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Statistics Learning Media Innovation B-Tube (Combination Blog and YouTube)

Irvan[1*], Alfauzan Ramadhanny Simangunsong[2], Marah Doly Nasution[3]

Magister Pendidikan Matematika, Universitas Muhammadiyah Sumatera Utara
Jalan Kapt. Mukhtar Basri No.3, Medan, North Sumatera, Indonesia
[1*]*irvan@umsu.ac.id*; [2]*alfauzanrasi01@gmail.com*; [3]*marahdoly@umsu.ac.id*

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Abstrak

Tujuan penelitian ini untuk mengembangkan media pembelajaran digital dengan mengombinasikan web-blog dan YouTube. Penelitian ini menggunakan metode Research and Development (R&D) Level 1 oleh Sugiyono. Subjek dari penelitian ini 30 siswa kelas VIII SMP IT Mutiara tahun ajaran 2023/2024. Jenis data penelitian ini kuantitatif dan dianalisis menggunakan analisis deskriptif dan analisis statistik. Instrumen penelitian berupa lembar validasi ahli media, materi, dan bahasa, angket respon pengguna guru dan siswa, serta tes hasil belajar. Hasil penelitian menunjukkan bahwa produk Kombinasi Blog dan YouTube (B-Tube) valid digunakan, praktis dan efektif meningkatkan hasil belajar matematika. Berdasarkan analisa hasil uji produk menunjukan skor ahli media 4.78 (sangat valid), ahli materi 4.50 (valid), ahli 4.67 (sangat valid). Respon pengguna guru dan siswa menunjukkan persentase kepraktisan sebesar 100% dengan kategori sangat praktis. Uji efektifitas menggunakan N-Gain menunjukkan hasil N-Gain Skor sebesar 0.73 atau N-Gain (%) sebesar 73 dengan kriteria tinggi berdasarkan kriteria N-Gain menurut Melzer. Penelitian ini menunjukkan hasil bahwa media B-Tube dalam pembelajaran statistika valid digunakan, praktis dan efektif dalam meningkatkan hasil belajar matematika.
Kata Kunci: Inovasi Media Pembelajaran; Kombinasi Blog dan You Tube; Media Pembelajaran Matematika; Pembelajaran Digital; Pengembangan Media Pembelajaran

Abstract

The purpose of this research is to develop digital learning media by integrating web blogs and YouTube. The study follows the Research and Development (R&D) Level 1 method by Sugiyono. The subjects are 30 eighth-grade students at SMP IT Mutiara during the 2023/2024 academic year. The research data is quantitative and analyzed using descriptive and statistical methods. The instruments used include validation sheets for media, material, and language experts, as well as questionnaires for teacher and student user responses, and learning outcome tests. The results indicate that the combination of Blog and YouTube (B-Tube) is valid, practical, and effective in enhancing mathematics learning outcomes. Based on the product test analysis, the media experts rated it 4.78 (very valid), the material experts 4.50 (valid), and the language experts 4.67 (very valid). The response from teachers and students indicated a 100% practicality rate, categorizing it as very practical. The effectiveness test, using N-Gain, showed an N-Gain score of 0.73 or N-Gain (%) of 73, which falls under the high criteria based on Melzer's N-Gain criterion. This study shows the results that B-Tube media in statistics learning is valid, practical and effective in improving mathematics learning outcomes.
Keywords: Learning Media Innovation; Combination of Blog and YouTube; Mathematics Learning Media; Digital Learning; Development of Learning Media

I. INTRODUCTION

Social changes, whether viewed through the lens of revolution or evolution, have led us to experience significant disruptions in the order of life (Goa, 2017). In this era, various aspects of life have undergone massive transformations due to advancements in technology, information, and digitalization (Yoga, 2019). These changes have driven innovation across various fields to reach unprecedented heights and will likely continue to do so (Simangunsong, 2022) (Simangunsong et al., 2022) In the era of the Industrial Revolution 4.0, we have transitioned to an all-digital way of life (Novita et al., 2021). Consequently, innovations in various fields have developed unique identities that differ from conventional innovations of the past. Moreover, these ongoing innovations have also made their way into the world of education.

Today's advancements in systems encourage us to gradually shift towards more sustainable methods, making them widely accessible and integral to our identity. Similarly, progress must also occur in education, which plays a crucial role in society by helping individuals mature and prepare for the future. We understand that every change brings both positive and negative impacts (Winahyu et al., 2018) (Nagel, 2022). The social changes that have propelled us into today's digital era also come with their own set of pros and cons. Therefore, it is essential to approach this progress wisely to ensure it maintains a balanced role without leaning toward any harmful extremes (Geraee et al., 2015). For instance, the use of digital media in education should be significantly increased to create a more enjoyable, accessible, and innovative learning environment. This is especially important given that modern students, often referred to as "digital natives" or "digital speakers" by Prensky (Lee, 2021), are already closely connected with various technologies. However, it is crucial to guide them in a way that helps them become not only more intelligent but also wiser in their use of these technologies.

Innovation in statistics learning media through B-Tube (a combination of Blog and YouTube) is necessary, given that statistics is a fundamental aspect of data knowledge and is closely related to daily life. A simple survey of mathematics learning activities revealed that statistics is one of the key subjects. However, many students in schools struggle with learning mathematics, including statistical concepts. Therefore, it is important to develop digital learning media that resonates with students, particularly in mathematics, with a focus on statistics.

The presence of digital-based learning media innovations is essential for providing indirect education to students, helping them become smarter in using technology, rather than just for entertainment, such as playing online games or following trends on social media (Zhong, 2020). One of the innovative developments in learning media that is expected to serve as a valuable tool for both educators and students in this digital era is the creation of a simple web-based platform, B-Tube, which combines two learning resources that are often overlooked but are highly beneficial for student learning (Saputra.S et al., 2015). This type of development needs to be

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widely promoted to ensure that the use of IT, particularly among students, is well-directed and organized now and in the future (Carenzio et al., 2021). Learning is the cornerstone of civilization (Salminawati, 2015) (Al-Rasyidin & Nasution, 2015), (Mustofa, 2015), and learning media (Riyana, 2012) (Nurulfadhilah, 2021) are crucial tools that support the educational process.

Further discussion, research and development that produces statistical learning media innovation products through a combination of blogs and YouTube (B-Tube) is very important because in today's digital era, the use of technology in education is one of the key factors in increasing learning effectiveness. Traditional learning media often cannot meet the needs of students who increasingly need a more interactive and interesting way of learning. With the combination of blogs and YouTube, it is hoped that statistical material that is often considered difficult can be presented in a more interesting and easy-to-understand way, increasing students' motivation and interest in learning statistics independently and in the context of the classroom.

The novelty of this research lies in the integration of two popular and effective platforms, namely blogs and YouTube, which complement each other in the delivery of material. Blogs as written media allow students to learn statistical concepts more deeply through systematically curated articles or posts, while YouTube provides audiovisual content that allows for more visual and practical explanations, and is more accessible at any time. The combination of the two offers a holistic and flexible learning experience, which has not been widely applied in statistical learning, so this research makes a significant contribution to technology-based learning innovation.

The development of digital-based learning media combines two primary platforms: blogs (Solomon & Scrum, 2011) (Herutomo, 2010) and YouTube (Ulandari et al., 2021), (Kindarto, 2008), (Permatasari et al., 2022). This media development is called B-Tube. B-Tube is an innovative learning medium that uses simple web development and can be utilized in online learning or blended learning strategies during the present "new normal" era and in the future (Simangunsong, 2022). This digital-based platform is easily accessible to students (Marbán et al., 2021) (Udayani, 2022) (Alshammary & Alhalafawy, 2023) and is created by educators. B-Tube combines the features of a blog and YouTube, presenting learning materials through written explanations typical of blogs (Sulasmianti, 2018) (Arighi et al., 2019), while also incorporating educational videos from YouTube (Ulandari et al., 2021)(Permatasari et al., 2022) The blog component of B-Tube supports written explanations of the material and is directly accessible, as it is designed to connect seamlessly with YouTube through embedded video links. B-Tube can be used to facilitate learning across various subjects, including language, history, economics, social studies, science, and mathematics. Additionally, B-Tube is accessible to the general public and can be utilized by individuals at all educational

levels, from elementary school to higher education. Given that today's students are often classified as digital natives or digital speakers by Prensky (Lee, 2021). B-Tube offers a broad range of access opportunities. In the context of technology-based learning (Irvan et al., 2021)), digital learning platforms like B-Tube provide significant convenience in educational activities (Maslahah et al., 2023). Blogs, as a component of B-Tube, serve as effective digital media for learning (Simangunsong & Irvan, 2023).

II. METHOD

This research employs a development research approach, also known as Research and Development (R&D). This innovative method is used to develop learning strategies within blended learning environments, based on Contextual Teaching and Learning (CTL) principles. In this study, the initial level of the development research method (Level 1) was applied, involving potential and problem analysis, literature review and information gathering, product design, design validation, and prototype testing (see Figure 1).

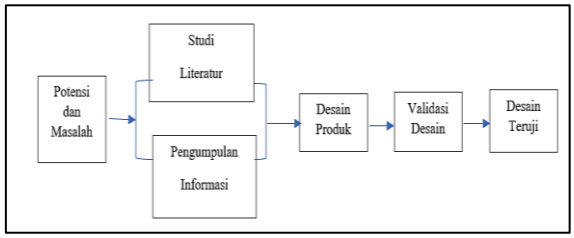

Figure 1. Level 1 R&D Flow by Sugiyono

In this study, we will conduct research without proceeding to product development or field testing. The research focuses solely on producing product designs, which are validated internally but not manufactured or tested externally (Sugiyono, 2019) The research instruments include validation sheets for media, material, and language experts, as well as questionnaires for teacher and student responses and learning outcome tests. Data analysis is conducted using quantitative descriptive analysis and the N-Gain statistical test. The research was conducted at SMP IT Mutiara Sunggal, located at Jalan Jati No. 125, Sei Mencirim Village, Sunggal, Deli Serdang Regency, North Sumatra, Indonesia. This study in April until July 2024. The population consists of 90 students, with a research sample of 30 students from grades VII and VIII, selected through random sampling. The sample was chosen based on the criteria that they will be studying junior high school-level statistics.

III. RESULT AND DISCUSSION

The initial design of this learning media development primarily focuses on blog content, which is enhanced with learning features such as videos that can be directly linked to YouTube. The development process begins with creating a simple blog that includes written content accompanied by learning videos connected to YouTube. As the development progressed through validation and refinement, additional features were incorporated. These include a monitoring feature for tracking students' independent learning activities, which is integrated into an attendance feature at the beginning of the B-Tube presentation. Additionally, a response room was added as a space for collecting students' opinions during perception activities. The platform

also includes an introductory video that presents the material to be discussed, created by the original developer and directly linked to YouTube. Finally, a practice feature was added, which contains digitally-based questions relevant to the discussion.

The development of this learning media aims to achieve its goals through several procedures outlined in the research proposal. Based on the development research conducted, a description of the research results is presented in the study as follows:

A. Description of Potential and Problem Analysis Stage

The information obtained from the potential and problem analysis stage is used to develop a problem-solving plan, which includes selecting appropriate learning media. Observations revealed that both teachers and students at the school are generally technologically literate. However, the digital resources available are not being utilized to their full potential. Students predominantly use their gadgets for entertainment, such as playing online games, browsing social media, watching videos on platforms like TikTok and YouTube, and searching for answers to learning difficulties on article pages and blogs. Observations and feedback indicate that students often struggle to find relevant material or answers online, particularly during independent study at home. Additionally, discussions with teachers revealed that students frequently forget or are unaware of previously covered material when it is revisited. This issue arises because the content seems unimportant to the students, who rarely take notes or review the learning materials.

The observations made during the initial study of the development research reveal several key issues related to the rapid advancement of technology and its uneven integration into educational practices. Despite the significant opportunities for leveraging technology, problems persist. Students frequently search for answers to learning questions online but often use digital platforms like YouTube primarily for entertainment. They struggle with independent study and find it challenging to understand material when only reading it online. Additionally, students tend to forget previously covered content due to inadequate review and engagement. These findings highlight the need for more effective use of technology in education to address these challenges and better support student learning.

The analysis of potential and problems based on the general and specific observations above provides an idea and an idea that there is a need for digital-based learning media on the internet combined with video platforms such as *YouTube* which actually have many relevant learning videos. In addition, the learning media in question can be used anytime, anywhere, and by anyone and teaching materials can be stored digitally for a long time and can be accessed repeatedly. Thus, the problem of students who only use the gadgets and technology they hold for fun can be balanced with the existence of learning media as intended. Likewise, the tendency of students who often seek knowledge and answers to questions from

the internet is also helped. Students who want to carry out independent learning can be directed, students who tend to learn audio-visual and do not like to read are also helped. Until in general, the learning media in question can compensate for the rampant development of technology that is only used for negative things.

B. Description of the Literature Study and Information Collection Stage

During the literature study and information collection phase of this study, the gathered information will be used to develop a design plan for a learning media product prototype. In this phase, researchers gather extensive information on potential media solutions that can address identified problems by leveraging existing resources. This involves reviewing various journals and books to explore whether combining existing digital media can lead to effective development. The goal is to identify and create innovative media solutions based on the analysis of potential and previous issues.

Information collection also involves analyzing internet pages frequently visited by students during their learning activities, such as blog-based media that primarily offer written content. These blogs only address part of the students' learning preferences. To enhance this, discussions with educational technology experts were conducted to support the use of digital media as a learning tool. It was determined that combining two platforms to develop learning content could be a viable approach, provided it includes novel elements. The media design will undergo validation to ensure its accuracy, and it will be tested for practicality and effectiveness.

The literature study and information gathering activities, which focus on combining writing-based and video-based platforms to address a wider range of students' learning preferences, led researchers to the idea of integrating blogs with YouTube using Sugiyono's Level 1 development theory. Blogs cater to students who learn best through reading and visual content, while YouTube supports those with an audio-visual learning preference. To further this idea, researchers analyzed the features and menus of both blogs and YouTube to identify how they can be effectively combined.

As a continuation of the literature study, researchers analyzed several mathematics learning blogs and journals discussing blog development as a learning medium to ensure the novelty of their idea. The review confirmed that no existing blog has combined its content with videos from YouTube. Based on this analysis and information collection, researchers designed a prototype of the learning media called B-Tube (Combination of Blog and YouTube).

C. Description Product Design Stage

The product design stage is the third step in Sugiyono's Level 1 development theory. At this stage, researchers implement the learning media design developed from the potential and problem analysis, literature review, and information collection. The output of this stage is the B-Tube prototype, which has not yet undergone validation or testing. To ensure the product becomes a valid, practical, and effective learning medium for improving students' mathematics learning outcomes,

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several key stages in product design must be carefully considered. The following outlines the process of the product design stage:

1) Curriculum Analysis

Curriculum analysis is a crucial part of the product design stage. The curriculum serves as a vital guide for implementing the learning process, making it essential to align the learning media with it. In this process, the researcher carefully considered the curriculum used at the school where the research was conducted. Consequently, the content in the B-Tube learning media was aligned with the 2013 Curriculum (K-13), revised in 2017.

2) Selection of Teaching Materials

The selection of teaching materials is a critical stage in the creation of B-Tube, as the learning content within B-Tube consists of these materials. In this study, the choice of statistics as the initial focus for the product design was made for several reasons: statistics is closely related to daily life, it is part of the curriculum at the school where the research was conducted, and observations revealed that students at this school struggle with mathematics, including statistical concepts. Based on these factors, the researcher selected junior high school statistics as the teaching material for the B-Tube product design.

3) Concept Maturation Process

The maturation process of the B-Tube concept involves several critical stages. These include preparing the teaching materials, refining the language used in the learning content, and selecting appropriate YouTube videos to be incorporated. Following the product validation process, which is based on expert feedback, the concept is further refined by adding features such as digital attendance for tracking student participation, a student response room for written feedback, practice questions for each sub-topic, and introductory videos on statistics created by the developers (researchers).

4) Concept Implementation Process

This is a crucial process in developing the learning media we are creating. After refining the concept in the previous stage, the implementation phase begins. The steps involved in implementing the concept include creating a blog account, designing the blog, drafting the learning materials, adding content and features, integrating the blog with YouTube, incorporating learning control features, and finally, publishing the learning content (see Figure 2).

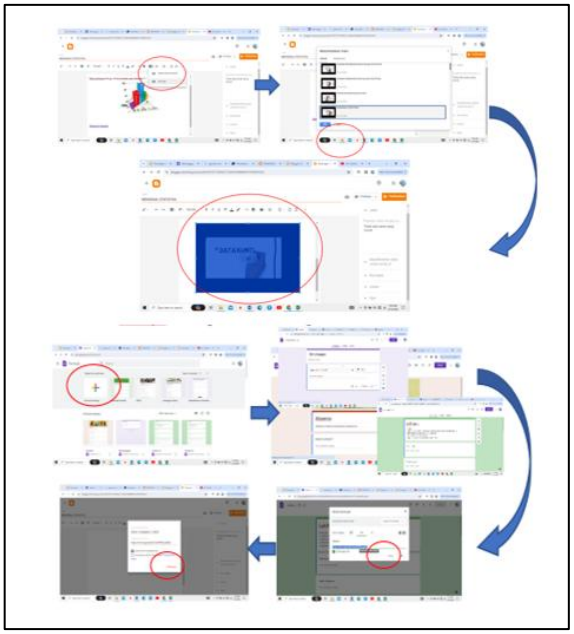

Figure 2. The Concept of Implementation Process

5) B-Tube Design Results

The product design, as a result of implementing the initial concept, has led to

the development of B-Tube—a combination of a Blog and YouTube that embodies the original theoretical concept. Below is a comparison of the initial and final designs of the developed B-Tube product (see Figure 3):

Figure 3. Results of the B-Tube Design

D. Description of the Design Validation Stage

This development research includes a validation stage involving experts in Media, Materials, and Language. The tabulated results of the product validation are presented in the Table 1:

Table 1.
Design Validation Results

Expert/Validator	Score	Classification
Media	4.78	Highly Valid
Material/Topic	4.50	Valid
Language	4.67	Highly Valid

The validity test results indicated that the B-Tube statistics learning media received an average score of 4.78 from media experts, 4.50 from material experts, and 4.67 from language experts. These scores reflect that the media is considered highly valid by the experts. This high level of validity demonstrates that the learning media meets quality standards in design, content, and language use, and aligns with the intended learning objectives. Achieving such high validity is a positive early indicator of the media's potential success in educational settings.

E. Description of the Tested Design Stage

The tested design stage is the final step in Sugiyono's Level 1 development research, applied in this study. At this stage, the validated product design is tested for use by teachers and students, making the testing process comprehensive. The design testing involves two key assessments: a practical test, conducted using a user response questionnaire, and an effectiveness test, carried out through N-Gain statistical calculations. The results of these design tests are as follows:

1) Practicality Test

The product practicality test in this study involved gathering user responses, including descriptive comments, to evaluate the practicality of the developed and validated product after its trial phase. This test was administered to users, specifically teachers and students. The following presents the results of the practicality test based on user feedback:

Table 2.
Practicality Test Results

Respondent Code	Sum	Presented (%)	Criterion
G1	1	100%	Very Practical
A1-A30	30	100%	Very Practical

Based on Table 2, the practicality assessment results show that teachers rated the product at 100%, categorizing it as "very practical." The feedback provided by teachers in the user response questionnaire highlighted several reasons for this high rating. Teachers noted that B-Tube learning media supports the teaching process by encouraging students to engage in independent learning before classes

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begin. They found the material on B-Tube to be easy to understand and well-suited for instruction, with clear and accessible language. Additionally, teachers described B-Tube as an engaging learning medium that effectively caters to both visual and audio-visual learning styles.

The practicality test administered to students via a user response questionnaire is equally important, as students are the primary beneficiaries of B-Tube learning media. The results from the student responses indicated a 100% rating, categorizing the product as "very practical." Students provided various reasons for this high rating, noting that B-Tube supports both independent learning and classroom activities. They found the materials and language to be easy to understand and the platform engaging and enjoyable to use.

The results of the practicality test indicate that 100% of respondents rated B-Tube media as "Very Practical." This rating reflects that all users find the media to significantly ease their learning process. The practical aspects assessed include ease of access and the alignment of content with learning needs. This exceptionally high practicality rating demonstrates that B-Tube is being used efficiently and effectively.

2) Effectiveness Test

The product effectiveness test in this study was conducted by evaluating N-Gain statistics through pretest and posttest activities with students. This test aims to assess the increase in students' understanding of the material after using the media. The results of the effectiveness test for B-Tube are presented in the Table 3:

Table 3.
Effectiveness Test Results

Sum of samples	N-Gain Score	N-Gain %	Criterion
30	0.73	73	High

The results of the effectiveness test indicate an N-Gain value of 0.73, or 73%, which falls into the "High" category according to the Melzer scale. This high score demonstrates that B-Tube, as an innovative learning media product, has a significant positive impact on enhancing users' understanding of statistical concepts. In other words, this N-Gain value confirms that the media has been successful in effectively improving learning outcomes.

This development research was guided by recommendations from several previous studies, which highlighted that using blogs in learning activities can enhance understanding of concepts and materials, offer a flexible learning experience, reduce assignment time, motivate students to use technology positively, and provide teaching materials that are accessible repeatedly. Additionally, recommendations from earlier research (Simangunsong & Irvan, 2023) inspired this study to create a blog media connected to the teaching material. This approach involves carefully selecting materials and designing content that aligns with learning needs, helping students stay focused and reducing difficulties in independent learning activities.

This development research has outlined the intricate research process in the previous section. To discuss the results, we must refer to the problem formulation

derived from the background of the study. This will help us determine whether the research findings effectively address the identified problems.

The validity test in this study confirms that B-Tube is valid for use in the statistical learning process. This conclusion is supported by the validation results from media experts, material experts, and linguists, addressing the first research problem concerning the validity of B-Tube as a statistical learning media. The development research products, which combine blogs and YouTube, align with findings from(Putri & Arsanti, 2022), who highlight YouTube's effectiveness as an engaging learning medium that enhances the learning experience due to its accessibility anytime and anywhere, including at home. This underpins the rationale for integrating YouTube with blogs to create B-Tube, a novel learning medium designed to offer a more dynamic educational experience.

The results of the practicality test indicate that B-Tube is effectively used in the statistical learning process. This conclusion is supported by user feedback from both teachers and students, addressing the second research problem regarding the practicality of B-Tube as a statistical learning media. The practicality of this development aligns with previous research by (Rangkuti et al., 2019), which explored the use of blogs in learning activities. Their findings suggest that blogs, as a learning medium, positively impact the teaching and learning process by facilitating easier access and use for both students and teachers.

The effectiveness test results indicate that B-Tube significantly enhances the statistical learning process and improves junior high school students' mathematics outcomes. The N-Gain statistical test confirms that B-Tube effectively addresses the third research question concerning its impact on improving mathematics learning outcomes. This finding supports and extends previous research by (Latifah & Kuswanto, 2018)which demonstrated that blogs as a learning medium can enhance problem-solving and collaboration skills. This study not only aligns with earlier findings but also highlights that B-Tube contributes positively to students' mathematics achievement, as evidenced by improved learning outcomes.

IV. CONCLUSION

Based on the research analysis and discussions regarding the development of B-Tube as a statistical learning medium, it can be concluded that B-Tube (a combination of Blog and YouTube) is a valid, practical, and effective educational tool for enhancing mathematics learning outcomes. This development research demonstrates that B-Tube meets the criteria of validity, usability, and effectiveness in the learning process. Essentially, B-Tube was designed to guide students in using technology wisely and to serve as a valuable resource for educators facing educational challenges in the digital era. The research recommends the adoption of B-Tube to address these challenges and improve educational practices.

Based on the research on B-Tube's development for statistical learning and its

impact on improving junior high school students' mathematics outcomes, several recommendations are proposed. First, B-Tube should be further developed for other mathematics topics and educational levels, as its success indicates it could benefit a range of subjects. Second, future research should utilize more complex methodologies to enhance and maximize findings. Third, quantitative studies are needed to evaluate B-Tube's effects on various student abilities, such as mathematical communication and creative thinking. Lastly, both teachers and students are encouraged to adopt B-Tube, given its demonstrated validity, practicality, and effectiveness in improving learning outcomes.

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AUTHOR'S BIOGRAPHY

Dr. Irvan, S.Pd, M.Si.

Born in Langkat, November 17, 1973. Teaching staff at the University of Muhammadiyah North Sumatra. S1 Mathematics Education Study, University of Muhammadiyah North Sumatra, Medan, graduated in 1997; S2 Mathematics from the University of North Sumatra, Medan, graduated in 2007; and S3 Mathematics from the University of North Sumatra, Medan, graduated in 2016.

Alfauzan Ramadhanny Simangunsong, M.Pd.

Born in Medan, December 30, 1999. Teaching staff at the Faculty of Public Health UIN Sumatera Utara Medan. S1 Mathematics Education Study, UIN Sumatera Utara Medan, graduated in 2021; S2 Mathematics Education at the University of Muhammadiyah North Sumatra graduated in 2024.

Dr. Marah Doly Nasution, S.Pd, M.Si.

Born in Medan, October 10, 1976, Teaching Staff at the University of Muhammadiyah North Sumatra, S1 Study in Mathematics Education, University of Muhammadiyah North Sumatra, Medan, graduated in 2003; S2

Mathematics from the University of North Sumatra, Medan, graduated in 2008; and S3 in Mathematics at the University of North Sumatra, Medan, graduated in 2020.