International Journal of Social Science And Human Research

ISSN(print): 2644-0679, ISSN(online): 2644-0695

Volume 06 Issue 04 April 2023

DOI: 10.47191/ijsshr/v6-i4-44, Impact factor- 6.686

Page No: 2344-2353

The Effect of Problem-Based Flipped Classroom Learning Accompanied by Digital Literacy Using Edpuzzle on Spatial Problem-Solving Abilities for 7th-Grade Students at Pangudi Luhur Ambarawa Junior High School

Betha Jaswati Putri Destiana[1], Sarwono[2], Pipit Wijayanti[3]

[1,2,3]Universitas Sebelas Maret Surakarta

ABSTRACT: Indonesian education is transforming to respond to future challenges in which a new education paradigm focuses learning activities on students and optimizes TPACK (Technological, Pedagogical, and Content Knowledge) learning. Kurikulum Merdeka explains the needs of students in the 21st century that can be taught through Social Studies learning with a Geography perspective. The purpose of this study was to determine the effect of the implementation of the Problem Based - Flipped Classroom Learning (PBFCL) model accompanied by Edpuzzle-based digital literacy on spatial problem-solving abilities in the material of spatial relations between geographical conditions of the area and the characteristics and ways of community activities in social studies learning. This research is already implemented at Pangudi Luhur Ambarawa Junior High School in 2022/2023.

The results of statistical analysis are known that (1) Learning with the PBFCL model accompanied by digital literacy using Edpuzzle has a better effect on the spatial problem-solving ability with an average score of 72.40 compared to PBFCL learning accompanied by digital literacy using Canva with an average score 68.93 both learning with Expository accompanied by digital literacy using Edpuzzle with an average score of 68.53 and learning with Expository accompanied by digital literacy using Canva with an average score of 65.23; (2) the factor of the PBFCL learning model has a significance of 0.001 <0.05 so that it can be concluded that there is an influence of the PBFCL learning model on the spatial problem-solving ability; (3) the Edpuzzle-based digital literacy factor has a significance of 0.003 <0.05 so that it means that there is an influence of digital Edpuzzle-based literacy on the spatial problem-solving.

KEYWORDS: PBFCL, Digital Literacy, Spatial Problem-Solving Abilities

I. INTRODUCTION

Education is an indicator of a country building a nation into a nation that is strong and has character. Dzvimbo et al., (2018) stated that education is the primary tool to free the world from ignorance, poverty, inequality, and underdevelopment to achieve national goals and visions. Education runs dynamically according to the era till education needs continuous innovation. The transformation is required in all subjects, including Social Studies learning. The ability of the 21st Century is the need for students to become human beings following nature and the times. Presently, spatial problem-solving is a necessity to answer these challenges.

A new approach to learning built upon the Kurikulum Merdeka is through the implementation of student learning oriented. Jo and Bednarz (2014) in Solari et al., (2015) state that improving spatial abilities requires the role of the teacher to prepare for learning and professional development. Learning design that presents technology positively affects student learning involvement (Francis, 2017). Through appropriate learning technology, students have the opportunity to develop themselves to overcome gaps from deficiencies experienced in learning. The Problem-based learning model can be used to study the spatial relation of geographic and environmental phenomena that are well-known as spatial relations. Mubarok (2017) examined the effect of the Flipped Classroom learning model on learning motivation which can organize student-oriented learning. ProblemBased and Flipped Classroom Learning model that integrates technology enables the learning process outside of face-to-face classes. Hendaryan et al., (2022) stated that digital literacy could act as a developer of subject matter that increases the creativity and curiosity of students. Therefore, in training students to improve spatial problem-solving, they can implement innovative digital learning and literacy models for students.

The current conditions that develop at Pangudi Luhur Ambarawa Junior High School are in a period of adaptation to changes in the curriculum. Based on observations of 186 students at SMP Pangudi Luhur Ambarawa, it means that information processing in social studies subjects is not optimal so it has an impact on low spatial problem-solving abilities. 58.06% or 108 of 186 had difficulty analyzing room problems when discussing questions. In addition, 58.60% or 109 out of 186 students had difficulty finding

alternative solutions to solve problems that happened at home. Whereas 53.76% or 100 out of 186 students have difficulty understanding spatial-problem, such as reading maps, analyzing information on maps, connecting natural disaster events with human activities, natural or social phenomena, and solving spatial problems. Another problem is 133 out of 186 students or 71.51% not read the learning material before the lesson started. Based on these problems, this research is done to provide different treatments to students through the application of innovative digital learning and literacy models to the ability to solve spatial problems.

Spatial Problem-Solving Ability

Spatial problem-solving can mean part of the competence of spatial thinking for geospatial critical thinking in which there are stages of problem-solving. There are ten questions in the form of multiple choice and fourteen essay questions. Students examine this test to determine students spatial problem-solving abilities. One of the class VII social studies materials that can equip spatial problem-solving skills is the spatial relationship between the geographic conditions of the area and the characteristics and ways of the community's activities. This material needs a spatial perspective to produce meaningful learning for students. The ability to think spatially is a prominent and relevant interdisciplinary ability for various aspects of life that forms the basis for creating new approaches to lifelong learning and determines cognitive problem-solving skills (Charcharos et al., 2016).

Digital Literacy

The definition of digital literacy in learning is competence in understanding, processing, accessing, and evaluating critically using digital technology in the learning activity. Edpuzzle is a web-based interactive video application like a formative assessment tool that allows users to create or trim existing online videos such as adding specific learning content. So we can establish that digital literacy using Edpuzzle in this research is the ability of students to understand, process, access, and evaluate learning critically through online technology using the Edpuzzle platform to learn through video education.

II. RESEARCH METHOD

Research Type

This type of research is quasi-experimental research (quasi-experimental research) in which the researcher adjusts the relevant variables except for a few main variables (Santoso, 2011:37). This quasi-experimental research has used the reason of knowing whether or not there was an influence of innovative digital learning and digital literacy models compared to conventional digital learning and literacy models that have fulfilled by teachers on spatial solving abilities. The experimental group of the Problem Based - Flipped Classroom Learning model and the effect of using digital literacy using the Edpuzzle interactive video on the ability to solve spatial problems in Integrated IPS learning materials compared to the Expository learning model and digital literacy in the form of e-modules using Canva. This experiment has been verified using factorial experimental 2 x 2 with the Anova technique.

Table 1. 2 x 2 Factorial Design in Research

B (Digital Literacy)	**A (Learning Model)**	
	***Problem-Based – Flipped Classroom Learning* (A_1)**	**pository (A_2)**
***Edpuzzle* (B_1)**	A1B1	A2B1
***Canva* (B_2)**	A1B2	A2B2

Wherein:

A1B1 = Score of spatial problem-solving ability group using the Problem Based - Flipped Classroom Learning learning model and digital literacy based on Edpuzzle

A2B1 = Score of spatial problem-solving ability group using the Expository learning model and Edpuzzle-based digital literacy

A1B2 = Score of spatial problem-solving ability group room using the Problem-Based learning model - Flipped Classroom Learning and digital literacy based on Canva

A2B2 = Score of spatial problem-solving ability group using the Expository learning model and digital literacy based on Canva

Based on the research design with Two-Way Anova testing, the researcher tested the hypothesis with a significance level of 5%, namely (1) there were differences in student's spatial problem-solving abilities through the PBFCL learning model; (2) there are differences in student's spatial problem-solving abilities through digital literacy based on Edpuzzle and (3) there is an interaction between the PBFCL learning model and digital literacy based on Edpuzzle in determining students' spatial solving abilities.

Before carrying out a hypothesis test with a statistical test of 2 x 2 factorial analysis of variance (Two-Ways Anova), it is necessary to carry out a prerequisite test with a normality test and a homogeneity test. In this study, the results of spatial problem-solving ability tests used the normality test with the Liliefors test and the homogeneity test of variance with the Bartlett test. The test carries on results of social studies solving ability tests on the learning material "spatial relations between the geographical conditions of the area and the characteristics and ways of the community's activities" towards class VII students of Pangudi Luhur Ambarawa Junior High School. Thus, the population in this study were all class VII students of Pangudi Luhur Ambarawa Junior High School in the 2022/2023 academic year, totaling 184 students in 6 classes, namely VII A - VII F. The sampling technique used cluster-random sampling due to the limitations of researchers who cannot change classes or group students according to the criteria for spatial problem-solving abilities. The sample in the study is students in classes VII B, VII C, VII D, and VII E.

The question item indicators obtain from the accordance between the learning objectives of the learning material, indicators of problem-solving ability, spatial concepts by geography perspective, and cognitive dimensions in Bloom's taxonomy in Table 2.

Table 2. Multiple Choice Items Grid of Spatial Problem-Solving Ability Test

Problem-Solving Aspects	**Spatial Concept**	**Spatial Problem-Solving Indicators**	**Number of Item**	**Bloom's Taxonomy**
Problem orientation	Identity and location, distribution	Orienting issues related to identity and location as well as distribution through ports on the distribution of fauna in Indonesia	1	Understanding (C2)
Develop a problem	Symbol, projection	Develop problems related to symbols and problem projections based on the Semarang rainfall distribution map	2	Understanding (C2)
Analyze data	Symbol, distribution, projection	Collect and organize information data related to the symbol, distribution, and projection of biosphere phenomena through the map of Rawa Pening Lake	3	Applying (C3)
Analyze Data	Identity and location, projection	Communicating the results of analyses related to identity and location and projections for land conversion solutions in Indonesia	4	Analyzing (C4)
Collect and organize data information	Identity and location, distance and direction, distribution	Collecting and organizing information data related to distribution, identity and location, distance and direction of earthquake risk through maps	5	Applying (C3)
Identify a problem	Identity and location, distance and ction dire	Explain issues related to identity and location as well as distances and directions regarding the boundaries of Indonesia's territory using a map.	6	Understanding (C2)
Communicate the result	Identity and location, projection	Communicating the results of the analysis in the form of solutions related to identity and location as well as projections of anthroposphere phenomenon (urban growth)	7	Analyzing (C4)
Analyze data	Identity and location, pattern	Analyzing data related to identity and location as well as patterns about the impact of Indonesia's geographical conditions	8	Analyzing (C4)
Analyze data	Identity and location, distribution, overlay	Analyze data related to location identity, distribution, and overlay of area characteristics and community activities	9	Analyzing (C4)

Collect and organize data information	Identity and location, distribution, overlay	Collect and organize information data related to location identity, distribution, and overlay of regional characteristics and community activities	10	Applying (C3)

Table 3. Essay Items Grid of Spatial Problem-Solving Ability Test

Problem-Solving Aspects	**Spatial Concept**	**Spatial Problem-Solving Indicators**	**Number of Item**	**Bloom's Taxonomy**
Problem orientation	identity and location, symbols, and complex spatial concepts	orienting issues related to identity and location, symbols, and complex spatial concepts on the Indonesian plate shift map	11	Understanding (C2)
Analyze Data	Identity and location, symbol, distribution	Analyzing problems related to identity and location, symbols, and distribution on the Indonesian plate shift map	12	Analyzing (C4)
Collect and organize data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Collect and organize information data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts based on a map of monsoon wind movement patterns in Indonesia	3	Applying (C3)
Analyze data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Analyzing information data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts based on the map of monsoon wind movement patterns in Indonesia	4	Analyzing (C4)
Analyze data	Identity and location, symbols, and complex spatial concepts	Analyzing data related to Identity and location, symbols, and complex spatial concepts using the Indonesian hotspot map	5	Analyzing (C4)
Evaluate Data	Distribution, pattern, projection, overlay	Evaluating data related to Identity and location, symbols, and complex spatial concepts using the Indonesian hotspot map	16	Evaluating (C5)
Evaluate Data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Analyzing data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts through a map of the rate of deforestation on the island of Borneo in 1950-2020	17	Evaluating (C5)
Analyze Data	Identity and location, distance and direction, and complex spatial concepts	Analyzing data related to Identity and location, distance and direction, and complex spatial concepts using Ambarawa city imagery from Google Map	18	Analyzing (C4)
Orient and collect information data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Comparing data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts using different imagery of Lake Rawa Pening in 2002 and 2020 from Google Map	19	Applying (C3)

Analyze Data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Analyzing data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts using different imagery of Rawa Pening Lake in 2002 and 2020 from Google Map	10	Analyzing (C4)
Evaluate data	identity and location, distance and direction, symbols and overlays, and complex spatial concepts	Evaluating data related to identity and location, distance and direction, symbols and overlays, and complex spatial concepts using different imagery of Rawa Pening Lake in 2002 and 2020 from Google Map	21	Evaluating (C5)
Orient and collect information data	identity and location and complex spatial concepts	Orienting data and information related to identity and location and complex spatial concepts from the phenomenon of the plurality of the Indonesian nation	12	Applying (C3)
Analyze Data	identity and location, and complex spatial concepts	Analyzing data and information related to identity and location, and complex spatial concepts from the phenomenon of the plurality of the Indonesian nation	23	Analizing (C4)
Evaluate Data	identity and location and complex spatial concepts	Evaluating data and information related to identity and location and complex spatial concepts from the phenomenon of the plurality of the Indonesian nation	24	Evaluating (C5)

Validity and Reliability

Verifying of validity of the spatial solving ability test instrument was carried out with content validity. Content validity is a test of whether or not the contents of the test are appropriate by competent experts through expert judgment carried out by rational analysis (Hendryadi, 2017). The aspects examined in the validation of the spatial problem-solving ability test instrument are based on the content or material, the construction of the items, and the language used. Testing the validity of the test instruments in this study was carried out by Dr. Sarwono, M.Pd, and Dr. Pipit Wijayanti, S.Si., M.Sc as an expert in Geography. The results of the content validity of the test instrument with the Gregory formula state that the spatial problem-solving ability test is very valid with the following summary:

Table 4. The results of validation of the spatial problem-solving ability test instrument in a 2x2 cross-tabulation

Cross-tabulation 2x2		**E**	**xpert 1**
		Not relevant	**Relevant**
Expert 2	**Not Relevant**	A = 0	B = 0
	Relevant	C = 0	D = 24

$$Vi = \frac{D}{A + B + C + D}$$

$$Vi = \frac{24}{0 + 0 + 0 + 24}$$

$$= 1$$

Wherein :

Vi = content validation

A = Both raters disagree

B = rater I agree, rater II disagree

C = rater I disagree, rater II agree

D = Both raters agree

There are also content validity criteria are as follows:
0.8 – 1 = very high validity
0.6 – 0.79 = high validity
0.40 – 0.59 = moderate validity
0.20 – 0.39 = low validity
0.00 – 0.19 = very low validity
Gregory (2000: 98) The reliability of the spatial problem-solving test instrument needs to be measured using the KR-20 formula for multiple-choice questions with a score of 1 and 0. As for the description, the reliability value is calculated using Cronbach's Alpha. If the calculation shows a reliability value ≥ 0.60, then the level of reliability can be said to have a high-reliability category. Meanwhile, if the value is <0.60 till the test is declared not to have high reliability (unreliable). Based on reliability testing on multiple choice questions using Microsoft Excel, the reliability coefficient value of the calculation is 0.662. The reliability value on multiple choice questions on the spatial problem-solving test is 0.662 ≥ 0.60 or has high reliability. Whereas for testing the reliability of the test items in the form of description questions on the spatial problem-solving ability test instrument using SPSS 26, the reliability value of the questions is 0.796 so that overall the items on the spatial problem-solving ability test have a highreliability category. The instrument test of spatial problem-solving ability can be used based on the validity and reliability test that is approved to be very valid and has a high level of reliability.

Cronbach's Alpha	N of Items
.796	14

Figure 1. The results of the reliability test on the essay for spatial problem-solving ability test Reliability Statistics

III. RESULT AND DISCUSSION

Result

In this study, each group received a different treatment. PBFCL groups get synchronous and asynchronous. Meanwhile, the expository groups only get face-to-face. Face-to-face learning at school runs three times a meeting. Two times run for learning activities and once time for testing.
The difference between the two learning models used lies in the syntax used. In the experimental groups, the implementation of the PBFCL model has a syntax that uses (1) students learn independently using the guidance in virtual classes, (2) classroom learning for teaching and learning activities to analyze problems found from independent learning, (3) conduct discussions and simulations in groups to find solutions to spatial problems that occur in everyday life from various sources, (4) communicate the results of the investigation, (5) evaluate solutions to the problems found. Whereas the Expository model is a conventional learning model (1) introduction: delivery of competencies, preparation, apperception, directing students, (2) presentation of material: lectures and questions and answers, (3) practice questions, (4) summarize, (5) evaluation and assignment. Students use Edpuzzle and Canva to do digital literacy activities. Students do digital literacy using Edpuzzle through interactive videos on the network. The video provides an explanation of the material along with questions. Meanwhile, in digital literacy through Canva, students are given material and questions in the form of e-modules. Because learning with digital literacy based on Edpuzzle and Canva is carried out using different learning models, the implementation of digital literacy is also different. Learning with the PBFCL model provides digital literacy based on Edpuzzle and Canva before face-to-face classes begin. Meanwhile, learning with the Expository model provides digital literacy based on Edpuzzle or Canva in face-to-face groups. Therefore, there are differences in the responses of students after learning activities.
The learning with a conventional model that uses an Expository model in the control class shows conducive class conditions in the preliminary stage and presentation of the material. The teacher's preparation for teaching materials and questions to conduct the debriefing must be ready before learning begins. However, conditions changed when students did the third syntax that practiced a question where students complained about the level of difficulty of the questions given. In addition, learning using the expository model is without group discussions till the tendency is that students ask more questions to the teacher to ask about the meaning of the questions, the good answers, and or how to use platforms for digital literacy so that the class becomes less conducive. The implementation of learning with the Expository learning model has a problem. There is less effectiveness and efficiency in training students to explore spatial problem-solving. The basic concepts that must be conveyed directly by the teacher in face-to-face classes are more compared to practice questions to solve problems and summarize learning outcomes. The PBFCL learning model that uses strategies inside and outside the classroom provides opportunities for students to carry out learning activities before learning runs. Students' curiosity about the material provided is higher than in classes with conventional learning models evidenced by learning

activities using both Edpuzzle and Canva digital literacy. During synchronous or face-to-face learning, students work in groups to practice collaboration, communication, critical thinking, and creativity to solve spatial problems given by the teacher. During presentations, students become accustomed to expressing opinions. The role of the teacher in presenting the material is less than that of the conventional learning model. In the end, the teacher acts as a facilitator in the learning and learning process in the classroom. Students can learn about the primary concept through virtual classes while deepening material related to problem-solving abilities is more effective and efficient through group activities and presentations. In the experimental group implementation of the PBFCL model accompanied by digital literacy using Edpuzzle, it gives the impression to students that learning social studies is fun and useful for everyday life. There is a state the student must be aware of the problems around his residence and be able to behave wisely in responding to these spatial problems.

Students in the class who were allowed to be digitally literate using Canva in the form of e-modules were less enthusiastic than students who were allowed to be digitally literate using Edpuzzle. Based on the narrative, they are used to getting e-modules that are less attractive. Even though the Canva-based e-module has provided complete material and written guidance so that students practice solving spatial problems, their enthusiasm for reading is lower than paying attention to moving images. Meanwhile, digital literacy groups with new learning experiences where learning technology in the form of interactive videos that they have never had before increases their curiosity. In addition, the representation of spatial problems shown through maps or images accompanied by an explanation in videos can provide data and information that is easier to understand than reading through readings. However, in implementing digital literacy online, there were problems with the internet network being less stable than the wifi provided by the school. This condition causes students who use the Expository learning model in which literacy is implemented in face-to-face classes not to run optimally. Therefore, students must independently prepare their cellular data.

The score from the problem-solving ability test results is then calculated and analyzed. Two Way Analysis of Variance analysis is to verify the hypothesis. However, it is necessary to have a prerequisite test before the Two Way Anova test, namely the normality test and homogeneity test for experimental and control groups that fulfill the basic assumptions. The normality test for problem-solving ability test results using the SPSS 26 application with the Liliefors technique because the sample data is more than 50. The normality test results can see in Figure 2.

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	model pembelajaran	Statistic	df	Sig.	Statistic	df	Sig.
kemampuan pemecahan masalah keruangan	PBFCL	.070	60	.200*	.973	60	.196
	Ekspositori	.069	60	.200*	.985	60	.662

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

a. Lilliefors Significance Correction

Figure 2. Normality test results on the PBFCL and Expository learning models

Based on the Liliefors test (Kolmogorov – Smirnov), the PBFCL learning model for spatial problem-solving abilities has a significance of 0.200 > 0.05. The conclusion is that the data distribution is normal. Meanwhile, the Expository learning model for spatial problem-solving ability has a significance value of 0.200 > 0.05. It means that the data distribution is normal.

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	media literasi digital	Statistic	df	Sig.	Statistic	df	Sig.
kemampuan pemecahan masalah keruangan	Edpuzzle	.088	60	.200*	.970	60	.151
	Canva	.051	60	.200*	.986	60	.710

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

a. Lilliefors Significance Correction

Figure 3. Results of the normality test on digital literacy based on Edpuzzle and Canva

Based on the Liliefors test (Kolmogorov – Smirnov), digital literacy based on Edpuzzle to spatial problem-solving abilities has a significance value of 0.200 > 0.05. It means the data has a normal distribution. Meanwhile, the digital literacy media using Canva for spatial problem-solving ability has a significance value of 0.200 > 0.05, meaning that data has a normal distribution. The next Anova prerequisite test is the homogeneity test which aims to determine whether the variance of the data distribution is the same or not. The homogeneity test uses the Bartlett test. Thus, the research data for this spatial problem-solving ability test use a homogeneity test with the Bartlett technique as follows:

Test Results

Box's M		2.356
F	Approx.	2.336
	df1	1
	df2	41772.000
	Sig.	.126

Tests null hypothesis of equal population covariance matrices.

Figure 4. Homogeneity Test Results of Spatial Problem-Solving Scores

Based on the results of the homogeneity test in Figure 4, it has sig. (P – Value) are 0.126 > 0.05. The conclusion is the variance of the data is homogeneous and that the assumption for the homogeneity test is approved. Thus, based on the results of the normality and homogeneity tests, the Two-way Anova test can be carried out.

Table 6. Comparison of The Average Spatial Problem-Solving Ability Scores

The average score of the spatial problem-solving ability test			
A1B1 (PBFCL – Edpuzzle)	**A2B1 (PBFCL – Canva)**	**A1B2 (Ekspositori – Edpuzzle)**	**A2B2 (Ekspositori – Canva)**
72,40	68,93	68,53	65,23

Based on Table 6, the histogram represents the comparison of the results of the spatial problem-solving ability test with each treatment in Figure 5 below:

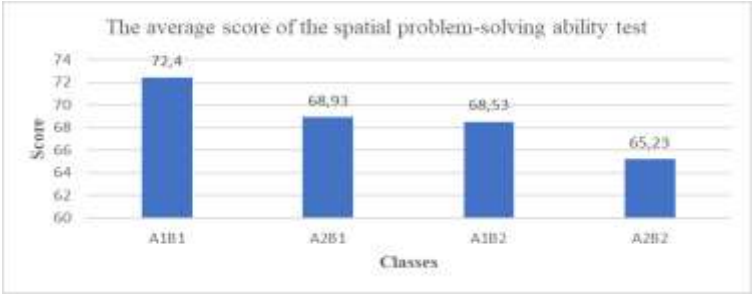

Figure 5. The Comparison of Mean Spatial Problem-Solving Ability Scores

Based on the problem-solving ability test scores depicted in Figure 5, shows that there are differences in the results of the process of learning and learning activities with different models and digital literacy. In addition to the average test results for spatial problem-solving ability, using the Two-Ways Anova can ascertain the difference in score.

Tests of Between-Subjects Effects

Dependent Variable: kemampuan pemecahan masalah keruangan

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	773.025[a]	3	257.675	6.729	.000
Intercept	567600.075	1	567600.075	14822.848	.000
MODEL	429.408	1	429.408	11.214	.001
MEDIA	343.408	1	343.408	8.968	.003
MODEL * MEDIA	208	1	208	.005	.941
Error	4441.900	116	38.292		
Total	572815.000	120			
Corrected Total	5214.925	119			

a. R Squared = .148 (Adjusted R Squared = .126)

Figure 6. Two-Ways Anova Test of Spatial Problem-Solving Ability Using SPSS 26

The results Two-Way Anova test using SPSS 26 have a significance value of 0.001 <0.05 which is students' spatial problemsolving abilities given the Problem Based-Flipped Classroom Learning learning model are better than students who use the Expository learning model. It means that the first hypothesis **is approved**. The second hypothesis results of the Two-lane Anova test using SPSS 26 where the Significant price is 0.001 <0.05. The conclusion is the student's ability to solve spatial problems given the Problem Based-Flipped Classroom learning model Learning is better than that given the Expository learning model. It means that the second hypothesis **is approved.** The results of the third hypothesis using the SPSS 26 test show the significance value 0.941 >

0.05. It means that the third hypothesis **disapproved**, that there is no interaction effect between learning model factors and media for digital literacy on the results of tests of spatial problem-solving abilities.

DISCUSSION

Geography is not a subject that includes in the junior high school curriculum in Indonesia. However, students need spatial ability convention that is the core of Geography subject. We can find it through the Social Science subject. Social science is a subject that accommodates social sciences to train students to become responsive to social issues in their living space. Therefore, in social science learning, teachers can equip students to practice spatial problem-solving ability.

Kurikulum Merdeka expects the modern learning process to direct students to develop their potential academic and nonacademic till they can become human beings according to nature and era. Through innovative learning models and digital technology-based learning, students grow following 21st-century skills through spatial problem-solving based on the environment in which we live. Awareness of solving problems that come to pass in living space is crucial because, in today's life, we must be able to contribute to saving the earth from environmental damage through attitudes and behavior that support sustainable development.

Innovative technology-based learning models currently provide opportunities for students and teachers to carry out face-to-face and virtual learning together. Modern learning strategies implement learning anytime and from anywhere to encourage students and teachers to become lifelong learners. Problem-Based Flipped Classroom Learning is a learning model that presents an inverted class strategy in which students will carry out learning activities through virtual classes. This learning process brings problem-solving through spatial phenomena through the lesson in face-to-face process classes. Concern about spatial relations between the geographical conditions of the area and the characteristics and ways of community activities given to class VII students at Pangudi Luhur Ambarawa Junior High School, they will display regional geographical phenomena and associate with community activities around their homes. Students will get to know the area where they live and the problems they face and be able to create solutions to these problems through their roles as individuals and communities through PBFCL learning. In the era of disruption with the rapid development of the internet, students' digital literacy skills are imperative. Students are required to understand, process, access, and evaluate learning critically. One of the roles of the teacher in facilitating students in carrying out digital literacy is developing teaching materials in the form of software according to the times. Edpuzzle is an educational technology platform that teachers and students need to collaborate to learn spatial problem-solving abilities because it is available in the shape of interactive videos that are interesting, practical, and modern. However, a collaboration between teachers, parents, and the community is needed to become guides so that students can access learning resources, answer questions that arise from curiosity, and provide suggestions for solving spatial problems they encounter in everyday life.

This research is conducted based on the problems experienced in social studies learning activities which to be able to get the right solutions to overcome discrepancies in class. The implementation of digital literacy models and media in this study began with direct observation and documentation of learning tools which then produced learning designs in the material of spatial relations between the geographical conditions of the area and the characteristics and ways of the community's activities. Teachers can implement this innovative learning model because it supports the learning objectives of social studies material and under the applicable curriculum. The PBFCL learning model applies student-oriented learning and then supports Merdeka Belajar to improve the quality of Indonesian education according to geographical conditions, character, and the needs of students. In addition, digital literacy brings with modern digital technology increases the student's activity and curiosity till motivates them to understand, find out for themselves, and try to provide opinions for solutions to the problem of roaring in the area where they live.

IV. CONCLUSION

The conventional learning activity makes students' processing of information not optimal. This condition drives 21st-century skills like the ability to solve spatial problems to answer the challenges of the times. Therefore it is necessary to create new strategies in learning so that the current generation can contribute to solving problems in their living space through innovative learning models, namely the Problem Based-Flipped Classroom Learning model. In addition, to improve the ability to orient to analyze and create solutions to spatial problems, social studies learning needs to practice modern digital literacy habits such as Edpuzzle. Digital education platforms need to be introduced and used in learning to innovate in education and increase digitization. PBFCL model accompanied by Edpuzzle-based digital literacy has a better effect than conventional digital models and literacy on spatial problem-solving abilities. It means that score of the spatial problem-solving ability test results of students using the PBFCL model accompanied by Edpuzzle is 72.40, the highest compared to other classes that combine conventional digital learning and literacy models. Whereas based on the Two Ways Anova analysis result of the PBFCL learning model has a significant effect on spatial problem-solving abilities with a significance value of 0.001 <0.05. Innovative digital literacy based on Edpuzzle influences the ability to solve spatial problems with a significance value of 0.003 <0.05. However, between learning models and digital literacy, it is known that there is no interaction effect on spatial problem-solving ability. Thus, that to be expected that social studies learning that conceals innovative learning models or the modern application of digital literacy can improve students' spatial problem-solving

ability. However, further research is still needed to find the factors that exploit the quality of spatial-solving ability to support improving the quality of teaching and learning processes for teachers and students. In summary, improving the quality of teaching and learning will escalate the quality of education.

REFERENCES

1) Charcharos, C., Kokla, M., & Tomai, E. (2016). *Investigating the Influence of Spatial Thinking in Problem Solving*. https://doi.org/10.13140/RG.2.1.4186.0729
2) Dzvimbo, M. A., Magijani, F., & Zimhondi, F. (2018). Education as a Tool for Nation Building: The Case of Zimbabwe's New Curriculum. *The International Journal of Humanities and Social Studies*, *6*(8), 37–44. www.theijhss.com
3) Francis, J. (2017). *The Effects Of Technology On Student Motivation And The Effects Of Technology On Student Motivation And Engagement In Classroom-Based Learning Engagement In Classroom-Based Learning* [University of New England]. https://dune.une.edu/theses
4) Gregory, R. J. 2000. *Psychological Testing: History, Principles, and Applications*. Boston: Allyn and Bacon.
5) Hendaryan, R., Hidayat, T., & Herliani, S. (2022). Pelaksanaan Literasi Digital Dalam Meningkatkan Kemampuan Literasi Siswa. *Jurnal LITERASI*, *6*(1), 142– 151.
6) Hendryadi. (2017). Validitas Isi: Tahap Awal Pengembangan Kuesioner. In *Jurnal Riset Manajemen dan Bisnis (JRMB) Fakultas Ekonomi UNIAT* (Vol. 2, Issue 2).
7) Mubarok, A. (2017). Model Flipped Classroom Dalam Memotivasi Belajar Siswa. *Prosiding TEP & PDs Transformasi Pendidikan Abad 21*, 184–188.
8) Santoso, S. (2011). *Penelitian Pendidikan.* Surakarta: UNS Press.
9) Solari, O. M., Demirci, A., & van der Schee, J. (2015). Geospatial technologies and geography education in a changing world: Geospatial practices and lessons learned. In *Geospatial Technologies and Geography Education in a Changing World: Geospatial Practices and Lessons Learned*. https://doi.org/10.1007/978-4-431-55519-3

There is an Open Access article, distributed under the term of the Creative Commons Attribution–Non Commercial 4.0 International (CC BY-NC 4.0) (https://creativecommons.org/licenses/by-nc/4.0/), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.