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The Development of Digital Comics Learning Media Based Ethnomathematics of *Kretek* Dance Integrated with Islamic Values

Arnetta Thalia Arthamevia[1*], Fina Tri Wahyuni[1], Achmad Yafik Mursyid[2]
[1]*Mathematics Education Department, Institut Agama Islam Negeri Kudus, Kudus, Indonesia*
[2]*Islamic Studies Department, İstanbul Üniversitesi, Istanbul, Türkiye*
** Correspondence: arnettathalia6@gmail.com*

Abstract

The Indonesian education system has come in the era of the industrial revolution 4.0, so the development of learning media should be carried out according to technological developments with upholding Indonesian cultural values and religious character to achieve the noble goals of education. Media development is carried out to overcome students' difficulties in learning mathematics, one of which is the angle material that requires visualization. One of the visual media is digital comics. This study aims to determine the development process and the feasibility of developing digital comic learning media based on the ethnomathematics of *kretek* dance that integrates Islamic values. This study used a Research and Development (R&D) type with a Four-D (4D) model that used a limited-scale trial. The model consists of four stages: define, design, develop, and disseminate. The results of this study were obtained by expert validation sheets and student response questionnaires as users. The research results from the three experts showed that the criteria were very feasible, with an average of 88.89% for material experts, 82.78% for media experts, and 95% for Islamic value integration experts. A limited-scale product trial conducted on 10 grade VII students of MTs NU Hasyim Asy'ari 03 Kudus obtained a percentage average of 98% with the criteria very feasible. Thus, the digital comic learning media developed in this study was very feasible to be used in mathematics learning. This research can encourage teachers to explore more about learning media that will be used to help transfer academic knowledge to students.

Keywords: Digital Comics; Ethnomathematics of *Kretek* Dance; Islamic Value; Learning Media

Abstrak

Sistem pendidikan Indonesia telah memasuki era revolusi industri 4.0 sehingga pengembangan media pembelajaran hendaknya dilakukan sesuai perkembangan teknologi dengan tetap menjunjung tinggi nilai budaya Indonesia dan karakter

religious sebagai usaha untuk mencapai tujuan luhur pendidikan. Pengembangan media dilakukan untuk mengatasi kesulitan siswa dalam pembelajaran matematika, salah satunya yakni pada materi sudut yang memerlukan visualisasi. Salah satu media visual yang dapat digunakan yakni komik digital. Penelitian ini bertujuan untuk mengetahui proses pengembangan dan kelayakan hasil pengembangan media pembelajaran komik digital berbasis etnomatematika tari kretek yang terintegrasi nilai keislaman. Penelitian ini menggunakan jenis penelitian *Research and Development* (R&D) dengan model pengembangan *Four-D* (4D) yang menggunakan uji coba skala terbatas. Model ini terdiri dari empat tahapan yaitu pendefinisian (*define*), perancangan (*design*), pengembangan (*develop*), dan penyebaran (*disseminate*). Hasil penelitian ini diperoleh dari lembar validasi ahli dan angket respon peserta didik sebagai pengguna. Adapun hasil penelitian dari ketiga ahli menunjukkan kriteria sangat layak dengan rata-rata persentase sebesar 88,89% dari ahli materi, sebesar 82,78% dari ahli media, dan sebesar 95% dari ahli integrasi nilai keislaman. Dari uji coba produk skala terbatas yang dilakukan kepada 10 siswa kelas VII MTs NU Hasyim Asy'ari 03 Kudus diperoleh rata-rata persentase sebesar 98% dengan kriteria sangat layak. Maka media pembelajaran komik digital yang dikembangkan dalam penelitian ini sangat layak digunakan dalam proses pembelajaran matematika. Dengan adanya penelitian ini, diharapkan dapat mendorong para guru untuk lebih mengeksplorasi mengenai media-media pembelajaran yang mungkin digunakan dalam membantu mentransferkan ilmu pendidikan kepada siswa.

Kata Kunci: Etnomatematika Tari Kretek; Komik Digital; Media Pembelajaran; Nilai Keislaman

Introduction

Mathematics education is fundamental learning for students which can guide them to think systematically. If the foundation is good, the development of mathematics will be well organized, so that it can produce quality human resources for the next generation of the nation and vice versa (Saputra, 2014). However, the implementation of mathematics learning activities in Indonesia is still not fully running well. Based on the result of the 2018 Program for International Student Assessment (PISA) study by the OECD (2019), showed that the average score of Indonesian students' mathematical ability is 379, even though the OECD (The Organization for Economic Co-operation and Development) average score in the field of mathematical ability is 489. From the data, it can be seen that the average score of Indonesian students' mathematical ability was beneath the OECD average score with a difference in the average score of 110 mathematics abilities.

The conventional learning method is frequently used in an Indonesian school. Mathematics learning in Indonesia is mostly carried out using conventional or lecture methods that only use the material in the handbook without using learning media that can support student understanding (Nugraheni, 2017). Based on the observations and interviews conducted by the researcher at MTs NU Hasyim

Asy'ari 03 Kudus, it was known that the implementation of mathematics learning was still carried out conventionally; teachers only used conventional methods by using whiteboard media. Learning done conventionally without the help of appropriate learning media only takes place in one direction, and students tend to be passive. It makes students' interest in learning mathematics low. Students' mathematical abilities cannot develop well with mathematics learning conventionally (Rahmata, Tuljannah, Chotimah, & Fiangga, 2020).

The observations and interviews were also known that the students found it difficult to learn mathematics because they only had student worksheets as the resource for learning mathematics, which contained more letters than the visual side. The materials are also incomplete. For example, the line and angle material only had a core material without introducing the angle concept. Angle material had many concepts in the form of images needed to be visualized with the help of appropriate learning media to make it easier for students to understand. In the subject of angles, students were required to be able to connect and apply the concept of angles. However, students experience many difficulties, including difficulty understanding and connecting concepts. One of the factors that cause these difficulties is the non-use of learning media (Juhana Senjaya, Sudirman, & Supriyatno, 2017). Learning media support the learning process to deliver messages more clearly so that learning objectives can be adequately achieved (Kustandi & Darmawan, 2020). Learning media has a remarkable role in fostering student motivation and interest, the selection of learning media should be adjusted to the needs such as graphic media. One type of graphic media that can be used to support mathematics learning activities is comics (Afifah & Dewi, 2022).

A comic is a visual communication system so that the information delivered can be more easily accepted. Secondary school students are comfortable to use a comic as learning media. Using the comic media in learning makes comfortable to the secondary school students. They think that comics can is the fun activity. The comic also plays a role in visualizing abstract ideas. With visualization, comics can be used as an effective platform for growing students' motivation to learn mathematics (Syahwela, 2020). Comics learning media is effectively used in learning mathematics on line and angle material (Ula, Kristanti, & Mursyidah, 2019).

Today, the Indonesian education system has come in the era of the industrial revolution 4.0 where technology is an important basis in the implementation of the learning process. The internet becomes the center of education and a massive source of knowledge due to the various learning resources and mass media. It can make most students more vulnerable to forgetting their culture because of the swift flow of coming foreign cultures, so it is necessary to develop mathematics learning media

that contain elements of Indonesian culture (Astuti, Yuzianah, & Supriyono, 2019). In mathematics, there is a cultural integration called ethnomathematics. Ethnomathematics can be interpreted as a science that studies mathematics and history (Sa'adah, Haqiqi, & Malasari, 2021). With ethnomathematics, it is possible for students to study a culture related to mathematical ideas (Rahayu, Bintoro, & Murti, 2021). The general use of ethnomathematical concepts can be related to various activities in mathematics, such as grouping, counting, designing, determining locations, and much more (Narsyah & Rahman, 2020).

The comic learning media packaged digitally with ethnomathematical approach is effective to be used as learning media in the mathematics learning (Ayuningsih, Purwoko, & Purwaningsih, 2020). Moreover, based on research that has been conducted by Fitrianingsih, Suhendri, and Astriani (2019) regarding the integration of culture with learning media in the form of math comics, it demonstrated that cultural-based math comics can develop an interest and enhance student learning outcomes. The comic-based mathematic learning media with a culture idea (ethnomathematics) also can be a media for learning mathematics that can connect mathematics, culture, and technology (Nisa, 2019).

Kretek dance is one of the cultures that can be explored in terms of mathematical concepts. MTs NU Hasyim Asy'ari 03 Kudus, located in Kudus Regency, so in this study, makes this cultural dance as the part of student activitis in the school. The *kretek* dance is inspired by the main occupation of the Kudus society, which at that time the society majority were cigarette laborers, so the body movements of the *kretek* dance described the process of making cigarettes from the beginning to the end. In the *kretek* dance movement, an ethnomathematical concept was found, namely the concept of angular geometry (Sa'adah, Haqiqi, & Malasari, 2021). In addition to having the *kretek* dance culture, Kudus is also known for its local wisdom, *Gusjigang*, which means (*bagus*) a good attitude, (*ngaji*) learning qur'an, and (*dagang*) trading. Gusjigang's philosophy is the teachings of Sunan Kudus that adhere to the Kudus society in upholding good character and guided by the values of Islamic education (Salma, 2022). The learning media developed should not only stop at developing the potential to create innovative learning, but also it must also be able to strengthen the religious character of students so that they are not only able to solve mathematical problems but also have good religious and moral attitudes (Wahyuni, 2019).

The development of culture-based digital mathematics learning media has been conducted in research by Nida, Buchori, and Murtianto (2017), Fitrianingsih, Suhendri, and Astrianim (2019), Ayuningsih, Purwoko, and Purwaningsih, (2020). In addition to the development of learning media for digital mathematics integrated

with Islamic values also conducted in research by Basir, Alif Hazira, and Kusmaryono (2020). Based on the researcher's analysis of previous research, it was known that no research develops a digital comic learning media with an ethnomathematical approach to *kretek* dance which was also integrated with Islamic values. From the interviews with teachers, it was also known that the integration of Islamic values in the material and the introduction of ethnomathematical concepts had never been done and were not available in the student worksheets used by students.

Based on the researcher's analysis of previous studies, it was known that there had never been a study that has developed digital comics learning media with an ethnomathematical approach that was integrated with Islamic values. Besides that, there has also been no development of the comic-based mathematic learning media based on the local culture of the Kudus, namely a dance called the *kretek* dance. Thus, researcher is interested to develop a comic-based mathematic learning media which integrated to Islamic value and ethnomathematics of *kretek* dance. This study aims to determine the development process and the feasibility of the results of the development of digital comics learning media. This research is expected to add to the scientific repertoire in mathematics education and become a reference in innovating the development of learning media in the form of digital comic with various other approaches to technological developments and learning needs. The development results in this study can also be used as an alternative learning media on the angle material.

Method

In this study, the researcher used Research and Development (RnD) with a Four-D (4D) development model, which includes four stages: define, design, develop, and disseminate (Winarni, 2018). Four-D (4D) development model has systematic stages and can be adapted to the school's needs and student characteristics, so this model can be used to be good problem-solving in the learning process (Wardani, Degeng, & Cholid, 2019). There were four stages: (1) Define stage, the researcher created an initial analysis, which was carried out by conducting observations and interviews with teachers and students. (2) Design stage, digital comic media was developed using a webcomic program called Pixton. Then proceed with selecting the format and the initial design of the product. (3) The Develop stage was carried out by validating the product to material, media, and Islamic value integration experts. Then the researchers conducted trial products. (4) Disseminate stage, digital comics products were disseminated online, which could be accessed on the web.

The researchers conducted trial products on a limited scale for applying the comic media in learning. Limited-scale product trials can be conducted with questionnaires to research subjects between 6 to 12 (Sugiyono, 2016). Thus, in this study the researchers conducted a trial product on a limited scale with 10 seventh-grade students of MTs NU Hasyim Asy'ari 03 Kudus. If the trial product on a limited scale gets a positive response (interesting), then it is not revised and retested.

The researcher used the data collection techniques which were observation, interviews, and questionnaires. Researchers used observations and interviews for a needs analysis related to the conditions of schools and students to determine learning media products to be developed. This study interviewed mathematics teachers and seventh-grade students at MTs NU Hasyim Asy'ari 03 Kudus to obtain information and data based on problems studied about learning conditions and students' needs. The questionnaires were used to determine the feasibility of the developed products based on validation results from the experts (material experts, media experts, Islamic value integration experts and student responses as users with a 5-point likert scale.

The researcher used quantitative and qualitative descriptive analysis techniques. The qualitative descriptive analysis technique was used to process the expert's validation and the results of a limited-scale product trial in the form of improvement suggestions to improve the product developed. Then the quantitative descriptive analysis was done by processing data into numbers or percentages to obtain general conclusions. This study used quantitative descriptive analysis techniques to process data in the form of scores obtained through a questionnaire. To calculate the percentage, use the formula:

$$\text{Percentage} = \left\{ \frac{\text{Total Score}}{\text{Maximum Score}} \text{ x } 100\% \right\}$$

To know the criteria of percentage calculation result, match the result with the Table 1 below:

Table 1. Interpretations of Feasibility Scales

Percentage (%)	Criteria
0 - 20	Inappropriate
21 - 40	Not Feasible
41 - 60	Less Feasible
61 - 80	Feasible
81 - 100	Very Feasible

(Diani & Hartati, 2018)

Based on Table 1, the mathematics digital comic learning media based on the ethnomathematics of *kretek* dance and integrated with Islam can be feasible if it reaches a minimum percentage of 61% with appropriate criteria. If the minimum percentage has not been achieved, the learning media product developed must be improved according to expert's validation and student responses as users until it can reach the minimum feasibility percentage.

Results

This research has successfully developed a learning media in the form of digital comics based on ethnomathematics of *kretek* dance integrated with Islamic values for students of class VII. The procedural steps used in this study were as follows:

Define

The stage of define was conducted by observing mathematics learning and interviewing the deputy of curriculum, seventh-grade mathematics teachers, and seventh-grade students at MTs NU Hasyim Asy'ari 03 Kudus to analyze the main requirements for development to correspond to the needs. At this stage, it showed that students' interest in learning mathematics is still low. Students also found it difficult to learn mathematics because they only have student worksheets as the resources for learning mathematics that contains more letters than the visual side. The materials were also incomplete. For example, the line and angle material only contained a core material without introducing the angle's concept. In the learning process, teachers only used conventional methods by using whiteboard media. Whereas MTs NU Hasyim Asy'ari 03 Kudus had quite complete learning support facilities that were provided such as wifi, projectors, and so on.

Design

In this stage, the researcher determined the media and scheme that would be used in product development by the results of the defining stage. The media determined was a digital comic created using a web-comic named Pixton with a comic output in the web-comic. In preparing the material and making the script (storyline), the researcher integrated the Islamic values by giving Islamic concepts to the characters, and storylines, also integrating the verses of the Qur'an and Hadith into the material learning. The researcher also added the ethnomathematical concept of *kretek* dance to the material learning. The initial design of the digital comic product could be seen in Figure 1 below:

Figure 1. Preliminary

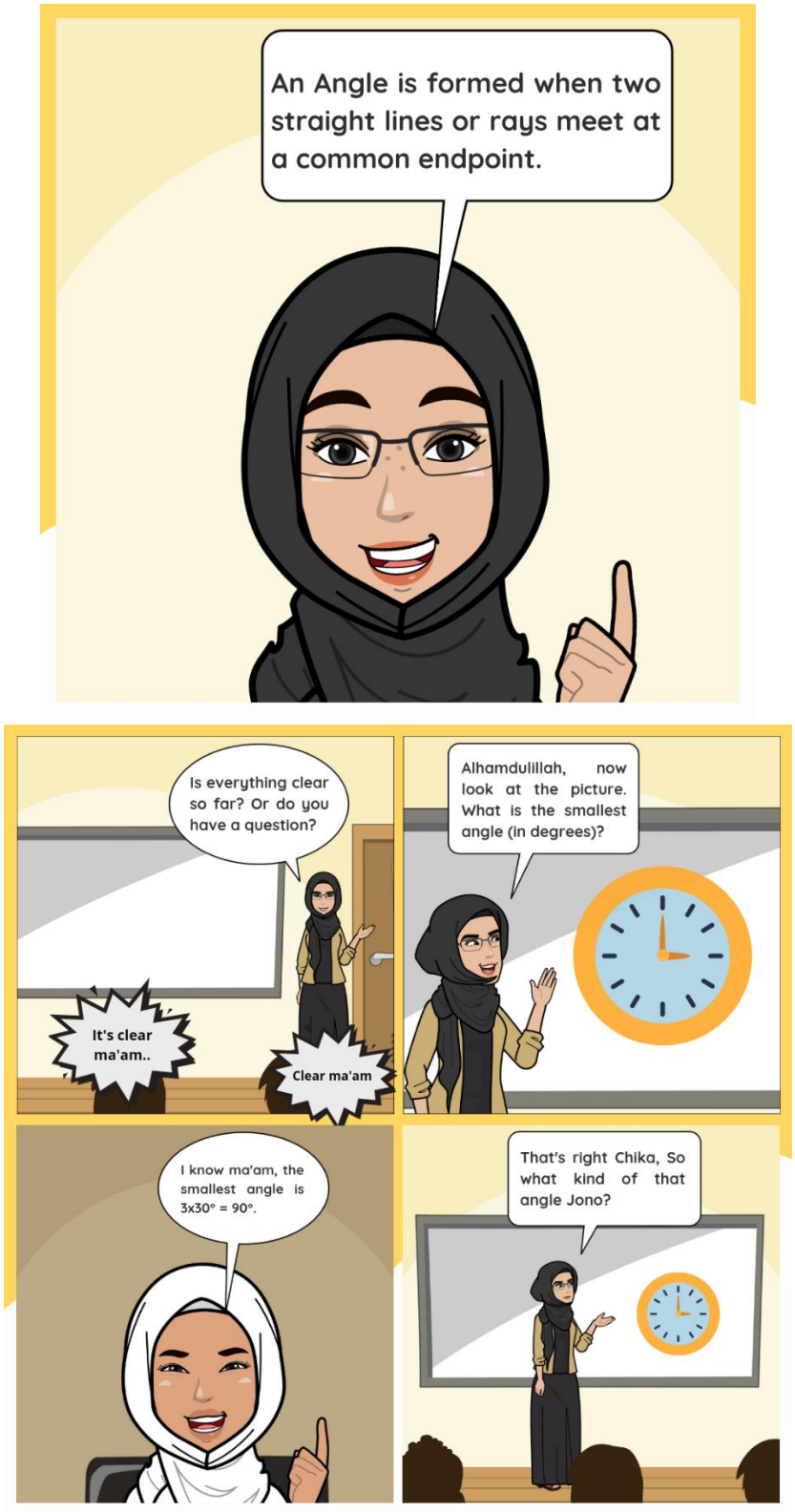

Figure 2. Contents

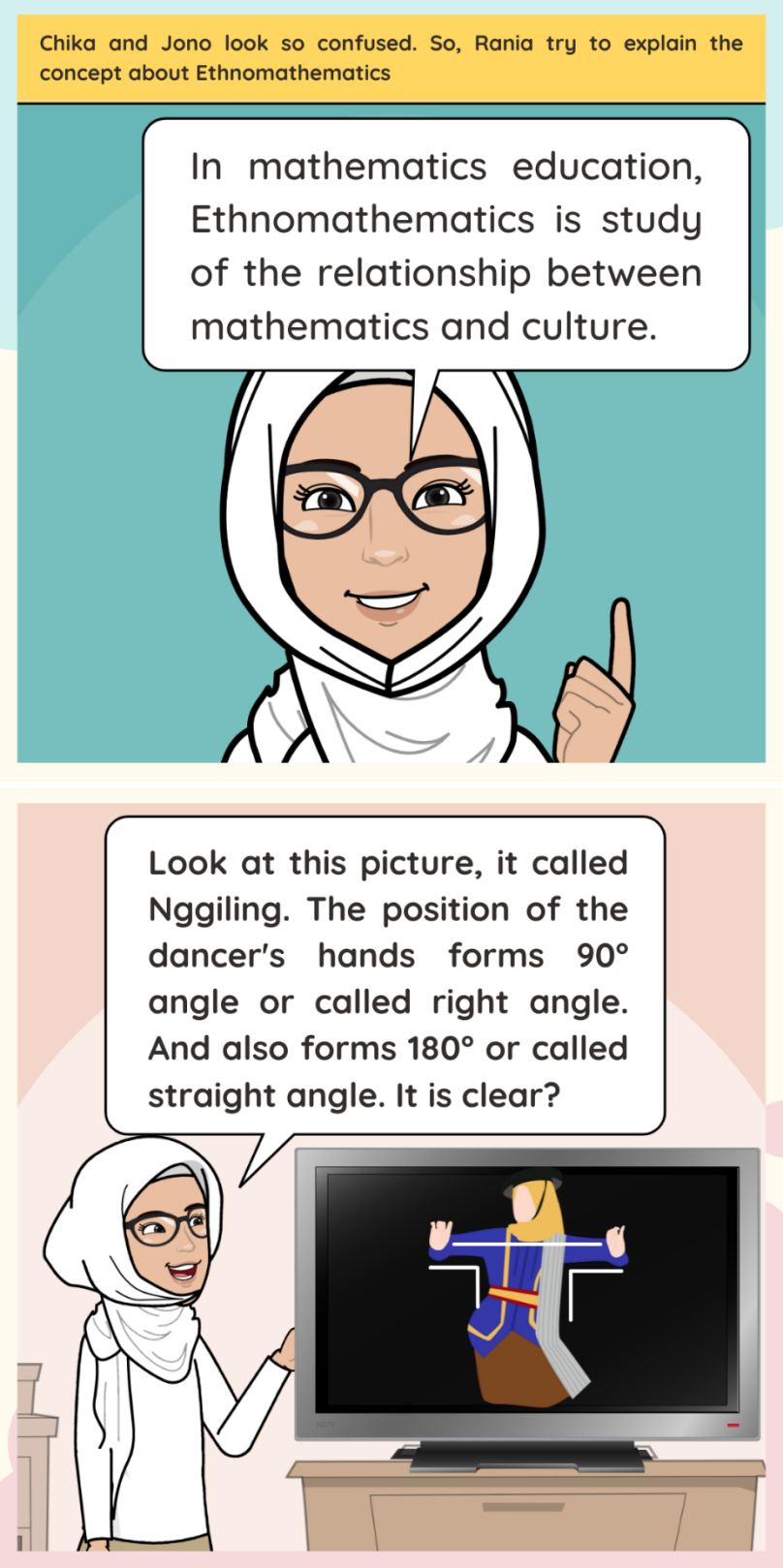

Figure 3. Ethnomathematics of *Kretek* Dance

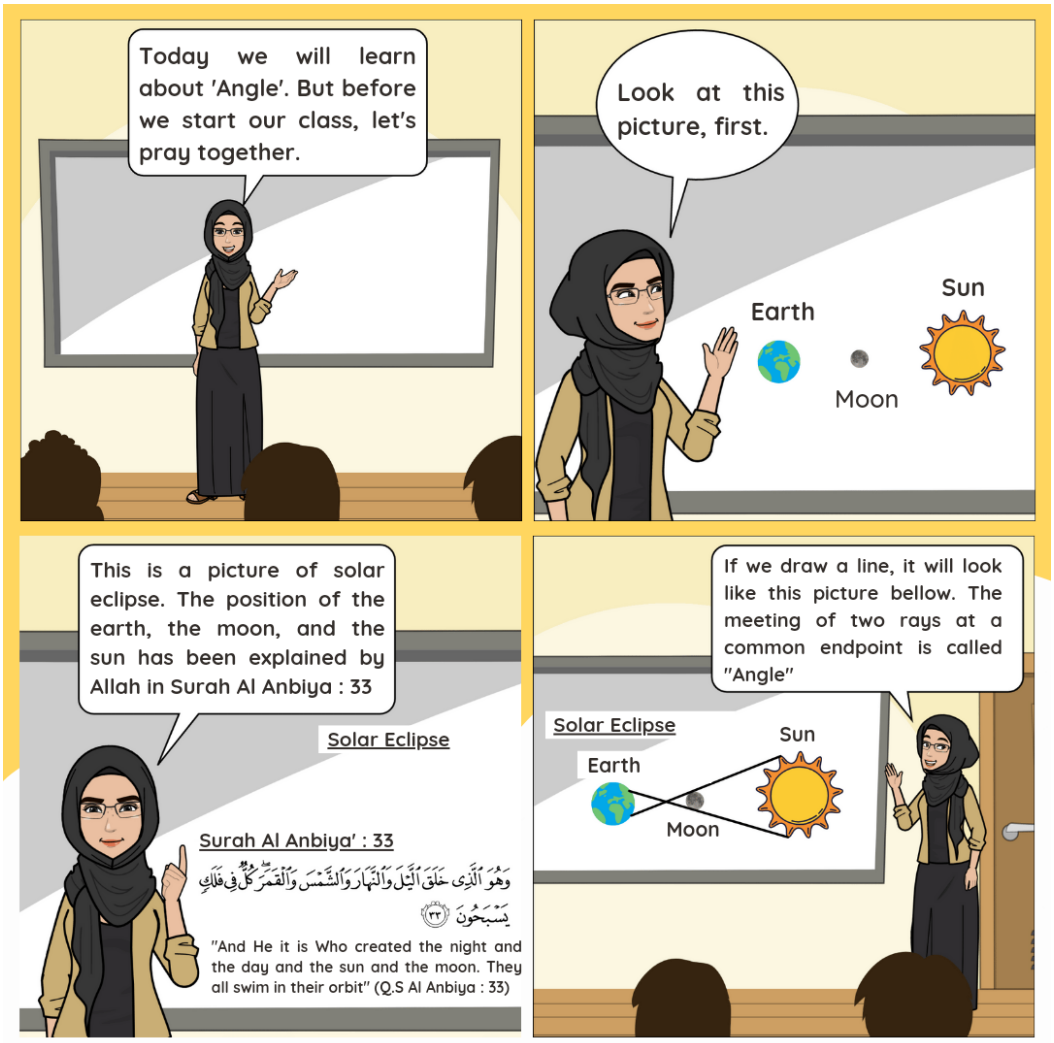

Figure 4. Islamic Values Integration

Develop

In this stage, there were two activities, namely expert appraisal and developmental testing. An expert appraisal is a validation technique or feasibility assessment by experts in their fields of products developed. While developmental testing is a trial product for users after the product is validated and improved according to the advice of experts (Winarni, 2018).

Expert Validation

In this study, there were three validation experts, namely material experts, media experts, and Islamic values integration experts. Product validation was carried out until the product was declared suitable by experts without any suggestions for evaluation.

Material Expert

Validation by material experts was only carried out in one stage because there was no suggestion for evaluation by experts and had been declared suitable for use. The results of the validation by the material expert are in Table 2.

Table 2. The Validation Results by Material Expert

Aspect	Material Expert I		Material Expert II		Average of Percentage	Criteria
	Score	%	Score	%		
Contented Eligibility	16	80%	20	100%	90%	Very Feasible
Language	12	80%	15	100%	90%	Very Feasible
Presentation	12	80%	14	93.33%	86.67%	Very Feasible
Total Average					88.89%	Very Feasible

Table 2 shows that the validation by the material Expert has three aspects of the assessment, namely the aspects of the eligibility of content, language, and presentation, getting a percentage average of all aspects of 88.89% so that it is included in the very feasible criteria.

Media Expert

Media expert validation gets suggestions for evaluation from experts so that it is carried out in two stages of validation. The assessment results of the media expert validation process in both stages are listed in Table 3 and Table 4 below.

Table 3. The Validation Results by Media Expert in Stage 1

Aspect	Media Expert I		Media Expert II		Average of Percentage	Criteria
	Score	%	Score	%		
Cover Design	12	80%	11	73.33%	76.67%	Feasible
Content Suitability	20	80%	16	64%	72%	Feasible
Overview	8	80%	8	80%	80%	Feasible
Total Average					76.22%	Feasible

Table 4. The Validation Results by Media Expert in Stage 2

Aspect	Media Expert I		Media Expert II		Average of Percentage	Criteria
	Score	%	Score	%		
Cover Design	12	80%	13	86.67%	83.33%	Very Feasible
Content Suitability	20	80%	20	80%	80%	Feasible
Overview	8	80%	9	90%	85%	Very Feasible
Total Average					82.78%	Very Feasible

Based on Table 3 and Table 4, the validation could be carried out by three aspects of the assessment, namely the cover design aspect, the content suitability aspect, and the overview aspect. In stage 1, the assessment of the digital comic learning media that the researcher developed obtained a percentage average of 76.22% with the feasible criteria and obtained a percentage average of 82.78% with the very feasible criteria in stage 2. The comparison of validation results by Media Experts stage 1 and stage 2 in each aspect is shown in Figure 5.

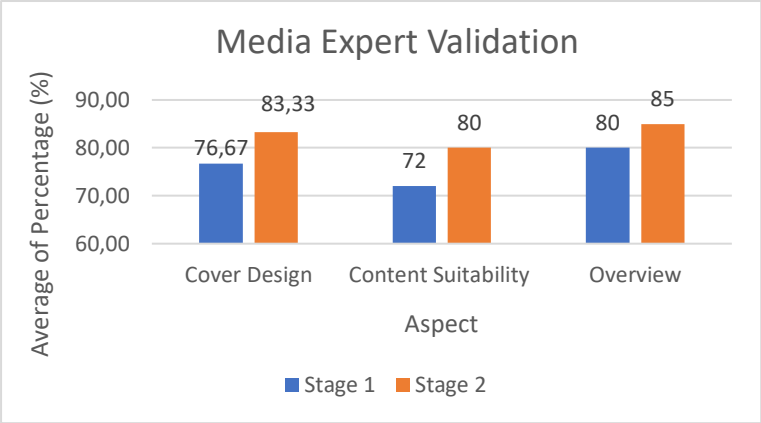

Figure 5. The Comparison of Validation Results by Media Experts

Based on Figure 5 above, the data showed that the results of the Media Expert validation from stage 1 and stage 2 have increased in each aspect. First, in the cover design aspect, which obtained a percentage average of 76.67% in stage 1 with the feasible criteria, it increased to 83.33% with the very feasible criteria in stage 2. Second, in the aspect of the suitability of the contents of stage 1, obtained a percentage average of 72% with the feasible criteria and an increase in stage 2 with a percentage average of 80% with the very feasible criteria. Third, in the overview aspect, which initially obtained a percentage average of 80% with the feasible

criteria in stage 1, it became 85% with the very feasible criteria at the second validation stage.

Islamic Values Integration Expert

In the validation of the expert of integration of Islamic values, the expert provided suggestions for the evaluation of digital comic products so that validation was carried out in two stages. In the expert's assessment of the integration of Islamic Values, there is only one aspect, namely the aspect of Islamic integration. The results of the validation of the two stages can be seen in Table 5 and Table 6 below.

Table 5. The Validation Results by Islamic Values Integration Expert in Stage 1

Aspect	Islamic Values Integration Expert I		Islamic Values Integration Expert II		Average of Percentage	Criteria
	Score	%	Score	%		
Integration of Islam	28	93.33%	28	93.33%	93.33%	Very Feasible
Total Average					93.33%	Very Feasible

Table 6. The Validation Results by Islamic Values Integration Expert in Stage 2

Aspect	Islamic Values Integration Expert I		Islamic Values Integration Expert II		Average of Percentage	Criteria
	Score	%	Score	%		
Integration of Islam	28	93.33%	29	96.67%	95%	Very Feasible
Total Average					95%	Very Feasible

Based on Table 5 and Table 6, there are differences in the validation results from stage 1 and stage 2. In stage 1, the percentage average was 93.33% and increased in stage 2 with a percentage average of 95%. From the two stages of validation, they obtained the very feasible criteria. The comparison of the validation results from stage 1 and stage 2 can be seen in more detail in Figure 6.

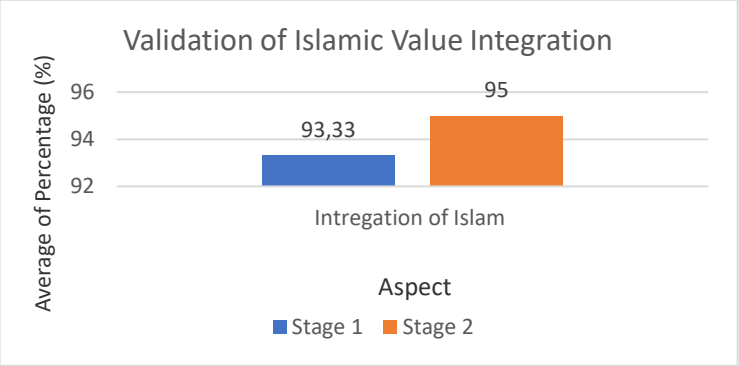

Figure 6. The Comparison of Validation Results by Islamic Expert

Based on Figure 6, the data showed that there was an increase in the assessment by the Islamic values integration expert at stages 1 and 2. In stage 1 the average percentage was 93.33% and in stage 2 it increased to 95% with the criteria very feasible for both validation stages.

Product Trial

After the comic-based mathematic learning media which developed by researcher was evaluated based on expert recommendation then has been declared suitable by the experts, then the product trial was conducted on a limited scale to 10 seventh grade students of MTs NU Hasyim Asy'ari 03 Kudus. After trialing the product, the students filled out a questionnaire to find out the student's responses to the learning media that the researcher developed after using it. The results of the student response questionnaire can be seen in Table 7.

Table 7. The Results of the Student Response Questionnaire

Question Number	Students									
	1	2	3	4	5	6	7	8	9	10
Question 1	5	5	5	5	5	5	5	5	5	5
Question 2	5	5	5	5	5	5	5	5	5	5
Question 3	4	5	5	5	4	5	5	5	5	5
Question 4	5	5	5	5	5	5	5	5	5	5
Question 5	5	5	5	5	5	5	5	5	5	5
Question 6	5	5	5	5	5	4	5	5	5	5
Question 7	5	5	5	5	5	5	5	5	5	5
Question 8	5	4	4	5	5	5	5	5	4	5
Question 9	5	5	5	5	5	4	4	5	5	5
Question 10	5	5	5	4	5	4	5	5	5	4
Question 11	4	5	5	5	5	5	4	4	5	5
Question 12	5	5	5	5	5	5	5	5	5	4
Question 13	5	5	5	5	5	5	5	5	5	5
Question 14	5	5	5	5	5	5	5	5	5	5
Question 15	5	5	5	5	5	5	5	5	5	5
Total Score	73	74	74	74	74	72	73	74	74	73
Average	73.5									
Percentage	98%									
Criteria	Very Feasible									

Based on Table 7, it was known that the digital comic learning media product that had been developed gets a positive response from students as users with a percentage average of 98% and was included in the very feasible criteria.

Disseminate

The comic-based mathematic learning media was disseminated online through a website (Arthamevia, 2022). Moreover, the digital comic product was also disseminated by teachers through the whatsApp group of class VII students of MTs NU Hasyim Asy'ari 03 Kudus in PDF form. This stage was conducted therefore, the digital comic products could be used in the implementation of mathematics learning on a wider scale.

Discussion

The researcher used a Four-D (4D) model consisting of define, design, develop, and disseminate for developing digital comics based on the ethnomathematics of *kretek* dance integrated with Islamic values. Based on the results of the analysis in stage define, the researcher determined digital comic media that was created by using a webcomic named Pixton. The determination of this media is by the economic factors, because of minimizing the costs for making learning media but with maximum results (Mashuri, 2019). Then the output of the digital comic based on the ethnomathematics of the *kretek* dance which is integrated with Islam is a webcomic. The digital comics form can be timeless, it does not have a period limit. In addition, digital comic also facilitate the dissemination process so that it can be more effective and efficient (Yasni, 2018).

The digital comic that the researcher developed is integrated with Islamic values so that students are not only able to solve math problems but also have good morals and religious attitudes (Wahyuni, 2019). Based on the definition of education the Republic of Indonesia Law No. 20 of 2003 Article 1, known that the purpose of education is not only to make students have potential in science but also to make students become human beings with faith and noble character. The integration of mathematics with Islamic values can also help in realizing the goals of education and improving the quality of education to balance between the intellectual aspect and spiritual aspects (Mutijah, 2019).

Correlating a culture in mathematics learning makes mathematics material can be more easily understood and have benefits for life extensively and optimally (Dominikus, 2021). *Kretek* dance is one of the cultures that can be explored in terms of ethnomathematical concepts. The movement in the *kretek* dance contains ethnomathematical concepts such as angular geometry, two-dimensional geometry, counting activities, and transformation geometry (Sa'adah, Haqiqi, & Malasari, 2021). In this study, researchers took the concept of angular geometry to be included in the digital comic product because comics are effective as a learning medium for lines and angle material (Ula, Kristanti, & Mursyidah, 2019).

Digital math comics based on ethnomathematics integrated with Islamic values are feasible because they have met the feasibility of experts and responses by students in product trials. Based on the research that has been carried out by Nida, Buchori, and Murtianto (2017) it is known that the feasibility of a learning media can be obtained from the validation of experts in the field and analysis of the assessed aspects. Then do the calculations with the formula to produce a percentage of feasibility. After obtaining a percentage of the feasibility of the product developed,

a trial is carried out to students. In another study, it was stated that after obtaining appropriate criteria from experts, a limited trial was carried out to see how students responded to the developed media products (Rahmatullah, Suryani, Fatmawati, Merdekawati, & Yahya, 2020).

Based on the stages of development and related research that has been carried out by Nida, Buchori, and Murtianto (2017), Febriani, Ratu, and Rahman (2020), and Rahmatullah, Suryani, Fatmawati, Merdekawati, and Yahya (2020) digital comic learning media based on the ethnomathematics of *kretek* dance that is integrated Islam developed in this study can be claimed as suitable media in learning mathematics because it gets the feasibility assessment from the experts and the responses of students as users in a limited-scale trial. The results of this study are commensurate with the results of research conducted by Nida, Buchori, and Murtianto (2017) which states that learning using *comic math* with an ethnomathematical approach is more effective than conventional learning. However, the difference is that the products produced in this study have not been integrated with Islamic values. In addition, research stated that the development of comic math on quadratic function material was in the valid, effective, and practical categories (Adeliyanti, Suharto, & Hobri, 2018). Meanwhile, the results of another study in 2019 by Fitrianingsih, Suhendri, and Astriani (2019) also stated that the mathematical comic learning media developed with the ASSURE floating research model was in the appropriate category and could increase the learning interest of junior high school students.

Based on the researcher's analysis of previous studies, it is known that there has never been a study that has developed digital comic learning media with an ethnomathematical approach that is integrated with Islamic values. Besides that, there has also been no development of a mathematical comics based on the local culture of the Kudus district, namely a dance called the *kretek* dance. Therefore, the results of this study can add to the scientific repertoire of adding theories in the world of mathematics education in the form of digital comic learning media based on the ethnomathematics of Islamically integrated *kretek* dance. The researcher hopes that future studies can integrate mathematics material with other regional local cultures with the integration of other sciences, such as science, social, technology.

Conclusion

Learning media for a digital comic based on the ethnomathematics of *kretek* dance integrated with Islamic values is developed using a 4D development model. At the define stage, the researcher does an initial analysis by conducting

observations and interviews with teachers and students. The results showed that there was a lack of student activity, learning media was limited, and the methods used were conventional. Then at the design stage, digital comic media developed using a webcomic program called Pixton. After that, proceed with selecting the format and the initial design of the product. At the develop stage, it was carried out by validating the product to material, media, and Islamic values integration experts, and also conducted trial products. The results of the assessment of experts in the validation of material experts, media experts, and integration experts of Islamic values show that digital comic learning media based on the ethnomathematics of *kretek* dance and integrated Islamic values get the very feasible criteria with a percentage average of 88,89%, 82,78%, and 95%. The results of the limited-scale product trial on students as users also received a positive response with a percentage average of 98% so the digital comic learning media developed in this study is very feasible to be used in the mathematics learning process. At the last stage, namely disseminate stage, digital comic products are disseminated online. In this study, product trials were only conducted on a limited scale due to the limitations of researchers and infrastructure. The assessment carried out only determines the feasibility of the product. Based on some of these shortcomings, the researchers suggest improvements to further studies by conducting large-scale trials and assessing the effectiveness and practicality of the products that have been developed. From this research, it is hoped that the part of education can see more broadly the problems that occur in education and know the steps to solve them. It can also be seen that the realization of two-way learning that actively involves students can be done by connecting three essential elements, namely technology, culture, and Islamic values, in the form of mathematical digital comics. Mathematics learning activities can run better by developing appropriate learning media according to student needs. This research also can encourage teachers to explore more about learning media that can integrate mathematics material with other regional and local cultures with the integration of other sciences, such as science, social, and technology, to help transfer academic knowledge to students.

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