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The Urgency of Android-Based Interactive Multimedia Development to Improve High School Students Collaboration Skills

Mutiara Kusuma Ananda Pramusita[1*], Sariyatun[2], Hasssan Suryono[3]
[1] Educational Technology Department, Universitas Sebelas Maret, Surakarta, Indonesia
[2] History Education Department, Universitas Sebelas Maret, Surakarta, Indonesia
[3] Civic Education Department, Universitas Sebelas Maret, Surakarta, Indonesia

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ABSTRAK

Manusia sebagai makhluk sosial didefinisikan sebagai manusia yang tidak dapat hidup sendiri sehingga saling bekerjasama dalam membangun kehidupan sosial yang harmonis dengan keterampilan kolaborasi. Melalui penerapan pendidikan, keterampilan kolaborasi merupakan salah satu keterampilan abad ke-21. Dalam penerapan pembelajaran sosiologi, siswa mengalami kesulitan untuk memahami materi sosiologi dan mengembangkan keterampilan kolaborasinya. Padahal keterampilan kolaborasi dibutuhkan untuk kehidupan bermasyarakat. Berdasarkan permasalahan diatas, penelitian ini bertujuan untuk mengembangkan multimedia interaktif berbasis android untuk mengoptimalkan pembelajaran seluler pada materi interaksi sosial. Penelitian ini merupakan jenis penelitian pengembangan (R&D) dengan menggunakan model ADDIE yang melibatkan ahli media, ahli konten, serta ahli instrumen pengukuran keterampilan dalam pembelajaran. Teknik pengumpulan data menggunakan pendekatan deskriptif kuantitatif dengan analisis persentase. Hasil analisis data menunjukkan bahwa 2 orang ahli media memberikan skor rata-rata 3,71 dengan persentase 93% persen. Kemudian ahli konten pembelajaran sebanyak 4 orang ahli memberikan skor rata-rata 3,9 dengan persentase 97,50%, dan terakhir 4 orang ahli instrumen pembelajaran memberikan skor rata-rata 4 dengan persentase 100%. Disimpulkan bahwa multimedia interaktif dinyatakan sangat layak untuk digunakan untuk pembelajaran sosiologi kelas X SMA/MA. Multimedia interaktif berbasis android yang dikembangkan diharapkan dapat memberikan kontribusi dalam urgensi kebutuhan inovasi media pembelajaran yang disesuaikan dengan kebutuhan pembelajaran Abad ke-21.

ABSTRACT

Humans as social creatures are defined as humans who cannot live alone so they work together to build a harmonious social life with collaboration skills. Through the application of education, collaboration skills are one of the skills of the 21st century. In applying sociology learning, students have difficulty understanding sociology material and developing their collaboration skills. Even though collaboration skills are needed for social life. Based on the problems above, this research aims to develop Android-based interactive multimedia to optimize mobile learning on social interaction material. This research is a type of development research (R&D) using the ADDIE model which involves media experts, content experts, and experts on skills measurement instruments in learning. The data collection technique uses a quantitative descriptive approach with percentage analysis. The results of data analysis show that 2 media experts gave an average score of 3.71 with a percentage of 93% percent. Then 4 learning content experts gave an average score of 3.9 with a percentage of 97.50%, and finally, 4 learning instrument experts gave an average score of 4 with a percentage of 100%. It was concluded that interactive multimedia was declared very suitable for use in teaching sociology for class X SMA/MA. The Android-based interactive multimedia being developed is expected to contribute to the urgent need for learning media innovation that is adapted to the learning needs of the 21st Century.

1. INTRODUCTION

Humans are a unity that cannot be separated or divided. Meanwhile, on the other hand, humans as social creatures are defined as someone who lives side by side and cannot carry out all their activities alone without involving other people. Therefore, humans interact with each other and must have collaboration skills to solve problems that occur in everyday life, both individually and in groups (Child & Shaw, 2016; Purwantiasning, 2017). There is an increasing need for students to be able to apply their knowledge and problem-solving skills in social environments. Through collaboration skills, a person will be able to work together in various fields and will not be easily offended by arguments from other people. Individuals involved in trying groups have the opportunity to activate mechanisms to resolve differences of opinion and internalize the explanations and arguments provided by

** Corresponding Author: Mutiara Kusuma Ananda Pramusita: mutiarakusuma93@student.uns.ac.id*

their colleagues, through collaborative information seeking (Pujiati et al., 2022; Shah, 2014). Although there is no consensus on the definition of collaboration, scholars often view it as mutual engagement in a coordinated effort to achieve a common goal involving the sharing of goals, resources, and representations related to the participants' joint activities as well as other important aspects related to mutual respect, trust, responsibility, and accountability in situational rules and norms (Child & Shaw, 2016; Lampropoulos et al., 2019). Collaboration skills can also be obtained through the world of education, namely 21st-century learning.

Education is one step in determining the quality of human resources and the progress of national civilization. In the world of education, collaboration skills found in 21st-century learning are known as 4C skill competencies which include communication, collaboration, critical thinking, and problem-solving, as well as the creative and innovative aspect which means being creative and innovative (Almajed et al., 2016; Daryanto & Karim, 2017). As stated by previous study 21st-century abilities can be measured by looking at how students can communicate, collaborate, think critically, solve problems, have creativity and innovation (Yulianto et al., 2019). Collaboration skills are an important measure of students' future abilities. Collaborative learning has advantages compared to other learning methods. This learning will help students have support from peers, learn presentation skills, and provide opportunities to stimulate the environment in a real way to encourage learning. Through skills in 21st-century learning, students can collaborate with groups in an attempt to solve a problem (Indarta et al., 2022; Sartini. & Mulyono, 2022). Students are taught to know how to collaborate both with their peers and with teachers. Not only that, teachers can also carry out meaningful learning for students, so that later students can apply this new knowledge in real life and students can play an active role in their social environment.

Several factors influence a level of success in learning activities, these factors are interrelated to determine the learning process and create good, safe, and comfortable conditions. These factors include the curriculum, teachers, students, supporting facilities and infrastructure, school conditions, and school management (Atin Sri Handayani et al., 2023; Cholilah et al., 2023). One of them is the curriculum, as a learning plan is an educational program designed to teach students. The designed program contains various activities that can support the learning process of students so that changes and developments arise in both students' behavior and skills according to educational and learning goals. Implementation of the Independent Curriculum (IKM) in Madrasas is an effort to improve the quality and competitiveness of madrasas by the demands of 21st-century competencies, so that the demands of implementing the Independent Curriculum guidelines are to be able to fulfill skills competencies (Pangestu & Rochmat, 2021; Zarkasi et al., 2022). Through independent learning, students will be able to freely obtain learning and experience in developing themselves and taking action in society.

The application and honing of collaboration skills in the educational domain are taught in sociology learning. This is implemented through case analysis of social phenomena that exist in society. Sociology studies social concepts and phenomena that exist in everyday society. Through this concept, students are expected to have the ability to face and resolve various social problems in society (Child & Shaw, 2016; Hadi & Junaidi, 2018). Students' abilities to face the real world in society will be paid attention to in how they interact and establish social relationships, both individually and in groups. Sociology facilitates students to understand how important communication, interaction, and social relationships are in studying social phenomena and problems in society. So it can be synthesized that through studying sociology, students can develop collaboration skills which will be applied to close social relationships in solving social problems in their social environment.

The reality on the ground shows that learning support in schools is still lacking in developing students' collaboration skills. Based on observation data and distribution of learning implementation questionnaires related to collaboration skills at MAN 2 Surakarta, 202 students answered that the teacher implemented learning using the question-and-answer method 76.7%, discussion 72.8%, lecture 56.4%, trial 17.3 %, study tours 5.9%. The media used by teachers in the classroom is 93.1% using a whiteboard, 61.9% using PowerPoint, 26.7% learning videos, and 17.8% online applications. Following are the teaching materials used by teachers in the classroom, 64.4% use printed modules, 39.6% textbooks, 3.55 infographics, and finally 34.2% electronic teaching materials. Through these data and problems, students cannot be optimally active in developing collaboration skills. Meanwhile, teachers in learning must have the skills to process teaching material in a pleasant atmosphere, one of which is through the use of technology as a learning resource.

Based on these problems, appropriate media is needed to support student learning in improving their collaboration skills. 21st-century learning is closely related to technology-based digital media, so it is hoped that digital technology-based media will be able to support students in improving collaboration skills. Smartphones as digital media are currently also used to process learning activities with the term mobile learning. Mobile learning can be defined as facilitating and enhancing the learning process through mobile devices anytime and anywhere, while the use of mobile devices in education is considered along with its potential pedagogical benefits such as increasing student motivation, achievement, and communication (Barlian et al., 2022; Baydas & Rabia, 2016). The mobile learning media is integrated into one application that students can later use to learn, which is called interactive multimedia. Multimedia is a combination of data or media used to convey information so that it is presented more interestingly. Multimedia is a collection of computer-based media from communication systems

with the role of building, storing, delivering, and receiving information in the form of text, graphics, animation, audio, and video (Munir, 2012; Simarmata et al., 2018). Interactive multimedia is very important for improving skills and updating technology in today's learning. Several studies related to interactive multimedia have been carried out, for example, research conducted has found that interactive multimedia has had a lot of impact on the world of education through the Android operating system, namely mobile learning. Other research also states that learning design that uses multimedia is often an effective learning approach to improve student skills (Zhang, 2010; Maag, 2004; Sorden, 2005). Other research findings state that interactive multimedia is practical, easy, efficient, and effective for improving 21st-century skills, one of which is collaboration skills (Mufit et al., 2023).

This research aims to produce learning media in the form of interactive multimedia applications that contain sociological learning about social interaction for class X SMA/MA. In particular, this research has the advantage of updating with a design that is adapted to the implementation of the Independent Curriculum which is intended to improve students' collaboration skills. This Android-based Interactive Multimedia is included in the latest media development compared to previous research, namely by including elements of student collaboration so that later students can understand, and know each other better as social creatures to be able to work together in solving problems, especially in the environment public. The existence of interactive collaboration between students will build the character of tolerance that humans need each other in life. This research aims to produce learning media in the form of an interactive multimedia application that contains sociology learning regarding social interaction for class X SMA/MA. In particular, this research has the novelty of updating with a design that is adapted to the implementation of the Independent Curriculum which is intended to improve students' collaboration skills. This research is also intended to answer teachers' problems related to developing appropriate learning media for students to apply in learning and improve students' skills.

2. METHOD

This research is a type of research that focuses on development research (R&D) by producing learning media in the form of interactive multimedia with a learning design for sociology subjects for class 10 SMA/MA. The development model uses the ADDIE model, which stands for Analyze, Design, Develop, Implement, and Evaluate as part of the product development concept (Branch, 2009). The combination of one aspect with another in ADDIE functions in a complex way to develop educational products and various learning resources. The contribution of various theories from learning and teaching makes the ADDIE process synergistic, systematic, and dynamic in achieving the expected learning objectives. The following are five ADDIE framework processes which include functions that are interrelated with each other (Peterson, 2003). (1) Analysis as the first step by identifying initial learning needs. Initial analysis was carried out in several SMA/MA class X in Surakarta City. The aim is to find out how mastery of technology, students' initial knowledge, and students' interests relate to interactive multimedia which is a digital-based learning media. (2) Design, which is planning and identifying the preparation of functional specifications to solve problems found during the initial analysis according to needs. (3) Developing which is the realization stage of designing and creating a program or product. During the development process, validation is carried out to determine the feasibility of the required product. Validation is carried out by a team of experts according to their respective fields. The product developed is Android-based interactive multimedia. (4) Implementation as a result of applying product development that can be tested on students. (5) Evaluation is carried out to improve implementation so that product acquisition can be maximized and applied in subsequent learning programs. The research subjects in this study were learning media experts, sociological material experts, and collaboration skills instrument experts. The questionnaires used in this research include a questionnaire to test the validity of learning media experts, a questionnaire to test the validity of learning material experts, as well as a questionnaire to test the validity of instrument experts with the measurement instruments used, namely to determine students' collaboration skills through observation or observation instruments (Child & Shaw, 2016; Febrianti et al., 2021; Setyawan et al., 2022). The questionnaire grid used in this study is shown in Table 1, Table 2, and Table 3.

Table 1. The Grid of Learning Media Validation Questionnaires for Learning Media Experts

Indicator	Number of Items
Media Display	1
Text Reading	2
Quality of Illustrations in Media	3
Use of Language	4
Navigation	5
Media instructions	6
Efficient use of media	7

Table 2. Validation of Learning Content Questionnaires for Learning Content Experts

Indicator	Number of Items
Material according to CP and ATP Independent Curriculum	1
Formulation of learning objectives	2
Clarity of learning objectives	3
Conformity between learning objectives and questions	4
Accuracy in selecting material coverage	5
Conformity between the material and the competency indicators to be achieved	6
The material is presented according to the ability level of high school students	7
Practice questions support correct concepts in learning	8
Material completeness	9
Clarity of material	10
Systematic arrangement of material	11
up-to-date information	12
The material is varied and interesting	13
Ease of understanding the material	14
Material according to conditions	15
The example contains elements of contextuality	16
Relate the material to students' daily lives	17
The presentation of material provides students with the opportunity to be actively involved in learning individually or in groups	18
Effective and efficient for use in learning activities	19
Material is presented in the form of text, images, audio and video	20

Table 3. Validation Questionnaire Grid for Assessment of Collaboration Skills for Instrument Experts

Indicator	Number of Items
Instructions for filling out student collaboration skills observation sheets for learning activities are made clearly	1
Instructions for filling out student collaboration skills observation sheets for learning activities are presented correctly	2
The type and size of letters on the student collaboration skills observation sheet for learning activities are easy to understand and read	3
The assessment aspects on the student collaboration skills observation sheet as learning implementation can be used to measure collaboration skills	4
The use of grammar is based on good and correct Indonesian language rules	5
Use and choice of words are simple and clear	6
The language used is easy to understand	7

The validation instrument grid was consulted with the supervisor and then the instrument was evaluated by experts. Data analysis uses quantitative descriptive analysis. This method is based on comments, suggestions, and evaluations submitted by experts which are tailored to the expertise of each field. The form in the expert assessment is then used to determine each expert's score using a descriptive analysis approach. The scores that emerge from the assessment are then measured based on the average. The average score achieved using a Likert scale conversion of 1-4 is in Table 4.

Table 4. Validation Assessment Criteria

Criteria	Score
Very good	4
Good	3
Pretty good	2
Very not good	1

Through the calculations above, a conclusion is obtained about the feasibility of interactive multimedia with a Likert scale based on Table 5.

Tabel 5. Validity Level Criteria

Percentage (%)	Criteria
0-20	Not valid category

Percentage (%)	Criteria
21-40	Not feasible category
41-60	Decent enough category
81-100	Very valid category

3. RESULT AND DISCUSSION

Result

Based on the development model used, namely the ADDIE model, the research results at this initial stage are regarding the characteristics of students. Characteristics analysis was carried out on the research subjects, namely class X SMA/MA students in the city of Surakarta. The results of the analysis of student characteristics are shown in Table 6.

Tabel 6. Student Characteristics

Category	Information
Development Goals	Android-based interactive multimedia to improve collaboration skills
Grade Level	Class X in several SMA/MA in Surakarta City
The number of students	202 Students
Subjects	Sociology
Material Theme	Social interaction
Learning Content	1. Understanding social interaction 2. Types of social interaction 3. Characteristics of social interaction 4. Factors in social interaction 5. Forms of social interaction
Learning Outcomes	Students can understand the function of sociology as a science that critically examines society.
Flow of Learning Objectives	10.4 Identify forms of social relations that occur in people's lives through observation and reporting the results of observations.

The selection of learning product development objectives was determined based on observations, interviews, and questionnaires of two sociology teachers and 202 class X students at MAN 2 Surakarta. Sociology teachers state that the media in sociology learning is not complete enough to be used to support improving collaboration skills. Meanwhile, collaboration skills are needed in implementation in the community to help each other and work together between one individual and another. Filling out the questionnaire from the needs analysis stated that as many as 95.4% of students used technology as a learning tool. Implementation of Merdeka curriculum learning by utilizing technological facilities is needed to support sociology learning in an applied manner. Interactive multimedia is then compiled and designed using an initial development draft, namely creating a flowchart for the flow of the media work sequence so that the work process can be understood to completion. The following is an interactive multimedia flowchart based on Android which is presented in Figure 1.

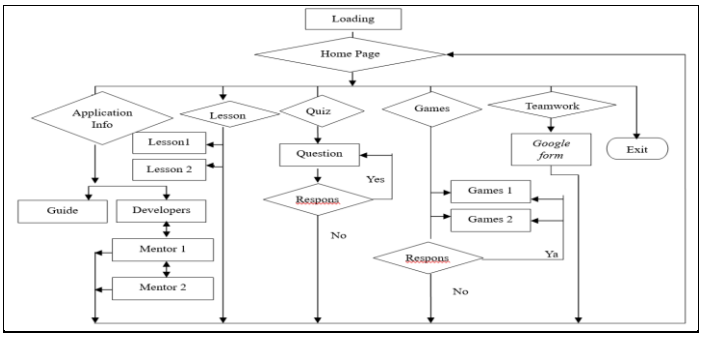

Figure 1. Android-Based Interactive Multimedia Flowchart

Interactive multimedia that has been prepared and designed is then tested using an expert judgment approach. Testing in the development of Android-based interactive multimedia is carried out by expert judgment which is divided into three categories, namely media experts, learning content experts, and skill measurement instrument experts. Media experts consist of 2 experts, learning content experts consist of 1 sociologist and 3

practicing sociology teachers. Lastly, the instrument experts consist of 4 experts. So the total number of expert assessments is 10 people. Each expert has been given a measurement instrument with an assessment score on a scale of 4. Following are the results of testing the learning media experts using a quantitative descriptive approach, the percentages are shown in Table 7.

Table 7. Media Expert Validation Test Results

Member Name	Average score	Percentage	Information
Learning Media Expert 1	3.71	93%	Very Valid Category
Learning Media Expert 2	3.71	93%	Very Valid Category

Base on Table 7, the test results using quantitative descriptive percentages showed that 2 learning media experts stated that it was a very valid category in the learning media aspect. The next test is regarding the learning content contained in the learning media by learning content experts. The number of learning content experts who tested the content was 4 experts, each of whom was given the same instrument. In the results of testing the validity of learning content using a quantitative descriptive approach, the percentages are shown in Table 8.

Table 8. Table Of Learning Content Expert Validation Test Results

Member Name	Average score	Percentage	Information
Learning Content Expert 1	3.9	97.50%	Very Valid Category
Learning Content Expert 2	3.9	97.50%	Very Valid Category
Learning Content Expert 3	3.9	97.50%	Very Valid Category
Learning Content Expert 4	3.9	97.50%	Very Valid Category

Table 8 show the test results used quantitative descriptive percentages which showed that 4 learning content experts stated that learning content was a very valid category for learning media. After Android-based interactive multimedia is declared very valid category by media experts and learning content experts, the next step is to test the collaboration skills observation instrument. Instrument testing is carried out using an expert judgment approach by skill measurement instrument experts. The number of experts on the skills measurement instrument for observing collaboration skills was 4 experts, all of whom were given the same instrument. The results of testing the skills measurement instrument for observing collaboration skills using a quantitative descriptive analysis approach are shown in Table 9.

Tabel 9. Table Of Learning Content Expert Validation Test Results

Member Name	Average score	Percentage	Information
Skills Measurement Instrument Expert 1	4	100%	Very Valid Category
Skills Measurement Instrument Expert 1	4	100%	Very Valid Category
Skills Measurement Instrument Expert 1	4	100%	Very Valid Category
Skills Measurement Instrument Expert 1	4	100%	Very Valid Category

Base on Table 9, the test results using quantitative descriptive percentages showed that 4 experts on skills measurement instruments stated that they were a very valid category. Based on the overall test carried out by 10 experts who were divided into 3 expert groups, namely learning media experts, learning content experts, and skills measurement instrument experts, it showed that each area of expertise was declared a very valid category individually through a descriptive quantitative percentage approach. So it can be concluded that Android-based interactive multimedia is used in designing digital learning designs in sociology subjects for class.

Discussion

The role of collaboration skills in all aspects of life makes collaboration skills also important to develop in the realm of education. This is what happened in the class X SMA/MA sociology learning content regarding social interaction. Students find it difficult to develop collaboration skills, while supportive learning media are needed for collaborative learning activities in sociology. Education is also concerned about how digital tools are used once students have digital access. One digital tool that can be used in learning is the use of mobile devices. Some teachers report that mobile devices are a distraction in the classroom (Lenhart et al., 2010; Meier, 2021). In fact, through mobile learning, educational benefits can be felt related to practices that benefit/improve classroom teaching. Mobile devices have a contribution to generating data for learning. Students can play a direct role in delivering collaborative interaction activities according to the instructions given by the teacher (Lee et al., 2019;

Nikolopoulou et al., 2021). Mobile technology, by its very nature, provides a unique opportunity to explore and generate collaboration, and the psychological processes it produces. And the application of collaboration as modern educational reform (Baydas & Rabia, 2016; Bernacki et al., 2020). Through mobile phones or m-learning students get the opportunity to learn anywhere such as on the bus, outside, or doing their part-time jobs. While the use of mobile devices in education is considered along with its potential pedagogical benefits such as increasing student motivation, achievement, and communication. The widespread use of digital technology has created opportunities for social interaction both in different locations and within the same location. Many applications have been designed to support learning activities that involve collaborative activities. They can learn whenever and wherever they are. Referring to the problems mentioned previously, it is necessary to produce learning media in the form of Android-based interactive multimedia using smartphones for social interaction learning content for class X SMA/MA sociology learning.

The learning media that has been produced must first be tested for its level of validity (Roemintoyo & Budiarto, 2021; Saifulloh & Muchtatom, 2023). The test results for the level of validity of learning media regarding the media created, namely Android-based interactive multimedia, were validated by 2 learning media experts. Regarding the learning content, it was validated by 4 learning content experts, as well as the skills measurement instrument, namely the collaborative skills observation instrument by 4 skills measurement instrument experts. The media aspect validity test shows that it is a very valid category. Next, the learning content test shows that it is a very valid category in containing social interaction content. Meanwhile, finally, the test results of the skills measurement instrument through the student collaboration skills observation instrument also show that it is very suitable for use.

The results of this research show that learning media, namely Android-based interactive multimedia which contains social interaction content, can be used according to the specifications of good learning media. This will certainly have an impact on students' collaboration skills in implementing their learning. According to a recent study, individuals involved in trying groups have the opportunity to activate mechanisms to resolve differences of opinion and internalize the explanations and arguments provided by their peers, through collaborative information seeking. Learning occurs more effectively when participants interact with their peers to build new knowledge (Miangah, 2012; Reychav & Wu, 2015). Teachers must develop teaching styles and develop the skills necessary to undergo deep learning. Through practicing skills, it gives meaning and valuable goals to life that can be applied and solved in everyday life. So that it becomes a continuous process to create a complete human being, both in terms of knowledge and talents, abilities that can be applied (Chaiyama, 2019; Chaudhuri et al., 2021).

This research focuses on social interaction learning content for class X SMA/MA which refers to the rules by the implementation of the Merdeka Curriculum. So, this research cannot be used for other levels of education, either in general or specifically. This is a limitation in this research. However, for the implementation of learning, this research can contribute to the use of Android-based mobile learning, namely interactive multimedia concerning implementation of the Independent Curriculum. There has been no other research that shows the same results regarding the development of Android-based interactive multimedia which refers to the Implementation of the Independent Curriculum. Other research on multimedia focuses on the use of Lectora Inspire-based multimedia which has a positive impact on the application of sociology learning (Nisa & Sylvia, 2021). Other similar research concerns the development of Android-based interactive chemistry learning multimedia which provides good results for evaluating chemistry learning (Putri & Muhtadi, 2018). Based on research regarding the development of Android-based interactive multimedia, it is hoped that in the future similar research can be carried out which can provide scientific contributions in the use of technology in learning.

4. CONCLUSION

The problems that have been described regarding student collaboration skills in sociology learning are highlighted. This is because collaboration skills are important and needed in society. Meanwhile, in learning, collaboration skills are one of the demands that refer to 21st-century skills that are currently being implemented in the implementation of the Merdeka Curriculum, especially learning about social interaction in the sociology subject for class X SMA/MA. The results of this research produce a description of Android-based interactive multimedia used for learning social interaction in sociology subjects which can answer the above problems. This research shows that the Android-based interactive multimedia created is declared very suitable for use in the learning process in sociology subjects in class X SMA/MA.

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