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DEVELOPMENT OF MOBILE GAMES-BASED SOCIAL STUDIES INSTRUCTIONAL MEDIA TO DEVELOP 21ST CENTURY SKILLS

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Abstract. Facts show that not all educators are able to optimize information technology facilities according to the learning needs and characteristics of students in social studies learning after the Covid-19 pandemic. Social studies learning will have a number of significant issues if it is not adjusted to the characteristics of students of generation Z, by which their daily life is influenced and dependent on gadgets. The purpose of this research is to produce a mobile game based social studies instructional media that is able to develop students' 21st century skills. This study uses the Research and Development method with research stages using the ADDIE design model (Analysis, Design, Development Implementation and Evaluation). The results showed that the media get recommendations with eligibility criteria for use from experts of media and social studies materials validators with an average score of 4.11. The study is implemented with a quasi-experimental design in class 8A as the Experiment class and Class 8C as the control class. With the significance of 0.000 < 0.05, social studies instructional media based on mobile games is effectively used to develop 21st century skills. It is concluded that mobile game-based social studies instructional media has been proven to effective in developing students' 21st century skills.

Keywords**:** Social Studies Instructional Media; Mobile Games; 21st Century Skills

I. INTRODUCTION

Changes in the world of education are things that must be done to keep up with the developments and demands of the era. In the 21st century education, students are expected to have skills in accordance with patterns, behaviors, and life skills to be able to compete in global life. Learners in the 21st Century are dominated by generation Z who have unique and different characteristics from previous generations and the world of education must transform following the cognitive development and characteristics of learners in their time in order to optimize the educational programs that have been planned.

Education is a process of transferring knowledge, transforming values, and forming personality with all the aspects it covers (Nurkholis, 2013). Along with the times, all knowledge has developed, the value system has changed and the skills needed to compete in the global world have competencies that are always changing according to its zeitgeish. Education in the 21st Century is an education that is full of challenges and becomes the basis for every country to develop human resource skills at a point where its people are able to compete globally in fast changing conditions. Social studies education as a subject has nature and goals that are aligned with 21st century competency skills which require students to have skills of learning and innovation, digital literacy, also career and life skills. According to Sapriya (2012) and Al Muchtar (2016), social science instruction can help students develop the abilities to solve problems, make decisions, carry out and take part in community-based activities, compete, think critically, work with others, be creative and innovative, and become good and intelligent citizens. These competences can be transformed to students appropriately if social studies instruction is properly designed following the characteristics

of cognitive development and learning styles of junior high school students.

Junior high school students are the Z generation, known as the digital generation, who are born when the digital era is already underway and growing rapidly. They accept the digital world, such as social media, as something that has become a daily part of their social life since birth (Pratikto and Kristanty, 2018). The results of Zis et al. (2021) study shows that generation Z cannot be separated from cellphones. This is evidenced by a minimum of 4 hours per day using a cellphone and a maximum of up to 18 hours, both for viewing incoming messages and surfing the internet. Activity on social media is the most dominant portion of activity on the internet, while the portion for doing schoolwork and playing games through gadgets has an almost balanced portion (Adriyanto, et al. 2019).

The findings of the researcher's preliminary study show that Google Classroom and WhatsApp Groups were the most popular social studies learning platforms during this time. Students' enthusiasm for learning increased during face-to-face instruction, but the real changes that occurred were that they felt uncomfortable and had trouble expressing themselves because they had been used to the online learning environment for the previous two years.

In Academic Year 2022/2023, learning forms and processes have returned to their previous condition, with face-to-face learning in classrooms. Nonetheless, social studies teachers' use of digital media in the classroom has not been optimized to accommodate the characteristics of Generation Z students. This is evident in the ASEAN topic, where learning media still take the form of student books, ASEAN maps, and power point media.

The results of interviews with students regarding learning media confirmed that mobile games had never been used in social studies instruction. Based on the preliminary study questionnaire, it is known that 96% of students like to play online games such as Free Fire, Mobile Legends and Pub G and are very enthusiastic when invited to discuss social studies instructional media packaged in a mobile game platform.

In order to facilitate the learning styles and needs of students, this research has the specific objective of presenting an alternative social media instructional media based on mobile game by designing a social studies instructional media application with the RPG (Role Play Games) genre on ASEAN material in grade 8 which can be used for learning where and whenever appropriate to the learning needs of Generation Z students.

II. METHODS

The method used in this study refers to the general concept of product-based research and development (Borg and Gall, 1983). The product to be developed is a Mobile Game-Based Social Studies Learning Model to Improve 21st Century Skills (MOGE K-21) using the ADDIE development design model. The ADDIE development design model is chosen for its function as a guide in developing instructional model (Reiser and Dempsey, 2007; Branch, 2009; Molenda; 2015). The steps taken in developing Social Sciences learning model based on mobile games to develop 21st Century skills follow the flow and design principles of the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation).

In the Analysis phase, the researcher uses a qualitative approach with a data analysis process that is carried out in accordance with the principles of qualitative data collection, such as the period of data collection, data reduction, data presentation and conclusion/verification (Miles and Huberman, 1994). In analyzing the data, the method used is triangulation which aims to obtain data reliability (Oliver-Hoyo and Allen, 2006; Carter, et al., 2014). The results of interviews, observations, documentation are used to cross check data with the aim of obtaining accurate meaning and the conclusion of the data, while the questionnaire data is used to clarify the characteristic of SMP Negeri 5 Jember students as generation Z who likes to play games via their mobile phones.

At the implementation stage the researchers use a quantitative approach with a quasi-experimental design. The researchers use a 21st century skills questionnaire by testing the validity and reliability of the instrument. The terms of validity and reliability are used to determine the degree of validity and reliability of the 21st century skill instrument (Taherdoost, 2006). To test the effectiveness, the researchers use the independent sample t test with regard to the normality and homogeneity of the data.

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III. RESULT AND DISCUSSION

Research begins with conducting a preliminary study which is the first and the most important part of conducting research. Through this stage researchers can get a clearer and sharper picture regarding the focus of the research (Pauline-Graf & Mandel, 2019). The results will be presented following the research design and development of the ADDIE model with the stages of Analysis, Design, Development and Evaluation with the aim of producing social studies instructional media based on mobile games that can develop 21st Century skills. The following results are obtained during the research process;

A. Preliminary Study

To obtain factual and comprehensive data about the school environment, researchers conducted preliminary studies utilizing qualitative descriptive data collection techniques using naturalistic data without interference or modification (Moleong, 2013; Nassaji, 2015), infrastructure, social studies learning atmosphere, methods and the media used during instructional activities and student learning styles to determine the needs of students and teachers in social studies instructions. The data collection instruments used are observation, interviews, documentation, and 21st century skills questionnaires.

The observation results show that social studies learning media used during the pandemic were Google Classroom, WhatsApp Groups, and some refreshments through Quizziz. During face-to-face learning, students were enthusiastic, but

Journal of Education, Teaching, and Learning
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the real change that appeared was that students felt awkward and had difficulty expressing themselves because they had accustomed for the past 2 years to the learning process carried out online. For the Academic Year 2022/2023, school activities have returned to its natural state with face-to-face learning, while the teaching media used by Grade 8 Social Studies teachers for the topic of ASEAN are student books and ASEAN maps which have not optimized digital media to facilitate the characteristics of Generation Z learners. The aspect of skills assessment carried out by the teacher in project-based assignments is limited to digital literacy skills using internet sources, innovation skills, collaboration, communication and problem solving in the learning and innovation aspects, while the life skills and career skills aspects of students have not been touched by the teacher.

The results of interviews with teachers and students confirm the social studies class atmosphere that occurred. It was found that teachers felt that there had been a decline in social studies learning outcomes during the pandemic. Teachers and students also needed adaptations in online learning and needed innovation in learning activities carried out in the form of interactive and fun learning methods and media, as according to Ms. N, the social studies teacher at SMP 5 Jember, students' learning motivation decreased and the submission of assignments often experienced delays. Based on the results of interviews with IP, a student in Class 8A, social studies instruction during online learning seemed as if the students were demanded and forced to study independently and seemed monotonous with the assignments given. M, a student of Class 8C, mentioned that there was some material that they had not mastered but when he asked via WhatsApps Group, the chat was drowned out and maybe the teacher did not read it. He was then reluctant to ask questions again (Wirawan, 2021).

The preliminary studies yield documents such as a syllabus, lesson plans, teacher and student books, grades, report cards, and teaching media used by social studies teachers. The syllabus and lesson plans used by social studies teachers correspond to the results of the Jember Regency social studies teacher group by modifying teaching methods based on students' learning styles. Learning outcomes of Social Studies during the 2021-2022 academic year in Even Semester show that 55% of students do remedial with a bench mark of 70. to assess skill aspects, teachers use project assignments and measure questioning, answering and analysis skills. The teacher's method is in line with the spirit of Indonesia's 2013 curriculum (Wening, 2013). However, when compared to the 21st century skills that must fulfill the elements of Learning and Innovation, Digital Literacy, and Career and Life Skills, it can be contended that what the teacher does is only based on two aspects, namely the Career and Life Skills aspects, which the two have neither been measured. According to Al Muchtar (2014), the Career and Life Skills aspects are consistent with the nature and philosophical goals of Social Sciences, emphasizing aspects of life skills and equipping students to determine life on a higher level.

Through data analysis using triangulation methods to obtain reliability of data (Carter, et al. 2014), it was obtained that social studies instruction that has been carried out so far at SMP Negeri 5 Jember has not optimally equipped students with 21st century skills according to the demands of the times, as the important aspects of 21st century skills, i.e., career and life skills, have not received attention. As for the learning styles and characteristics of students who like to play games via mobile phones, they have not been taken into consideration to provide a pleasant social studies learning experience, such as the use of mobile games-based social studies instructional media.

Students from Generation Z, who primarily use mobile phones in their routines and enjoy playing games on their gadgets must be accommodated in social studies learning activities. Questionnaire data from preliminary study assert that 62 students (96.8%) of Class 8A and 8C at SMP Negeri 5 Jember approved and wanted Social Studies taught through mobile games. This clearly indicates that gadget as one of technology tools permeates Generation Z's daily lives. In line with the findings, W. Widodo, et al (2020) emphasize that Generation Z students utilize mobile phones in almost every aspect of their lives. In the same vein, Dwidienawati and Gandasari (2018) also emphasize how Generation Z students' characteristics differ from those of previous generations. They are more self-sufficient and require different treatment.

On a scale of 1 to 5, the analysis of 21st century skills that was conducted during the initial measurement yielded an average score of 2.75. These findings suggest that SMP Negeri 5 Jember students' 21st century skills are below average in some respects. This guideline is based on Likert scale and the 5-scale measurement recommendation (Joshi, et al. 2015). Pertaining to the preliminary findings, it is possible to conclude that the needs and learning styles of SMP Negeri 5 Jember students can be complied by incorporating social studies learning materials into information technology subjects. As a result, the use of mobile phones in classroom teaching and learning activities is required. It is identified that students like to play games with a minimum of playing games for 1 hour per day. The aspects of 21st century skills which form the minimum basis for learning in the 21st century are still below the established criteria.

B. Design of Social Studies Instructional Media Based on Mobile Games to Develop 21st Century Skills

The design went through several stages. The first stage is an analysis of core competencies, basic competencies, competency achievement indicators, material development, the chosen learning model, and determining the outputs and outcomes of social studies learning conducted. After analyzing all the components in the instructions, the researcher then designed and made game story board. The story board that have been designed is as follows;

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
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Table 1
Story Board Of Social Studies Instructional Media Based On Mobile Games

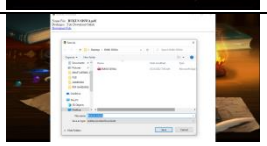
Meeting	Game	Note
I	Photographs of the 5 founders of ASEAN were given	Students choose a name and match it with the photo of each character.
II	Given maps of ASEAN and NATO	Students are asked to determine and analyze the population size and military strength which is superior
III	Given the ASEAN Blind map	Students are asked to match the names of the countries with the map correctly. Assessing ASEAN's Strategic Position and Determining the latitude and longitude cordinate.
IV	Given the Country Flag, Capital City and Currency	Students are asked to name a country according to the characteristics of the country's identity
V	Provided 10 Flags of ASEAN Countries	Students are asked to choose 2 countries in ASEAN. Then given items of similarities between the two countries to be filled in by students.
VI	Acting as an Indonesian Diplomat	Choose among 10 Countries to visit Political Cooperation
VII	The Sea Games event for the Mobile Legends e-sport	An illustration of e-sport is given as a career/occupation Socio-Cultural Cooperation
VIII	Given the plot of the game: ASEAN chooses to do war/not against China due to the South China Sea conflict.	Cooperation in the field of defense and security An explanation of the impact of war was given. Then students make their decision
IX	Roleplaying to carry out professions abroad (ASEAN) e.g., doctors, pilots, farmers etc as consequences of MEA	Picking a profesion.
X	Roleplaying as one of exchange students in ASEAN countries	Choose a country in ASEAN Collaboration in the Field of Education and Knowing the Quality of Education in ASEAN
XI	Roleplaying as a farmer, rancher and fisherman	The younger generation is reluctant to farm, raise livestock or become fishermen. They were given a description of the three jobs, the potential of Indonesian natural resources and comparison to other professions.
XII	Game of survival from natural disaster conditions.	Students must be prepared for potential disasters in the Southeast Asia/Indonesia region
XIII	Vacation from Indonesia to Singapore, Malaysia and Thailand by plane	Very fast cross-country travel time using transportation technology.
XIV	Game of being an E-commerce entrepreneur.	Internet transactions facilitate economic activities even across countries.
XV	Game: build housing complex using farm land	More and more agricultural land is running out as a result of Industrial/settlement expansion.

The story board is used as a reference by researchers to compile and develop social studies instructional media based on mobile games in collaboration with game designers and programmers.

C. Development of Social Studies Instructional Media Based on Mobile Games to Develop 21st Century Skills

The programming technology used is the RGSS Javascript model with the RPGMaker MV engine tools, or you can use C# with the Unity engine tools. The designer technology used is a character reference from the rpg maker mv with a 16-way form. The results are as follows.

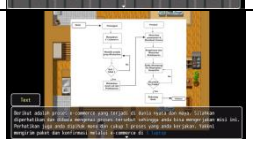
Table 2
Development Of Social Studies Instructional Media Based On Mobile Games To Develop 21st Century Skills

NO	Game Screenshot	Note	Aspect of 21st century skills in Social Studies
1		Main Interface (menu)	All Items Contain Digital Information Search (Digital Literacy)
2		Grade 8 Social studies book download menu	Adaptation

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
p-ISSN: 2477-5924 e-ISSN: 2477-8478

3		Display of Core Competencies and Basic Competencies	Adaptation, communication
4		Game instruction	Adaptation, Communication, Critical Thinking
5		Set character name	Communication, Creative
Game I		Malaysian Flag Question	Communication, Problem Solving, Critical Thinking, Creative
		5 Founding Figures of ASEAN Game	
		Initial 21st Century Skills Score Display	Adaptation, Critical Thinking.
Game II		Comparison of ASEAN and NATO	Critical Thinking and Problem Solving
.Game III		Mystery box	Decision Making, Confident, Independent
		ASEAN Blind Map Game	
Game IV-V		ASEAN Country Identity and Their Similarities.	Problem solving, Creative
Game VI		Role Playing as a Diplomat	Leadership, Decision Making, Cross-Cultural Cooperation
Game VII		Indonesian National Team Mobile Legends E-Sports at the 2021 Vietnam SEA Games	Citizenship, Career, Cross-Cultural Cooperation
Game VIII		ASEAN defense and security game	Love Peace, Citizenship
Game IX		ASEAN Economic Community (AEC) Play the role of a doctor	Career, Cross-Cultural Cooperation
		ASEAN Economic Community (AEC) Play the role of being a Pilot	Career, Cross-Cultural Cooperation
		ASEAN Economic Community (AEC) Play the role of being an entrepreneur	Leadership, Career, Cooperation
Game X		Student exchange	Confidence, Cross-Cultural Cooperation
Game XI		Game: live the fun of being a farmer	Critical Thinking, Creative, Problem solving, Citizenship, career

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
p-ISSN: 2477-5924 e-ISSN: 2477-8478

		Game: live the fun of the profession as a farmer	Critical Thinking, Creative, Problem solving, Citizenship, career.
		Game: live the thrill of the profession as a fisherman	Critical Thinking, Creative, Problem solving, Citizenship, career
Game XII		Earthquake survival game	Independence, Problem Solving, critical thinking
Game XIII		Game: carry out flight missions and vacations to ASEAN countries	Cross-Cultural Cooperation
Game XIV		Game: run e-commerce	Innovation, Career, Decision Making
Game XV		Game: defend farmland from housing construction	Creative, area mapping
6		End display	

The results of the development are not immediately used in research, as they must comply with the rules in development research, i.e., testing by media validators and social studies learning experts. Researchers conducted a Focus Group Discussion (FGD) on August 10, 2022 by inviting various experts and practitioners in the field of education to perfect the study of social studies instructional media based on mobile games to develop 21st century skills and the following input was obtained;

Table 3
FGD Result

No	Speaker	Feedback	Note
1	Instructional Media Expert	Visual appearance must be given more attention and made more attractive according to today's more interactive visual designs. Audio is adjusted to the appearance of games, when answering questions or completing missions.	Learning media is feasible to use. Input is used as a means to improve the appearance of the media that has been made.
2	Social studies expert	The instructional model that is made should adapt to the interface. It is suggested to use the Game Based learning model. Learning syntax, syllabus, lesson plans and materials should be made in guidebook for user convenience.	The material and content of social studies instructional model are appropriate and feasible to apply. Additional guidebooks as a companion is needed for the media that have been designed.
3	IT experts/ Games developer	For the fun of educational games, you have to be able to let go of the uptightness of the existing material. The focus of the material is still conveyed and the recreational facilities in the game are fulfilled.	Games that have been compiled have used good assets and coding. There are no bugs in the game.
4	Social studies teacher	The development of social studies material that is carried out should still follow the outline in the teacher's book and student's book. If you want to measure the 21st century skills assessment aspect in social studies instruction, an assessment format should be made.	Hoping to be immediately applied in learning because it is very appropriate to the characteristics of students and as an alternative means of IT-based social study instructional media.

Overall, experts in the field of instructional media, social studies learning experts, IT experts and social studies teachers provide assessments with appropriate criteria for use with revisions according to the feedback. The feedback given is used by researchers to revise the media according to the suggestions mentioned above. After revision, the researcher conducted a Black Box test conducted by a mobile game expert who comes from the android game

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
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developer "Elite Project" to examine the functionality contained in the software (Bhasin, et al. 2014). The results show that all items and icons function properly and there are no bugs in the social studies instructional media based on the New Save ASEAN mobile games that have been made.

The validation test of mobile games-based social studies instructional media to determine eligibility criteria from experts was then carried out by instructional media lecturers and social science education lecturers at FP IPS Universitas PGRI Argopuro Jember. They declared the game valid for use based on input from the FGD results. Following are the results of expert validation assessments related to social studies instructional media based on mobile games..

Table 4
Assessment Of Mobile Games-Based Instructional Media Validators

NO	Validator Name	Expertise	Score	Note
1	Shendy Andrie Wijaya	Instructional Media	4,13	valid
2	Ilfiana Firzaq Arifin.	Social studies instruction	4,1	valid

Based on the expert validation assessment above, it is shown that the mobile games media is in a high criterion with an average of 4.11 referring to the criterion scale of 5 (Mazurek, et al, 2021). After validating mobile games-based instructional media and getting recommendations for use, the researchers continued to the next stage by implementing them in the development class.

D. Implementation of Social Studies Instructional Media Based on Mobile Games to Develop 21st Century Skills

The implementation was carried out to statistically test the 21st century skills possessed by students of Class 8A and 8C. The data was tested for a normal and homogeneous distribution and found that there was no difference in the average 21st century skills possessed between the two sample groups. Through a Quasi-Experimental design (Gopalan, et al, 2020) it will be tested using an independent t test sample of class 8A (experimental) which is treated with mobile games-based learning media and class 8C (Control) which is not given any treatment.

The research hypothesis given is as follows;

H0: There is no difference in average 21st century skills between the Experiment and the control classes

Ha: There is an average difference between 21st century skills between the Experiment and the control classes

Researchers use a significance level of α = 5% in this study. Test decision if the significance value is <0.05, then Ho is rejected and if the test results are sig. > 0.05, then the conclusion of the test is that H0 is accepted (Singh and Cardiol, 2013). The following is the obtained pretest score;

Table 5
21ST Century Skills Equivalence Pretest

Experiment class(8A)			Control class (8C)		
No	**Name**	**Score**	**No**	**Name**	**Score**
1	Respondent 1	96	1	Respondent 1	106
2	Respondent 2	87	2	Respondent 2	110
3	Respondent 3	88	3	Respondent 3	114
4	Respondent 4	116	4	Respondent 4	108
5	Respondent 5	109	5	Respondent 5	93
6	Respondent 6	97	6	Respondent 6	97
7	Respondent 7	90	7	Respondent 7	96
8	Respondent 8	86	8	Respondent 8	91
9	Respondent 9	100	9	Respondent 9	89
10	Respondent 10	93	10	Respondent 10	107
11	Respondent 11	97	11	Respondent 11	109
12	Respondent 12	101	12	Respondent 12	94
13	Respondent 13	89	13	Respondent 13	104
14	Respondent 14	94	14	Respondent 14	104
15	Respondent 15	88	15	Respondent 15	103
16	Respondent 16	102	16	Respondent 16	107
17	Respondent 17	102	17	Respondent 17	105
18	Respondent 18	101	18	Respondent 18	95
19	Respondent 19	103	19	Respondent 19	98
20	Respondent 20	101	20	Respondent 20	90
21	Respondent 21	98	21	Respondent 21	89
22	Respondent 22	100	22	Respondent 22	101
23	Respondent 23	96	23	Respondent 23	91
24	Respondent 24	97	24	Respondent 24	98
25	Respondent 25	101	25	Respondent 25	97
26	Respondent 26	99	26	Respondent 26	97
27	Respondent 27	110	27	Respondent 27	105
28	Respondent 28	91	28	Respondent 28	97
29	Respondent 29	89	29	Respondent 29	93
30	Respondent 30	101	30	Respondent 30	106
31	Respondent 31	97	31	Respondent 31	113
32	Respondent 32	114	32	Respondent 32	99
Total score		3133	Total score		3206
Average score		97.90	Average score		100,18

To carry out the equivalence test, it is necessary to use the independent sample t-test with the help of the SPSS 21 program. However, it requires the data to be normally distributed and homogeneous. Therefore, the researcher conducts a normality and homogeneity test of the data first. The following is the output of the calculation results of the data normality test;

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	CLASS	Statistic	Df	Sig.	Statistic	Df	Sig.
RESULTS OF THE 21st CENTURY SKILLS QUESTIONNAIRE	CLASS 8A	.137	32	.135	.946	32	.111
	CLASS 8C	.120	32	.200*	.958	32	.241

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Statistical calculations state that the data is normally distributed with sig > 0.05, i.e., in class 8A as the experimental class of 0.135 and in class 8C as the control

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
p-ISSN: 2477-5924 e-ISSN: 2477-8478

class of 0.200, so it can be concluded that the two groups of data are normally distributed. Once it is known that the data are normally distributed, the next step is to test the homogeneity of the data as a further requirement. The following is the output of SPSS 21 calculations using Oneway Anova.

Test of Homogeneity of Variances

RESULTS OF THE 21st CENTURY SKILLS

Levene Statistic	df1	df2	Sig.
.215	1	62	.645

Through the statistical calculations above, it can be said that the experimental class and control class data are homogeneous, which is indicated by the Sig value > 0.05 which is equal to 0.645. After the data is known to be normally distributed and homogeneous, the research is continued by conducting a t test to see the initial 21st century skills possessed by the experimental class and the control class. The following is the output of the independent sample t test statistical calculations;

		Levene's Test for Equality of Variances		*t-test for Equality of Means*						
		F	*Sig.*	*T*	*df*	*Sig. (2-tailed)*	*Mean Difference*	*Std. Error Difference*	*Lower*	*Upper*
RESULTS OF THE 21st CENTURY SKILLS QUESTIONNAIRE	*Equal variances assumed*	*.215*	*.645*	*-1.243*	*62*	*.219*	*-2.281*	*1.836*	*-5.951*	*1.389*
	Equal variances not assumed			*-1.243*	*61.869*	*.219*	*-2.281*	*1.836*	*-5.951*	*1.389*

From the t test data above, it is known that the significance is 0.219 > 0.05, thus Ho is accepted or in other words there is no mean difference between the experimental class and the control class. Before testing the use of mobile game-based learning media, the average initial 21st century skills of the experimental class and the control class were equivalent.

Determining the effectiveness of mobile game-based learning media to develop 21st century skills is carried out by conducting a 21st century skills post test. The following are the post test scores for 21st century skills of both classes.

Table 6
THE 21ST Century Skills Post Test

Experiment Class (8A)			Control Class (8C)		
No	**Name**	**Score**	**No**	**Name**	**Score**
1	Respondent 1	158	1	Respondent 1	124
2	Respondent 2	154	2	Respondent 2	122
3	Respondent 3	153	3	Respondent 3	118
4	Respondent 4	169	4	Respondent 4	119
5	Respondent 5	161	5	Respondent 5	107
6	Respondent 6	160	6	Respondent 6	112
7	Respondent 7	155	7	Respondent 7	111
8	Respondent 8	155	8	Respondent 8	104
9	Respondent 9	161	9	Respondent 9	106
10	Respondent 10	162	10	Respondent 10	118
11	Respondent 11	159	11	Respondent 11	117
12	Respondent 12	163	12	Respondent 12	107
13	Respondent 13	157	13	Respondent 13	113
14	Respondent 14	160	14	Respondent 14	117
15	Respondent 15	152	15	Respondent 15	112
16	Respondent 16	165	16	Respondent 16	116
17	Respondent 17	164	17	Respondent 17	116
18	Respondent 18	161	18	Respondent 18	111
19	Respondent 19	160	19	Respondent 19	112
20	Respondent 20	160	20	Respondent 20	108
21	Respondent 21	165	21	Respondent 21	101
22	Respondent 22	164	22	Respondent 22	114
23	Respondent 23	162	23	Respondent 23	103
24	Respondent 24	162	24	Respondent 24	115
25	Respondent 25	163	25	Respondent 25	110
26	Respondent 26	162	26	Respondent 26	115
27	Respondent 27	166	27	Respondent 27	112
28	Respondent 28	158	28	Respondent 28	111
29	Respondent 29	159	29	Respondent 29	107
30	Respondent 30	168	30	Respondent 30	118
31	Respondent 31	160	31	Respondent 31	121
32	Respondent 32	161	32	Respondent 32	117
Total Score		5139	Total Score		3614
Mean score		160,59	Mean score		112,94

The research hypothesis tested are as follows;

H0: There is no difference in the average 21st century skills between the experimental class and the control class

Ha: There is an average difference of the 21st century skills between the experimental class and the control class

The researcher uses a significance level of α = 5% in this study. If the significance value is <0.05, then H0 is rejected and if the test results are sig. > 0.05, then the conclusion of the test is that H0 is accepted.

The following is the output of the independent sample of the t-test conducted;

Group Statistics

	CLASS	N	Mean	Std. Deviation	Std. Error Mean
RESULTS OF THE 21st CENTURY SKILLS QUESTIONNAIRE	CLASS 8A	32	160.59	4.047	.715
	CLASS 8C	32	112.94	5.634	.996

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 226-235
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Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RESULTS OF THE 21st CENTURY SKILLS QUESTIONNAIRE	Equal variance	4.273	.043	38.864	62	.000	47.656	1.226	45.205	50.107
	Equal varian			38.864	56.266	.000	47.656	1.226	45.200	50.112

From the data above, it is known that the significance is 0.000 < 0.05, so Ho is rejected or in other words, there is a mean difference between 21st century skills of the experimental class and the control class. After testing the use of social studies learning media based on mobile games, the final scores of the 21st century skills in the experimental class were higher than the control class. Statistically, there was a mean difference between groups using learning media based on mobile games compared to other audio-visual media.

IV. Conclusions

Research on the development of learning media is carried out through a series of evaluations at each stage starting from preliminary studies, design, and development stages by conducting FGDs (Focus Group Discussions) with learning media experts, social studies learning experts and IT/Games Developer experts to perfect each component in social studies learning media based on mobile games. After the feasibility of learning media is considered fulfilled in the development phase, the implementation process is carried out. Input from students during implementation in the development class was used as a reflection and basis for revising mobile games-based learning media. Improvements and input on mobile games in development classes such as gameplay, pictures, audio, material are used as a reference for making improvements. It is further proven that mobile games-based social studies learning media are effective in developing 21st century skills of students at SMP Negeri 5 Jember. Researchers have limited research in terms of testing the development of mobile games media and only testing it in one school and in terms of game technology being developed is not yet in the form of 3D, animation or metaverse cool technology to maximize the potential of 21st century skills possessed by students from playing mobile games.

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