

The Effects of A Serious Game Activity and Learning Tasks on Students' Motivation Towards Reading Skill

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Abstract— English language is considered a global language, and it is widely known that it is crucial for many students to acquire English language successfully in order to communicate, work and enter into the global workforce. However, it has been noticed that Jordanian English language learners lack motivation in learning English language. And since motivation is very important in learning English language, it is crucial for researchers to explore how to foster learners' motivation in order to achieve the outcomes of the learning process. Hence, the aim of this paper is to examine the effects of serious game activity and learning tasks based on the Attention, Relevance, Confidence and Satisfaction model within the technological pedagogical content knowledge framework on students' motivation towards English reading. A pre-experimental research design was conducted among fifty undergraduate students who registered in "Effective communication skills" subject for semester II 2016/2017 at Yarmouk university, Jordan. Further, pre and post motivation questionnaires were used to measure the students' motivation towards English reading skill. The results indicated a significant improvement of students' motivation towards learning English reading skill. Moreover, the serious game activity and learning tasks had a positive impact on students' attention, relevance, confidence and satisfaction levels.

Keywords—motivation, serious games, reading skill

I. INTRODUCTION

The video game market is considered one of the most important markets that continues to grow rapidly with more than \$101 billion in income in 2014 and \$111 billion in 2015 [1]. Moreover, the demands of the new generation learners encouraged researchers to examine the potential of applying games in different fields such as education. For instance, college graduates spend 10,000 hours or more playing video games, while spending 5,000 hours of their lives reading [2]. Hence, new forms of games have been designed and developed such as serious games. Serious games (SGs) can be defined as "(Digital) games used for purposes other than mere entertainment" [3] and "Games primarily focused on education rather than Entertainment" [4].

Serious games are being widely applied in various areas concerning health care, education, cultural heritage and military. Moreover, researchers started to explore the best practice of serious games in the classroom to assure that teaching and learning objectives will be achieved successfully. However, there is a lack of researches exploring the best practice to use serious games in the classroom, considering that researchers were focusing on the SGs characteristics from

the learners' prospective instead of teachers' prospective [5-14]. Also, there are no frameworks or guidelines by governments or institutions to guide the implementation of SGs in education. Therefore, implementing serious games in the classrooms is left to teachers and institutions to use SGs inside classrooms as they see best fit [15]. Besides, researchers explore all possible solutions to benefit from the existed SGs in the best ways [16]. This is because English as a foreign language learners lack motivation in learning English skills, which is considered an obstacle in the learning development process [17]. In addition, learners seem passive and bored in the English reading classes and they do not pay attention to their teachers while explaining the topics [18]. A serious game activity and learning tasks based on ARCS model within the technological pedagogical content knowledge (TPACK) framework is proposed to motivate students towards English reading.

II. LITERATURE REVIEW

A. Serious Games and Motivation

Serious games provide learners with interactive environments that offer meaningful experiences and engaging activities [16] which are effective in enhancing learners' motivation and achievement in many contexts [14]. Furthermore, many researchers consider serious games as being more motivational than other educational games because of the beneficial motivational factors that SGs offer for learners [19]. Also, playing serious games is considered challenging for many players which encourages them to play the game to the end [20]. A study by Girard, Ecalte [21] explored the results of experimental studies that aimed to examine SGs' effectiveness on the players learning and engagement, two of the serious games that were used increased the students' level of motivation compared to the traditional methods of teaching, and it was found that SGs seem to have a positive influence on the learning context.

However, there is a lack of the empirical studies that investigate SGs effectiveness in the learning situation. Hence, it is recommended to conduct more studies to explore the effectiveness of SGs in learning and training contexts. SGs are applied widely in many different areas such as higher education, military, business, health care and cultural heritage. And since it has been noticed that these applications showed remarkable success [22, 23], researchers started to explore the idea of applying SGs in the language learning

process, specifically in motivating students towards English reading skill.

B. *Serious Games and Reading Skill*

Serious games offer instruction by experiencing gameplay that helps English language learners to develop their skills, such as reading and problem-solving skills [24]. Furthermore, a study by Tsihouridis and Batsila [25] investigated the effectiveness of a serious game called “Silang” on vocational school learners’ reading and listening skills and the results showed that “Silang” improved the learners’ reading and listening skills. Moreover, it has been noticed that “Silang” game was motivating, pleasant and relevant to the learners’ studies. However, the researchers mentioned that the serious games’ activities should be carefully designed inside the classroom in order to benefit the most from the SGs in the educational process. Otherwise, the use of SGs will be only for recreational purposes. A contextual study by Gaytán-Lugo, Hernández [26] showed that the Mexican third grade students enjoyed playing four serious games without worrying about their weaknesses in reading skill. Additionally, researchers suggest applying a suitable instructional design model in order to use SGs effectively inside the classrooms.

Another example of a successful SG that focuses on improving reading, writing and spelling English language is called “Mingoville” [27]. “Mingoville” was introduced in Denmark in 2006 because of its success in improving reading, writing and spelling English language. “Mingoville” course was translated into thirty one languages around the world [28]. On the other hand, Anyaegbu [27] stated that there are some barriers faced while using “Mingoville” in Nigeria for learning English skills such as the adequacy of the IT infrastructure, and there is a need to provide teachers with sufficient training in how to use the SGs inside the classroom. Likewise, De Marco, Evain [29] created a serious game platform called “MyGame-4u” that helps students share games in the field of literature studies. The results of the study showed that “MyGame-4u” can improve learners’ reading skills and that most of the participants did the reading activities independently and successfully.

Implementing SGs in the educational context is a costly process that requires a lot of time, effort and budget to design and develop, and most schools that implement serious games in the formal education lack alignment and planning between serious games and the formal curriculum. Hence, learning outcomes are not achieved successfully [15, 30-32]. The SGs effectiveness inside the classroom is determined by the successful implementation of SGs in the formal education. However, as there are no frameworks or guidelines from governments or institutions to guide the implementation of and SGs in education, implementing SGs in the classrooms is left to teachers and institutions to use SGs inside classrooms as they best see fit [15]. Thus, researchers explore all possible solutions to benefit from the existed SGs in the best ways [16]. In addition, and in order to help integrating technology in the educational process, researchers have developed popular frameworks such as the Technological Pedagogical Content Knowledge (TPACK).

C. *The Technological Pedagogical, and Content Knowledge (TPACK)*

The Technological pedagogical and content knowledge framework (TPACK) was built based on the construct of pedagogical content knowledge (PCK) by Lee Shulman. PCK represents the crossing of the pedagogy and content knowledge. Moreover, the intersection of the content and pedagogy is the heart of PCK where teachers know how to teach a specific subject and make it understandable for learners [33]. TPACK framework consists of three knowledge areas which are: a) the technological knowledge (TK) which represents the knowledge of teachers on how to use technologies such as ICT tools; b) the Pedagogical knowledge (PK) which is teachers’ knowledge of the teaching and learning methods and procedures; c) the content knowledge (CK) is the teachers’ knowledge of the subject matter [35].

Intersecting the three knowledge forms CK, PK and TK creates new knowledge forms which are: Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and Pedagogical Content Knowledge (PCK). TCK is the knowledge of how to employ technology to present the subject in various methods, and how to recognize how the content and technology are influenced by each other [34]. PCK is the knowledge of how to present the content by utilizing the appropriate pedagogical strategies [35, 36]. TPK is the knowledge of how learning and teaching changes when applying a particular technology [34].

A study by Jupit, Minoi [37] applied game-based learning using the Technological Pedagogical Content Knowledge (TPACK) framework to promote cultural awareness. The proposed CuTPACK framework includes all elements necessary to guide the development of a game. Moreover, this new framework was tested and showed positive results in the cultural awareness domain. What is more, the Attention, Relevance, Confidence and Satisfaction (ARCS) model of motivation is used in this study to design the serious game activity and learning tasks to provide students with a motivating and engaging learning environment [38].

D. *ARCS Model: Attention, Relevance, Confidence and Satisfaction*

ARCS Model was created by John Keller in 1984 to improve the motivation towards the instructional materials. According to Keller [39], ARCS includes four steps that promote motivation in the learning process, which are:

(1) *Attention*: attracting students’ attention can be achieved by surprising the learner, grabbing his/her interest and stimulating the learner’s knowledge seeking curiosity by presenting challenging questions and posing problems to be solved, as well as providing learners with various instruction methods and switching between learning activities.

(2) *Relevance*: relevance can be accomplished through describing how mastering a skill will be useful to learners’ needs by matching objectives to their needs. Also, relevance can be achieved by explaining how the game will be useful to them in their future studies and career as well as illustrating how playing the game will extend their knowledge and skills. Also, it is important that the materials are made familiar to the learners by providing them with examples related to their lives.

(3) *Confidence*: confidence is considered one of the very important components in ARCS model that can influence the learners' success and accomplishment. Moreover, teachers can increase learners' confidence by helping them believe they can succeed in their learning process. In addition, applying techniques and strategies that offers personal control and feedback can increase confidence.

(4) *Satisfaction*: participating in the learning activities helps the learners to feel good about their accomplishments. For example, playing a serious game motivates learners towards the newly acquired skill that can help them to practice it in a realistic setting.

III. METHODOLOGY

A. The Participants

In this study, a purposive non-random sampling technique was used to select fifty first-year undergraduate students with different expertise who registered in "Effective communication skills" subject for semester II 2016/2017 at Yarmouk University, Jordan. Yarmouk University serves students from different educational levels in order to improve their English language skills [40].

B. Instruments

One-group pre-test and post-test design of pre-experimental design by Campbell and Stanley [41] is conducted in this study. Two motivation questionnaires were used to measure the students' motivation. The pre and post motivation questionnaires were modified from the Instructional Materials Motivation Survey (IMMS) and Course Interest Survey (CIS) by [42]. The first part of the questionnaire consists of general items about the students' backgrounds, and the second part contains 21 items with 5-point Likert-scale. Moreover, the questionnaires contain four subscales which are attention, relevance, confidence and satisfaction. Further, "Silang" serious game was used in this study, "Silang" is a serious game designed by language experts who are familiar with the kind of problem a non-native speaker may face through the learning process of a second language. The main targets of groups of the game are higher education students and professionals [25]. Within the game, a user can experience various situations where he/she is supposed to interact with other characters in the game in order to complete the stages which in turn can help in improving English language skills.

C. The study procedure

This study occurred in four phases based on the Analysis, Design, Develop, Implement and Evaluate (ADDIE) instructional design model.

- 1) *Analysis phase*: The aim of this phase was to find a suitable serious game activity and learning tasks to be used for learning English language. The students were interviewed to identify the learning activities they prefer in learning. Also, the lecturers were interviewed to identify the suitable learning activities to use while teaching English reading skill.
- 2) *Design and Development Phases*: This phase was concerned with setting the goals and objectives of

the learning process as well as designing the learning environment, materials and the resources. ARCS model was used to design the learning environment activities and tasks such as the presentation and worksheets. Following, the learning activities and tasks were developed, organized and planned in a systematic way for the implementation phase.

- 3) *Implementation Phase*: A popular blended learning model called lab rotation model was applied in the learning process. Compared to other blended learning models, lab-Rotation model has been proven as incredibly useful in the learning process [43, 44]. Hence, it is a suitable model since most Jordanian public universities' classes lack technological infrastructure [45, 46]. At first, the students answered a pre-motivation questionnaire to define their level of motivation before participating in the serious game activity and learning tasks. After that, the lecturer gave a face to face lecture about English reading skill and serious games where he discussed the importance of mastering reading skill for students in their studies and daily lives. Also, the lecturer presented some reading strategies that help students in mastering reading skill.

Likewise, the lecturer discussed how serious games support students in mastering reading skill. In addition, she presented "Silang" serious game to students and how the game can support their learning. By applying a lab rotation model, students rotated on a fixed schedule between teacher-led instruction, playing "Silang" serious game activity and involving various learning tasks such as presentations, worksheets, quizzes and group discussions.

- 4) *Evaluation Phase*: In this phase, the students answered a post - motivation questionnaire to measure their levels of motivation after participating in the serious game activity and learning tasks. Following that, the collected data from the motivation questionnaires of the study were analysed. A paired sample t-test was conducted between the scores of the pre and post - motivation questionnaires.

IV. RESULTS

After collecting the data of the motivation questionnaires, a paired sample t-test was conducted between the pre and post motivation scores. Table I below shows the results of the paired sample t-test scores. Also, Table I shows that the sig (p-value) is less than 0.05, which means that there is a statistically significant difference between the means of the pre-motivation and post-motivation questionnaires. Further, Table II below shows the means and standard deviations of the students' responses on the attention, relevance, confidence and satisfaction (ARCS) constructs of the pre and post-motivation questionnaires. Table II shows that the means of the attention construct increased from 2.83 to 4.07; the means of relevance construct increased from 2.86 to 4.05; the means of confidence construct increased from 2.76 to 4.03; and the means of satisfaction construct increased from 2.83 to 4.10. The overall mean of all ARCS constructs increased from 2.82 to 4.06.

TABLE I. PAIRED SAMPLE T-TEST

	Paired Differences					<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>	<i>95% Confidence Interval of the Difference</i>				
				<i>Lower</i>	<i>Upper</i>			
Pair 1 Pre-motivation questionnaire Post-motivation questionnaire	-26.100	12.119	1.714	-29.544	-22.656	-15.229	49	.000

TABLE II. THE MEANS AND STANDARD DEVIATIONS OF THE STUDENTS' RESPONSES ON THE ARCS CONSTRUCTS OF THE PRE AND POST MOTIVATION QUESTIONNAIRES

ARCS constructs	Pre-motivation questionnaire		Post-motivation questionnaire	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Attention	2.83	1.13	4.07	0.96
Relevance	2.86	1.16	4.05	0.90
Confidence	2.76	1.21	4.03	0.95
Satisfaction	2.83	1.18	4.10	0.98
Overall Mean	2.82	1.17	4.06	0.94

V. DISCUSSION

The results showed that there is a statistically significant difference between the means of the pre and post-motivation questionnaires. Thus, the serious game activity and learning tasks based on ARCS model within the technological pedagogical content knowledge TPACK framework improved students' motivation in English reading. Moreover, the results of this study support the results of studies which found that using serious game in the learning process improves students' motivation and reading skill [25, 47], and that providing learners with various learning activities improves their motivation and brings out their hidden talents [48, 49]. Also, it helps to meet their different styles of learning [50] and engage them in the learning process [51]. For example, the serious game provided learners with interactive environments that offer meaningful experiences and engaging activities [16] which are effective in enhancing learners' motivation and achievement in many contexts [14]. Moreover, providing students with features such as free to fail helps to improve their intrinsic motivation [52] and engagement [53]. Also, the group discussions helped them to share their experiences and communicate with other students as they will participate in such discussions in their future jobs. As well, the worksheets were related to students' study and

future work. The results also showed that the serious game activity and learning tasks had a positive impact on students' attention, relevance, confidence and satisfaction levels. This can be related to the elements and features of the various learning activities. For instance, the serious game attracted students' attention because of its immersive storyline and visual elements. Likewise, the presentation included pictures, sounds and videos as well as interesting facts about serious games in general, English reading skills and how the topic is related to their study and life goals. And since relevance is considered an important factor since it helps students to recognise the importance of the topic and how it is related to their life and study [54], the lecturer described how participating in the serious game activity and learning tasks improves students' reading skill and how mastering reading skill will be useful for students' study and life.

Students' confidence improved by providing them with the goals and objectives of the serious game activity and learning tasks. Following that, they proceeded to challenging levels of the game, completed worksheets and quizzes in order to meet their capabilities. Moreover, providing students with prompt feedback while participating in the serious game activity and learning tasks helped them to identify their mistakes and how to correct them [54]. Additionally, the quizzes improved their confidence and assessed their reading skill. Finally, students' satisfaction was obtained by providing them with real life situations through the serious game activity and learning tasks that helped them in applying their new acquired skills in such situations, as well as providing students with verbal praise and incentives through the learning activities and tasks.

VI. CONCLUSION

A serious game activity and learning tasks based on ARCS model within the technological pedagogical content knowledge (TPACK) framework were applied to improve students' motivation in reading English. The results showed a significant improvement of the students' motivation towards learning English reading skill. Also, students' attention, relevance, confidence and satisfaction levels had improved. However, it has been noticed that there is a lack of the empirical studies that investigate SGs effectiveness in learning, specifically in English language learning [21]. Thus, more studies should be conducted to investigate serious games effectiveness in English language skills such as reading skill [14]

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