Application of Digital Games in Developing Values and Problem-Solving Skills in Social Studies

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Abstract

This study assessed the potentials of using digital games to develop problem-solving skills and values of patience, tolerance and perseverance which digital games tend to promote. The study provides answers on the contributions of digital games into the development of problem-solving skills and values in Social Studies students. It adopted a descriptive design using 200 level pre-service Social Studies teachers in a government owned tertiary institution in Ogun State. At first, purposeful sampling technique was used to select pre-service Social Studies teachers while volunteer sampling was used to select forty (40) respondents for the study. A structured questionnaire tagged "Digital Games and Development of Problem Solving and Values in Social Studies Questionnaire" (DGDPVSSQ) (r = .89) was used to get feedback from the students. Descriptive statistical analysis of mean and standard deviation was used for the analysis of data obtained from students' experiences after the games exercise. The result showed that digital games help in developing the problem-solving skills of logical thinking, solution focus, and evaluation of options; as well as the values of persistence, will to achieve, rules application and determination in Social Studies students. Based on the findings, it is recommended that digital games learning will be of immense benefit in improving academic achievement of students in Social Studies and hence using digital games in Social Studies should be encouraged to attract the attention of the students and develop problem-solving skills, positive attitudes and values in the student.

Keywords: digital games, problem-solving, values development

Innovations within the field of science and technology have continued to motivate the agitation for inclusion of many strategies that can be used to enhance students' performance into school curricula. This curriculum innovation is based on the premise that keeping the curriculum within the new trends in the society will help to include solutions for keeping students engaged and develop critical thinking, creativity and problem-solving skills in the students and as well developing values of persistency, will to achieve and determination which they'll need for success in the work-a-day world of the future. Many learning innovations related to technology have emerged and digital game is one of such technological innovations in the field of education. The integration of computers, smartphones, and other devices in the teaching and learning process is a move that every school must embrace to become relevant in the present time (Barrera et al., 2020). The use of digital games for education has been identified as one of the new teaching techniques required for 21st century students (Kukulska-Hulme et al., 2021).

Digital games-based learning (DGBL) has been recognized as an effective approach in promoting students' learning motivation which is an important factor of improving their learning performance (Chen & Hwang, 2004). However, the core principle behind game-based learning is teaching through repetition, failure and the accomplishment of goals. The player starts off slow and gains in the skill until he/she is able to skillfully navigate the most difficult levels. The free atmosphere provided by digital games gives the students the freedom to fail, freedom to experiment, fashion styles, make efforts and interpret outcomes, which is one of the key benefits of using games in Social Studies classroom. In addition, students' control over the games gives them the opportunity to manipulate their activities which is an essential component in the real-life situation. The feeling of control and opportunities provided for decision-making in playful activities and relaxed atmosphere without fear of failure can help students to understand their role as active explorers of their society and to enhance their skills of problem-solving.

Digital games since their introduction have been an avenue for young people to have fun and entertain themselves. The games come in different forms and these include puzzle, role playing, chess and real time strategy games (Han & Zhang, 2008). Also, Talib et al. (2019) identified Scratch, Puzzle, Simulation, Video Game, Kahoot, and Brain Blast as digital games that can be integrated into teaching and learning. Digital games based-learning is used as a medium for engaging students in the process of learning. This helps to captivate and engage Social Studies students to develop knowledge, skills and values which are essential to becoming active members of the society. Students with advanced level motivation and positive attitude towards GBL are likely to experience satisfaction in their engagement using this approach of learning (Vlachopoulos & Makri, 2017).

Literature Review

The Concept of Digital Games Based-Learning

Digital Games Based-Learning (DGBL) is a form of application of technology in teaching and learning which uses features of video and computer games to enhance learning experiences (Freitas, 2006). DGBL or mobile game-based learning is one type of game that is specially designed where the operation uses digital equipment (Sćepanović, et al., 2015), whose model does not require face-to-face meetings (Wati &Yuniawatika, 2020). Games are played primarily for entertainment and learning could mostly occur when one is happy and not under any stress. Digital games learning helps to create learning conditions in that while playing the games, Social Studies students will be acquiring some basic skills and values of life.

Games in learning promote the learners to take risks and master the act of learning in the process. Games-based learning takes this same concept and applies it to teaching a curriculum. Games in learning allow students to work towards a target, choose actions and experience the results of their efforts. When students engage in games during learning, they actively learn and practice the right way to do things. In the process of students using games based-learning, they always see it as fun, meanwhile the strategy provides a lot of potentials for the students to gain values that Social Studies tends to promote. Application of digital games in teaching and learning of Social Studies is about changing the students' approach towards learning using new models. The essence is for the students to learn in a relaxed atmosphere. As students learn through GBL, they gain much more ownership of the material, which improves retention. GBL promotes the learners' creativity and their critical thinking related to technology us, could help to develop cognitive skills in students, and awakens their curiosity, competitiveness, and creative behaviors that enable them to construct concepts (Boyle, 2011). Learning games provide students a safe environment for failure and give them a chance to try out new things. If they fail in the process of the game, they can learn from their mistakes while repeating the process again. This promotes consistency and perseverance in the face of a challenging world that human beings live in.

Game Based Learning and Problem-Solving

Problem-solving is a fundamental means of developing students' knowledge by training themselves to think and is one aspect that is very useful in their future lives. Problem-solving means engaging in a task for which the solution process is unknown. To this end, students use their knowledge for the development of new understandings. Zhong et al. (2010) define problem-solving as an intellectual process of the brain, which explores the explanation to a specified problem to comprehend a new target. Also, Mayer and Wittrock (2006) see problem-solving as a cognitive process that focuses on accomplishing an objective for which the students do not primarily know a solution technique. Problem-solving skill is a complex mental activity comprising a variety of cognitive skills and activities; and is made up of

advanced order thinking skills like visualization, abstraction, comprehension, reasoning, analysis, synthesis and generalization (Garofalo & Lester, 1985). Sardone and Devlin-Scherer (2010) in their study have found that students can learn a variety of skills through game-based learning, which appears to enhance problem-solving, critical thinking, and creativity for users. Also, Kwon et al. (2011) noted that students solve problems when given the option to generate their explanations. Sardone and Devlin-Scherer (2010) stressed further that problem-solving and critical thinking skills are considered to be among the most important skills in the 21st Century. Social Studies programs teach students to acquire, organize, interpret, and communicate information. Students process the information as they draw logical conclusions, solve problems, make decisions and interact with others.

Game-based learning provides an opportunity for students to acquire sets of skills like critical thinking, reasoning, and problem-solving skills to help them achieve the specific learning goals which could help them to analyze situations, organize data and information, set goals, and construct different patterns and designs. These skills are the most essential ones that an active student needs (Talib et al., 2019). Studies have shown potentials of digital game-based learning (DGBL) in increasing students' learning and enhancing their learning effectiveness (Huang, 2011; Yang, 2012). The extent to which these assertions will be replicated becomes a point of interest for this study. This study therefore examined the effectiveness of digital games-based learning in the teaching of values and problem-solving in Social Studies among the pre-service Social Studies teachers in Ogun State.

Game-Based Learning and Values

Values are internalized cognitive structures that guide choices by evoking a sense of basic principles of right and wrong (Oyserman, 2015). Stressing further, Erdem (2007) defines values as a tendency to prefer a state to another one. They are basic and fundamental beliefs that guide or motivate attitudes or actions, and describe the personal qualities we choose to embody to guide our actions (Ethic sage, 2018) Through the design process, values and beliefs become embedded in games whether designers intend them to or not. Digital games are designed in a way that promotes the values to which the surrounding societies and cultures subscribe. These values might include liberty, justice, inclusion, equality, privacy, security, creativity, trust, and personal autonomy (Agre, 1997).

Theoretical Framework

The theory that supports this study is found in Activity Theory which has its origin from the theoretical spheres of Soviet Vygotskian Psychological Cultural-Historical approach to learning and Praxis-Marxist materialism (Benjamin & Kurt 2012). Activity theory conceptualizes learning from social and intellectual perspectives which state that learning occurs through involvement with other people and cultural tools. This means that learning is a

product of activity with other people and things, rather than being an individual's mental processes alone. Activity theory further stresses that human mind develops from historically contextualized, object-practical activity (Gregory & Waldener, 2004). Activity theory is a framework for the analysis and understanding of human interactions through their use of tools and artifacts (Hashim & Jones, 2007). A major disadvantage of Activity Theory is that it tends to discourage creativity (Gregory & Waldener, 2004). Despite this, the theory allows researchers to investigate varieties of situations and problems and studying forms of human activity as development. Games in learning involve students engaging in the games which will lead to development of value systems and acquisition of problem-solving skills.

Empirical Review

Woo (2014) assessed how digital game-based learning could support student motivation, cognitive success, and performance outcomes. The result showed that motivation correlates with performance of the students. Papastergiou (2009) assessed the effectiveness of digital games-based learning on students' motivational appeal and the result showed that DGBL could provide effective and motivating learning environments regardless of students' gender. Yogi et al. (2021) assessed the effectiveness of educational games on post-pandemic learning and the result showed that the integration of games into online learning had a significantly positive effect on student learning outcomes and that the game-based learning through E-CrowdWar was effective in promoting the students' academic outcomes. Wati et al. (2020) examined the digital game-based learning as a solution to fun learning challenges during the COVID-19 pandemic. The result showed that digital game-based learning models helped to promote learning during the pandemic period. Digital game-based learning can foster learning motivation and student activity to be involved in learning and help to improve student learning outcomes and creativity. As reported by Eltahir et al. (2021), the utilization of games-based learning resulted in a significant improvement in the students' engagement, motivation, and academic performance in an Arabic language course. Results revealed improvement in the knowledge of the empirical group than the control group.

The objectives of Social Studies in Nigeria is to help the students to acquire knowledge that will make them to develop the ability to make informed decisions; skills that promote critical thinking, problem solving and values of hard work, honesty, tolerance and so on (Oluwagbohunmi, 2012; Ogundare, 2000). Also, Social Studies as a school subject aims among other things to develop positive attitudes of tolerance, perseverance, justice and fairness and problem solving skills in students. Achieving the objectives of Social Studies requires teaching and learning of content that promotes the development of skills of problem-solving, critical thinking, reflective analysis and values of tolerance, perseverance, justice, fairness and so on in the students through the use of innovative strategies such as digital games learning. Social Studies by its nature promotes innovative ideas and strategies that will help to equip the

students with the skills of resolving human problems and develop attitude that promote interpersonal relationship in the society (Fan et al., 2012). Social Studies education helps to facilitate learning of knowledge, skills, values and attitudes. If the purpose of education is not only to make students literate, but also make them knowledgeable, creative, solve problems, think rationally and develop values that make them to become functional members of the society, then Social Studies must adopt innovative ideas and strategies such as digital games to be able to achieve her objectives. Therefore, innovative methods such as Digital Games Learning help to engage learners with tasks that will develop skills in the students which are needed in their daily life activities.

Online games have been applied to education in some parts of the world to foster learning processes effectively and interestingly, especially among young learners. Despite the enormous potential of DGBL, it is still difficult to integrate games into the curriculum of formal education. This is because of the difficulty in identifying their relevance to the curriculum, potential benefits and practical integration method. Research into the application of games in Social Studies classes concentrated in highlighting the potentials of using games in teaching Social Studies. However, not much has been done in using games in practical form to teach problem-solving skills and the values aspect of social studies. This study therefore examined the application of digital games into the teaching of values and problem-solving skills in Social Studies.

Objectives

This study set out to:

1. Assess the contributions of digital games in the development of problem-solving skills in Social Studies students.
2. Determine the contributions of digital games in the development of values in social studies students.

Research Questions

1. What are the contributions of digital games into the development of problem solving skills in social studies students?
2. How do digital games contribute to value development in social studies students?

Methods

The study employed a descriptive research design to examine the usefulness of digital games in the development of problem-solving skills and values in Social Studies students. This study was conducted on second-year Social Studies students of Tai Solarin University of Education, Ijebu-Ode, Ogun State, Nigeria during the first semester of 2019/2020 academic session. 200 level students were purposefully selected for the study because they offer computer applications in Social Studies at this level. Participants were selected using volunteer sampling procedure. Different digital games were used during the teaching of different concepts in Social Studies. The students were made to

practice with games and identify problems, mode of solving the problems, and the values that they gained from the activities they embarked on. Games such as *Cognifit* – (brain train game); *Forza* (Car racing game); *Starcraft* (Military Science fiction game) and *Thinking* were used in the study. After the games exercises, students were given a questionnaire tagged "Digital Games and Development of Problem Solving and Values in Social Studies Questionnaire" (DGDPVSSQ) (r = .89) The questionnaire was based on 5 Likert scale of Very Useful (5), Often Useful (4), Sometimes Useful (3), Rarely Useful (2) and Never Useful (1). The content and face validity of the questionnaire was established by presenting two copies of the draft questionnaire to two experts in the field of test and measurement for further scrutiny and modification. This was to ascertain the suitability of the instrument in terms of language, presentation, clarity and applicability. Based on their comments, necessary modifications were made. The verified copy of the questionnaire was trail tested on thirty-five (35) respondents that did not take part in the actual field work. Split-half reliability analysis technique was used to determine the reliability coefficient of the instrument which was found to be 0.89. Data obtained from the field work were coded and analyzed using descriptive statistics to answer the research questions raised to guide the study. The results are presented below.

Results

Research Question 1: What are the contributions of digital games to the development of problem-solving skills in social studies students?

Table 1

Distributions on the Opinion of Respondents on the Degree Contributions of Digital Games to the Development of Problem-solving Skills in Social Studies Students

S/N	Items	N	Mean	SD	Remarks
1.	Logical Thinking	40	4.76*	.472	Very Useful
2.	Evaluating	40	3.64	.780	Very Useful
3.	Dependability	40	3.65	.734	Very Useful
4.	Technical Knowledge	40	3.87	.683	Very Useful
5.	Practice Problem	40	4.35	.553	Very Useful
6.	Solution Focus	40	4.78*	.467	Very Useful
7.	Brainstorming Ideas	40	3.89	.678	Very Useful
8.	Repeat practices	40	4.65	.546	Very Useful
9.	Mastering interrelated skills and abilities	40	4.50	.579	Very Useful
10.	Solving imaginary and real-life problem	40	4.38	.625	Very Useful
11.	Evaluate options faster	40	4.72*	.483	Very Useful
12.	Goal getting	40	3.85	.694	Very Useful
13.	Reflecting on progress	40	3.76	.720	Very Useful
	Average Grand Total		4.21	.581	

Table 1 shows the respondents' opinions on the development of problem-solving skills using digital games. The result shows that item 6 on digital games making the respondents to be solution focused has the highest mean score of 4.78 (SD = .467), followed by item 1 which stated that digital games developed logical thinking, with mean score of 4.76 (SD = .472) and 11 which stated that digital games help to evaluate options faster with mean score of 4.72 (SD = .483). The least mean score of 3.64 (SD = .780) in the distribution is recorded by item 2 which stated that digital games enhance evaluative skills in the students. All the items in the distribution were recorded above 2.5 consideration level of mean. The average mean score of 4.21 (SD = .581) showed that digital games have potentials of developing problem-solving skills in the students. The implication of this is that exposing students to digital games in Social Studies teaching and learning will help them to develop some basic problem-solving skills which is one of the core objectives of Social Studies. The standard deviation showed high level of closeness of scores.

Research Question 2: How do digital games contribute to value development in Social Studies students?

Table 2
Distributions on the Opinions of Respondents on the Degree of Contributions of Digital Games to the Development of Values in Social Studies Students

S/N	Items	N	Mean	SD	Remarks
1.	Tolerance	40	2.56	.968	Useful
2.	Persistency	40	4.23*	.589	Very Useful
3.	Sharing	40	3.34	.879	Useful
4.	Decision Making	40	3.56	.834	Very Useful
5.	Team building	40	3.40	.786	Useful
6.	Rules Application	40	4.00	.623	Very Useful
7.	Consistency	40	3.98	.754	Very Useful
8.	Determination	40	4.04	.596	Very Useful
9.	Will to achieve tasks	40	4.34*	.565	Very Useful
	Average Grand Total		3.72	.732	

Table 2 showed the respondents' opinion on the development of values in Social Studies using digital games. The result shows that item 9 on digital games making the participants develop the values of strong will to achieve tasks has the highest mean score of 4.34 (SD = .565), followed by item 2 which stated that digital games develop values of persistency, with mean score of 4.23 (SD = .589) and 6 which stated that digital games help to develop values of rule application with mean score of 4.00 (SD =.623). The least mean score of 3.34 (SD = .879) in the distribution is recorded by item 3 which stated that digital games develop values of sharing in the students. All the items in the distribution were recorded above 2.5 consideration level of mean. The average mean score of 3.72 (SD = .732) showed that digital games have potentials of developing

positive values in the Social Studies students. The standard deviation showed high level of closeness of scores.

Discussion

The study examined the usefulness of digital games in the development of problem-solving skills and values in Social Studies students. The innovation in the field of technology has created a huge gain in its application to teaching and learning (Risk & Hillier, 2022). New technology application such as digital games has been found to increase students' engagement during classroom interactions. The results of research question one showed that digital games help to promote the development of problem-solving skills in Social Studies students. This supports the findings of Taub et al. (2019) and Yogi et al. (2021) whose findings revealed positive effects of digital games in enhancing problem-solving in students. This might be because playing games allows the students to acquire skills in a relaxed atmosphere without the fear of failure, and repeating activities helps them to develop essential problem-solving skills. This finding contributes to the conclusion of scholars that digital games have the potential of providing students with different ways of participating in classroom activities (Risk & Hillier, 2022; Talib et al., 2019; Vlachopoulos & Makri, 2017). Digital games have assumed critical roles in the lives of children (Chao-Hong et al., 2009). The results of research questions two showed that digital games help to develop critical values in Social Studies students. This supports the findings of Eltahir et al. (2021), whose findings revealed that digital games can be used to improve students' problem-solving skills. This might be due to the fact that students' exposure to the games and its application into classroom discussion helps them to gain some basic values that were often overlooked during normal games. The finding also supports the conclusions of Activity Theory that learning can occur when it is conceptualized from social and intellectual perspectives (Gregory & Waldener, 2004).

Conclusion

The opinion of the respondents in terms of the skills they acquired while playing digital games showed the usefulness of allowing students to learn in relaxed and non-authoritarian environments. Involvement of students in learning processes will make them to learn better and faster and as well acquire necessary skills and values. Game playing is now common among students, therefore using it as a means of teaching and learning develops their interest in learning and acquiring skills and values in Social Studies.

Recommendations

i. Teachers of Social Studies should not only concentrate on the already established strategies but also look at the interests of students and use such to engage them in the teaching and learning process.
ii. Digital games have the potential of developing skills and values in students therefore, this potential be exploited in the teaching and learning of Social Studies.

iii. Values are learnt mostly when they are taught using practical procedure. Social Studies teachers should incorporate practical into their teaching as this can help to develop positive attitude values through learning by experience.

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