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USE OF F-MATH MEDIA WITH A RELIGIOUS NUANCE AND STUDENTS' CREATIVE THINKING ABILITIES ON COGNITIVE AND AFFECTIVE ABILITIES IN MATHEMATICS LEARNING

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Abstract

Social media plays a significant role in the daily lives of students and holds strong appeal, especially among younger generations. Its integration into learning, particularly when contextualized with religious values, offers new opportunities for enhancing students' engagement and attitudes toward mathematics. This study investigates the use of *F-Math media with a religious nuance* in fostering students' creative thinking and improving their cognitive and affective abilities in mathematics learning. This research used a qualitative approach involving observation, interviews, and document analysis. The study was conducted with junior high school students who participated in mathematics learning activities using F-Math media integrated with Islamic values and delivered through social media platforms. The findings show that F-Math media based on social media effectively enhances students' participation, confidence, and motivation. The integration of religious values provides meaningful contexts that support deeper understanding of mathematical concepts. Furthermore, students demonstrated improved creative thinking skills, particularly in approaching and solving contextual mathematical problems. The results suggest that religiously nuanced F-Math media can serve as an innovative and contextual learning tool. By leveraging the familiarity and appeal of social media, and embedding moral-religious elements, students developed more positive attitudes towards mathematics and greater self-confidence in learning. This approach is particularly relevant for environments seeking to align cognitive learning outcomes with affective and spiritual development.

Keywords: *Affective Domain; Cognitive Abilities; Creative Thinking; F-Math Media; Mathematics Learning; Religious Context; Social Media in Education.*

1. INTRODUCTION

Mathematics plays a vital role in developing logical and analytical thinking and is widely applied in real-life contexts such as calculations, measurements, and decision-making [1] To enhance understanding and make learning more effective, the integration of media and technology, including social media platforms like Facebook, can enrich students' experiences, foster collaboration, and support communication [2], [3] Social networks offer a space for students to share ideas and work together in mathematics learning. Moreover, embedding religious nuances into learning is essential, as it supports students' spiritual and moral development by instilling values like honesty, justice, and respect [4], making mathematics education not only intellectually enriching but also ethically grounded.

Integrating religious nuances into mathematics learning provides a strong ethical foundation for character development by reinforcing values such as honesty, responsibility, and integrity [5] While traditional mathematics focuses on logic and analytical thinking without regard to belief systems [6], real classroom practice often lacks meaningful context and diverse media, resulting in poor understanding and low student engagement [7]. Moreover, unbalanced use of social media may reduce motivation and academic focus [8]. Therefore, incorporating religiously nuanced media into mathematics learning can help students connect abstract concepts with spiritual values, making learning more contextual, relevant, and personally meaningful [9].

Apart from that, learning mathematics using media with religious nuances can also motivate and increase students' interest in this lesson [10]. Mathematics is often considered

difficult and boring by some students. However, by integrating the principles of the religion they adhere to in mathematics learning, students can feel more connected and interested in the subject matter. Media with religious nuances such as using examples in religious stories or holy verses can help students see how mathematics can be used and relevant in contex they are familiar with and care about. As a result, students' interest and enthusiasm for studying mathematics may increase, which in turn may increase their academic achievement in this subject. Thus, learning mathematics using media with religious nuances is important because it can connect mathematical concepts with students' spiritual values and motivate their interest in this lesson.

Learning greatly influences students' cognitive and affective abilities through interactive processes that enhance understanding and analytical skills [11]. The integration of religious nuances and creative thinking in learning media has been shown to improve these abilities [12]–[14]. Models that incorporate religious values or local wisdom [15] not only deepen conceptual understanding but also foster positive attitudes and character development. Furthermore, creativity plays a critical role in learning, as it enables students to express ideas, solve problems innovatively, and connect concepts to real-life situations [16]–[18] To cultivate this, educators should design learning experiences that stimulate imagination and provide opportunities for exploration [19] Altogether, combining creative thinking with religiously nuanced media enriches both cognitive and affective domains, preparing students for the demands of the future.

Mathematics remains one of the subjects that many students find challenging, especially at the junior high school level. Its abstract nature and conventional delivery often result

in low engagement, limited participation, and underdeveloped creative thinking skills. Many students struggle to see the relevance of mathematics to their daily lives, and this disconnect can lead to a lack of motivation and a negative perception of the subject [20]. Additionally, mathematics instruction frequently neglects the affective domain, such as students' attitudes, confidence, and motivation, which are essential for meaningful and sustained learning.

In recent years, the integration of digital technology, particularly social media, into education has opened new pathways for interactive and engaging learning experiences. Social media, widely used by today's younger generation, offers a familiar and dynamic platform for delivering educational content [21]. Research has shown that social media can improve communication, foster collaboration, and enhance students' motivation. However, the use of social media as a pedagogical tool in mathematics learning, particularly when combined with religious values, remains underexplored. In Islamic education settings, integrating faith-based values with academic subjects is increasingly encouraged to foster holistic student development [22], [23] This intersection between technology, religious character-building, and cognitive skill development presents a promising area of innovation in mathematics education.

This study aims to investigate the use of social media-based F-Math media with religious nuances in enhancing students' creative thinking abilities, as well as their cognitive and affective capacities in learning mathematics. Specifically, the research seeks to understand how integrating Islamic values into mathematics instruction via social media can foster meaningful learning, boost students' engagement, and develop a more positive attitude toward mathematics. The study also

aims to contribute to the growing discourse on contextual and values-based learning in digital environments.

2. METHOD

This research employs a qualitative approach, focusing on descriptive data in the form of narratives, images, or words [24]. The study is categorized as library research, where data is sourced from literature to explore real and relevant problems [25]. The approach integrates qualitative and library methods simultaneously, particularly in connecting mathematical concepts with Quranic verses.

F-Math is an innovative learning media that leverages Facebook as a platform for delivering mathematical content and fostering student interaction. Utilizing familiar features—such as posts, comments, images, videos, and live sessions—F-Math transforms a social network into an engaging learning space. By embedding religious values into tasks and discussions, it aims to create a contextualized and meaningful learning experience, particularly in Islamic education.

Student creativity is reflected through creative projects. Figure 1 presents an instrument example to assess student creativity levels.

	Yes	No
1 When I encounter a problem, I am open-minded about the best way to solve it		
2 I am not afraid of being seen as different from other people		
3 I am stimulated by free-thinking people		
4 I find it easy to look to the future		
5 I readily generate new ideas to solve a problem		
6 I like a sense of order in my life		
7 I enjoy working with detail		
8 I prefer to have all the facts before I make a decision		
9 I dislike having to meet new people or going to unfamiliar places		
10 I like to read instructions before starting something new		

Figure 1. Example Table of Creativity Assessment for Yourself

To assess students' creative thinking in mathematics, this study uses four indicators: fluency (generating many relevant ideas),

flexibility (offering varied approaches), originality (presenting unique ideas), and elaboration (expanding ideas with detail). These indicators help evaluate creative engagement in open-ended or real-life problems.

Affective abilities are analyzed by collecting data on students' emotions, attitudes, and engagement in learning [26] as illustrated in Figure 2.

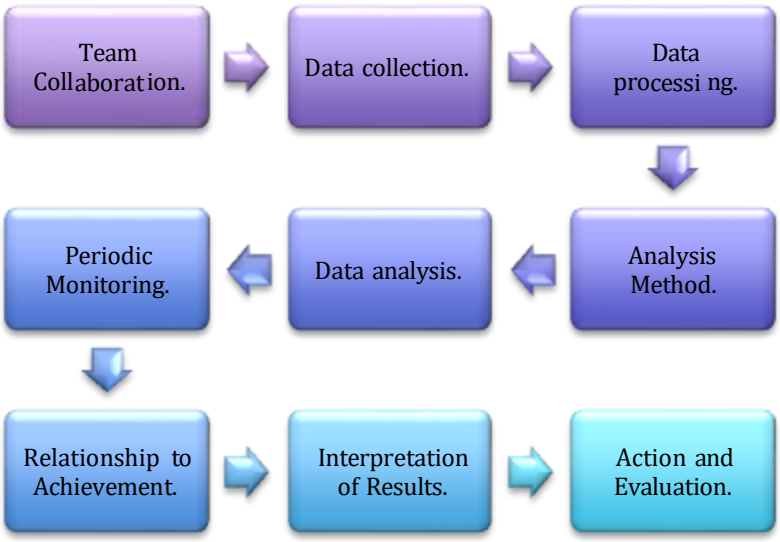

Figure 2. Affective Capability Analysis Steps

Meanwhile, when observing students, they can use the affective ability assessment sheet instrument. The following are examples of instruments that can be used:

Table 1. Affective Ability Assessment Instrument

No	Type/ Aspect Attitude	Description	Score	Assessment Strategy
1	Have faith and piety to God Almighty	Carryout activity religious	Max 20	Observation Journal activity
2	Noble Barakhlak	Respect the people in the environment school classes	Max 20	Observation
3	Responsible answer	Finish task with ability Alone	Max 20	Observation

4	Independent	Carry out task without must wait order	Max 20	Observation Instruction task
5	Empathize towards other people	Cares about society/friends class / school	Max 20	Observation

Affective abilities in mathematics education encompass students' attitudes, emotions, and values that influence their engagement with the subject. A critical component of this domain is self-belief—students' confidence in their ability to understand and solve mathematical problems. Strong self-belief fosters perseverance, intellectual risk-taking, and a positive disposition toward mathematics. Enhancing this confidence is essential, particularly in educational contexts where mathematics is often perceived as challenging or anxiety-inducing. Learning media such as F-Math have the potential to strengthen students' affective engagement and motivation by providing a supportive and familiar learning environment.

3. RESULT and DISCUSSIO

4.

1. The design of f-math media has a religious nuance.

Facebook is suitable for more relaxed and light messages, but once in a while, there is no harm in posting more serious and in depth things as well as more varied messages [27]. Not only for communicating, Facebook also has the opportunity to be a marketing activity that aims to introduce, improve, and establish good communication with customers [28]. Facebook social media has an influence on increasing the number of visitors to a tourist attraction. Below are presented technological features from Facebook that can be used in the

learning process, namely profiles, news updates, Facebook messages, groups, activities, videos, photos, searches, and pages.

Facebook is a social network or social media site that allows users to add profiles with photos, contacts, or other information. Users can join communities to connect with and interact with other users. The features offered by Facebook as a social networking site or social media make many people use it [29]. According to McQuail in Setiawan, several roles of social media, such as Facebook, include being a social media forum to present various information and ideas to the public, thereby enabling responses and feedback [30]. Apart from that, it is also an interlocutor, which is not only a place for information to pass but also a communication partner that allows interactive communication to occur.

a) Name and logo

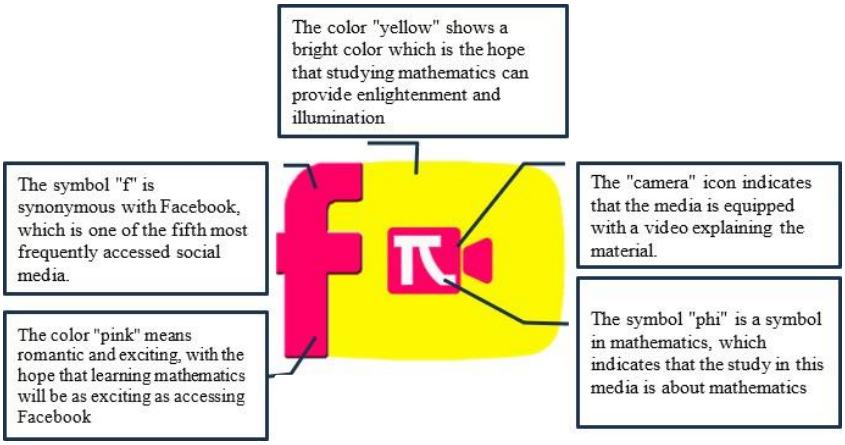

Figure 3. Affective Capability Analysis Steps

b) Content Structure

This application can actually also be used on a laptop or PC; in this case, it will only be displayed on the display using a cellphone.

1) Opening page

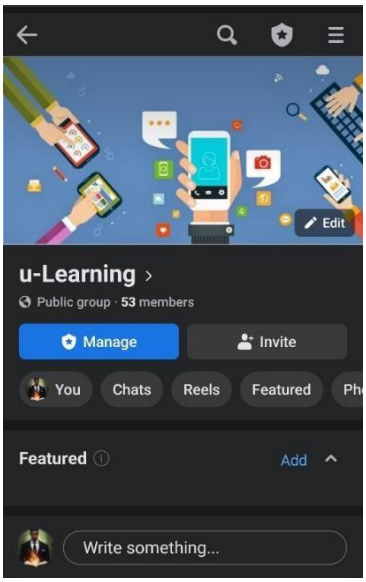

Figure 4. Front view of the Calculus Learning Facebook Group

The Facebook group is used as a learning center as a substitute for class, and the initial appearance of the group is as shown in Figure 4. In it, there is material in the form of videos and files in Android format. Apart from that, there is also a comments feature, which is used for discussions regarding material and also for collecting material Video content

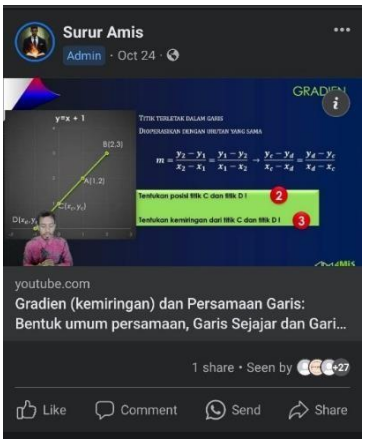

Figure 5. Display of video explanation material

The video material used is videos that have been

uploaded by educators on YouTube, and then the link is placed on Facebook so that it looks like in Figure 5. This video material is used as support if students need explanations related to the material. If the material in text form is sufficient, then you are not required to see an explanatory video. To interact, students can use the comments feature to ask questions they don't understand.

2) ***Main material content***

Figure 6. Main Calculus Material

As a first step, students need to download the file, then install it on their cellphone until finished. Then students can start learning, and Figure 6 is the initial display of the Android application. The file is equipped with materials, including practice questions, evaluation questions, and the ability to collect assignment answers online.

3) ***Facebook group comments column***

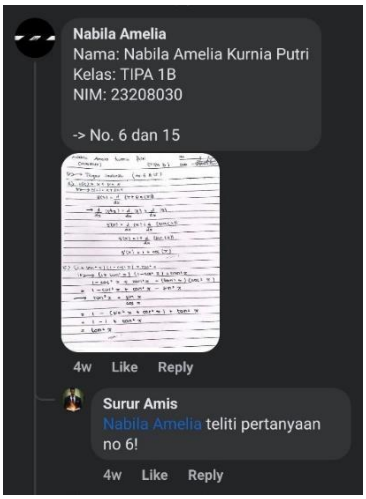

Figure7. One of the students collects the results of their assignment.

This comment column feature is used as a place for discussion regarding the material discussed, and at the end of the meeting, students collect the assignments they have made by uploading them in the comments column. If the answer is correct, a "thumbs up" will be given, and if the answer is not correct, then comments will be given regarding the part that still needs improvement (Figure 7). Android application display

Figure 8. First appearance of the Android application

The Android application that is already available is then

installed by the students on their respective cellphones, and Figure 8 is the initial display. On this page, there is also a "menu" button that will display the contents of this application.

Figure 9. Menu display

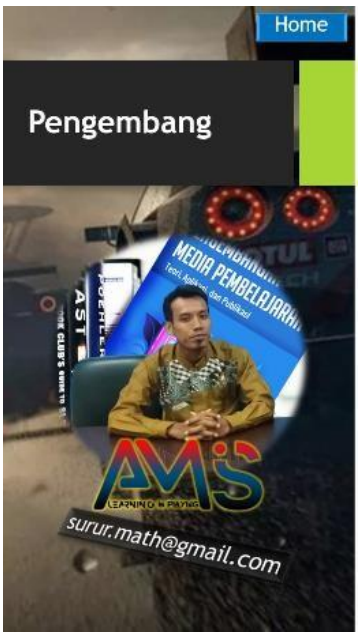

Figure 10. Developer display

If you press the menu button on the start page of the application, it will go to the menu page, as shown in Figure 9. Inside there is a menu that will be studied, including material, evaluation, close, and developer. If the developer section is clicked, it displays as shown in figure 10.

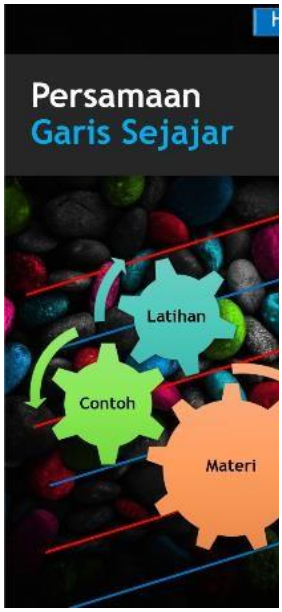

Figure 11. Material menu display

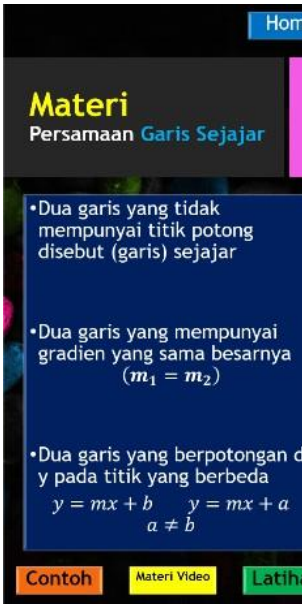

Figure 12. Text menu display

Figure 13. Video menu display

Based on figure 9, there is a menu for the materials to be studied; for example, when selecting parallel line equation material, a menu related to parallel line material will be displayed, including the home button, material, exercises, and examples, as shown in figure 10. Then, if the menu is selected material, it will display the material in text form, as shown in figure 11, and is also equipped with a video explanation of the material, which is a video explaining a snippet of the main video on Facebook, displayed in figure 12. Based on Figure 13, there is a page that displays examples of questions related to the material that has been studied, which is equipped with calculations and graphs obtained from the equations obtained. Then the display of the training material as in Figure 14 is adjusted to the material that has been studied, and to do it, you need an internet connection. Also, the final evaluation after learning as a whole is displayed in Figure 15, and the collection is collected in the Facebook comments column after the students

write on their respective sheets of paper. each.

Figure 14. Example material display

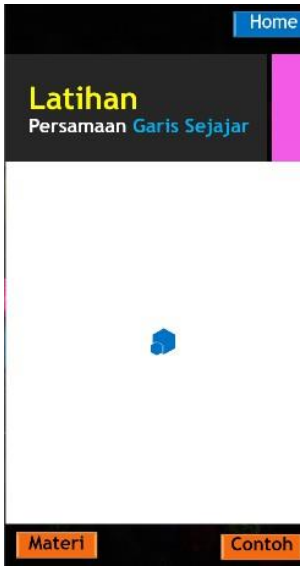

Figure 15. Exercise display

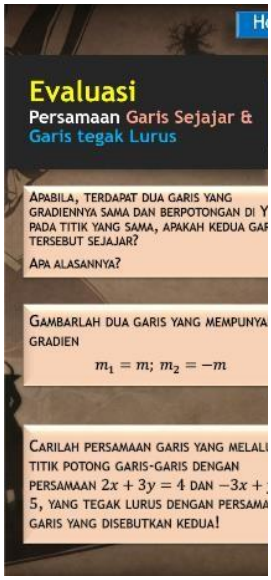

Figure 16. Video menu display

c) Rating and Feedback

Regarding assessment, educators use two methods, namely the section in Figure 16. On this page, students will be presented with several questions related to the material they have studied. The form of the questions is essays with multiple choices, which will result in immediate scores. The assessment is also seen in the assignments sent in the Facebook comments column, as shown in Figure 7.

Educators can also provide feedback regarding the assignments carried out, both from the assignment in image 16 and in image 7. In image 7, the educator will give a thumbs up or "like if it is correct and provide comments if there are parts that are lacking or wrong. The results of the grade recap are submitted in the Facebook group to anticipate mistakes by educators when assessing.

d) User Flow

This f-math media was compiled and created to convey mathematical material with content that is easy to understand and also uses applications that make it easier for users. Apart from that, it also uses applications that are familiar and comfortable to look at and use. The following is the flow of media use:

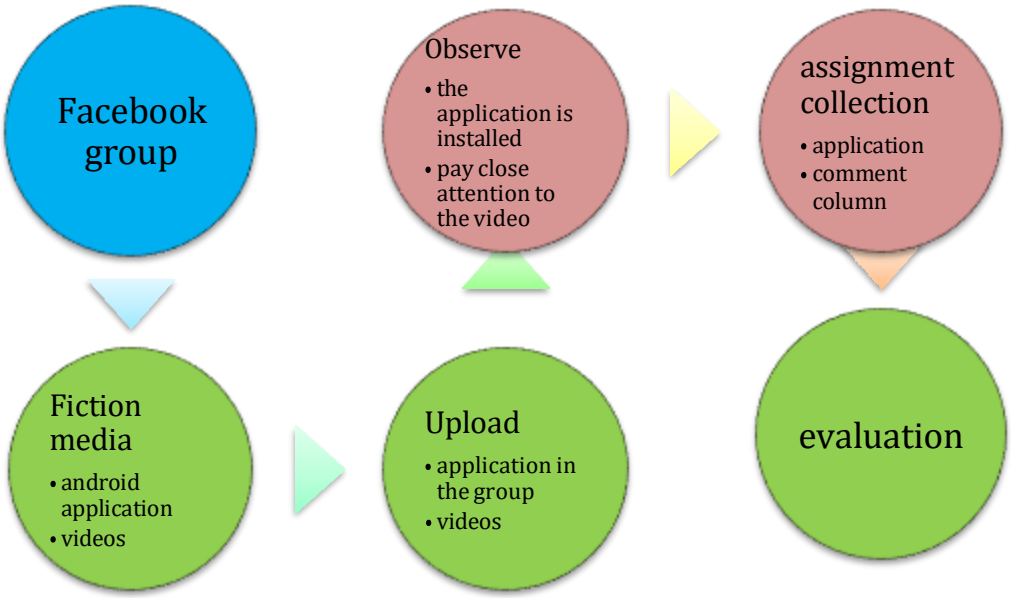

Figure 17. Flow of media use

The flow above is carried out jointly by educators and students. The blue color is done together by joining the available groups. The green color is the teacher, and the red color is the student.

e) Key Features List

The main features related to the f-math media used are as follows:

1) Groups, to unite educators and students in the same class, forum, or group; this is a substitute for equally limited classes.
2) Material, in two forms, namely video and application. Videos are used when students need a more detailed

explanation of the material. Meanwhile, with the application, students are allowed to only read and pay attention to written material.

3) Practice questions and evaluations are used to measure students' abilities after participating in the lesson. Both of them require an internet connection to submit assignments.
4) Assessment, submitted by educators after students send answers.
5) Easy navigator because Facebook is an application that has many users, and the application can also be used on each student's cellphone because some students already have a cellphone.
6) An attractive appearance, using various combinations of colors and images that add to the attractiveness of the media.
7) The application is easy to access.

f) Guide and documentation

This f-math media uses applications that are easy to find, namely the Facebook application and the Android application (APK). Most newly purchased cellphones already have the Facebook application installed, although it can be deleted because the user may not have an account. If you don't have the Facebook application, install it first by visiting the Play Store (for Android users), typing Facebook, and installing it. Meanwhile, applications created by developers are files with the apk extension, like Android applications in general. The file will be given to students, then installed, and it can be used. The main menu display in the application is shown in Figure 7 below

Figure 18. Menu display

In the image above, there is a developer menu that shows the identity of the developer, a close menu to exit the application, a gradient menu with perpendicular and parallel lines as the material being studied, and an evaluation menu as a final evaluation when you have studied the material. Meanwhile, in the Facebook menu, there is a menu for sending files as material, videos, and a comments column that is used in carrying out assignments.

2. Ability to think creatively

To assess students' creative thinking skills in mathematics, this study applied four indicators: fluency, flexibility, originality, and elaboration, through a series of open-ended math problems embedded in real-life contexts.

Students' creative thinking skills in mathematics showed varied results across four indicators: fluency, flexibility, originality, and elaboration. In terms of fluency, most students could generate multiple ideas when solving open-ended problems, with high scorers proposing more than four

alternative strategies, while those in lower categories repeated similar solutions or provided only one. Flexibility was moderately present, as some students changed approaches when prompted, yet many struggled to adapt strategies under new constraints, showing a need for further exposure to diverse problem-solving methods. Originality emerged as the weakest aspect, with only a few students offering unique solutions such as integrating environmental themes, while others relied on standard textbook ideas or demonstrated minimal innovation. In elaboration, students who performed well were able to justify their responses thoroughly, providing calculations, considering constraints, and illustrating their ideas, whereas others gave partial or brief explanations, indicating a shallow level of reasoning.

The analysis reveals that fluency and flexibility are moderately developed among students, while originality and elaboration remain areas needing significant improvement. Interviews indicate that students tend to prioritize accuracy over exploration, often fearing mistakes. Teachers' roles were also found to be influential, classrooms where teachers encouraged open discussion and accepted multiple solutions saw higher scores in originality and elaboration.

These findings highlight the importance of integrating teaching strategies that foster creative mathematical thinking, such as inquiry-based learning, real-life problem tasks, and encouragement for multiple solution paths. By focusing not just on correct answers but on how students think, reason, and communicate their ideas, educators can better support the development of creative mathematical thinkers.

3. Techniques for measuring cognitive abilities

The affective attitudes of students in mathematics

learning using religious nuance and creative-thinking-based media were evaluated through five main aspects: faith and piety, noble character, responsibility, independence, and empathy. Each aspect was scored with a maximum of 20 points based on observational data, journal entries, and instructional task reviews.

The results of the affective assessment show that students demonstrate strong faith and devotion, in activities integrated with religion such as prayer and reflection. Noble character is also clearly visible, consistently showing respect and cooperation in class. Responsibility is well developed, because they are able to complete tasks independently and on time, although a small part still relies on peer support. In terms of independence, showing initiative without waiting for instructions, which shows that the media used successfully encourages self-motivation. Empathy, students who show concern and support during group work, remains an area that can be further strengthened through deliberate social-emotional learning strategies.

Overall, the integration of religious nuances and creative learning media had a measurable and positive impact on students' affective development. Most students showed strong attitudes in faith, responsibility, and noble character, while empathy and independence, though present, require further nurturing. These findings suggest that combining affective targets with academic learning can support holistic student development and create a value-rich educational environment.

4. CONCLUSSIONAND RECOMMENDATION

The integration of F-Math media mathematics learning delivered through social media platforms with religious nuances, proves effective in enhancing students' creative

thinking, as well as their cognitive and affective development. This approach allows students to engage more deeply with complex mathematical concepts by contextualizing them within familiar and meaningful spiritual frameworks. The religious elements not only foster values such as perseverance, honesty, and empathy, but also stimulate imagination and innovation in problem-solving. Findings indicate that students showed increased motivation, confidence, and participation when learning mathematics through F-Math media. By connecting mathematical content to broader religious and moral values, this method promotes a more holistic and inspiring learning experience that supports both intellectual growth and character formation.

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