Educational Game Media Based on CAI in PPKn for Fourth Grade Elementary School

Kartika Eka Mustika Yani[1*], Parji[2], Candra Dewi[3] 🆔

[1,2,3] Elementary School Teacher Education, University of PGRI Madiun, Madiun, Indonesia

ABSTRAK

Pelaksanaan pembelajaran PPKn masih terpaku pada metode konvensional, dan kurangnya media pembelajaran interaktif yang memanfaatkan teknologi di sekolah dasar membuat siswa merasa bosan. Sebagian besar siswa sekolah dasar kesulitan memahami materi PPKn karena cenderung menganggap PPKn sebagai mata pelajaran yang banyak hafalannya, terutama tentang sejarah terbentuknya Pancasila. Pesatnya perkembangan teknologi diharapkan guru mampu memunculkan inovasi dalam pembelajaran Pendidikan Pancasila dan Kewarganegaraan untuk meningkatkan motivasi belajar siswa. Penelitian ini bertujuan untuk mengembangkan media pembelajaran yaitu media permainan edukatif berbasis materi Computer Assisted Instruction (CAI), sejarah perumusan Pancasila dalam pembelajaran PPKn untuk siswa kelas IV Sekolah Dasar. Jenis penelitian yang digunakan peneliti adalah penelitian pengembangan atau R&D dengan model pengembangan ADDIE. Metode observasi, wawancara, angket, dan dokumentasi digunakan untuk pengumpulan data dalam penelitian ini. Teknik kuantitatif dan kualitatif berguna sebagai teknik analisis data. Berdasarkan hasil validasi ahli media diperoleh persentase 84,5% memenuhi kriteria sangat layak, ahli materi memperoleh persentase 100% memenuhi kriteria sangat layak, serta respon pengguna yaitu respon siswa memperoleh skor rata-rata sebesar 93 % memenuhi kriteria sangat layak dan respon guru memperoleh persentase sebesar 96,2% kriteria sangat layak. Jadi dapat disimpulkan bahwa media permainan edukatif berbasis CAI layak digunakan sebagai media pembelajaran PPKn siswa kelas IV SD.

ABSTRACT

The implementation of PPKn learning is still fixated on conventional methods, and the lack of interactive learning media that utilizes technology in elementary schools makes students feel bored. Most elementary school students have difficulty understanding PPKn material because they tend to perceive PPKn as a subject with a lot of memorization, especially on the history of the formulation of Pancasila. The rapid development of technology is expected teachers to be able to bring up innovation in Pancasila and Civic Education learning to increase student learning motivation. This study aims to develop learning media, namely educational game media based on Computer Assisted Instruction (CAI) material, on the history of the formulation of Pancasila in PPKn learning for fourth-grade elementary school students. The type of research used by researchers is development research or R&D with the ADDIE development model. Observation, interview, questionnaire, and documentation methods were used for data collection in this study. Quantitative and qualitative techniques are helpful as data analysis techniques. Based on the validation results of media experts, a percentage of 84.5% met the very feasible criteria, material experts obtained a percentage of 100% completed the very feasible criteria, as well as user responses, namely student responses, obtained an average score of 93% meeting very feasible criteria and response teachers obtained a percentage of 96.2% very feasible criteria. So it can be concluded that educational game media based on CAI is appropriate to be used as PPKn learning media for fourth-grade elementary school students.

1. INTRODUCTION

Pancasila and Civic Education (Pendidikan Pancasila dan Kewarganegaraan/PPKn) is one of the compulsory subjects at the elementary school level. Pancasila and Civic Education in the independent

*Corresponding author
E-mail addresses: kartikaekamy00@email.com (Kartika Eka Mustika Yani)

curriculum are separate from other subjects as in the 2013 curriculum, namely thematic learning. Independent learning aims to provide opportunities for teachers to freely design learning activities according to learning needs and targets (Khoirurrijal et al., 2022; Widodo & Al Muchtar, 2020). Pancasila and Civic Education / PPKn subjects are helpful in developing students to become competent citizens according to national education based on Pancasila and the 1945 Constitution. According to the Law of the Republic of Indonesia, Number 20 of 2003 concerning the National Education System, Article 1 Paragraph (2) confirms that national education is education based on Pancasila and the 1945 Constitution of the Republic of Indonesia, which is rooted in religious values, Indonesian national culture and is responsive to the demands of changing times (Hasanah et al., 2020; Raisita et al., 2021). The role of the teacher is needed so that learning becomes more meaningful so that students learn actively in Pancasila and Civic Education learning to increase their knowledge and form strong characters. One of the Pancasila and Civic Education materials in the independent curriculum is historical material for the formulation of Pancasila. The purpose of students studying the history of the formulation of Pancasila is to increase their understanding of the meaning, and values of Pancasila and the process of its formulation as the basis of the state, the nation's view of life, and state ideology. Pancasila must be preserved because it is the basis of the state, ideology, and philosophy of the Indonesian nation, which is capable of maintaining the integrity of the Unitary State of the Republic of Indonesia (NKRI) (Ahmadi et al., 2021; Susilawati et al., 2022).

The problem that is often encountered in Pancasila and Civic Education learning is that students have difficulty learning a material. Low learning outcomes because education is more concerned with completing the target material each semester rather than paying attention to the implementation of the learning process (Dewi, 2016; Wang et al., 2013). Most students have learning difficulties because they do not like Pancasila and Civic Education learning. Pancasila and Civic Education factual material, namely the history of the formulation of Pancasila, is considered difficult for elementary school students to learn. More material or memorization in Pancasila and Civic Education causes students to feel heavy in learning, so it is difficult to remember and even forget about the material taught by the teacher (Halimah & Sungkono, 2021; Putriningsih & Putra, 2021). The teacher's lack of ability to provide learning variations causes students to view Civics as boring learning, so learning media is needed to attract interest in education and understand the material more easily. Pancasila and Civic Education learning paradigm still uses the old paradigm in which students are given knowledge from the teacher so that students become passive (Musafa, 2018; Raisita et al., 2021). Teachers explain Pancasila and Civic Education material more by telling stories and only occasionally using instructional media depending on the learning material. Teachers in elementary schools are expected to be able to innovate to create exciting learning media so that it will stimulate increased student motivation and understanding of the material. Learning in elementary schools does not match the level of development and needs of elementary school students (Dewi, 2016; Sartono et al., 2022).

Based on the results of observations during the learning process and interviews with fourth-grade teachers at Ngegong Elementary School, it is known that the teacher is dominant in the Pancasila and Civic Education learning process using the lecture and question and answer method. Even the teacher is more prevalent in learning with the old paradigm by providing explanations of the material than students are given assignments (Santoso & Wuryandani, 2020; Silvia et al., 2019). Teachers and students only use LKS books as printed media for learning resources. Students are less interested and lazy when reading LKS books because they only contain black-and-white writing and pictures. This causes competence in Pancasila and Civic Education learning to be not optimal because students are lazy to read or memorize learning material. In addition, teachers still do not utilize technology as a learning medium. Even though the media in learning is very effective when used during the learning process, it must be considered systematically (Ciğerci, 2020; Manuaba & Putra, 2021). The media that teachers often use is PowerPoint media in delivering material and has not maximized the availability of school computers and laptops as support for Civics learning media. Teachers in the 21st century must have new skills to keep up with changes and advances in science and technology and adapt them to everyday life.

According to the Law of the Republic of Indonesia Number 14 of 2005 Article 20 regarding the professional duties of teachers, it is mandatory to improve and develop academic qualifications and competencies sustainably in line with developments in science, technology, and art. The characteristics of children who like to play games in this digitalization era are one of the factors for utilizing technology in developing educational game media fun and adapted to the material and learning objectives. A term that has just emerged is gamification, a phenomenon during a generation of digitally literate people (Alsawaier, 2018; Nugroho & Ma'arif, 2022). Media use of game education at pedagogical age is very effective in stimulating children's emotional solving of problems so that children can be encouraged appropriately. Games play an essential role in the development of the human brain because a person will start thinking when he is facing a problem (Fayanto et al., 2022; Hermawan et al., 2017). Game education is designed as learning media in the form of digital game devices that are educational by combining elements of education

and elements of entertainment so that learning activities are more attractive, provide motivation to students and make it easier for students to learn. Advantages of educational games can visualize real problems and students' memory will increase with the presence of interesting animations so that students can remember material for a long time rather than using conventional methods (Ilhami, 2022; Vitianingsih, 2017). This is in accordance with the development of elementary school-age children, which is related to their cognitive abilities in thinking and problem-solving.

Based on the results of observations, Ngegong elementary school has computer and laptop support facilities at school, making opportunities for innovation in designing instructional media packaged in the form of computer-based games so that students can carry out learning activities while playing. Technological changes and advances affect the development of educational technology in the 21st century towards computer-based learning or Computer Assisted Instruction (CAI) as an innovative learning medium. Digitalization of the independent curriculum to achieve regionally competitive students by implementing computer-based learning so as to encourage students' literacy towards technology (Khoirurrijal et al., 2022; Nugraha et al., 2020). The process of using CAI is when students interact with computers, information is displayed, simulations are monitored, and students receive feedback. On CAI-based media, a digital game can be developed to aid learning. One of the products of CAI technology is digital games which are developing and changing quite rapidly (Hermawan et al., 2017; Susilawati et al., 2022). Educational game media based on CAI innovations are suitable for Pancasila and Civic Education learning fourth-grade elementary school, especially material on the history of the formulation of Pancasila. Students can understand the content of learning material by seeking their knowledge, especially the subject of Pancasila and Civic Education in the independent curriculum, by using educational game media based on CAI. Learning in the independent curriculum wants students to process their thoughts independently in supporting their understanding of their knowledge. Previous research has shown that CAI-based interactive multimedia effectively increases student interest and learning outcomes (Priskila et al., 2018). CAI presents an innovative and more independent learning system, increases student motivation to learn, and students can visualize material that was previously difficult to understand and explained only through conventional methods (Febriyanto & Sulistiowati, 2018; Japar, 2018).

Previous research has developed educational game media for learning the history of Indonesian independence, which is more fun with the Android-based Construct 2 application so that students can understand the material in the lessons carried out by the teacher (Dias et al., 2021). Furthermore, the second study showed the results that CAI-based learning media was able to convey abstract material into computer animation so that students understood the material (Rahma & Fatimah, 2020). In this study, the researchers were interested in updating by developing a Computer Assisted Instruction (CAI) -based educational game media as a solution in helping students and teachers in teaching and learning activities focusing on historical material for the formulation of Pancasila for the Pancasila and Civic Education learning class in the independent curriculum of fourth-grade elementary school. Game education developed is computer-based or CAI because it is based on computer ownership from the school for fourth-grade students, especially Ngegong elementary school. This media can be run without an internet connection, except when working on evaluation questions, you have to be connected to the internet. Students can understand abstract material by visualizing it more simply through educational game media based on CAI, making it easier for students to learn. This media will likely become an alternative solution to overcome various problems in Pancasila and Civic Education learning for elementary school students.

2. METHOD

Research is a type of research conducted by researchers developing educational game media based on CAI through the ADDIE development model. The stages of the ADDIE model are (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation (Branch, 2010). The ADDIE model was chosen by researchers because this model is effective and efficient as a model for developing learning media, the results of which are evaluations from each stage that will be developed in the next stage and end up in ready-to-use products for mass distribution (Haky et al., 2018). The stages of developing the ADDIE model can be seen in Figure 1. The research was conducted at Ngegong Elementary School. The subject of this development research is the media game education based on CAI on Civics learning material on the history of Pancasila formulation for grade IV elementary schools. Learning media as a subject in the study was tested by experts, students, and teachers of fourth-grade elementary school to determine the feasibility of the media being developed. The expert consisted of 1 material expert, namely a lecturer at the PGRI Madiun University who was competent in the field of elementary school PPKn, and 1 media expert, namely a lecturer at the PGRI Madiun University who was competent in the field of educational technology. Experts aim to validate the feasibility of the product being developed before being tested on users. In addition, this study

also involved 34 grade IV students and 1 grade IV teacher at Ngegong elementary school to find out user responses to the feasibility of educational game media based on CAI as learning media.
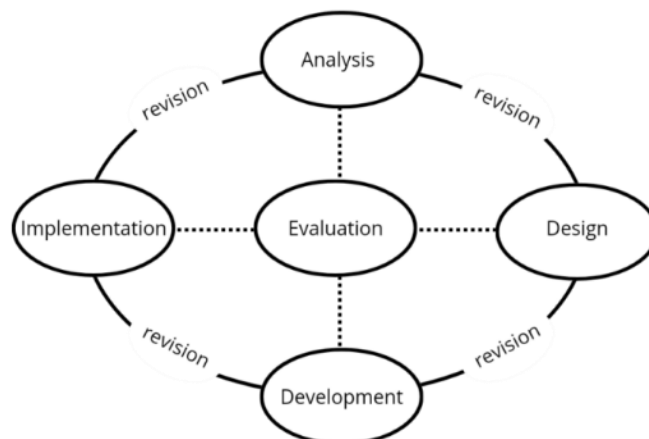

Figure 1. *ADDIE* Model Development Stage
(Branch, 2021)

Data in this development research were obtained by observation (nonparticipant), interview (unstructured), questionnaire, and documentation. Observations were carried out during fourth-grade at Ngegong elementary school, interviews were conducted with fourth-grade teachers at Ngegong elementary school at the analysis stage to find out learning problems, and documentation was used to collect photographs during the research and to record the name documents of fourth-grade students at Ngegong elementary school. The questionnaire sheet is used when conducting a media needs analysis containing statements regarding suggestions for media to be developed, expert validation sheets, and user responses. Expert validation questionnaire sheets and user responses as a measure of the feasibility of the product developed by researchers from the assessment of material experts, media experts, student responses, and teacher responses. The instruments are presented in Tables 1, Table 2, Table 3, and Table 4.

Table 1. Material Expert Validation Questionnaire Instrument

No.	Assessment Aspects	Item Number
1	Content material	1, 2, 3, 4, 5
2	Presentation of material and feedback	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22

Table 2. Media Expert Validation Questionnaire Instrument

No.	Assessment Aspects	Item Number
1	Appearance	1, 2, 3, 4, 5, 6, 7, 8
2	Instructional	9, 10, 11, 12, 13
3	Program	14, 15, 16, 17, 18, 19
4	Audio and Visuals	20, 21, 22

Table 3. Student Response Questionnaire Instrument

No.	Assessment Aspects	Item Number
1	Appearance	1, 2
2	Submission of Materials	3, 4, 5, 6, 7
3	Instructional	8, 9, 10
4	Program	11, 12, 13
5	Audio and Visuals	14, 15

Table 4. Teacher Response Questionnaire Instrument

No.	Assessment Aspects	Item Number
1	Appearance	1, 2, 3
2	Content Material	4, 5, 6, 7
3	Submission of Materials	8, 9, 10, 11, 12, 13

No.	Assessment Aspects	Item Number
4	Instructional	14, 15, 16, 17
5	Program	18, 19
6	Audio and Visuals	20, 21

Qualitative and quantitative techniques were chosen as data analysis techniques in research. The Guttman scale was used on the media needs analysis questionnaire with "yes-no" answers which were analyzed using qualitative techniques. Data with a Guttman scale are calculated according to the number of respondents in each choice of needs analysis questionnaire answers. The Likert scale is used as a measuring tool for data validity from expert validation sheets and response questionnaires with a range of answers from 1 to 5. Data analysis techniques with a Likert scale are carried out by analyzing quantitative and qualitative data. The average score of the due diligence based on the expert validation sheet and response questionnaire is quantitative data, while the critical review, comments, and suggestions from the expert validation sheet and response questionnaire, as well as the final feasibility assessment obtained, are concluded as qualitative (Riduwan, 2010; Sugiyono, 2015). After the data obtained from the validation questionnaire and response questionnaire were analyzed using a Likert scale score assessment, then the percentage score was calculated using the percentage formula. Likert scale score criteria is show in Table 5. The results of the final calculation of the media feasibility assessment are concluded or converted as qualitative data by looking at the eligibility criteria of learning media. Learning media eligibility criteria is show in Table 6.

Table 5. Likert Scale Score Criteria

Criteria	Score
Strongly agree	5
Agree	4
Doubtful	3
Disagree	2
Strongly Disagree	1

Table 6. Learning Media Eligibility Criteria

Percentage Score	Information
0% - 20%	Very Inappropriate
21% - 40%	Less feasible
41% - 60%	Feasible Enough
61% - 80%	Feasible
81% - 100%	Very Feasible

3. RESULT AND DISCUSSION

Result

This development research resulted in a educational game media based on CAI for Pancasila and Civic Education learning in the independent curriculum on the history of the formulation of Pancasila for fourth-grade elementary school. The results of this study are educational game media based on CAI which is very feasible. This research was developed using the ADDIE development model, which consisted of five stages, namely (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. The process at the analysis stage is to analyze the needs of the media, learning environment, and materials. Analysis of media needs through a questionnaire for the needs of teachers and fourth-grade students at Ngegong elementary school. The purpose of the needs analysis is to identify the need for and availability of Pancasila and Civic Education learning media in the form of *games.* The results of the analysis of media needs are obtained in Table 7, and Table 8.

Table 7. Results of Teacher Needs Analysis

No.	Question Analysis
1	The teacher answered that he did not use learning resources other than the PPKn subject handbook provided by the school.
2	The teacher answered that he often uses learning media in PPKn subjects in class.

No.	Question Analysis
3	The teacher answered by using technology as an interactive learning medium in the learning process PPKn.
4	The teacher answered that it was helped by using learning media to convey material to the eyes PPKn lesson.
5	The teacher answered that at school, there are supporting facilities for using different learning media utilizing technology (e.g., computers or laptops, LCD, wifi network, and others).
6	The teacher answered that he had never developed learning media in Civics subjects.
7	The teacher answered that there were no learning media with computers or laptops that students used to study independently to understand the material history of the formulation of Pancasila.
8	The teacher answered that he needed interactive learning media in the form of games (e.g., educational game media contains material, games , and evaluation exercises) to make it easier for students to understand the material history of the formulation of Pancasila.
9	The teacher answered that he was interested in the educational game media played on a computer or laptop to help students learn independently to understand historical material for the formulation of Pancasila.
10	The teacher answered agreed if learning media were developed as educational game media based on Computer Assisted Instruction to help students understand PPKn historical material Pancasila formulation.

Base on Table 7 from the needs analysis questionnaire results, class IV teachers at Ngegong elementary school often use media that utilize technology with supporting facilities from schools in teaching Civics. However, the teacher has never developed media and never used learning resources other than the school for Pancasila and Civic Education learning. Educational game media based on CAI media is highly recommended for learning historical material for the formulation of Pancasila for Pancasila and Civic Education fourth-grade elementary school lessons that can attract students' learning interests. This learning media is expected to help teachers and students learn, especially in Civics subjects.

Table 8. Results of Student Needs Analysis

No.	Question Analysis
1	29 students answered that in PPKn subjects, the historical material for the formulation of Pancasila needed to be explained.
2	24 students answered that they needed help understanding historical material for the formulation of Pancasila through the methods and media used by the teacher.
3	20 students answered that they were not enthusiastic during the PPKn learning process on the history of formulation material Pancasila.
4	25 students answered that they did not use textbooks or other handbooks to study the historical material formulation of Pancasila.
5	26 students answered that the teacher did not use learning media (video, PowerPoint interactive, Etc.) to convey material on the history of the formulation of Pancasila in class.
6	31 students answered that they needed alternative learning media that used technology to help understand the material history of the formulation of Pancasila.
7	29 students answered that they felt happy when learning independently to understand the material of the history of the formulation Pancasila with a computer or laptop.
8	29 students answered that they had never been given learning media in the form of a game to make it easier understand the material history of the formulation of Pancasila independently
9	33 students answered that they were interested if there were learning media in the form of interactive games (e.g., there are images, text, animation, backsound, and video) using a computer or laptop on the material history of the formulation of Pancasila.
10	33 students answered agreed that if engaging learning media such as game media were developed education based on Computer Assisted Instruction to help understand material for the history of formulation Pancasila

Base on Table 8 the results of the questionnaire analysis of the needs of fourth-grade students at Ngegong elementary school showed that most students had difficulty understanding the historical material for the formulation of Pancasila, so students were very interested in and agreed with the development of learning media in the form of computer-based games in PPKn subjects on the history of the formulation of Pancasila. In addition, the analysis of the learning environment through observation during the learning

process and interviews with fourth-grade teachers can be concluded that the teacher uses the old paradigm in teaching material to students using conventional methods, powerpoint media, and learning resources only from worksheets. The availability of supporting facilities in schools is useful for presenting innovation in learning media in the form of computer-assisted games. The selection of material in this development research is based on material analysis in the form of learning outcomes and learning objectives as a reference in developing material in the media.

The design stage is the second stage in media development through planning activities for the creation of educational game media based on CAI with reference to the analysis stage. The media is designed in several stages, including the stage of determining the media maker application using a computer with the help of the Microsoft PowerPoint 2013 application, Ispring Suite 10, and Canva, determining the material in making media according to the flow of learning objectives, preparing learning resources as a reference for the contents of material from books or the internet, and designing the content of learning media by making flowcharts. Educational game media based on CAI flowchart is show in Figure 2.
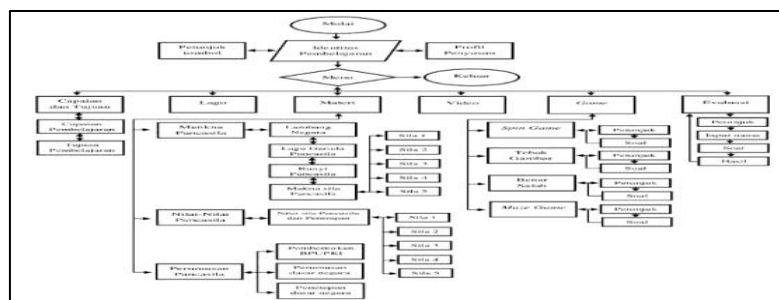

Figure 2. Educational Game Media Based on CAI Flowchart

The third stage is development. The process in this stage is to make the final product of media *game education* based on CAI in Pancasila and Civic Education learning material on the history of Pancasila formulation for fourth-grade elementary school which was previously designed at the design stage with *a flowchart*. Media *game education* based on CAI consists of six menus, namely the menu of achievements and goals, songs, materials, videos, *games*, and evaluation. The *game* menu for the developed media product consists of *spin games,* guess the Picture, true-false, and *maze games*. This media is packaged in a *file* format (. *pps*m). Figure 3, Figure 4, Figure 5, Figure 6, Figure 7, and Figure 8 is a display of media developed by researchers.

Figure 3. Page View Media Identity

Figure 4. Page View Learning Identity

Figure 5. Page View Media Main Menu

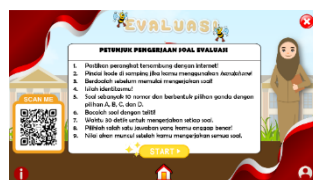

Figure 6. Page View Game Menus

Figure 7. Page View Evaluation Matter

Figure 8. Page View Media Developer Identity

After the media has been developed, a validation test is carried out by experts using a validation questionnaire. Validation aims to test the feasibility of educational game media based on CAI before being tested on users. Experts in validating products that have been developed by researchers are material experts and media experts. The validator in this study is a PGSD Lecturer at PGRI Madiun University who is competent in his field. The following is the data from the validation questionnaire in Table 9 in the form of material expert assessment scores on educational game media based on CAI.

Table 9. Material Expert Validation Questionnaire Result Data

No.	Assessment Aspects	Total Score Obtained	Maximum Total Score
1	Content material	25	25
2	Presentation of material and feedback	60	60
	Total	**85**	**85**
	Percentage (%)	**100%**	

Based on the presentation of the data from the material expert validation questionnaire in Table 9, it can be concluded that the percentage score of the material expert's assessment of educational game media based on CAI media for material on the history of the formulation of Pancasila is 100% which is classified as very feasible. The results of this assessment prove that the media developed by the researcher contains very appropriate material. Material experts do not provide comments and suggestions for revising material in educational game media based on CAI. Media expert validation questionnaire result data is show in Table 10.

Table 10. Media Expert Validation Questionnaire Result Data

No.	Assessment Aspects	Total Score Obtained	Maximum Total Score
1	Appearance	31	40
2	Instructional	23	25
3	Program	26	30
4	Audio and Visuals	13	15
	Total	**93**	**110**
	Percentage (%)	**84.5%**	

Based on the presentation of validation questionnaire data by media experts in Table 10 regarding the feasibility of educational game media based on CAI media for material on the history of the formulation of Pancasila, a percentage of 84.5% was obtained and was declared to meet the very feasible criteria. Media expert validators provide comments and suggestions for product revisions developed by researchers.

The results of expert suggestions and comments are used as a reference for media revisions so that they are more perfect and feasible to be tested on students and teachers of fourth-grade elementary school. The media expert validator provides input on the display of the learning identity page and the display of the video page. Table 11 show the product revision result according to the validator's comments and suggestions.

Table 11. Media Expert Revision Results

No.	Before Revision	After Revision
1		
2		

Based on the results of the media revision in Table 11, the researcher made improvements according to the validator's comments and suggestions on the display of the identity page by changing the black color of the learning identity writing to orange, changing the background color of the fourth grade SD learning media writing background, and equalizing the size of the writing and the space on the learning identity and adding a picture of the state symbol. Other improvements were made to the display of the video

page, namely changing the color of the learning video frame to red and adding an "On-Off" button to start playing the video.

The results of the revised learning media from the suggestions of experts are used in the implementation stage to be tested on students and teachers. The product trial activity aims to determine the feasibility level of educational game media based on CAI that has been developed according to user responses, namely students and teachers. The trial process was carried out using a user response questionnaire which was distributed to 34 students and fourth-grade teachers at Ngegong elementary school. The results of the student assessment can be seen in Figure 9.
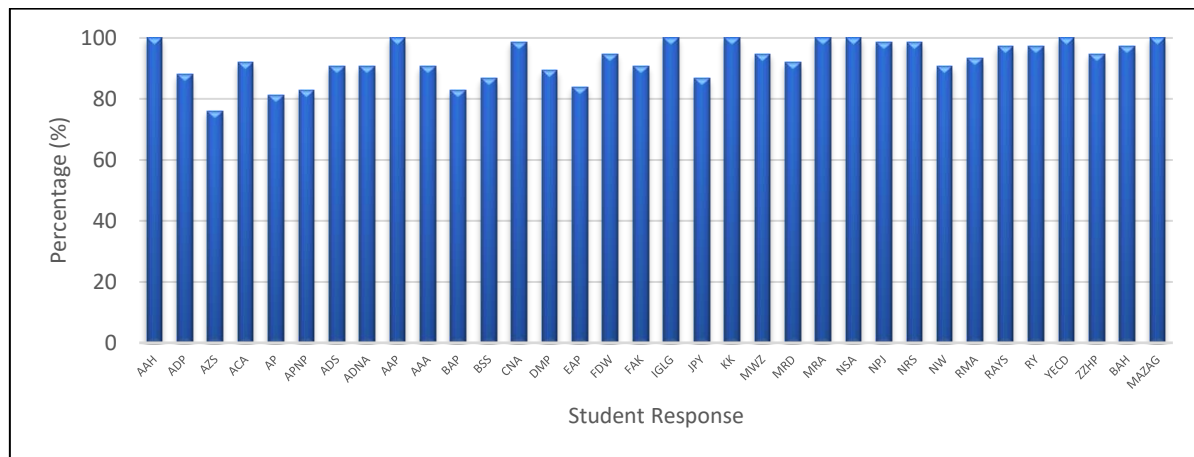

Figure 9. Student Response Questionnaire Results Data

Based on Table 9 the presentation of the percentage value of each student on the educational game media based on CAI, it can be seen that students give a percentage score of 76% to 100%, which includes the criteria for feasible and very feasible. The overall percentage results from the combined number of student response questionnaire data get an average of 93% which is included in the very feasible criteria. The overall average results of student responses can be concluded that the educational game media based on CAI that has been developed by this researcher is very suitable for use as a learning medium. However, students gave suggestions for improving the final stage of the product being developed to make it more perfect. Students stated that in the educational game media based on CAI in section on the material for the process of formulating Pancasila, the pictures of the nine committees were not clear, so students had difficulty getting to know the figures. Table 12 show revisions and results of improvements made by researchers on educational game media based on CAI according to student suggestions.

Table 12. Results of Revised Student Responses

No.	Before Revision	After Revision
1		

In addition to using a student response questionnaire to determine the appropriateness of the media, this study also used the teacher's response questionnaire results. The following is the data from the teacher's response questionnaire in Table 13 in the form of the teacher's assessment score on the educational game media based on CAI.

Table 13. Teacher Response Questionnaire Result Data

No.	Assessment Aspects	Total score obtained	Maximum total score
1	Appearance	14	15
2	Content Material	19	20

No.	Assessment Aspects	Total score obtained	Maximum total score
3	Submission of Materials	30	30
4	Instructional	19	20
5	Program	9	10
6	Audio and Visuals	10	10
	Total	**101**	**105**
	Percentage (%)	**96.2%**	

Based on the presentation of the teacher's response questionnaire data in Table 13 regarding the feasibility of the media that has been developed by researchers, a percentage of 96.2% is included in the very feasible criteria. The class IV teacher's comments stated that the educational game media based on CAI was very good and attracted students' attention to enthusiasm for learning.

The overall average results of the assessment from the expert validation questionnaire, namely media experts and material experts, as well as user responses, namely the responses of students and teachers of fourth-grade Ngegong elementary school can be seen in Table 14.

Table 14 . Expert Validation Feasibility Assessment Results and User Responses

No.	Respondents	Eligibility Percentage	Eligibility Criteria
1	Media Expert	84.5%	Very Feasible
2	Material Expert	100%	Very Feasible
3	Student Response	93%	Very Feasible
4	Teacher Response	96.2%	Very Feasible

The results of the data obtained on the feasibility assessment of educational game media based on CAI by experts and user responses are also presented in graphical form as show in Figure 10.
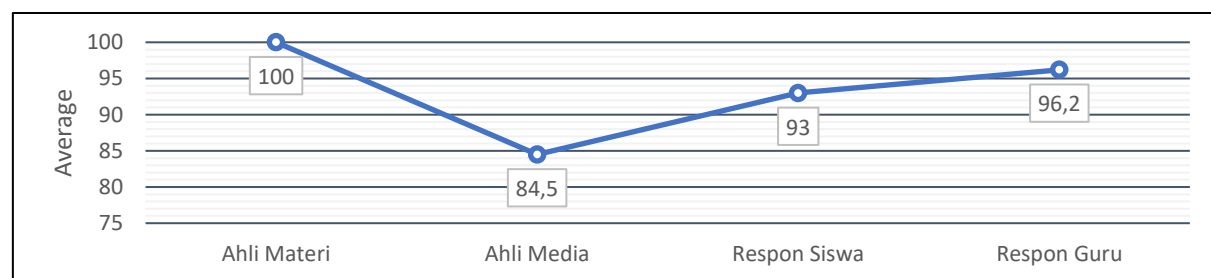

Figure 10. Graph of Expert Validation Feasibility Assessment and User Response

Based on Table 14, and Figure 10 obtained, the average assessment questionnaire validation of material experts obtained a feasibility percentage of 100%, including very feasible criteria; media experts reached a percentage of 84.5 % with very feasible criteria, the average percentage of the overall student response was 93% included in very feasible criteria, and the teacher's response obtained a percentage of 96.2% with very decent criteria. The results of the feasibility assessment of experts and user responses can be concluded that the educational game media based on CAI product developed is very suitable for use in the Civics learning process, especially the historical material for the formulation of Pancasila.

The last stage is an evaluation to find some deficiencies in the media so that it can be refined according to the suggestions in the product revision. The evaluation consists of formative evaluation and summative evaluation. Formative evaluations are obtained during the product development process. References for revisions in the previous stages were obtained from the validation tests of media experts and material experts. Media experts provide suggestions for revising the learning identity page to change the size of the writing and spacing and choose a more contrasting color. However, the two experts stated that the educational game media based on CAI was very interesting and feasible to implement. Summative evaluation is carried out at the end of the development of educational game media based on CAI media after carrying out the implementation stage of product trials on students and teachers to obtain a perfect final product result. This evaluation aims to improve or revise the educational game media based on CAI that has been developed. Media improvements were adjusted according to comments and suggestions from students and teachers of class IV at Ngegong elementary school. One of the students suggested that the appearance of the nine committee figures be enlarged in size, and the rest commented that the educational game media based on CAI was interesting, very good, and fun, so it was easy to understand the learning material. In

addition, the teacher also stated that the media was able to attract students' learning motivation and make it easier for students to absorb the material presented in the form of games.

Discussion

Based on the results of research on the development of educational game media, Educational game media based on CAI using the ADDIE model obtained very feasible criteria from all respondents so that this media can be applied to teaching and learning activities, especially Pancasila and Civic Education learning in the independent curriculum of fourth-grade elementary school. Development of educational game media based on CAI to be able to facilitate students in studying historical material for the formulation of Pancasila independently and overcome student boredom with Pancasila and Civic Education learning which previously used monotonous media. Making this media takes advantage of technological developments in the era of the industrial revolution 4.0. This is reinforced by the opinion of that state the rapid development of technology is an opportunity for an educator to take advantage of it to develop an innovation in learning (Prasasti & Dewi, 2020). Same opinion also state that the quality of national education is expected to compete on the international stage by integrating technology into learning so that Indonesian human resources can compete with other countries (Dewi, 2021). Teachers are required to increase their creativity in choosing learning media for students. Creativity means the ability to make a new product that did not exist before or to modify it by developing an existing product (Parji, 2022; Syah & Harsono, 2020).

The selection of various learning media by the teacher has a very important function in the learning process. Learning media makes students able to understand learning material in more depth, creates two-way communication in the active learning process, and makes teaching and learning activities more interesting so that students are encouraged to like learning (Dinata, 2021; Kristanto, 2016). Online gameplay activity in the current era can be one of the innovations to develop learning media that is rife among students, namely in the form of game education . Students need gamification to be able to motivate them to learn and create a fun learning atmosphere. This is reinforced by research conducted that *games* aimed at education are more popular with students, so students pay more attention to learning when learning media are presented in the form of educational *games* (Rosyidah & Lutfi, 2016). The availability of supporting facilities such as computers or laptops in schools is useful as learning hardware that uses *game education media* to train students to learn independently. This is reinforced by research that the use of computers as learning media has trained students to learn independently in understanding the material (Lucero, 2021). In line with that other study found the characteristics of CAI are based on independent learning, the use of media can be in class or study at home, the operation uses computer assistance, equipped with pictures, sounds, graphic animations, and videos and is interactive for students (Kristanto, 2016). The use of CAI can improve cognitive aspects and children's critical thinking skills. Student interest has also become more interested in effective computer-based learning (Cain & Pitre, 2019; Solehat, 2018).

Educational game is one of the learning media that is designed or *by design.* In line with the opinion state that learning media by design is deliberately made by the teacher for learning (Sukmawati et al., 2022). Innovation in learning can be created by integrating gamification and CAI theory in accordance with today's modern circumstances. Cognitive learning theory states that the teacher is a promoter of learning because, in CAI, the teacher does not only act as a distributor of learning material (Vavropa et al., 2012; Zhang, 2021). This learning media is different from previous research because there is no *educational game media* that contains historical material for the formulation of Pancasila and is computer-based. Gamification is useful in all lessons because it is easier for students to learn the material, and it becomes a solution for understanding difficult material in a fun way (Bicen & Kocakoyun, 2018; Mee Mee et al., 2020). Educational game media based on CAI can be used easily by students and can be accessed offline, except when working on evaluation questions must be online. Educational game media based on CAI has gone through the validation test stage by experts before being disseminated to users to find out the user's response to the eligibility of the media. This is reinforced by study that state media products must have gone through due diligence from experts from instructional experts, media experts, and material experts and be declared worthy (Surjono, 2017).

The results of the expert validation test stated that the educational game media based on CAI is suitable for use as a learning medium so that it can be continued in the implementation stage*.* Students commented that educational game media based on CAI was very interesting and fun so that it could help understand the historical material for the formulation of Pancasila. The grade IV teacher also commented that the media developed by the researcher was suitable for fourth-grade students because it presented a fun learning atmosphere and trained students to learn independently in understanding the material. Games in learning have several advantages, namely helping children to be able to improve the development of cognitive skills such as thinking and solving problems, increasing children's creativity, training children's

competitive spirit in games with wins and losses, and increasing socialization (Bicen & Kocakoyun, 2018; Sabir & Putra, 2021).

The development of educational game media in the previous study was used for learning in class V SD, while the products developed by researchers were useful for learning in fourth-grade elementary school. Relevant research conducted found that the existence of innovative and interesting learning media in the form of *games* or games can help the learning process by utilizing technological facilities in the form of computer availability in schools so that students can more easily understand the material, there is interaction between the media used and students, and overcome boredom in learning (Nurfitriana & Nugraha, 2019). Educational game media based on CAI made with Microsoft PowerPoint 2013 has different advantages from PowerPoint media in general because the media contains various games with interesting audio, visual, and audio-visual for Pancasila and Civic Education learning. This media is distributed to students via the Google Drive link, saved in PowerPoint Macro-Enaled Slide Show (*ppsm) format. Students can efficiently operate media and download media that has been shared on Google Classroom anytime and anywhere. The material in the media can easily be repeated to be studied until students understand the meaning of the material that has been given (Ajam et al., 2021; Syahputri & Murdiono, 2022). Access educational game media based on CAI offline, except when working on evaluation questions. It would be best if you used the internet network, and the value will appear after completing all the questions.

Besides having advantages, educational game media based on CAI also has weaknesses, namely (1) Media operations can only be done on a computer or laptop that has a PowerPoint application; (2) The PowerPoint program cannot display the final score after playing the game activity but only provides feedback on the selected answer; and (3) The music in the educational game media based on CAI has not accommodated each student's musical tastes. The implications of creating educational game media based on CAI are motivating and attracting interest and enthusiasm for student learning by presenting digital games as learning media that can be run independently with a computer device. Students can solve challenges in educational game media based on CAI so that they can build their knowledge and help students understand the material by visualizing attractive media displays so that learning becomes more active. The limitation of educational game media based on CAI is that this media only contains material on the history of the formulation of Pancasila for fourth-grade elementary school and is only tested at the feasibility stage on experts and users. Thus, for further research, it is hoped that it will expand the discussion material in media development and test the effectiveness of educational game media based on CAI by measuring student learning outcomes after using the media.

4. CONCLUSION

Based on the results of development research to produce educational game media based on Computer Assisted Instruction (CAI). The results of the expert validation assessment, namely media experts and material experts, obtained very feasible criteria, while the effects of product trials on 34 students and fourth-grade elementary school teachers obtained positive responses with very feasible criteria so that educational game media based on CAI can be used as learning media. Educational game media based on CAI can attract motivation and enthusiasm for learning and help understand the material in the Pancasila and Civic Education learning process, as evidenced by the results of product trials to measure user responses to media feasibility. Educational game media based on CAI trains students in independent learning in the independent curriculum according to the Pancasila student profile. Teachers are also helped by using educational game media based on CAI that supports the distribution of learning materials. Thus, the development of media game education based on CAI is feasible to be applied to Pancasila and Civic Education learning activities for fourth-grade elementary school, especially material on the history of the formulation of Pancasila.

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