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Development of a teaching media: Powtoon as a learning media for arithmetic

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Abstract

Mathematics is a fundamental science that characterizes the advancement of modern technology. Powtoons are used to explain mathematical concepts attractively, to students' conceptual understanding of mathematics. This study explores how media developed using the Powtoon application can enhance students' understanding of mathematical concepts. This study used the research and development (R & D) method with the ADDIE model. Furthermore, data was obtained from 30 students in a Junior High school. The instruments used include a validation sheet of teaching materials, teacher and student practicality assessment sheets, and tests of students' mathematical understanding abilities. The overall data obtained indicated that students' responses to Powtoon media are good. Based on observations, students like it, but there are a small number of students who feel stiff when learning with Powtoon media. Meanwhile, the teacher's response was high, and this indicated that the teacher felt very helped by the presence of Media Powtoon. In the limited trial phase, the results of teacher and student assessments generally gave practicality assessments, with an average being in the "practical" category. Meanwhile, in the field trial, the result showed that mathematical understanding ability was significantly better than the average pretest.

Keywords: ADDIE models; arithmetic material; learning technologies; mathematical understanding; Powtoon media.

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1. INTRODUCTION

Mathematics is a basic science that underpins the development of technological advancements, plays an essential role in many professions, and improves thinking skills. Furthermore, it is an essential part of the core program and is essential for success in today's workplace as well as in everyday life (Cueli et al., 2019; Laurens et al., 2017). Mathematics is a discipline of knowledge that has structure and a strong and clear relationship between one concept and another (Ratnawulan & Kania, 2020). Learning mathematics emphasizes the thinking process in the order of several logical and systemic steps (Bezanilla et al., 2021; Csapodi & Hoffmann, 2021; Laurens et al., 2017) to solve a particular problem (Dewanti et al., 2020). Also, it is important to know mathematics because individuals with strong personal knowledge (Norton, 2019) have a significant role in 21st-century thinking (Vale, 2018). Mathematical competency is a set of characteristics that describe a person's knowledge, skills, and activity approaches (Alpysov et al., 2017). It encompasses the abilities of creativity, critical reasoning, problem-solving, decision-making, communication, teamwork, and information literacy (Maass et al., 2019; Sönmez & Alptekin, 2020; Suryadi & Santoso, 2017). Therefore, mastery of mathematical concepts is necessary and needs to be correctly understood from an early age.

In learning mathematics, the students need to understand the concept. This is because when an individual already understands a concept, it will be easy to solve the problem. By understanding a concept, students will find it easy to improve their procedural knowledge (Yuliani & Suragih, 2015). Mastery of content is included in conceptual understanding, which can be formed and established through various relationships between current knowledge and prior knowledge and transmitted through recovery techniques (Donevska-Todorova, 2016). Therefore, they have strong basic math skills that lay the foundation for future academic success in modern Western societies (Rathé, 2018).

In reality, Mathematics subject is still considered difficult by students and many dislike their classes. Students have difficulty in learning and may not be certain whether they like the subject or not (Uchida & Mori, 2018). Also, students gave different reasons, such as mathematics is hard, boring, and mostly irrelevant (Brunkalla, 2009). Students who lack information may get progressively irritated and fail to seek the assistance they require to advance. (Smalley & Hopkins, 2020). PISA 2018 showed that only "about 1% of Indonesian students could model complex situations mathematically" (OECD, 2019). In Indonesia, mathematics is a subject with the lowest score compared to others on the National Examination (UN) in 2019.

UN is a national evaluation system of basic and secondary educational standards and the equality of education quality levels between regions carried out by the Center for Educational Assessment. Abduh et al., (2019) recorded that Education quality is an activity that evaluates students' competencies attainment in certain subjects using the Competency Standards (SKL). Educational quality and equity are the key priorities indicated in policy documents of national governments and international organizations (Jakaitienė et al., 2021).

Islamic Junior High School is an educational institution in Indonesia (Purwati et al., 2018), which uses a madrasah curriculum consisting of 70% general subjects and 30% religious lessons (Tan, 2014). Therefore, the inculcation of religious values in schools and families becomes very important (Ikhwan et al., 2019). The MT scores for UN in West Java Province and Majalengka Regency place mathematics as a subject with the lowest average compared to others. Suryadi and Santoso (2017) reported that the students' mathematics performance is still considered low. Furthermore, student involvement is often poor, with negative feelings and undesirable attitudes toward a material that is frequently mentioned by multiple pupils (Clarkson et al., 2019). This is because it usually causes more negative reactions among students compared to other subjects (Hill et al., 2021). In the UN for MTs, there are four subjects, namely Bahasa Indonesia, English, Science, and Mathematics (Abduh et al., 2019).

Based on the problems above, there is a need to develop mathematics learning resources that pay attention to cognition. The observed annual poor performance of students at these UN subjects necessitates the concern to find the longer-lasting solutions to this dilemma (Fatade et al., 2013). Also, low mathematics ability has been identified as a key underlying factor in poor understanding (Koponen et al., 2019; Rolison et

al., 2020). In addition, student's prior knowledge that does not match scientific concepts is a major problem in learning (Fratiwi et al., 2020).

The use of computers as a tool in information technology has great potential to improve the quality of learning, especially in mathematics (Valverde-Berrocoso et al., 2022; Drijvers & Sinclair 2024). Technologies have continuously had significant impacts (Kaharuddin, 2019; Weinhandl et al., 2021) and become a vital component of daily lives (Powell et al., 2020), transformation of education, and learning conceptions (Chang et al., 2018). The potential of educational technologies to promote student engagement is being investigated (Kania, & Kusumah, 2023; Schindler et al., 2017), and the mathematics classroom is no exception (Bond, 2020; Weinhandl et al., 2021). Therefore, educational institutions need to transform teaching-learning activities through technology to meet the demands of society in the 21st century (Salas-Rueda et al., 2020; Weinhandl et al., 2023; Trgalová & Tabach 2023).

Currently, a lot of computer software is used to facilitate learning (Ye et al., 2023). This study employed Powtoon, an application frequently utilized by entrepreneurs to create visually appealing presentations and explainer videos for their companies. This application can present a project which is delivered interactively. Its virtual communication using short videos and animation allows the entire team to achieve more, regardless of the kind of work being carried out (Powtoon, 2022). It is used by 96% of Fortune 500 companies, Ivy League universities, and top Small and Medium-sized Businesses, agencies and presentations use an intuitive drag-and-drop interface with infinite versatility (Barbosa & Vale, 2023; Powtoon, 2019). Based on this, the researcher uses Powtoon in learning mathematics with the aim that mathematical material can be displayed in an attractive and easy-to-understand way.

When Powtoon is used in mathematics instruction, students find topics more appealing, interesting, and engaging. To improve understanding and learning, this program uses visually appealing films that include captivating sounds and graphics to convey mathematical concepts. Because of Powtoon's captivating multimedia approach, it is therefore expected that incorporating it will improve students' comprehension and understanding of mathematical ideas. Furthermore, the application easily creates unique and beautiful videos and presentations (Powtoon, 2019). It is a visual communication tool that allows you to make professional, fully personalized videos (Morales-López et al., 2023; Powtoon, 2022).

The predicted impact of using Powtoon-based mathematics teaching tools, which incorporate animated presentations and explainer movies with religious values, in the Majalengka Regency is expected to greatly improve pupils' understanding of mathematical topics. The research team endeavors to enhance the educational experience by combining technology and adding spiritual principles into the learning process, to foster engagement and meaning. Methods of calculation to ascertain precision, thoroughness, and a thorough mindset are necessary for the outcomes of answers based on theorems or definitions. This has to do with the cautious and straightforward approach of the interpreter (Fitriyani, D., & Kania, 2019).

1.1. Purpose of study

This novel methodology not only utilizes multimedia resources for efficient pedagogy but also cultivates a comprehensive comprehension of mathematics by integrating it into a wider cultural and ethical framework. This approach has significant potential for transforming mathematics education and fostering the development of people with comprehensive skills in the Majalengka Regency. The question of this research is how valid and effective Powtoon-based mathematics teaching materials, especially animated presentations and explanatory videos, in improving learning outcomes.

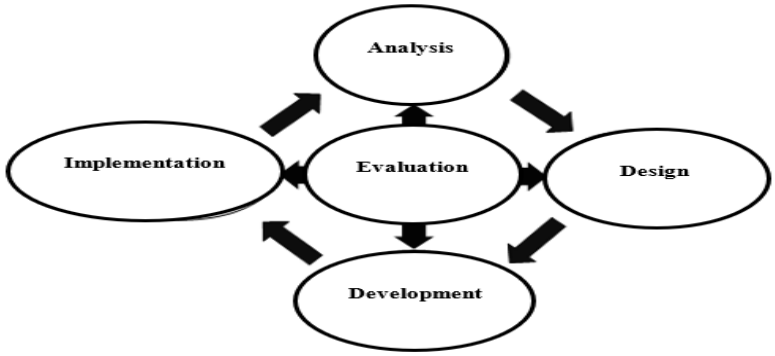
2. METHODS AND MATERIALS

2.1 Research design

This study makes use of the research and development (R&D) model, a methodology known for its efficacy in product development and assessing its usefulness (Sugiyono, 2015). This study centers on designing and implementing a mathematics instructional module incorporating a scientific methodology.

Figure 1

ADDIE model development stage



This study was designed as an R & D with the ADDIE version of the development model (figure 1). The user's text is empty. The process is segmented into five distinct phases: analysis, design, development, implementation, and evaluation, sometimes referred to as ADDIE. The R&D method is among the most widely used in instructional design to lead the creation of a straightforward and easy-to-learn product (Hidayanto et al., 2017) and acts as a cognitive framework that organizes and facilitates the development of instructors (Alsaleh, 2020). R & D refers to a systematic process that uses the arts, sciences, learning, and learning theory to help create and develop effective, engaging, and efficient learning materials in a supportive environment (Aldoobie, 2015). The visual representation below illustrates the sequential order in which various scientific endeavors have occurred.

The research method is comprised of five separate steps (table 1), each rigorously delineated to ensure efficient implementation. The first phase of the process involves doing an analysis, which encompasses a thorough evaluation of needs, identification of problems, and task analysis to clearly define the intended learning objectives for students. Following this, the subsequent phase involves the design process, which involves the development of a comprehensive and detailed blueprint. In the subsequent phase, the development stage facilitates the transformation of the conceptual design into a concrete and perceptible manifestation. The implementation phase signifies the practical execution of the developed learning system. The evaluation step is a crucial process that involves a thorough assessment to determine the extent to which the system has achieved its intended objectives, as outlined in the initial expectations (Wiyani & Prihantono, 2014).

Table 1

Contextualize each stage for creating a powtoon application using the ADDIE Model

Stage	Activity	Output
Needs Analysis	Action taken: Student analysis. At this stage, the needs of students to achieve an appropriate learning environment should be identified. Learning Goal Analysis. Setting clear goals for specific guidelines at this stage will save time and energy and allow more focus. At the end of the needs analysis, the goals and what students will learn should be clear.	Process Flowchart Survey Results menu documentation required
Design	This design phase is about the implementation of the guidelines. There are two projects to be completed, (1) An evaluation-design. Assessment of learning outcomes in a subject is crucial, but it is important to select a tool that can be evaluated before designing and qualifying. (2) Design the income form. At this point, the class form is selected (3) Establish a learning strategy	Design of interface
Development	Sort the functions of each menu.	Function document Powtoon Learning Application
Implementation	Conduct training for users Prerape students Prepae a conducive learning environment	Training application Infrastructure checklist
Evaluation	Test your education app with questionnaires and design tests	Questionnaire document Evaluation result

2.2 Participants

The data used in this research was obtained from a sample of 30 students studying at level 8 at a school in Majalengka. The selection of participants from certain classes was purposeful to ensure a representative sample of students from a variety of backgrounds within the institution. The current enrollment status of the participants and their willingness to participate in the study served as the basis for these sample selection criteria. In addition, the selection of Grade 8 students at a school is based on their ability to accurately represent the target group investigated. This particular course comprises a diverse range of academic talents, socio-economic statuses, and cultural viewpoints, offering a valuable and all-encompassing data set for conducting research (Gamage et al., 2021). The choice of a particular school in Majalengka was considered important because of its ability to accommodate a heterogeneous student population, thus potentially providing a valuable perspective in the broader scope of research. Additionally, the institution is renowned for its unwavering focus on providing high-quality education and creating an environment that supports learning. It is hoped that the data obtained from this carefully selected sample will yield significant insights that will enhance the comprehensive understanding of the research subject.

2.3 Data collection instrument

The study utilized a diverse range of devices to systematically collect data for the investigation. The instruments utilized in this study encompassed various tools to gather data and assess different aspects of the research. These instruments consisted of (a) a semi-structured questionnaire designed to obtain information related to the needs assessment, (b) semi-structured interview guidelines aimed at capturing responses from both students and teachers regarding Powtoon-Based Mathematics Teaching Materials, (c) a validation sheet to ensure the accuracy and relevance of the materials, (d) a practicality assessment sheet to evaluate the usability and effectiveness of the materials, (e) tests specifically tailored for assessing the Powtoon-Based Mathematics Teaching Materials, (f) an observation sheet for recording real-time classroom dynamics and interactions, (g) a guide for assessing the learning process, and (h) a documentation tool to meticulously record and analyze the implementation process. The selection process for these instruments was conducted with great attention to establish a comprehensive range that would facilitate a strong and multidimensional approach to data collection. This strategy was implemented to ensure a thorough examination of the study objectives.

2.4 Analysis

The evaluation of the instructional materials involved the examination of four specific criteria: validity, practicality, effectiveness, and the analysis of student response surveys. The validation data underwent a comprehensive quantitative examination and were subsequently classified into five unique groups. Subsequently, these categories were employed to compute the mean value, facilitating a comprehensive assessment. The following table 2 demonstrates the process of converting quantitative data into qualitative categories.

Table 2

Categorization of quantitative data conversion into qualitative data

Value	Score Interval	Category
A	$X > \bar{X}_i + 1{,}5\ Sbi$	Very Good
B	$\bar{X}_i + 0{,}5\ Sbi < X \leq \bar{X}_i + 1{,}5\ Sbi$	Good
C	$\bar{X}_i - 0{,}5\ Sbi < X \leq \bar{X}_i + 0{,}5\ Sbi$	Enough
D	$\bar{X}_i - 0{,}5\ Sbi < X \leq \bar{X}_i - 0{,}5\ Sbi$	Not enough
E	$X \leq \bar{X}_i - 1{,}5\ Sbi$	Very low

The implementation of a rigorous categorization procedure significantly facilitated the execution of a full evaluation of the instructional materials, ensuring a clear comprehension of their reliability and credibility. The use of this methodical technique facilitated a thorough analysis, empowering educators to make informed decisions in choosing materials that align with educational objectives and standards. Consequently,

this approach not only enhanced the caliber of instructional resources but also strengthened the overall efficacy of the educational syllabus.

The evaluation of the feasibility of the media that has been created is an essential component of this examination. The objective of this study is to determine whether the media produced adheres to standards of practicality. In this particular context, practicality is assessed based on several essential factors. These criteria function as standards by which to assess the efficacy and viability of the media. The obtained data were subsequently classified according to their practicality, as outlined in Table 3.

Based on the evaluations conducted by both instructors and students, the media that has been created can be classified as belonging to the category of "readily implementable. This implies that the media possesses a user-friendly nature and may be effortlessly integrated into the educational process.

Table 3

Categories of Practical Learning Powtoon Media

Value	Score Interval	Category
A	$X > \bar{X}_i + 1{,}5\ Sbi$	Very Practical
B	$\bar{X}_i + 0{,}5\ Sbi < X \leq \bar{X}_i + 1{,}5\ Sbi$	Practical
C	$\bar{X}_i - 0{,}5\ Sbi < X \leq \bar{X}_i + 0{,}5\ Sbi$	Somewhat Practical
D	$\bar{X}_i - 0{,}5\ Sbi < X \leq \bar{X}_i - 0{,}5\ Sbi$	Not Practical
E	$X \leq \bar{X}_i - 1{,}5\ Sbi$	Impractical

Moreover, it was determined that the rate of successful implementation of learning activities reached a satisfactory threshold of at least 80%. This observation suggests a notable degree of pragmatism, thereby confirming the media's successful fulfillment of its designated objectives (Kania et al., 2023).

Table 3 presents a comprehensive overview of the specific categories employed for the classification of the practicality of Powtoon-based learning media. These categories are determined based on the calculated values and their accompanying score intervals. The categories encompass a spectrum of practicality, spanning from very practical to impractical." This classification system provides a well-defined and organized framework for evaluating practicality.

Furthermore, the efficacy analysis aimed to determine the influence of the created educational resources. This achievement was attained through a meticulous analysis of the data obtained from both initial and final assessments. The objective of this study was to assess the effectiveness of the Powtoon-Based Mathematics Teaching Materials with Islamic Values by analyzing the performance of participants before and after their exposure to these instructional resources. This comparison allowed us to evaluate the extent of improvement and determine the overall efficacy of the materials. This approach yielded significant findings on the degree to which the instructional materials had a favorable impact on the student's educational achievements. Moreover, it facilitated the formation of well-founded judgments regarding the overall efficacy of the research intervention.

The questionnaires and student answer surveys played a crucial role in assessing their perception of the instructional materials that were based on Powtoon. The questionnaires were intentionally designed to obtain targeted feedback and gain valuable insights from the students. A systematic evaluation was conducted using a Likert scale framework that included four distinct categories: (1) "strongly agree" (abbreviated as SS), (2) "agree" (abbreviated as S), (3) "disagree" (abbreviated as DS), and (4) "strongly disagree" (abbreviated as SDS). The use of this scale facilitated a comprehensive comprehension of the students' emotions and viewpoints about the Powtoon materials. This process yielded significant numerical information that could be subjected to further examination to derive substantial insights into the general effectiveness and reception of these materials among the student population. The use of this scale introduced a quantitative element to the qualitative observations obtained from the questionnaires, augmenting the comprehensiveness and robustness of the research.

3. Results

3.1 Analysis

One of the activities at the analysis stage using ADDIE is a preliminary study. At this stage, an analysis of the student's and teachers' needs was carried out. This stage is a process of defining what will be learned from students, such as conducting a need assessment (needs analysis), identifying problems, and conducting task analysis. There are five stages, namely (a) student analysis (b) analysis of instructional objectives (c) development instructional analysis, and (d) developing learning objectives. This stage was carried out through field observations and literature studies. The first step in any process is to ascertain the current state of operations, which includes the online course redesign process (Abernathy, 2019).

In the field observation activity, a questionnaire of needs was distributed to mathematics teachers and students. Furthermore, an in-depth interview was conducted to obtain information about the state of the school, the student's condition, as well as the availability of teaching materials. Based on the needs and reference analysis, several results were obtained, namely:

(1) The material delivered as close to real life
(2) The illustrations presented can support students' understanding
(3) Presentation of material from simple to complex levels and given examples and exercises.
(4) The media used can use animation and sound simultaneously

3.2 Design

The design stage is for implementing the instructions at analysis. In other words, making strategies that can be done to achieve learning objectives Goals and objectives are created but not completed at this stage, learning activities are imagined, media selection is determined, and assessment methods against the goals are sketched out tentatively. Goals and objectives are created but not completed at this stage, learning activities are imagined, media selection is determined, and assessment methods against the goals are sketched out tentatively (Allen, 2017).

The design process begins with the collection of data obtained from a thorough examination of the requirements of both students and teachers. Subsequently, the educational framework at MTs conducted a comprehensive analysis of the survey results. To enhance the depth of this phase, a group discussion forum (FGD) was organized, comprising distinguished professionals in the fields of mathematics teaching material development and program design. The collaborative discussion during the focus group discussion (FGD) resulted in significant decisions. These decisions include: (1) ensuring that the teaching materials created using Powtoon align with the relevant curriculum of the mathematics teachers (MTs); (2) ensuring that the materials can effectively communicate mathematical concepts to enhance understanding; (3) requiring validation by end-users; (4) integrating Islamic concepts in a way that is compatible with the relevant mathematical teachings; and (5) demonstrating the potential to improve students' proficiency in comprehending mathematical concepts. Each design iteration was accompanied by a comprehensive narrative, elucidated through the use of the Powtoon platform.

A meticulous data-driven approach to the design process was evident, starting with a thorough analysis of the unique needs of students and instructors. Each design iteration was accompanied by a comprehensive narrative, elucidated through the use of the Powtoon platform. The foundation was strengthened as the outcomes of the questionnaires were carefully cross-referenced with the curriculum implemented at MTs. To enhance the quality of the design, a group discussion forum (FGD) was organized, inviting renowned experts in the domains of mathematics teaching material development and program design. A series of crucial judgments arose from this amalgamation of expertise: (1) Ensuring the alignment of Powtoon-based teaching materials with the corresponding MTs curriculum in a cohesive manner (2) Enhancing the clarity of mathematical concepts through the incorporation of articulate materials (3) The necessity for validation by end-users (4) The smooth integration of Islamic concepts into the current mathematical teachings (5) The capacity of the resources to promote improved understanding of mathematical ideas among students A

comprehensive narrative complemented each design iteration, skillfully communicated using the interactive medium of Powtoon.

3.3 Development

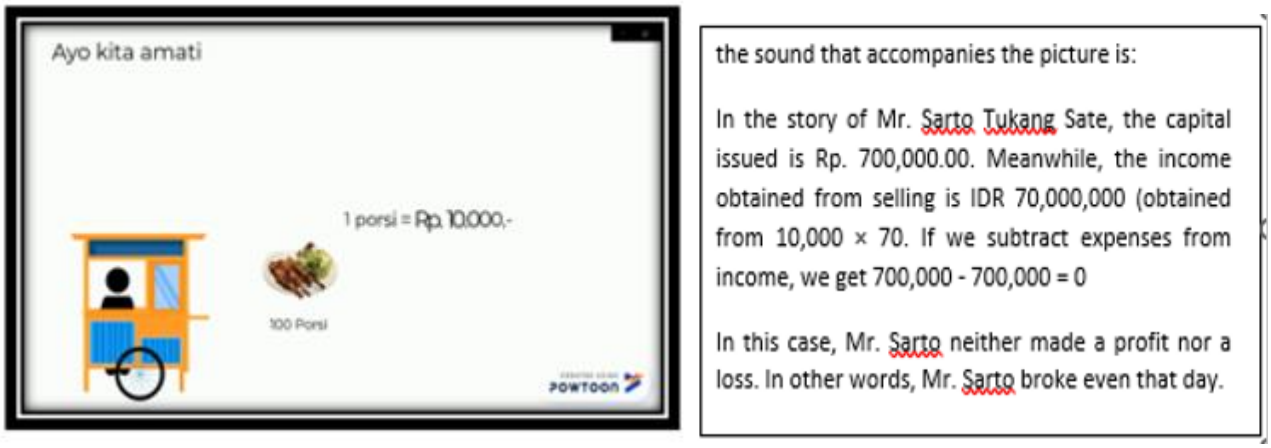
The Powtoon educational materials, which incorporate religious beliefs, have undergone a thorough validation process under the supervision of qualified professionals. The examination examined key elements, including the quality of training, methods of assessment, and level of linguistic competency. The panel of validators consisted of individuals with expertise in academia and practical experience in the field of education, guaranteeing a thorough and equitable evaluation.

A team of recognized specialists ran a rigorous validation process on Powtoon teaching materials infused with religious principles. The assessment conducted in this study includes key components such as clarity of instruction, effectiveness of assessment, and competency in language usage. The validation panel was comprised of individuals with extensive academic backgrounds as well as substantial experience in the field of education, thereby ensuring a comprehensive assessment. To illustrate this concept, let us examine the design of instructional materials utilizing Powtoon effectively (figure 3).

Making a draft that was closely related to the original concept served as the starting point for the developmental phase. The execution of this phase was conducted with great attention to detail, incorporating findings from a thorough requirements analysis, engaging in focus group talks with experienced professionals in material and media, and conducting a thorough examination of heritage studies relevant to the curriculum used in MTs. Significantly, an esteemed design authority who also serves as a lecturer in the Informatics Study Programme provided invaluable assistance in facilitating this process. Following that, the instructional materials that were created went through a thorough validation process to confirm their effectiveness. A thorough analysis of the supporting instructional materials improved the validation process and resulted in the creation of a comprehensive finished product.

Figure 3

Powtoon-based teaching material design



In general, the development phase exhibited a methodical approach that incorporated research, talks with experts, and thorough validation, culminating in a comprehensive collection of instructional materials and accompanying media.

Powtoon is a highly interactive and captivating platform that has several possibilities for the development of educational resources. This novel application enables instructors to generate visually captivating presentations, seamlessly integrating religious themes and concepts. By utilizing the various capabilities offered by Powtoon, educators can engage their pupils through the use of dynamic animations and interactive components, thereby fostering a more profound comprehension of mathematical ideas. The UI of the platform is designed to be user-friendly, providing educators with the ability to personalize information that is integrated into the learning process. By utilizing Powtoon, educational resources have the potential to

surpass conventional methods and serve as an influential medium for imparting and reinforcing significant mathematical principles.

Moreover, the integration of religious principles into instructional materials based on Powtoon offers significant depth to the educational experience. By integrating spiritual discernment and ethical direction into these educational resources, educators possess the capacity to deeply motivate pupils. The visual storytelling capabilities of Powtoon facilitate the effective depiction of religious narratives and lessons, thereby engendering a lasting impression on individuals engaged in the learning process. Moreover, the versatility of the platform guarantees the accommodation of diverse religious traditions and beliefs, fostering inclusivity and promoting a diverse educational experience. The integration of dynamic capabilities with Powtoon's religious principles fosters a transforming educational setting that promotes both intellectual advancement and spiritual maturation.

Based on the validity analysis table of the four validators, it can be concluded that the Powtoon-based teaching materials containing religious values are in a very good category. However, in addition to providing an assessment of the validity, there are several suggestions from validators regarding improvements as follows. The validation resultsfrom expert validators and users are presented in the following Table 4.

Expert validators have recommended using slower and more repetitive media-serving methods to assist young individuals with inferior cognitive capacities in understanding the presented subjects. A thorough analysis of the supporting instructional materials improved the validation process and resulted in the creation of a comprehensive finished product. The purpose of this modification is to optimize the learning experience of individuals by offering a tempo and level of repetition that are tailored to their specific learning requirements. In The endeavor to improve the audio fidelity of the video, Validator I provided vital suggestions to augment the intelligibility of the audio soundtrack. The user's comments stood out for their insightful nature, with a focus on implementing changes that would ultimately lead to an improved aural experience that is both lucid and simple for the audience to understand.

In contrast, Validator II placed significant emphasis on the prioritization of more precise and concentrated visual presentations. The user's input emphasized the necessity of increased visual accuracy, asking for a degree of lucidity that would enable viewers to perceive intricate elements easily. This tip is crucial in ensuring the video provides a visually captivating experience. In the discourse, Validator III made a significant contribution by advocating for the reduction or elimination of extraneous animations. This astute recommendation is in line with the overarching objective of optimizing the visual components of the video, guaranteeing that each animation fulfills a specific purpose and adds substantial value to the entire material. By adhering to this guidance, the video has the potential to enhance its coherence and purposefulness in terms of its visual storytelling.

Table 4

Results of analysis of the validity of powtoon-based teaching materials

Validator	Total Score	Interval	Category
Expert	32	X >29,25	Very good
Validator I	34	X >29,25	Very good
Validator II	33	X >29,25	Very good
Validator III	33	X >29,25	Very good
Average	33	X >29,25	Very good

The input from the validator is mostly technical in the field, which means the material content is acceptable (table 4). Also, the validity had an average of very good category, hence, the teaching materials can be used for research purposes.

3.4 Implementation

Field testing on the ADDIE development model was the implementation phase (figure 5). This stage involved changing the plan into action, meaning that valid teaching materials will be applied to students. Only after proper analysis, design, and development can the learning objectives of the learning community

be seamlessly implemented to enable knowledge-building and promote deep learning (Zhang, 2020). Implementation on students was carried out in 2 stages, specifically, limited and field tests in the experimental class as the sample.

Figure 5

The implementation of powtoon media

3.5 Limited test

Limited testing was conducted to examine the quality of the initial product model developed on a small scale. This was carried out on one sample MTsN, namely teachers and students at MTs 2 Majalengka. This is due to time efficiency and considering the mathematics rankings of these students in moderate ability. The test was carried out on students who had obtained the material representing high, medium, and low abilities. This limited trial is known as the practicality test of the learning model. The trial results are used as the basis for improvements to the initial product to develop a practical learning model for teachers and students. The assessment results of the limited test are as follows (table 5):

Table 5

The results of the practicality assessment of Powtoon

Evaluator	Ability Category	Average Total Score	Interval	Practicality Category
Teacher	-	59	X >58,5	Very Practical
Student	High	36,6	X > 32,5	Very Practical
	Medium	30,3	27,5<X≤32,5	Practical
	Low	26	22,5<X<27,5	Practical Enough

Field trials were used to determine the practicality and effectiveness of the developed teaching materials. The practicality test of Powtoon in this trial was carried out by teachers and students.

3.6 Practical analysis of Powtoon teaching materials

Professional validators have suggested the adoption of media-serving practices that are slower and more repetitive to enhance the comprehension of offered topics among children with weaker cognitive capacities. The purpose of this modification is to optimize the learning experience of individuals by offering a tempo and degree of repetition that are congruent with their specific learning requirements.

Table 6

The results of the practical assessment of powtoon teaching materials

Student	Total Score	Interval	Category
MTsN 2 student	30,9	27,5<X<32,5	Practical
Teacher	59	X > 58,5	Very Practical

3.7 Test the effectiveness of powtoon teaching materials

Field tests were carried out on a larger sample to conduct a final trial of the developed teaching materials. This was conducted in the research class under observation using the materials developed during the learning process. Before the test, a pretest of mathematical understanding ability was conducted to know the students' initial abilities. Subsequently, the students were given a final test (posttest) to determine their final mathematical understanding ability. The field trial is known as the effectiveness test of the materials based on the results of the expected pretest and posttest abilities. The results of this trial will determine the effectiveness of the materials on the expected abilities, namely the ability to understand mathematically. Apart from that, field tests were carried out on experimental classes as samples for 4-5 meetings. Each meeting lasts 80 minutes or 2 hours of lessons with social arithmetic material.

Table 7

The Results of The Effectiveness Assessment of Powtoon Materials

Student	Percentase	Category
MTsN 2 student	77,41	Good
Teacher	81,84	Very Good

The overall data obtained is 77.41% and this concludes that students' responses to Powtoon media are good. Based on observations (table 7), students like it, but there are a small number of students who feel stiff in learning with Powtoon media. Meanwhile, the teacher's response was obtained by 81.84% and this concluded that the teacher felt very helped by the presence of Media Powtoon. The teacher gave a very good response to the presence of this Powtoon media.

3.8 Evaluation

Assessment was conducted at every phase of the ADDIE development process. During the design phase, the tutor and colleagues conducted an evaluation. Peers, teachers, and students all conducted evaluations during the development phase. Meanwhile, at implementation, students who were the subjects were asked to evaluate Powtoon-based mathematics teaching materials (animated presentations and animated explainer videos) containing religious values. The evaluation stage was carried out after applying the arithmetic teaching materials to students. This aims to evaluate learning outcomes by providing post-test questions. The main goal of this stage is to assess when the goals have been fulfilled and what would be necessary to even further improve the project's efficiency and success rate (Alodwan & Almosa, 2018).

4. DISCUSSION

This is a study on the development of Powtoon-based teaching materials with religious values. Based on the results, it can be concluded that the developed materials met the valid, practical, and effective criteria. Therefore, they can be used in learning mathematics in the classroom on a wider scale. The learning environment has an impact on the learning experiences of students (Chickasha, 2022; Bringula et al., 2021). This study consists of several development stages. At the initial product analysis and design stage, information was obtained about the state of the school, the student's condition, and the availability of materials. Furthermore, a literature study was conducted to analyze the content of mathematics that corresponds with characteristics of Powtoon's teaching materials and that religious values could be conveyed properly. Also, the material of Social Arithmetic was obtained as the subject.

At the product trial stage, the materials were tested on a small (limited trial) and a large scale (field trial). The initial stage is the expert validation test and teacher validation as a user. Based on the result, it was concluded that the teaching materials met the valid criteria with the average validity being in the "Very Good" category. The four validators assessed the developed materials by providing some suggestions for improvement. The Powtoon teaching materials containing religious values were designed with a scientific approach, which includes observing, asking, trying, reasoning, and communicating. In addition, each discussion had religious values related to the material, therefore, it can inform students about Islamic views on the subject. It is hoped that this will foster students' spiritual values. The sub-materials in the social

arithmetic material include profit and loss, profit sharing in Islam, as well as gross, net, and tara. These sub-materials are integrated with Islamic values such as honesty, sincerity, accuracy, obedience, and thoroughness (Fitriyani & Kania, 2019).

Based on the results and discussion, the ADDIE Model has been successfully implemented for evaluating students in Math subject. The media constructed under Powtoon Software, where Islamic values are inserted inside the construction, is a valid and practical media for learning mathematics. Powtoon media can be used as an option in delivering social arithmetic material, where the concept of social arithmetic is presented in an attractive and helpful animation. The limitation of this research is the students' difficulties in using technology. It is expected that students can improve their technological literacy for learning mathematics.

The overall data obtained is 77.41% and this concludes that students' responses to Powtoon media are good. Based on observations, students like it, but there are a small number of students who feel stiff in learning with Powtoon media. Meanwhile, the teacher's response was obtained by 81.84% and this concluded that the teacher felt very helped by the presence of Media Powtoon.

5. CONCLUSION

The use of Powtoon media is very effective in improving the quality of student understanding. A deeper study will us recommended to investigate future work related to the use of Powtoon media in improving students' mathematical thinking skills. This is expected to improve the quality of learning, especially mathematics in schools. The ADDIE Model has been successfully used for students' math evaluation, based on the findings and discussion.

The media created using Powtoon Software, which incorporates Islamic beliefs into the design, is a legitimate and useful tool for teaching mathematics. Delivering social arithmetic content can also be done through Powtoon media, which presents the idea in an engaging and practical animation. The difficulties students have using technology limit the research. By acquiring mathematical skills, students are expected to enhance their technical literacy.

Ethical Approval:

The complete name of the ethics committee responsible for approval was recorded, and it was verified that informed consent was received from all patients or participants involved in the study.

Authors' Contributions Statements

NK, YSK, and FMK conducted the research and conceptualization. NK conducted research under the careful supervision of FMK and YSK. YSK and FMK came up with the initial writing and manuscript review ideas. Each author examined and approved the published version of the script in addition to taking part in the discussion results.

Conflict of Interest

The writers affirm that they do not have any conflicts of interest. The funders had no involvement in the study's design, data collection, analysis, interpretation, manuscript writing, or decision to publish the results.

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