere and the teaching methods. There are different T-test types: The One sample t-test, the Paired sample t-test and the Independent t-test. The one-sample t-test is used to measure the performance of a given group and compare it to the average or the mean (μ). Researchers rely on this type of test to see whether the participants have scored lower or higher than the standardized value (the mean). As for the Paired sample t-test, it compares the achievement of participants within the same group before and after the intervention period. It allows the researcher to compare the results at different time points. Meanwhile, researchers rely on the independent t-test to examine the differences between two groups or subjects. In this experiment, we adopted an independent t-test (pre- and post-tests). Two tests were administered to the control and experimental groups before and after the implementation of the teaching methods (traditional instruction and Blooket-based learning). This test was adopted to compare the means of the two groups before and after the treatment period. We also aimed to determine whether the difference between the two teaching methods is statistically significant. Therefore, the experiment followed the t-test method as a statistical tool for data analysis, specifically the independent t-test to compare the findings of the control and experimental groups.

III. RESULTS

A. Presentation and Description of the FIndings

The statistical data below represent the number of control and experimental group participants. It also displays the scores they obtained in the pre- and post-tests:

Pre-test				*Post-test*			
Ctrl. Grp		Ex. Grp		Ctrl. Grp		Ex. Grp	
N. Stdnt	Mark/20	N. Stdnt	Mark/20	N. Stdnt	Mark/20	N. Stdnt	Mark/20
Sdnt. 1	2	Sdnt. 1	3	Sdnt. 1	3	Sdnt. 1	7.5
Sdnt. 2	3.5	Sdnt. 2	3	Sdnt. 2	3.5	Sdnt. 2	10
Sdnt. 3	4	Sdnt. 3	4	Sdnt. 3	3.5	Sdnt. 3	11.5
Sdnt. 4	4.5	Sdnt. 4	4.5	Sdnt. 4	4	Sdnt. 4	13
Sdnt. 5	4.5	Sdnt. 5	4.5	Sdnt. 5	5.5	Sdnt. 5	13.5
Sdnt. 6	4.5	Sdnt. 6	5	Sdnt. 6	5.5	Sdnt. 6	14
Sdnt. 7	5	Sdnt. 7	5.5	Sdnt. 7	6	Sdnt. 7	14.5
Sdnt. 8	6	Sdnt. 8	5.5	Sdnt. 8	6	Sdnt. 8	15
Sdnt. 9	6.5	Sdnt. 9	6	Sdnt. 9	6	Sdnt. 9	16
Sdnt. 10	6.5	Sdnt. 10	6.5	Sdnt. 10	7	Sdnt. 10	16
Sdnt. 11	7	Sdnt. 11	7.5	Sdnt. 11	7	Sdnt. 11	16
Sdnt. 12	7	Sdnt. 12	8	Sdnt. 12	7.5	Sdnt. 12	17
Sdnt. 13	7.5	Sdnt. 13	8.5	Sdnt. 13	8.5	Sdnt. 13	17.5
Sdnt. 14	7.5	Sdnt. 14	9.5	Sdnt. 14	8.5	Sdnt. 14	17.5
Sdnt. 15	8	Sdnt. 15	9.5	Sdnt. 15	9.5	Sdnt. 15	18
Sdnt. 16	8	Sdnt. 16	9.5	Sdnt. 16	9.5	Sdnt. 16	18
Sdnt. 17	9	Sdnt. 17	10	Sdnt. 17	10	Sdnt. 17	18.5
Sdnt. 18	9.5	Sdnt. 18	11.5	Sdnt. 18	11.5	Sdnt. 18	18.5
Sdnt. 19	10	Sdnt. 19	12	Sdnt. 19	12.5	Sdnt. 19	19
Sdnt. 20	11	Sdnt. 20	12.5	Sdnt. 20	13	Sdnt. 20	19
Sdnt. 21	11.5	Sdnt. 21	14	Sdnt. 21	14.5	Sdnt. 21	19.5
Sdnt. 22	12	Sdnt. 22	14.5	Sdnt. 22	15	Sdnt. 22	20
Sdnt. 23	12.5	Sdnt. 23	15	Sdnt. 23	15.5	Sdnt. 23	20
Total: 167.5		*Total: 189.5*		*Total: 192.5*		*Total: 369.5*	
Mean: *167.5 / 23 = 7.28*		*Mean:* *189.5 / 23 = 8.23*		*Mean:* *192.5 / 23 = 8.36*		*Mean:* *369.5 / 23 = 16.06*	

experimental groups

It is clear from the table above that the number is distributed equally across the control and experimental groups. Each group encompasses 23 students before and after administering the experiment tests. The rationale behind this choice is to obtain valid and reliable results and avoid biased comparisons of the two adopted methods (traditional instruction and ICT game-based teaching). Maintaining this balance helps us achieve consistency in the findings and minimize the effect of any other extraneous factors, including an unequal number of students. Moreover, Table 1 gives a detailed account of the students' scores in the pre- and post-tests in both groups. It reveals discrepant results and remarkable student performance changes in both categories. In other words, we can see that the experimental group's marks are higher than those in the control group. It is worth mentioning that the first group followed an innovative teaching strategy (Blooket game), while the second group was taught conventionally. If we take student 8 in the control group, we find that he achieved the same score in the pre- and post-tests, suggesting a lack of improvement and progress. On the other hand, student 8 in the experimental group recorded excellent outcomes, as he received (8/20) in the pre-test and (15/20) in the post-test. Therefore, differences in the results indicate that students may respond positively to one instructional method while interacting negatively with another.

The following table illustrates the development of the mode and median in the control group in the pre- and post-test:

	Pre-test control group	***Post-test control group***
Mode	4.5	6
Median	7	7.5

Table 2: The mode and median of the control group in the pre- and post-test

A close analysis of the findings shows a slight increase in the mode and median. We notice that the mode was 4.5 in the pre-test and became 6 post-assessment, whereas the median increased from 7 to 7.5. This proves that implementing traditional teaching methods (Ticket to English textbook and designed worksheets) had a limited impact on students' general scores and achievement. In other words, the effect of this method is unsatisfactory and does not meet students' learning expectations. Many important factors can explain the modest positive influence of these traditional teaching and learning materials. The nature of our Moroccan English program (textbook) does not match the current needs of students due to its irrelevant and outdated content. Students strive to understand the incorporated reading texts and decipher the meaning of concepts. It includes uninteresting activities and less authentic language input, making it difficult for students to enrich their learning

experiences and develop knowledge. Furthermore, the adopted textbook does not foster interactive learning in the classroom and does not motivate or challenge students to invest more effort in their learning journey. Therefore, the slight progress in the mode and median of the control group points out the ineffectiveness of the applied traditional material.

The third table represents the mode and median of the experimental group in pre- and post-assessment:

	Pre-test experimental group	***Post-test experimental group***
Mode	9.5	16
Median	8	17

Table 3: Mode and median of the experimental group in the pre- and post-test

It is clear from these statistics that the mode and median increased significantly in the experimental group. The mode, for instance, shifted from 9.5 in the pre-test to 16 in the post-test, which indicates that many students scored in this range after the treatment period. As for the median, we can see that it changed from 8 to 17, showing a remarkable improvement in students' achievement. It also proves that even low achievers managed to get their average. These findings stress the impactful role of the implemented game (Blooket) in enhancing students' learning outcomes and facilitating their vocabulary retention. Given the interactive nature of this tool, students are more likely to understand the subject matter better and use their critical thinking in problem-solving situations. Therefore, the impact of the Blooket game on the mode and median of the experimental group is statistically conspicuous compared to the control group, which followed a traditional intervention.

The Control group		The Experimental group	
Pre-test	Post-test	Pre-test	Post-test
7.28	8	8.23	16.06

Table 4: The mean in the control and experimental groups in pre- and post-assessment

The table above displays a huge difference in terms of the mean in both the control and experimental groups. By comparing the mean in the pre-test of each group, we can say that the numerical values are very close: 7.28 for the control group and 8.23 for the experimental group. This shows that the participants demonstrated approximately the same level before the manipulation of the independent variable in the treatment period. The small difference of 0.95 between the average of both groups means that the participants exhibited a similar degree of understanding. These findings confirm the null hypothesis, which states that there are no significant differences between the control and experimental groups in pre- and post-assessment. Besides, the control group's mean increased slightly from 7.28 in the pre-test to 8 in the post-test, with an increased percentage of 9.87%. As for the experimental group, it moved from 8.23 to 16.06 with a rise of 95.14%, indicating clear progress and development. The obtained results explain that incorporating traditional methods and teaching materials (the textbook and worksheets) has enabled students to relatively achieve better outcomes in the post-test. This hardly noticeable change in the average reflects the limited role of traditional instruction in classroom engagement and motivation. We can also deduce that students were not actively involved in the learning process and had fewer opportunities to develop their language understanding. Meanwhile, we find that applying creative instructional techniques has massively contributed to students' vocabulary retention and improved their test results. Hence, this evidence supports the alternative hypothesis in this experiment, which supposes significant differences in the mean (average) of the control and experiment group after the intervention and the manipulation of the independent variable.

The graph below offers more illustration of the mean development in the two groups:

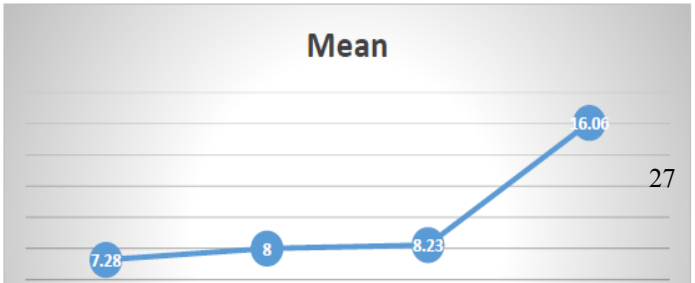

Figure 1: The mean development in the control and experimental groups

This figure illustrates the development curve of the average students' scores before and after the treatment period in the control and experimental groups. We can see that the curve increased slowly, leading to hardly noticeable improvement in the control group. Conversely, the average of the experimental group moved up drastically in the post-test, providing clear insights into students' positive achievement. After analyzing the mode, median, and mean of each group, it is important to shed light on the standard deviation by explaining how much students deviate from the mean (average). Before examining this aspect, it is necessary to provide insights into the process of its calculation. We first need to subtract the mean from the scores of students, and then we square the root of the obtained result. If we want to calculate the deviation of student 4 in the post-test of the experimental group, we need to follow the equation below:

Deviation = the student's score – the mean.

Deviation= 13-16.06= -3.06

Deviation= 3.06

This means that the student deviates from the mean (average of the group) by 3.06. As for the standard deviation, it represents the squared deviations from the mean (average) of all scores in the group. It allows us to know how far or close the scores are to the mean and gives us a general overview of students' performance. The table below represents the standard deviation of both the control and experimental groups before and after the intervention.

	N	***Min***	***Max***	***Sum***	***Mean***	***Std. Deviation***
Pre-test control	23	2	12.5	167.5	7.28	$\sqrt{7.89}$ = 2.80
Post-test control	23	3	15.5	192.5	8.36	$\sqrt{13.86}$ = 3.72
Pre-test experimental	23	3	15	189.5	8.23	$\sqrt{13.21}$ = 3.63
Post-test experimental	23	7.5	20	369.5	16.06	$\sqrt{10.39}$ = 3.22
Valid N (listwise)	23	—	—	—	—	—

Table 5: The standard deviation of the control and experimental groups

A close analysis of the above table reveals that the standard deviation in the control group changed from 2.80 in the pre-test to 3.72 in the post-test, reflecting a conspicuous increase. It also indicates that the scores of students are not spread around the mean (average), especially after the treatment period. It is worth mentioning that the more the standard deviation decreases, the less learning progress takes place. Concerning the experimental group, we observed a significant decrease in standard deviation, as it was 3.63 in the pre-test and became 3.22 in the post-assessment. These results show that students have benefited from the incorporation of Blooket and scored well on the test. The statistical analysis proves the effectiveness of Blooket in engaging students and developing their language understanding compared to traditional teaching. It also emphasizes the crucial impact of innovative tools and technological resources on increasing students' motivation and boosting their interaction with the instructional input. Besides, the integrated game positively influenced the experimental group's mean as it moved up from 8.23 in the

pre-test to 16.06 in the post-test. Students got higher marks and demonstrated stronger learning abilities than the control group. The statistical findings of the post-tests in both groups demonstrated a significant difference in favour of the experimental group ($p < .001$), confirming the role of Blooket as an effective tool in vocabulary development. The experiment findings accord well with the general tenets of modern teaching approaches and methods, including the communicative approach, which gives primacy to students' cognitive, emotional, and social needs.

IV. ANALYSIS OF CLASSROOM INTERACTION FEATURES

The present sub-section aims to describe and analyze the major features of classroom interaction manifested in the control and experimental groups after the intervention. This encompasses classroom interaction types, the general learning atmosphere, students' engagement,communication and emotional response to the implemented teaching material. It also aims to compare the effectiveness of the teaching methods incorporated in both groups. By emphasizing these aspects, we gain richer insights into the best classroom practices that appeal to students' needs and interests. Therefore, this sub-section focuses on the impact of Blooket on students' classroom interaction and engagement.

A. The Experimental Group

Adopting Blooket in vocabulary teaching has led to significant positive changes in students' interaction and understanding of the subject matter. The participants managed to communicate meaningfully using most of the unit-related vocabulary. They interacted actively with the language content and demonstrated effective learning. The application of the interactive game encouraged different classroom interaction patterns, especially learner-learner interaction. Students were very open to each other and enthusiastic to share their thoughts freely, compared to the control group. It was an opportunity for them to socialize and learn in an anxiety-free atmosphere. Even the shy and introverted participants were involved in the process and motivated to contribute to the game. In other words, students who rarely or do not speak in ordinary sessions manifested a strong inclination towards learning and interacting with their classmates. The teacher's role was limited to guiding, clarifying instructions, and cueing students when needed. More focus was put on the learning process rather than teaching. The teacher's talking time was reduced to give more space for the participants to express themselves. Besides, Blooket transformed the classroom into a dynamic and entertaining place where all students were excited about the experience. They displayed more passion for the activity and worked hard to make their group win. Since the game was competitive, the atmosphere was quite tense, as all the groups did their best to achieve an excellent score and get the reward. Therefore, we can say that the experimental group had better opportunities to interact and participate productively in the learning process compared to the control group.

B. The Control Group

The control group received traditional-based instruction. The adoption of this approach was less satisfactory compared to the experimental group. Relying on the textbook and worksheets led to a slight increase in students' participation and engagement. The participants had a less interactive experience and limited opportunities to explore the language content meaningfully. They were less dynamic in the classroom because the lesson was more teacher-centered. The teacher found it difficult to explain instructions due to the students' low level. He had to use gestures and body language to clarify the purpose of every activity and account for the breakdowns of interaction. In some cases, he was obliged to use Arabic to explain some key terms and elaborate on certain aspects. Furthermore, the control group's participants showed varying levels of interaction and collaboration. Five out of 23 students demonstrated a 'good' participation level in the classroom, and two students manifested an average level. As for the rest of the participants, they remained silent and inactive throughout the treatment period. However, this was expected since most of the selected students could barely understand the teacher's instructions and form correct sentences. The teacher's talking time (TTT) was dominant throughout the lesson's stages, which made the process less engaging and unappealing. The task was challenging for both the teacher and students because of the absence of interaction. Overall, students in the control group did not benefit as much from the learning experience as those in the experimental group. Therefore, we can say that the implementation of Blooket in the teaching of the experimental group led to positive results compared to the control group. The use of interactive activities has proved to be effective in promoting various classroom interaction patterns, particularly learner-learner interaction. The results showed that interactive technological resources have the potential to affect students' dynamism and motivation positively compared to other traditional teaching methods. This means that twenty-first-century language learners welcome innovative and creative strategies that can boost their performance and increase their interactive learning.

V. DISCUSSION

The study showed that the integration of Blooket has the potential to boost vocabulary retention, foster collaborative learning and cultivate teamwork spirit. It engages students in authentic activities and interesting input, encouraging group work, critical thinking, cooperative learning, and effective communication. Existing research supports this finding, as it stresses the essential role of educational digital games in improving students' learning and increasing their intrinsic motivation [15]. It also contextualizes the learning process and involved the classroom in problem-solving situations. Unlike traditional methods, which target individual performance and reinforce the teacher's authority, games can help students work together to achieve common objectives and share different learning perspectives. They pave the way for more social interaction and ensure active learning with less intervention from the teacher. Based on a study conducted in Thai University, it was found that the integration of such games increase students' interest in learning and appeals to their emotional needs [22]. This aligns well with the constructivist approach, which posits that students should contribute effectively to the building of the lesson and participate in knowledge construction. Through the implementation of interactive activities. ELT practitioners can provide their students with more space to express themselves and work cooperatively, which results in the building of effective social skills and meaningful communication. Comparable results were reported in previous studies, as they suggest that the game characteristics and elements such as badges and points level up classroom interaction and help with vocabulary practice [16]. This can have several implications for English language teaching and learning in Morocco. On the one hand, when teachers update their teaching pedagogy and devise collaborative and creative activities, they allow their students to develop their communicative competence and peer learning, which are core elements of effective language acquisition. Such a game fosters collaboration and social interaction, which have become essential features in the era of globalization and leadership. That is, as the Moroccan Ministry of Education is striving to prepare students to function well in the job market, the ability to interact using the language in and outside school is mandatory. On the other hand, the application of technology-driven activities helps students learn new vocabulary in context and motivates them to lead classroom discussions, negotiate meaning, and work cooperatively towards a common learning objective. This not only improves their English language learning but also helps them deal effectively with real-life problems and challenges. Additionally, the experiment findings revealed that the implementation of the Blooket game can maximize students' language learning significantly. Participants of the experimental group scored better in post-assessment than those of the control group following a traditional method. The t-test results showed a significant statistical difference in favour of the experimental group ($p < .001$). This supports the alternative hypothesis, which emphasises the essential role of Blooket in enhancing vocabulary retention and the comprehension of complex concepts. This might be attributed to game visual characteristics that appeal to students' needs and help them retain vocabulary easily. Besides, the Blooket game strengthened the teacher-student relationship and encouraged various classroom interaction patterns, particularly learner-learner interaction, a key asset in learner-centered approaches and methods. With this game, students are not perceived as passive recipients of information; they question ideas and contribute to the construction of knowledge. They become active and enthusiastic to discover more about learning. Conversely, opponents of the Blooket game believe that it does not fully satisfy the needs of students as they may learn incorrect information, waste time, or use it to cheat [23]. While some studies align with these results, others diverge. Overall, Blooket can function well in English classes if it is well-integrated and designed.

VI. LIMITATIONS OF THE STUDY

Although the present study contributes effectively to academic research and provides significant insights into the impact of Blooket on students' vocabulary retention, it is important to acknowledge some limitations. First, the study was limited to one high school in Guercif city, which limits the generalizability of the findings. Second, the intervention period was a bit shorter. The experiment could have been conducted for more than two months to assess students' reactions to Blooket. Third, students might have responded positively to the tool because they were not exposed to it before and were curious about it. Fourth, this study relied on only the experiment as a data collection instrument. Other qualitative tools, such as interviews, need to be used to understand the issue from a different perspective and get in-depth information. Fifth, the treatment was not conducted for a long period, as it lasted only three weeks. This could make it difficult to measure the real impact of Blooket integration on students' long- term vocabulary learning. Sixth, the teacher may influence the experiment's findings unintentionally, especially if he taught the same groups. Moreover, the results can be affected by the Hawthorne effect, as the participants might notice that they are part of an experiment, which leads them to show motivation and interest in the activity. Therefore, future research can be

carried out in a larger context and examine other research variables to help us understand the practicality of technological tools in the Moroccan context.

VII. CONCLUSION

The present study investigated the impact of Blooket on the classroom interaction and vocabulary acquisition of Moroccan high school students. It explored how this teaching tool creates better learning opportunities and affects the general atmosphere in English classes. The findings showed that applying the Blooket game in English classes led to positive and promising results. Thanks to this game, students were more active and interactive with each other compared to those who received traditional instruction. We also noticed that integrating Blooket game made learning easier and more collaborative during the intervention period. The findings of this study add to the accumulation of human knowledge and contribute effectively to the existing literature, especially in the Moroccan educational community. The results proved that Blooket not only fosters students' language learning and interaction in the classroom but also provides significant solutions to deal with some issues in traditional teaching environments. Equally important, ICT games can be one of the valuable tools to introduce positive change in language instruction and discard traditional roles. Teachers may adopt an eclectic approach to their teaching by drawing from both traditional and innovative instructional methods to improve the learning quality and respond to students' multiple needs. In other words, ELT teachers are invited to benefit from both schools to maintain discipline in the classroom and make the learning journey more enjoyable. This study is also significant because it focuses on the Moroccan oriental region, where less research is conducted, particularly in the field of education. This enriches the body of literature in these places and helps us gain insights into the evolution of ICT games in this geographical context. Therefore, exploring the issue of interactive learning is generally important because it allows us to understand how technology has shaped the teaching of foreign languages in Moroccan classrooms.

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ETHICAL APPROVAL

This study was conducted in accordance with ethical standards. All participants were informed about the purpose of the research and gave their voluntary consent to take part. Confidentiality and anonymity were ensured throughout the study.

ABBREVIATIONS

ELT: English Language Teaching.
ICT: Information and Communication Technology.
anonymity was ensured throughout the study.

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