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Systematic Literature Review: Scope Analysis of Research on Mathematics Learning Media

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ABSTRACT

Good learning media is learning media that is able to provide stimulation to students so as to generate interest in learning. Various types of media, of course students have no difficulty in choosing what media to use, both audio-based, visual-based, and audio-visual-based media. Learning media can be used to generate student learning motivation so that it can improve students' problem-solving abilities. This study aims to conduct a literature review related to effectiveness in learning mathematics at all levels. The research method chosen in this study is SLR (Systematic Literature Review). Data collection was carried out by documenting all articles that had similar research within the last 10 years in this research report. The articles used were 15 national journal articles accredited by Sinta obtained from Google Schoolar. Based on this research, it was found that the use of mathematics learning media can improve students' problem solving abilities, change the mindset and creativity of learning to be more fun. Based on the literature review conducted, learning media can be developed at all levels.

Keywords: learning media, learning mathematic, analysis

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1. INTRODUCTION

Mathematics is one of the sciences that is useful in human life (Tampubolon et al., 2019). Learning mathematics is important because it cannot be separated from its role in the various aspect of life (Doly & Ahmad, 2021). Even mathematicians are often dubbed as the science of its roots because it has a very large role in life (Anwar, 2018). The characteristics of mathematics are abstract so that understanding them requires high concentration and seriousness and even takes a long time because they are full of symbols which are sometimes difficult to understand (Hartinah & Setiawan, 2013). The importance of learning mathematics is emphasized in RI Law no. 20 of 2003 concerning the National Education System article 37 that mathematics is one of the compulsory subjects studied by students at every level of education (Auliya, 2016). Mathematics lessons are not only about numbers, but much deeper than that(Puspaningtyas, 2019). Therefore it is necessary to use learning media as a support for the teaching and learning process.

In the 21st century as it is today there have been significant developments in world technology which of course have had an effect on the education system in Indonesia. The development of this technology can be an alternative for educators in developing and supporting the learning process (Muthy & Pujiastuti, 2020). One development that is clearly visible is in the learning process (Muthy & Pujiastuti, 2020). The most important thing to solve is problem solving, which is the heart of learning mathematics. To be able to help students find innovative solutions to various problems they face, both at school and in everyday life, one of them is using learning media (Azhari & Irfan, 2019)

Learning media is one of the tools needed by teachers in transferring knowledge to students at school (Samura, 2015). Media is a tool for teaching and learning process to convey learning material in order to achieve learning objectives (Karmiani, 2018). A teacher's education must be able to develop an interesting, innovative and fun learning process (Menrisal et al., 2019). In the world of education various kinds of media, learning models and methods have been developed in accordance with the times (Nurbani & Puspitasari, 2022). There are several types of learning media, for example comic media, animation media, visual media, and so on. Comic media is expected to help students understand the contents of a story so that they can convey the contents of the story well (Musfiroh,

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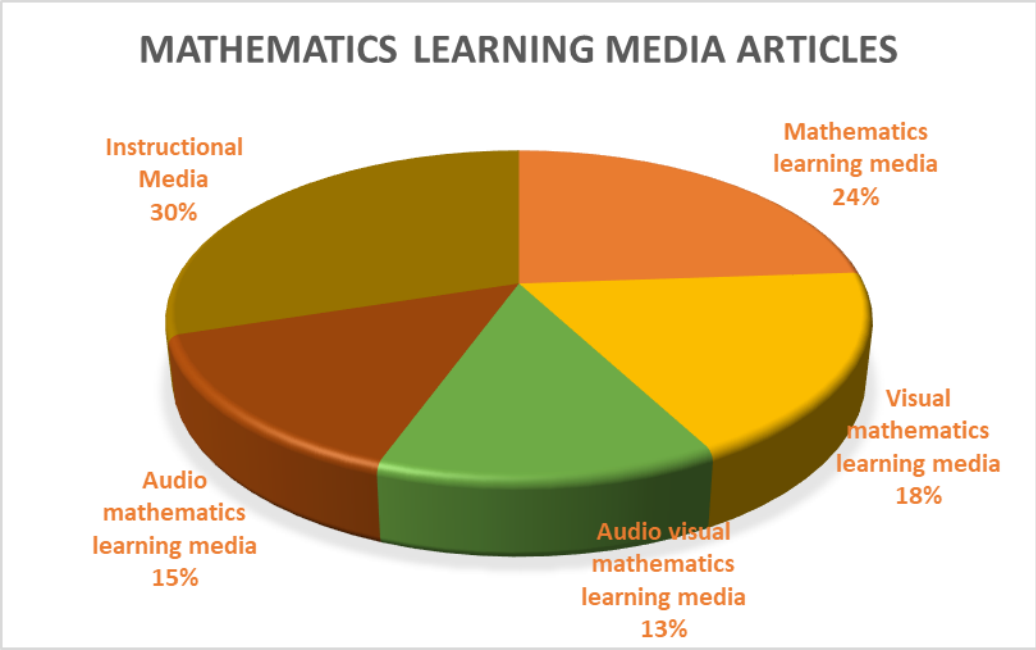
2018). Utilizing rapidly developing technology, teachers can create learning media to support face-to-face or face-to-face learning (Sakiah & Effendi, 2021).

Human life is currently changing, both changing in terms of positive and negative aspects. Most students are only able to master the material but cannot apply it so this is where the use of learning media is needed so that students can more easily understand and absorb what material is provided by the teacher. Learning to use this developed media does not rule out the possibility of more than one-way communication between the communication components, in this case the teacher, media and students.

2. RESEARCH METHOD

This study uses the SLR (Systematic Literature Review) method. SLR (Systematic Literature Review) is a method that can be used to evaluate, determine and interpret the findings of research problems in answering predetermined questions. Literature Review is a search from various sources either through books or articles on the same topic so that a certain topic is raised (Marzali, 2017). Literature Review helps us in developing a framework of thinking that is in accordance with the 6 theories, findings, and results of previous research in solving the problem formulation in the research that we make. The SLR method is used to identify, review, evaluate, and interpret all available research with interesting topic areas, with specific relevant research questions (Hasanah et al., 2021). With this method, the researcher reviews and identifies journals systematically, which in each process follow predetermined steps (Triandini et al., 2019).

Fig. 1 Mathematics Learning Media Articles



The diagram above shows that in terms of learning media articles 30% or 38,700, mathematics learning media articles 24% or 30,800, visual mathematics learning media articles 18% or 23,700, audio mathematics learning media articles 15% or 18,700, mathematics learning media audio-visual by 13% or 17,100.

Based on these steps, the researcher looked for sources of journals with the keywords learning media, learning mathematics, and analysis. The research was conducted by collecting sinta 1 to sinta 4 journal sources on Google Scholar. All sources referred to in this study range from 2013 to 2023. From various articles, the researcher chose 15 articles that were closely related to the keywords used. The next step, the researcher grouped articles related to the scope of education in mathematics learning media.

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3. RESULTS AND DISCUSSION

In the opinion of Nana Sudjana (2007:17), media is anything that can be used to channel messages from senders to recipients so that they can stimulate thoughts, feelings, concerns, and interests and attention of students in such a way that the learning process occurs. According to Djamarah (2006), media development includes visual-based media, audio-based media, and audio-visual based media. There are lots of various tools, both electric and non-electric, to be used as media for learning mathematics.

A. Visual Based Media

According to Djamarah (2006), media development includes audio-based media, visual-based media, and audio-visual based media. Visual media is the delivery of messages or information technically and creatively which displays pictures, graphics and clear layout and location so that the recipients of messages and ideas can be received by the target. The form of visual media can be in the form of representational images, such as pictures, paintings or photographs that reveal an object; diagrams depicting concept relationships, organization and structure of matter; a map showing the spatial relations between elements in matter; graphics such as tables, graphs, and charts that present figures and figures. Some visual media, including media that are not projected, one of which is reality/real media. Students can look directly at the object. Then there is the model, which is an artificial object in three dimensions which is a representation or substitute for the real object. The use of models to overcome certain obstacles as a substitute for realia, as well as graphic media, are classified as visual media that transmit messages through visual symbols. The function of graphic media is to attract attention, clarify lesson presentations, and illustrate facts or concepts that are easily forgotten. The types of graphic media are pictures/photos, sketches, diagrams/schemes, charts/charts, graphs, cartoons. there is also print media, namely visual media that is made through a printing process. This print material media presents its message through letters and illustrated pictures to further clarify the message or information presented. Types of printed material media include textbooks, namely books about a particular field of study or science which are arranged to make it easier for teachers and students in an effort to achieve learning goals; module, namely a package arranged in the form of a certain unit and designed in such a way for the benefit of student learning; programmed teaching materials, i.e. individual teaching programs, are much the same as modules. The difference with modules, programmed teaching materials are arranged with small topics for each frame/page. Some of the advantages and disadvantages of visual-based media. The advantages of visual media are repeatable, can be read many times, sharper analysis, can make people really understand the content and can make people think more specifically about the content. There are also disadvantages of visual media, namely slow and impractical, no audio, of course you cannot be heard, so the material presented is not detailed enough, limited visuals, in the form of images that represent news content, production costs are quite expensive because the print media have to print and send it to the public.

B. Audio Based Media

Audio media is or listening media is a type of learning media or learning resources that contain messages or subject matter that are presented in an interesting and creative way and are applied using the sense of hearing only, because this media is only in the form of sound. Some examples of audio-based media, namely language laboratories are audio media that function to support the teaching and learning process and its application using the sense of sight. This media is usually used to convey subject matter such as: listening to conversations in foreign languages such as Indonesian, Arabic, and English; Radio is a visual media in the form of objects or tools that can be used to facilitate the teaching and learning process and is applied by using the sense of hearing. The advantages and disadvantages of this media, the advantages of which are that the costs that must be incurred are only a little, the media is easy to carry and move, so it is easy to use, the material can be played back, can stimulate the active listening of students, and can also develop imagination such as writing, drawing and so on. Then the lack of this media is abstract because it is only in the form of sound so that in certain cases it also requires visual assistance, this audio media is abstract so that it can only be controlled through words or language, as well as sentence structure, this media will be successful if

applied to them who already have the ability to think abstractly, this media cannot be applied by students with special needs, more precisely for those who cannot hear (deaf).

C. Audio-Visual Based Media

Audio-visual media is a type of learning media or learning resources that contain messages or subject matter that are made in an interesting and creative way by using the senses of hearing and sight. This media is in the form of sound and images. Some examples of audio-visual-based media include television, which is an electronic system that displays live and still images accompanied by sound via cable. Television plays an important role for educators, because educators are assisted in conveying things that cannot be brought into the classroom. Students can use the media at home; Video cassette is a tool that can display motion pictures and accompanied by sound. Each has its advantages. Usually educators show learning videos in front of the class via a projector. Video cassette has a function to record data. The data can be deleted and replayed when needed; Sound slide is a combination of slides or pictures with audio or sound tape. Sound slides in the form of PowerPoint, Adobe Flash, Adobe Premiere, and Windows Movie Maker. Sound slides are very effective for the teaching and learning process and make students creative. If the sound slide made is good, it will increase the results. There are advantages and disadvantages to audio-visual-based media, namely time-free usage, very practical and attractive, the price is relatively inexpensive, because it can be used many times, saves time and videos or films can be played back. The drawback is that if you play the film too fast, students cannot follow, television media, cannot be taken anywhere because it tends to be in a certain place, requires special expertise and skills in presenting or making audio-visual learning media, because this media is in the form of sounds and pictures. , both moving and still images. Therefore making this media tends to be more complicated than using visual media and audio media.

4. CONCLUSION

Based on the results and discussion that have been described above, it can be concluded that learning media is divided into three, namely visual-based media, audio-based media, and audio-visual-based media, where the three media both have different advantages and disadvantages but the functions of the three media remain the same, namely to facilitate and facilitate teaching and learning activities so that learning objectives can be achieved, can improve the quality of teaching and learning, can improve students' problem-solving abilities, depending on the characteristics of these students, and change the mindset and creativity of learning to be more fun . It is hoped that in this study students can use learning media well, so that they can increase their understanding of learning mathematics and can improve student achievement.

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Applying Flipped Classroom Model Using Duolingo Application to Enhance Thammislam Foundation School's Student Learning EFL

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ABSTRACT

Numerous research endeavors have been undertaken to formulate a flipped classroom learning model to enhance the caliber of education. However, integrating weblogs with the flipped classroom learning model has yet to garner significant scholarly scrutiny. The primary issue pertains to the need for more students' vocabulary acquisition. Consequently, individuals need help with attempting to engage in English language communication. Acquiring proficiency in a foreign language via the Duolingo platform offers a different and unique learning experience. Every educational system must incorporate a comprehensive set of methodological aspects that ensure the efficacy of the learning process. The elements above encompass monitoring progress, motivation, feedback, and vocabulary. The present study employs a quantitative descriptive research design. The research design used in this study is pre-experimental. This study employs a design that incorporates external variables which have the potential to impact the development of the dependent variable. The research utilized the Duolingo application as a tool for student engagement, accompanied by an observation sheet consisting of questions aimed at enhancing teachers' writing proficiency in the learning process. Additionally, post-test sheets were administered to assess the outcomes of the intervention. There is a total of 14 students classified as active, 14 students classified as moderately active, and 12 students classified as less involved. Based on the examination of student activity data, it can be inferred that 70% of student engagement with the flipped classroom approach, employing the Duolingo application for English language acquisition, falls within the active and moderately active classifications.

Keywords: Flipped Classroom, Duolingo Application, Learning EFL

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1. INTRODUCTION

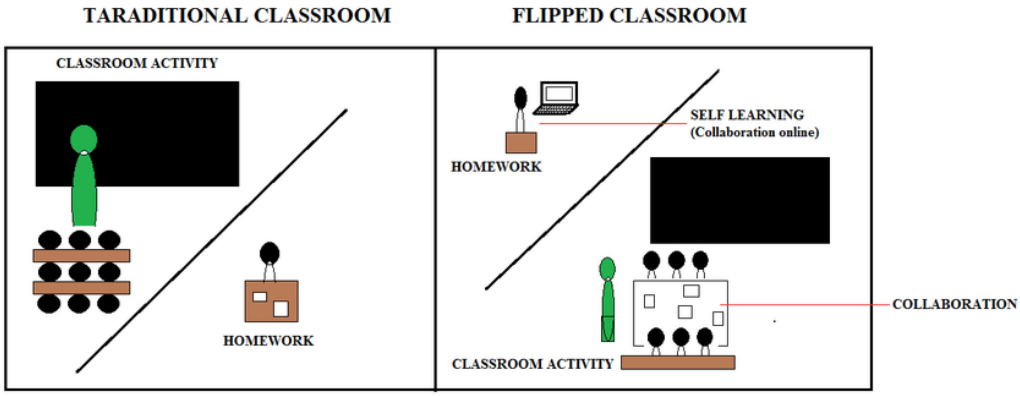
Indonesia and Thailand have adopted English as a bilingual language alongside their national mother tongues. English is incorporated into the curriculum of junior high schools and high schools in these countries. It is anticipated that students possess the ability to communicate proficiently in the English language. However, many students need help effectively expressing their thoughts and ideas in English. The primary issue pertains to the need for more students' vocabulary acquisition. The individuals in question encounter challenges when engaging in effective English communication. Using Duolingo to acquire proficiency in a foreign language offers a different and unique learning experience. Every educational system must incorporate a comprehensive set of methodological components that ensure the effectiveness of the learning process. The elements above encompass monitoring progress, motivation, feedback provision, and vocabulary development.

Furthermore, within the realm of education, teachers must possess the capacity to innovate and employ diverse instructional approaches and learning frameworks. The statement above is closely associated with the teacher's diligent endeavors to consistently uphold the standard of education, as well as the students' inclination towards engaging in the learning process (Yulietri, 2015). According to Johnson (2013), Flipped Classroom is a strategy educators can provide by minimizing the amount of direct instruction in their teaching practice while maximizing interaction. This strategy utilizes technology that provides additional supporting learning materials for students to access online easily. Flipped Classroom changes the learning instruction model, which usually directs and explanations come directly from the teacher to students, into learning in which directions and explanations can be accessed by students online outside or inside the classroom. Flipped Classroom and Flipped Learning are used interchangeably but differ in contextual meaning. Flipping classes can but does not always

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lead to Flipped Learning (FL). Having students read texts, watch audio-video material, and complete activities outside of class, perhaps in the computer lab or at their homes online or offline, seems like the reverse model. However, to engage in reverse learning, teachers must ensure the learning environment is flexible, as teachers often physically rearrange their learning spaces to carry out group or individual activities. In contrast to the traditional teacher-centered model, where the teacher is the primary source of information, the flipped classroom model shifts to a learner-centered approach, and activities in the classroom are intended to discuss and explore topics in-depth, and these activities also assist students in knowledge construction. (Praveen Sam D, 2016).

Fig 1. Differences in the Flipped Classroom Learning Model with traditional learning (Praveen Sam D, 2016)



This notion of learning inside and outside the classroom is supposed to help students display high-level skills professionally. However, classroom-based teaching prepares students only for tests and examinations (Roehl et al. 2013). The main aim of teaching English to students is to develop them to deal with real-life situations in their careers and social life. Therefore, a shift in language learning from classroom to mass is necessary at home. According to Boucher et al. (2013), the time allocated for teaching language in the classroom must be utilized differently in the flipped model. The problem of using time differently in this model is not in the interest of change. However, this is associated with many improvements in teaching and learning levels, i.e. more time for interacting and clarifying texts, more time for intensely discussing ideas, and additional input on material used to study and practice with active learning methodologies. Implementing the flipped classroom approach allows students to engage in learning activities within and beyond the confines of the traditional classroom setting. By utilizing online resources such as educational videos and internet-based materials provided by the instructor, students can review and access course content multiple times. (Syam, 2014). Johnson (2013) posits that implementing the flipped classroom approach allows educators to reduce the extent of direct instruction in their pedagogical methods while concurrently enhancing opportunities for interpersonal engagement among students. This approach employs technological tools to offer supplementary educational resources to students, which can be conveniently accessed online. The Duolingo application is an online platform that can be utilized to facilitate the implementation of flipped classrooms. In addition to this, Duolingo has the potential to support independent study among students. According to Gracia (2013), Duolingo is a freely accessible online platform for language learning. Its primary objective is facilitating language acquisition through various web-based exercises and mobile applications. Duolingo employs a diverse range of techniques and remains current in its approach to language acquisition. This approach can enhance students' comprehension, engagement, and enjoyment of the learning experience by fostering the development of practical learning skills.

Duolingo has many languages where learners can choose which language to learn, such as English, Arabic, Spanish, French, Dutch, and other languages. Duolingo also provides data such as points earned, course overview trees, curtains, and time spent on fabrics. Duolingo is easy to use because its procedure is straightforward, so that Duolingo can be used for all ages. Duolingo is easier to use and more enjoyable, so it will be comfortable as a medium we use in teaching online classes. Duolingo is a free online language platform that provides translation assignments to learn vocabulary

and grammar (studying and practicing a given topic) and works to practice pronunciation and listening (Bende, 2017). Using the Duolingo application platform as a medium is expected to help make it easier for students to learn English anywhere effectively, efficiently, and fun in learning Mobile Learning because it is accessed and executed using a device/smartphone. As a language learning application, Duolingo can help someone improve their vocabulary, pronunciation, and grammar knowledge of the foreign language being studied. Duolingo has a reasonable learning strategy with a learning system in the form of a game that can motivate students to learn (Jaskova, 2014: 24). In addition, Duolingo provides vocabulary exercises and opportunities for students to evaluate their knowledge and identify needs to improve learning (Guaqueta & Gerces, 2018) continuously. It can be interpreted that Duolingo is presented as an educational application that can be integrated anywhere to provide new learning experiences for students and is based on the quality of the content. Abdillah and Kurniawan (2021:45) explain that Duolingo offers interactive features and games with other users. In addition, Duolingo has competition and ranking features that make the Duolingo application popular and competitive. Duolingo has several features in the initial appearance of the main menu, such as learning, stories, friends, shop, and settings. Learn is the main menu used for the learning process. The stories menu is a feature used to discuss vocabulary or in a specific context, for example, in a museum context. The friend's menu is used to find study friends by inviting them via e-mail. The shop menu is a menu that contains information about the lingots you have. Lingots are the currency in the Duolingo application and can be exchanged for bonus skills.

Finally, Duolingo has a settings menu, which allows users to monitor their learning progress. This menu visually represents points earned as experience points (XP), which act as a metric for advancing to higher levels. Additionally, users can explore options to learn different languages within this menu. In addition to the primary menu options, Duolingo offers an additional feature, "Duolingo for School," a valuable tool for educators and learners alike. This feature enables teachers to gain insights into the individual challenges faced by students, thereby facilitating targeted interventions to enhance their language proficiency. It is an undeniable reality that a significant majority of individuals possess a strong desire for practicality. The progress made in information technology has heightened our passion for efficiency and functionality. Most of our daily tasks can now be accomplished through electronic devices such as gadgets and smartphones. Gadgets and smartphones allow individuals to engage in various activities, including but not limited to work, shopping, and socialising. Gadgets and smartphones have become necessities in contemporary society. Duolingo is a cost-free digital platform accessible on mobile devices, allowing users to acquire proficiency in foreign languages. Duolingo is regarded as a highly functional and flexible platform for language acquisition due to its various practical, convenient, and comprehensive features. Numerous academic investigations examining the efficacy of Duolingo as an educational tool have consistently reported favourable outcomes. According to several studies (Widyastuti & Kusuma Dewi, 2018; Nursyamsiah, 2021; Budiharto & Syahroni, 2020), Duolingo effectively enhances English vocabulary proficiency.

2. RESEARCH METHOD

The research conducted falls under the category of quantitative descriptive analysis. The research design employed in this study is a Pre-Experimental Design. This research uses a design that incorporates external variables which have the potential to exert an influence on the development of the dependent variable. The absence of a control class is the underlying cause. One type of Pre-Experimental Design employed in this study is the One-Shot Case Study, wherein a group is exposed to a treatment (X). Subsequently, the outcomes will be duly observed. According to Sugiyono (2018), the independent variable in this study is treatment, while the dependent variable is the result.

3. RESULTS AND DISCUSSION

This research was conducted at Thammislam Foundation School. The subjects in this study were all high school students, with 40 students. Data collection techniques used are observation, tests, and questionnaires. The research instrument used was the Duolingo application for student activities, observation sheet questions in the form of improving the writing ability of teachers' learning, and test sheets (posttest). The data analysis technique used in this study is:

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A. Muhammadiyah Al-Islamic Learning System for Students' Social Behavior at Nurul Hadina Middle School

Data from observations of student activity during learning takes place analyzed using the following formula:

STUDENT ACTIVITY SCORE = SCORE OBTAINED X 100 (KHOLIQ 2015)
TOTAL SCORE

The value of student activity is obtained from the average value of student activity at the first and second meetings. Each student will get a predicate from the value of student activity in the following categories:

Table 1. Duolingo scores are linked to the Common European Framework of Reference (CEFR), an international benchmark of language proficiency.

DUOLINGO TEST SCORE	CEFR LEVEL	PROFICIENCY LEVEL
10-55	A1/A2	Basic user
60-85	B1	Independent user
90-115	B2	Independent user
125-160	C1/C2	Expert user

A detailed guide to CERF levels

a. A1 and A2

The candidate has a basic understanding of English words and phrases. They can understand and express themselves in similar situations.

b. B1

Candidates can understand the most important aspects of concrete writing or speeches on regular topics.

c. B2

Candidates can communicate on various topics in English. They are familiar with the basics of concrete and abstract writing. This group of candidates can speak with experts with confidence.

d. C1 and C2

Candidates can understand spoken and written English, including specific English usage scenarios. They can communicate effectively and efficiently in various settings, such as academic, social, and professional.

B. Data Analysis of Implementation of Learning by Teachers

Data from observations of the implementation of learning by teachers in applying knowledge can be analyzed in the following steps:

Each aspect observed on the observation sheet of the implementation of learning by the teacher uses a score of 1,2,3,4 and 5; data collection is carried out at each meeting, then the average value of each indicator (RTI) that has been observed during two meetings will be sought, the observation indicators are grouped into six sub-categories (preparation, preliminary activities, core activities, closing activities, time management, and learning atmosphere), after that for each indicator in the observed sub-categories, the average value of the sub-categories (RSI) is sought, the six sub-categories are grouped into four categories (preparation, implementation, time management, and learning atmosphere), find the average value of each category (SSR) namely dividing the total value of the sub-categories by the number of categories. Then interpret and determine the average for each category (SSR) with the following criteria:

$0.00 \leq SSR < 1.50$: Not Good

$1.50 \leq SSR < 2.50$: Not good

$2.50 \leq SSR < 3.50$: Fairly Good

3.50 ≤ SSR < 4.50: Good
4.50 SSR ≤ 5.00: Very Good

C. Muhammadiyah Al-Islamic Learning System for Students' Social Behavior at Nurul Hadina Middle School

Calculating the percentage of completeness of student learning outcomes (h) at each meeting using the formula:

Results = *frequency of completeness of learning outcomes* X 100%
many students

The percentage is then categorized according to Table 2.

Table 2. Categories of Cognitive Level Learning Outcome

Category	Percentage
90% ≤ h ≤ 100%	Very good
80% ≤ h < 90%	Good
65% ≤ h < 80%	Fairly Good
55% ≤ h < 65%	Not Good
h < 55%	Failed

4. CONCLUSION

The research results obtained are student activity data during learning, data on the implementation of education by teachers, data on student learning outcomes, and student response data. Student activity data can be seen in Table 3.

Table 3. Student Activity Data

Category	The number of students	Percentage (%)
Active	14 students	35 %
quite active	14 students	35 %
less active	12 students	30 %

Table 3 shows that the average assessment of student activity at the first and second meetings was found. There are 14 students in the category of active students, 14 students who are pretty busy, and 12 students in the less active class. Based on the analysis of student activity data, it can be concluded that 70% of student activity with the flipped classroom method using the Duolingo application in learning English is in the active and moderately active categories.

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Perspectives of International Apprentice Students in Teaching English as an International Language at Thammislam School, Thailand

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ABSTRACT

The international internship program is an excellent platform to open the eyes of prospective educators to see how far English is actively used in each country. The approach used in this study is a qualitative approach presented in a descriptive form. The data collection technique used in this research is document study. Primary data was obtained from the research results on 7 English language education students carrying out a student exchange program at Thammislam Foundation School. With a total of 6 questions from the questionnaire answered by international internship students as their perceptions, the samples were taken using the Google Room media. In this study, it was found that participants from Thai and Indonesian schools had almost the same level of mastery of English morphology.

Keywords: Perspectives, Teaching, Apprentice

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1. INTRODUCTION

In this era, it is undeniable that English is not only used as a second language used in every country, predominantly Asia, but English is also now used as a language that can be used to deliver things to foreign countries. Not much different from Indonesia, Thailand also makes English a second language besides the language of its own country. The English language skills of Indonesian and Thai citizens are just not very good, in contrast to the Philippines, which is more developing English for every citizen of every layer so they can speak English well. It often happens when schools in Thailand teach English without teaching speaking skills, and we wonder why many Thais are embarrassed to speak English. Speaking is an essential English skill.

In teaching, they need to be motivated, but they need to be involved in every class activity that encourages them to learn as long as they find it fun because students are considered to have less motivation. Therefore, here the teacher's role is very important because it guides students to enjoy and creates fun learning so that students remain motivated to learn. According to Guidanceforal (2019) states that perception is a process of sensory clues (sensory) from relevant past experiences organized to give us a structured and meaningful picture of a particular situation. In terms of perception, there are two crucial elements, namely interpretation and organization. Interpretation is an effort to understand the individual's information obtained. Meanwhile, the organization is in the process of managing certain information so that it has meaning. Perceptions of teachers are used to measure the framework of the overall learning process and the performance of the teachers themselves, especially in early childhood students.

Here the teacher must create and introduce this atmosphere and provide material according to the needs of the material objectives and students. Therefore, the teacher's perspective is needed to bring up learning materials and processes suitable for teaching students, especially young learners. Based on the situation presented above, this research conducts research on the need to teach English as a Foreign Language in Thailand, where the researcher becomes an apprentice Teacher at Thammislam Foundation School. An elementary school English Teacher to fulfill the goal of mastering English as a Foreign Language, namely learning communicative skills focused on basic conversational skills.

As previously explained, this article focuses on the perspective of international student interns in teaching English at Thammislam Foundation School. Perspective is perception which means the ability to be aware of objects or phenomena using the five senses. Rakhmat (2013) explained that

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perception is the first step in receiving information, called sensation, through the senses. Humans have five senses to receive information from the environment. One acquires knowledge and all abilities to interact in real situations. According to Gibson in Rahmatullah (2014:11-13), Internal factors that influence perception, namely the factors contained within the individual, include several things, among others:

A. Physiological
   Information enters through the senses, then the information obtained will affect and complement efforts to perceive each person differently so that the interpretation of the environment can also be different.
B. Attention
   Individuals need a certain amount of energy expended to pay attention or focus on the physical form and mental facilities that exist in an object. Each person's energy is different, so one's attention to objects is also different, which will affect an object's perception.
C. Interest
   The perception of an object varies depending on how much energy or perceptual violence is driven to perceive it. Perceptual vigilance is a person's tendency to pay attention to a certain type of stimulus or can be said as interested.
D. Unidirectional Needs
   This factor can be seen from how strong an individual is in looking for objects or messages that can provide answers according to him.
E. Experience and Memory
   Experience can be said to depend on memory in the sense of how far one can remember past events to find out a stimulus in a broad sense.
F. Mood
   Emotional state affects a person's behavior. This mood shows how a person feels at a time that can affect how a person receives, reacts, and remembers.

For English, as a Foreign Language (EFL) teachers to be effective in their classrooms, they need essential competencies. Richards (2013) defines ten core aspects of language teaching expertise and practice: language proficiency, content knowledge, teaching skills, and contextual knowledge. Language teacher identity, student-focused teaching, pedagogical reasoning skills, theorizing from practice, a community of practice membership, and professionalism.

2. RESEARCH METHOD

The approach used in this study is a qualitative approach which is presented in a descriptive presentation. Judging from the object and the results to be obtained, this research is included in the type of descriptive research using qualitative methods. Descriptive research is research conducted to determine the value of one or more variables without making comparisons and connecting with other variables. According to Moleong (2017: 6), qualitative research is research that intends to understand phenomena about what is experienced by research subjects, such as behavior, perceptions, motivations, actions, and others, holistically and by means of descriptions in the form of words and language, in a special natural context by utilizing various natural methods. Qualitative research, according to Hendryadi, et. al (2019: 218), is a process of naturalistic inquiry that seeks an in-depth understanding of natural social phenomena.

Sugiyono (2017) also mentions that qualitative research concentrates on describing the meaning of induction data obtained from natural objects where the researcher acts as a research instrument. This approach was chosen because using processability theory as a reference in mastering foreign languages in Indonesia is still very rare. The following are the stages of this research:

1. Stage Description
   The researcher collected data regarding the description of the object of his research, namely the views of international apprentice students at Thammislam Foundation School when teaching English.
2. Reduction Stage
   Researchers filter the information needed in this study as the primary research focus. At this stage, the intern students filled out a questionnaire as a medium to share their views on teaching English at the Thammislam Foundation School.

3. Selection Stage
   Researchers analyzed the data reduction in detail to obtain knowledge construction in this study. The results of data reduction coding are then analyzed in terms of structure English, and existing suitability.
4. Conclusion Stage
   Researchers conclude from the data analysis done in the previous stage. At this stage, the researcher concludes the results of the analysis without generalizing the results.
5. The Lighting Stage
   Researchers double-checked to ensure the credibility of the data used in this study. At this stage, the research assistants conducted interviews with participants with the same questions to find out the consistency of the answers given by the participants.

The data collection technique used in this research is document study. Primary data were obtained from a study of 7 English education students conducting a student exchange program at Thammislam Foundation School. Data were analyzed using five qualitative data analysis steps: data collection, data reduction, data presentation, data verification, and conclusion (Miles, Huberman, & Saldana, 2014). The research data is then compared. Comparative data is presented in a table for easy reading. Data verification was carried out by conducting verification interviews with several participants. The conclusion of the data is then taken as material for analysis.

3. RESULTS AND DISCUSSION

Table 1. Table of data from questioner on Google Spreadsheet

QUESTION	PERSPECTIVE
(1) What do you think about students' abilities in carrying out the teaching and learning process in the classroom?	1. I think the students need more practice to polish their abilities 2. I think it's the same as indonesian students. No specific abilities mentioned. They learning english as hard, as easy, as possible like we ever seen general students. If they good at english than it's okay for them, but if they bad at english than it's a problem for them 3. My opinion about students' abilities in carrying out the teaching and learning process in class is that students in class are very active when I provide creative material in class, they tend to want to be fully involved in the teaching and learning process taking place 4. They can understand it well 5. They need learn more about English
(2) What is the behavior or attitude of Thammislam Foundation School's students in the internship program when interacting with University of Muhammadiyah North Sumatra students around the school?	1. Its amazing. They are respectful towards people 2. I found out that they are quite good at respect and also humble like always until the end. 3. the students there really appreciate me as a teacher at their school, they always greet and smile when they see me around the school, and they also give their food when they see me and other colleagues eating, they also give us their snacks after class finished 4. Always polite and easy to smile 5. Polite
(3) How did you feel when you first arrived at Thammislam Foundation School?	1. Nervous 2. I feel amazed. Not only by the buildings but

	also the facilities but the fact that i am technically at the real foreign school with a different culture. 3. I'm so grateful because they're treated us like their friends/family, and also the environment looks so clean 4. I feel amazing 5. Good
(4) What do you think after Thammislam Foundation School's students studied the material prepared by students of the University of Muhammadiyah North Sumatra?	1. I think they accept what we are teach them 2. I feel the same. They don't really look interested on our material, i think they feel excited just because of our existence 3. students are enthusiastic when learning and interacting with me, after I give the material the students also give a good response, like when after I explain the material I give students blackboard practice and they try to answer it correctly 4. They kinda shock for the first time 5. I think they understand the material
(5) What do you think about students' understanding and knowledge of learning English?	1. They are interested to learn english 2. Same answer, they are the same as our students. If they are good at english than it's naturally become easy for them but if they blindly know english than it will come out hard for them 3. In my opinion, students' understanding of the learning that I provide is quite good, but because there are language limitations that occur during teaching and learning, it makes it difficult for some students to get good income as expected, but this happens when I teach alone without the help of a teacher their english. if I am accompanied by Mrs. Nazwa they understand better what I convey and their learning outcomes are also much better 4. I think they can understand it when they learned more 5. Some of then easy to understand but some are didn't
(6) Do you think the response of school students in Indonesia is better than students in Thailand about learning English?	1. Full of curiosity 2. No, i don't think so. It's the same. Asian students basically not interesting in english 3. I think no, students In Thai more excited to

	learn English than Indonesia students 4. Absolutly better 5. It depends, some of the students in Indonesia give the good response. Some are not. And so does in thai

The questionnaire provided is 6 questions, including:

(1) What do you think about students' abilities in carrying out the teaching and learning process in the classroom? (2) What is the behavior or attitude of Thammislam Foundation School's students in the internship program when interacting with University of Muhammadiyah North Sumatra students around the school? (3) How did you feel when you first arrived at Thammislam Foundation School? (4) What do you think after Thammislam Foundation School's students studied the material prepared by students of the University of Muhammadiyah North Sumatra? (5) What do you think abou students' understanding and knowledge of learning English? (6) Do you think the response of school students in Indonesia is better than students in Thailand about learning English?

A. SECTION 1

Based on the question ***"What do you think about the ability of students in carrying out the teaching and learning process in the classroom?***" the author gets several answers that the author considers interesting to respond to, namely as follows:

- I think it's the same with Indonesian students. No special abilities were mentioned. They learn English the hard way, as easily, as easily as we have ever seen as students in general. If they are good at English then it is ok for them but if they are bad at English then it is a problem for them.

from the exposure of the first intern student's response said that there was no significant difference that distinguished Indonesian students from Thai students, it was just that the teaching techniques used by Thai teachers themselves might be different from teachers in Indonesia.

- My opinion about the ability of students in carrying out the teaching and learning process in class is that students in class are very active when I give creative material in class, they tend to want to be fully involved in the ongoing teaching and learning process.

From the presentation of the second intern student, it appears that the English teaching situation is quite cooperative and responsive, but not all of these situations exist in every class. Some students are interested in learning foreign languages, but not a few students are not interested in learning foreign languages.

B. SECTION 2

Based on this question, ***"What is the behavior or attitude of the Thammislam School Foundation students in the internship program when interacting with North Sumatra Muhammadiyah University students around the school?"*** the author gets several answers which, according to the author, are interesting to respond to, namely as follows:

- the students there really appreciate me as a teacher in their school, they always greet and smile when they see me around the school, and they also give me their food when they see me and other colleagues eating, they also give us snacks after class.

Based on the perception of first students, this is very interesting because this is a cultural custom that belongs to the Thai people, who really appreciate the guests who come. students are not racist towards people not from their country, so the learning process improves because they respect each other.

-This is amazing. They respect people.

Based on the perception second student, the same as the description above, if the teacher and teacher respect each other, the student learning system can run well, and the knowledge conveyed will be much easier to understand.

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C. SECTION 3

Based on this question "How did you feel when you first arrived at the Thammislam Foundation School?" the author gets several answers which, according to the author, are interesting to respond to, namely as follows:

-I feel amazed. Not only the building and the facilities but the fact that technically I was a real foreign school with a different culture.

From the first apprentice students, the environment looks very different compared to Indonesia. For some reason, all of the apprentice students felt that the school facilities were exceptionally complete, and it seems that in Indonesia itself, these complete facilities are only owned by well-known schools. but unfortunately, with such good school facilities, it doesn't put too much pressure on learning English.

- I am very grateful because they treat us like their friends/family, and also the environment looks very clean.

from student apprentices, the environment looks clean, which is good because students need a good atmosphere for learning, it's just that the motivation to learn English needs to be instilled even more.

D. SECTION 4

Based on this question, ***"What do you think after the Thammislam Foundation School students studied the material prepared by Muhammadiyah University students of North Sumatra?"*** the author gets several answers which, according to the author are interesting to respond to, namely as follows:

- I feel the same. They are not very interested in our materials, I think they feel happy just because of our existence.

This is an essential note for international internship students because, abroad, there is no guarantee that the country will use English correctly. students are miserable when schools have good facilities to study more intensely, but with a lack of interest in learning English, some difficulties will be faced.

- They were a bit shocked for the first time.

This results in a different mother tongue which makes it difficult for students to communicate with international intern students. The limitation of not being too proficient in English and their own daily language, namely Tagalog, makes it difficult for students to convey their opinions.

E. SECTION 5

based on this question, ***"What do you think about students' understanding and knowledge of learning English?"*** the author gets several answers which according to the author are interesting to respond to, namely as follows:

- In my opinion, the students' understanding of the learning that I provide is quite good. Still, because there are language limitations that occur during the teaching and learning process, it makes it difficult for some students to get good income as expected, but this happens when I teach alone without the help of a language teacher their English. if I am accompanied by Mrs.Nazwa they understand better what I convey and their learning outcomes are also much better.

just like in the previous session, they needed translators to help them understand the lesson, it seems like the initial Indonesian method can help students in Thailand to learn better with the help of English to-Tagalog translation.

-Some are then easy to understand but some are not

The second statement is not much different from the first statement, the constraints on the main language should be that the English students learn can be far more optimal if they have the same understanding of the language.

F. SECTION 6

based on this last question ***"Do you think the response of school students in Indonesia is better than students in Thailand about learning English?"*** the author gets several answers which according to the author are interesting to respond to, namely as follows:

- It depends, some students in Indonesia give a good response. Some don't. Likewise in Thai.
There is no excessive difference between the two countries in terms of English among students, not all of them are interested but both of them still want to learn English well.

- Full of curiosity.
Their curiosity makes international internship students consistently teach English enthusiastically even though they lack interest but greatly desire to learn.

4. CONCLUSION

The International Internship program has provided benefits for students who take it. Mastery of English is the focus of this research. In this study, it was found that participants from Thai and Indonesian schools had similar levels of mastery of English morphology. the reason is that English in Thailand is a language that is rarely used actively in several sectors such as commerce, business, government, and education. English is used by participants only when there is English material when interacting with foreigners and when there are international-scale activities.

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Analysis of Learning in Implementing Digital Technology Based on Power Point at SD Muhammadiyah Karangkajen IV

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ABSTRACT

Technology is the result of knowledge development in the field of education. Education is an essential part of improving life and nation-building. Effective education involves actively engaging students and developing their skills while learning in the classroom. Our research aims to analyze learning through the implementation of digital technology in the fourth-grade class at SD Muhammadiyah Karangkajen IV. We used a qualitative descriptive research method, utulizing classroom action research techniques,and conducted interviews with the fourth-grade homeroom teacher. Based on the research conducted, students applied learning theories using visual and audiovisual media during the teaching and learning process. As a result, 75% of the total number of fourth-grade students understood the subject matter and utilized the Power Point media optimally. The implementation of digital technology in SD Muhammadiyah Karangkajen IV can enhance students' quality and learning development, leading to increased focus, concentration, and motivation due to the engaging learning content presented through Power Point.

Keywords: Digital technology, Media, Learning

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1. INTRODUCTION

Education that holds meaning is one where students learn actively, creatively, and actively engage in classroom learning. Schools and teachers must encourage students to develop their potential, thus, utilizing the technology available in the current era as a learning medium (Ali Mustadi, 2020). The use of learning media captures students' attention during lessons to achieve learning objectives (Muthoharoh, 2019). The role of teachers is changing in today's context. Teachers are no longer just knowledge and information providers, but their role will evolve with the presence of technology in the future. The role of teachers will change if they choose not to adapt (Rahayuningsih & Muhtar, 2022).

Education that holds meaning is one that is effective in encouraging students to learn actively, creatively and be engaged in the learning process at school. Teachers should help students sharpen their potential, and to achieve that, schools and teachers can leverage the available technology in this era as a medium for learning (Ali Mustadi, 2020). Using instructional media should captivate students' attention during the learning process to achieve learning objectives (Muthoharoh, 2019). Currently, the role of teachers is evolving. Teachers are no longer just knowledge and information providers; their role will change with the presence of technology in the future. If teachers choose not to adapt, their roles will change (Rahayuningsih & Muhtar, 2022).

In enhancing the education system in Indonesia, the Ministry of Education and Culture (Kemedikbud) implemented the "Merdeka Belajar" (Freedom to Learn) program. The concept of "Merdeka Belajar" was introduced by Mr Nadiem Anwar Makariem and aimed to improve students' personalities in line with cultural values, believing in God, being healthy, moral, competent, excellent, innovative, imaginative, independent, and responsible citizens (Karuniawati et al., n.d., 2022). Through the "Merdeka Belajar" concept, teachers are expected to enhance their potential in creating interesting, enjoyable, and meaningful learning activities. In preparing for the implementation of the "Merdeka" curriculum, school principals and teachers of grades 1 and 4 must participate in training to deepen their general and in-depth knowledge about the "Merdeka" curriculum (Metriana Tae & Ngono, n.d., 2022).

Technology development impacts the learning tools used during the educational process in schools. This explains the importance of utilizing technology in this global era (Sarbaini et al., n.d.,

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2020). According to research (Sarbaini et al., n.d., 2020) and citations (Harahap et al., 2021; Rambe et al., 2021), in addition to the advancement of knowledge and technology, the main task of teachers in education is to create an imaginative learning atmosphere, such as using attractive learning tools for students. Besides learning media, teachers can also use and leverage digital-based technology. Various innovative digital learning media can make the learning process more effective and efficient (Hidayat & Khotimah, n.d., 2019).

Learning media is the key to successful classroom learning (Portanata et al., n.d., 2017). Engaging learning media are based on analyzing learning needs and characteristics, developing learning, and achieving the learners' success. Learning media are essential for implementing education and play a role as innovative providers (Rahma et al., 2023). As teachers, they must determine and apply learning concepts that align with students' characteristics to achieve learning objectives and enhance students' understanding of the subject matter and academic achievement (Sarbaini et al., n.d., 2020). According to research (Sarbaini et al., n.d., 2020) and citation (Tiar, 2020), in the use of learning media in the digital era, teachers need to be digitally literate to effectively and efficiently support the learning process, making it easily understandable for students.

Using digital technology as a learning tool in the classroom can facilitate quick access to information, such as finding teaching materials during the learning process. In the learning process, teachers utilize learning tools such as LCD projectors, teaching aids, and educational games to present materials to students. The aim is to make it easier for students to understand the subject matter presented by the teacher during the classroom learning process (Wilma Khairunnisa, 2020).

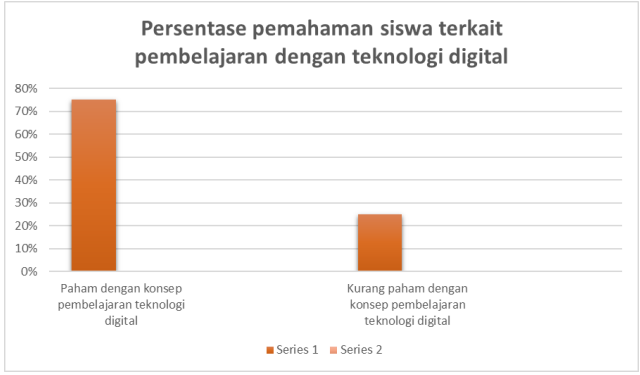
2. RESEARCH METHOD

This research was conducted using a qualitative descriptive technique. In the book (S.I.K., 2021), the author referred to the writing of (Sugiyono: 2015:15), stating that the qualitative descriptive method is a procedure based on the philosophy of direct research by observing the object of interest directly. This method is used to examine the object's condition with a comparison to experiments, where the researcher is the key instrument, and data is collected using appropriate snowball technology and combined techniques of qualitative data analysis, emphasizing the research results. The data collection method we used at SD Muhammadiyah Karangkajen IV was through interviews.

Table 1. Student Comprehension Index Score

Number of Students	Comprehend	Do not Comprehend
21 Students	75%	25%

Fig 1. Percentage of Difference in Students' Comprehension Abilities



3. RESULTS AND DISCUSSION

Our research aims to analyze the learning process with the implementation of digital technology in the 4th grade at SD Muhammadiyah Karangkajen IV. The school where our research was conducted follows the "Merdeka" curriculum. In the "Merdeka" curriculum program, there are combined subjects, namely Science (IPA) and Social Studies (IPS), which are taught as Integrated Science and Social Studies (IPAS). In this case, Science is taught in the first semester, and Social Studies is taught in the second semester.

From the results of this research, it can be observed that digital technology is used in alignment with the subject matter. For example, when learning about the water cycle. During the interview, we asked the teacher about the use of digital technology in the 4th-grade learning process at SD Muhammadiyah Karangkajen IV. The teacher responded that learning with digital technology helps students better understand and grasp the learning material. The use of digital technology at SD Muhammadiyah Karangkajen IV can enhance the quality and learning development of students, making them more focused on learning.

Based on the interview results, the teacher also explained the challenges in implementing digital technology in the learning process: limited school facilities, including LCD projectors and laptops. The utilization of LCD projectors makes students' learning more engaging. This is because primary school children are highly curious and need a learning model that can enhance their interest in learning (Nurfadhillah et al., 2021). According to the explanation from the source, the school only has 2 LCD projectors that are also shared among other classes. However, the school is committed to improving the learning process by implementing digital technology in the future to make it more optimal and beneficial for students to concentrate and be motivated in learning.

Teachers choose media as a tool when delivering information and learning materials to students to help them acquire knowledge concretely (Wibowo et al., 2022). According to this research, most educators utilize digital technology, such as PowerPoint, to achieve the learning objectives, such as delivering material to students. The use of media like this can enhance students' creativity, as elementary school students have a strong ability to grasp learning material when teachers present interesting things (Hardiyanti et al., 2020).

Improving the utilization of technology in this modern era can be applied in education as a means to facilitate the learning process. The use of digital technology has been proven to enhance the quality and creativity of students during direct learning, as well as increase concentration and motivation due to the enjoyable learning content that prevents students from feeling bored during lessons. Utilizing learning media can ease students' knowledge acquisition regarding the learning content, thereby maximizing their concentration while learning (Heryani et al., 2022).

External factors present challenges for teachers when implementing digital technology in the classroom, such as inadequate facilities and infrastructure. For instance, in Indonesia, there are limitations in supporting facilities like computers (Hainul Putra et al., n.d., 2019). The development of digital technology in education should be supported by all relevant institutions, including the government, school principals, teachers, and the community (Ambarwati et al., n.d., 2022). Based on the interviews conducted with the sources, one of the obstacles in the learning process at SD Muhammadiyah Karangkajen IV is the need for more supporting facilities from the school, such as laptops and LCD projectors, to present learning materials using PowerPoint media. Facilities are a crucial factor in implementing technology-based learning (Purnasari & Sadewo, 2021).

The media required by students nowadays provide significant means to illustrate situations that can inspire them to express ideas and opinions. These learning media are categorized based on the form of information used, such as visual media theory and audiovisual media theory. This categorization can serve as a reference for comparing the processes used to convey information and the ways in which sound or images can be obtained and received by students.

A. Visual Media

Based on the research (Sahuni et al., 2020) as cited by (Kustandi et al., 2021), visual media is one of the means that the human senses can perceive. The presence of visual media enables the implementation of learning to be well-directed.

Visual media involves the sense of sight and is further developed into two types of messages: verbal-visual and non-verbal visual messages (Inpres Tumpu Jaya I Kec Batui Selatan & Banggai, 2020). Verbal-visual messages are presented in the form of symbols, while non-verbal visual messages serve as substitutes for verbal language.

B. Audio Visual Media

The use of teaching materials in the form of audiovisual media serves as a medium for delivering content through sight and hearing senses to enhance the conditions that enable students to receive knowledge and information easily. According to research (Saputro et al., 2021), audiovisuals are devices that require a projector to present both images and sound.

Audiovisuals are employed in student learning, allowing them to become interested in the subject matter, and the lessons can stimulate students' perspectives, thus increasing their motivation to learn (Dian & Gabriela, 2021).

4. CONCLUSION

Based on the research results, it is evident that the use of digital technology in the learning process at SD Muhammadiyah Karangkajen IV is quite optimal. The utilization of technology-based learning media, such as PowerPoint, can enhance the quality and interest of students in learning, with a percentage of 75% of students understanding the concept of technology-based learning with visual and audiovisual media. It is hoped that in the future, teachers will continue to develop and implement technology-based learning concepts in elementary schools (SD). It is also hoped that the school will improve learning facilities to ensure they are sufficient and suitable for the student's learning process.

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The Effectiveness of Islamic Religious Education Subjects in the Merdeka Belajar Curriculum

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ABSTRACT

This research is related to the lack of mutual collaboration between educators and students in the running of Islamic Education learning activities in the classroom because they have not been able to unite perceptions to achieve learning goals. Islamic Religious Education educators face challenges to implement within the framework of characteristics that include the development of soft skills and character, focus on essential materials, and flexible learning for students. The purpose of this research is to analyze and measure the effectiveness and strategies of Islamic Religious Education subjects in the Merdeka curriculum. This research used an analytical descriptive method with a qualitative approach using observation flow wrapped with interviews and questionnaire instruments totaling 20 question points containing 10 positive questions and 10 negative questions and 5 items of interview instruments to PAi subject educators at the school. This study shows positive results that there is an effect of the effectiveness of PAI subjects in the independent learning curriculum at Dharma Wanita Pare High School, seen from the results of the questionnaire instrument the majority of students answered agree and strongly agree on positive questions and vice versa for negative questions apply vice versa. This is the alternative hypothesis (H_a) is accepted or approved while the null hypothesis (H_o) is not accepted or not approved.

Keywords: Effectiveness of Islamic Education Subjects, Independent Learning Curriculum, Islamic Education Subjects

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1. INTRODUCTION

Education in schools is a conscious effort of guidance made by educators to students in order to achieve learning objectives. Educators will always guide and direct their students to become directed. But in the process, of course, there are various problems such as lack of one perception between educators and students in the learning process in one subject so that it hampers the educational process itself.

In learning Islamic religious education, this also applies, there are various problems related to the effectiveness of certain subjects. Educators prepare all the needs of the educational process of students but students do not receive according to the expectations of educators. Conversely, students come to school with high enthusiasm and motivation must be dashed because the delivery of learning is beyond the concept of the learner's expectations.

Subjects are components of a curriculum. If it is called a component, then if it is not effective it will interfere with and even hinder the process of achieving learning goals. In relation to the independent learning curriculum, of course, in the subjects there is religious education, whether it is Islamic religious education or others. In this study, it is more focused on the effectiveness of Islamic religious education subjects.

In the Independent Independent Curriculum, learners are given autonomy in choosing topics or learning projects that interest them. They can explore their own interests and talents and explore topics that are considered interesting and relevant. This curriculum emphasizes more on project-based learning, where learners are involved in real tasks or projects that require them to apply the knowledge and skills they learn.

Merdeka Mandiri curriculum also gives learners the freedom to determine their own learning time and rhythm. They can learn at a pace that suits their own needs and learning style. In addition, this curriculum also encourages students to develop skills such as problem solving, collaboration, and creativity, which are considered important in facing real-world challenges.

The Merdeka Mandiri Curriculum approach aims to create students who are more active, independent, and have intrinsic motivation for learning. By giving freedom and responsibility to learners, it is hoped that they can develop their maximum potential and prepare themselves to face various challenges in the future.

Islamic education teachers as entities in schools are also required to be able to understand and implement the learning curriculum in Islamic education learning. Islamic education teachers face the challenge of implementing it within a characteristic framework that includes the development of soft skills and character, focus on essential materials, and flexible learning.

Thus, according to him, the time allocation is directed to develop soft skills and character of students through initial assessment and final assessment in several phases. Feisal gave tips so that GPAI's learning outcomes can meet the requirements, namely by encouraging teachers to provide varied learning, "schools need to find out and communicate intensely with parents." (Challenges of Implementing the Merdeka Curriculum in Islamic Education Learning (Directorate of Islamic Education).

2. RESEARCH METHOD

A. Research Background

This research was carried out in a series of research programs for the 2023 Social Work Lecture which was driven by lecturers and students of the Faculty of Islamic Religion, Islamic University of Jakarta, and Class of 2019. Researchers would describe the results and researched data that aimed to determine the role of the effectiveness of Islamic religious education subjects in the Merdeka curriculum as described in the previous chapter, this researcher used qualitative methods to saw the natural conditions of a phenomenon. According to Sarosa (2012) qualitative research is research that tries to understand phenomena in their natural setting and context where researchers do not try to manipulate the observed phenomena. The research took place in June on June 7, 2023.

The results of this study were obtained through semi-open interview techniques and questionnaires conducted in depth to obtain information and data directly. Furthermore, researchers also used observation and documentation methods to found out more deeply and clearly and triangulate existing data have been analyzed. The analysis itself would focus on the effectiveness of islamic religious education subjects in the independent learned curriculum.

The first participant was an Islamic religious education educator at the school and the second participant was a student who has been actively participating in learning at this institution until now.

B. Research Method

This researche used an analytical descriptive method with a qualitative approached by using an observation flowed wrapped in interviews and questionnaire instruments. Descriptive analytic is a method that serves to describe or provide an overview of an object to be studied through data or samples that have been collected as is without conducting analysis to make conclusions that apply to the public.

This research aims to find whether there is evidence of the effectiveness of Islamic religious education subjects in the independent learning curriculum at Dharma Wanita 01 Pare High School.

C. Data Collection Procedure

Data collection techniques in this study were carried out from primary data sources. Primary data is taken from educators and secondary data comes from students of class XI SMA Dharma Wanita 01 Pare by observing directly at the time of research implementation and also through research instruments, the research instruments used in this study are interview questionnaires and questionnaires.

For more details in this study using data collection techniques as follows:

1) Observation

Observations made by researchers are by observing and asking the educational pattern of an educator with students. Observation is used to collect data objectively if direct observation is made and by observing the data directly it will make it easier for researchers to analyze. This observation was conducted at SMAS Dharma Wanita 01 Pare which is located at SMAS DHARMA WANITA PARE Jl. Jend Ahmad Yani No.1 Pare, Kab. Kediri, Prov. East Java

2) Questionnaire

The questionnaire distributed is a closed questionnaire of 20 question items related to the effectiveness of Islamic religious education subjects in an independent curriculum. This technique aims to collect data from respondents, by giving a set of written questions to respondents to answer. The questionnaire used is a questionnaire controlled by the researcher, namely a questionnaire whose answers are already available in 5 alternative answers. This study used a sampling method in the form of simple random sampling.

D. Data Analysis Technique

Data analysis techniques in writing this research used narrative analysis. Data analysis techniques with narrative analysis are a type of qualitative method data analysis used to analyze stories or narratives that arise from qualitative data. In this technique, qualitative data is collected through interviews or narratives that are analyzed to understand the narrative structure and related meanings (Qualitative Data Analysis Techniques: Definition, Types, and Examples). This method focuses on how to convey ideas by collecting descriptions of an event and then organizing them into a story with a chronological approach. Therefore, the data is presented in the form of a narrative or description.

3. RESULTS AND DISCUSSION

In analyzing the data on the influence of the effectiveness of Islamic education subjects in the independent learning curriculum at Dharma Wanita Pare High School, the researcher submitted a number of interview statements to the educators of Islamic Education subjects at Dharma Wanita Pare High School.

Among the list of questions asked are as follows:

1. In relation to the subject of Islamic religious education here, is it considered effective for changing the morals of students?

Answer: Islamic Religious Education at Dharma Wanita High School is effective. It can be seen from the behavior of students when meeting educators as a form of implementation of moral education to educators.

2. In relation to Islamic religious education learning materials, is the material presented in accordance with the direction of the applicable curriculum here?

Answer: Yes, on the other hand we evaluate educational activities, especially in Islamic religious education subjects so that they are more developed and effective for students.

4. In relation to the implementation of Islamic religious education learning, has it gone well?

Answer: In the process it has shown a good level, but there are some things that need to be improved such as the way of dressing, hair tidiness and the like.

5. Are the curriculum demands related to Islamic religious education subjects too burdensome for educators?

Answer: Educators consider it a challenge to develop and advance education in this high school.

6. What is the main target of Islamic religious education learning achievement at Dharma Wanita High School in the near future?

Answer: Maximizing the potential achievements of students both academically and non-academically in order to achieve the best achievements in schools around Pare.

*(Interview with one of the Islamic religious education teachers at Dharma Wanita Pare High School, June 7, 2023, Time 08.00-09.00 WIB)

Observation of secondary data is through students in the form of a questionnaire to 22 students with 20 items of positive question type statements and negative question variables.

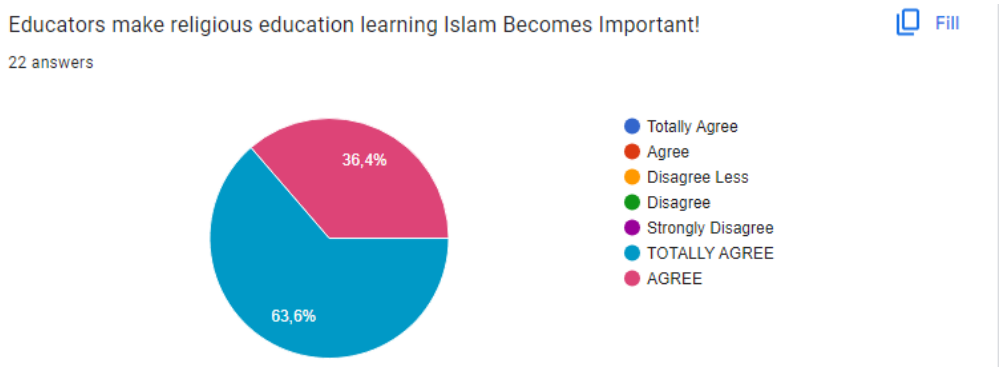
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Data regarding the effectiveness of Islamic religious education subjects in the independent learning quirkulum at Dharma Wanita Pare High School were taken from the answers to questionnaires given to a sample of 11th grade students at Dharma Wanita Pare High School on Monday, Wednesday, June 7, 2023 which was carried out after educational counseling material by the resource person Drs Mugiyono, M.Pd.I. The yellow-colored questions are questions that describe the educator who describes the educator.

Yellow colored questions are questions that describe educators in educating students. While yellow-colored questions are the dimensions of students' understanding in understanding the learning delivered by educators.

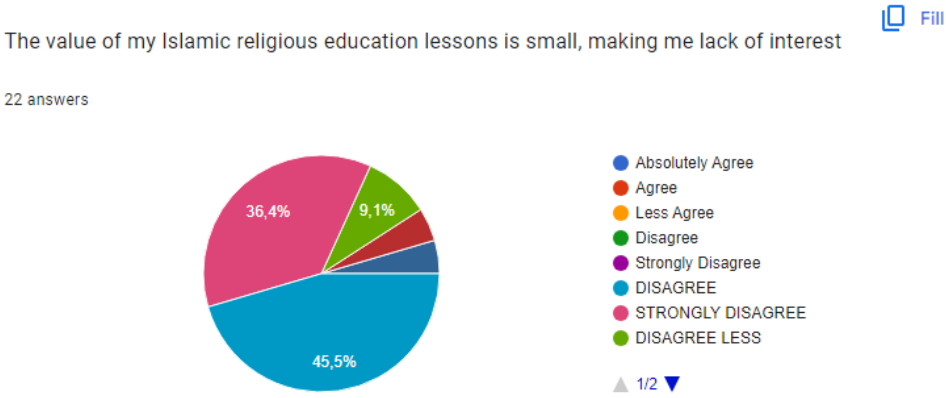
In the first point statement (Positive Question) about the importance of educators in learning PAI from a total of 22 respondents, 14 (63.6%) respondents answered strongly agree and 8 (36.4%) respondents answered agree. The following is the data tabulation:

Fig. 1 Diagram of positive questions for respondents regarding educators



Quoted from the diagram above, it is known that educators are an important key in the success of PAI learning in the classroom. As stated by the researcher that educators are a component of education, if one component is missing then the process will be disrupted until it fails.

Fig. 2 Negative question diagram for respondents regarding educator



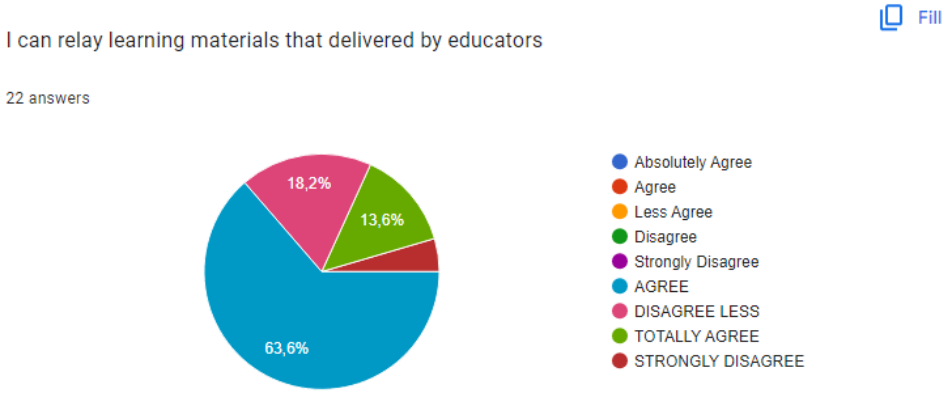
In the second point statement (Negative Question) about the disinterest of students because of the small value in PAI learning from a total of 22 respondents, 8 respondents answered strongly disagree and 10 respondents answered disagree.

From the data above, it is known that whatever the results of students' PAI scores do not make students uninterested in learning PAI at the School,

In relation to students' understanding of Islamic Religious Education learning on (positive question), the following data results were found:

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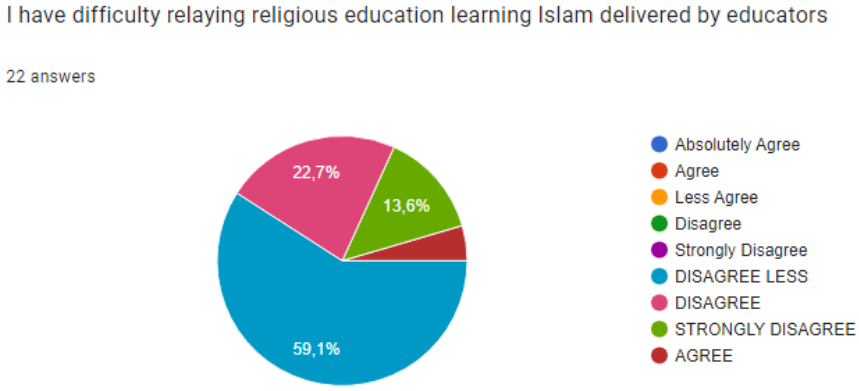
Fig. 3 Diagram of positive questions for respondents regarding lesson comprehension



It is known that 14 students agree with a percentage of 63.6% being able to convey back the learning material that has been conveyed by the educator, meaning that the educational process runs effectively.

While negative questions about students' understanding of learning understanding found the following data:

Fig. 4 Diagram of negative questions for respondents regarding learning comprehension

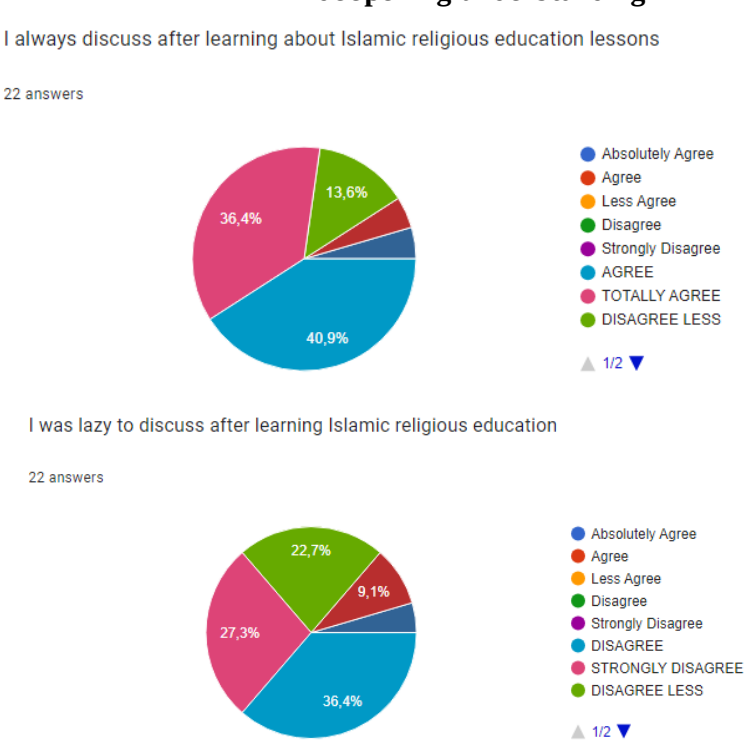


From the diagram above, it is known that more students are able to convey back the learning outcomes than difficulties. This means that learning material is successfully conveyed from educators to students.

In relation to the creativity of students which is the main demand of the independent learning curriculum, researchers try to ask positive and negative questions related to this. Then the following data is known:

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Fig. 5 Diagram of positive and negative questions for respondents regarding learners' creativity in deepening understanding



In the positive question index, it was found that 8 (36.4%) learners strongly agreed and 9 (40.9%) out of a total of 22 learners agreed that they always discuss after PAI learning takes place to develop students' critical thinking.

On the negative question index, it was found that 6 (27.3%) learners strongly disagreed and 8 (36.4%) out of a total of 22 learners disagreed that they always discuss after PAI learning takes place to develop learners' critical thinking.

From the data exposure obtained that the majority of students want and implement discussions after PAI learning is over to improve their critical thinking at Dharma Wanita Pare High School.

Similarly, researchers found that in statements or questions with positive weights they tend to respond well and vice versa if the statement or question has a negative weight then they respond with disagreement.

From the results of data analysis, both from observations of interviews with one of the Islamic religious education subject educators and observations of the second students showed a positive response which is certainly in accordance with the facts in the field. Researchers made observations found that the habit of takdzim to the teacher was found in this Dharma Wanita Pare High School. This means that the implementation of Islamic religious education learning in Dharma Wanita High School runs effectively.

Learning Islamic religious education in a school can provide significant benefits for students. Here are some sentences that explain the effectiveness of Islamic religious education learning in schools:

1. Effective learning of Islamic religious education in schools can help students understand the moral and ethical values espoused in Islam. This will shape their characters to be responsible, honest, and respectful individuals.
2. With effective Islamic religious learning, students will have a better understanding of religious teachings, including the basic principles, beliefs and worship practices in Islam. This will help them strengthen their religious identity and develop a deeper relationship with Allah SWT.

3. Effective Islamic religious learning can also improve students' understanding of Islamic history, culture and civilization. They will learn about important figures in Islam, relevant historical events, as well as Islamic contributions in science, art and architecture. This will open their minds to the rich heritage of Islamic civilization.
4. In addition, effective Islamic religious learning in schools can help students understand and appreciate diversity in Islam. They will learn about different opinions in religion, schools of thought in Islam and the importance of interfaith tolerance. This will help create an inclusive atmosphere in the school that respects students' religious diversity.
5. Effective Islamic religious learning also provides opportunities for students to participate in social and humanitarian activities that are based on Islamic values. They can engage in charity work, community service or humanitarian projects to help them develop an attitude of empathy, compassion and concern for others.

Thus, effective Islamic religious education learning in schools makes an important contribution to shaping students' character, strengthening religious identity, enhancing understanding of Islamic religion and culture, and promoting inclusive attitudes and social care based on Islamic values.

The implications of effective learning of Islamic religious education in schools are as follows:

1. Strengthening Moral Values: Effective Islamic religious learning can help students gain a deeper understanding of moral and ethical values in Islam. They will learn about concepts such as honesty, justice, loyalty and kindness. This has an impact on building the character of students who have integrity, responsibility, and concern for others.
2. Increased Religious Awareness: Effective Islamic religious learning helps students strengthen their religious identity. They will learn about the principles of Islamic teachings, worship practices and underlying values. This enhances their understanding of Islam as their own religion, helping them to face challenges and maintain the integrity of their faith in a diverse society.
3. Development of Tolerance and Acceptance: Effective Islamic religious learning encourages students to respect and understand the diversity within Islam. They will learn about different schools of thought and opinions within the religion, as well as the values of tolerance and respect for the beliefs of others. This helps to create an inclusive climate in schools, where students respect each other's religious differences and build harmonious relationships.
4. Increased Understanding of Islam: Effective Islamic religious learning provides students with a better understanding of Islamic history, culture and civilization. They will learn about the contributions of Islam in science, art, literature and architecture. This helps raise students' awareness of the heritage of Islamic civilization and broadens their perspective of the world.
6. Development of Social Awareness: Effective Islamic religious learning encourages students to participate in social and humanitarian activities that are based on Islamic values. They will learn about the importance of doing good, helping others, and taking care of the environment. This helps students develop an attitude of empathy, social concern and charitable activities that benefit society.

The implications of effective Islamic religious education learning in schools include strengthening moral values, increasing religious awareness, developing tolerance, increasing understanding of Islam, and developing social awareness. These all contribute to the formation of students who have strong characters, deep religious understanding, inclusive attitudes, and concern for others.

4. CONCLUSION

Based on the research on the effectiveness of Islamic religious education subjects in the Merdeka curriculum at Dharma Wanita Pare High School, it can be concluded as follows:

First, there is a fairly good effectiveness between Islamic religious education subjects in the applicable curriculum which is implemented in morals/behavior in the school environment of Dharma Wanita Pare High School.

Second, the magnitude of the effectiveness of Islamic religious education subjects in the independent learning curriculum at Dharma Wanita Pare High School is the average response from respondents during interviews and questionnaire respondents from students show answers in

accordance with the expectations of researchers. Therefore, the null hypothesis (Ho) is rejected while the alternative hypothesis (Ha) is accepted or approved. So it is concluded that the effectiveness of Islamic religious education subjects in the independent learning curriculum at Dharma Wanita High School is quite effective. This means that there is a high/strong influence.

Third, Strategies that need to be done for the effectiveness of the subject can be done by preparing learning materials and materials that are appropriate and targeted according to the conditions of each student.

This can be started from the diagnostic assessment of the independent learning curriculum. Another thing that needs to be dealt with is character-based learning with reference to Rosulloh SAW and his Companions in socializing and in the world of education. Like that, it will slowly make students imitate the concept of learning in the style of Rosul and his Companions. The next strategy is monitoring the attitudes and behavior of students at school and evaluating them every month. and if students are at home can coordinate with the parents of students. This is effective for monitoring changes in the attitudes and behavior of students towards a better direction.

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Applying the Simplex Method to Optimize Employee Distribution to Increase Sales Internet Data Package

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ABSTRACT

The goal of this article is to ascertain how to maximize sales of internet data packages while keeping the company's marketing budget within reasonable bounds. The technique utilized is linear programming using the Simplex method; this approach's benefit is the ability to compute two or more choice variables, which produces results that are superior to those of the graphical method. Variable Three are utilized in this study: senior marketing (X1), junior marketing (X2), and apprentice marketing (X3). The maximum amount of data package cards that may be sold by the three marketing is 3000. The marketing senior target can sell 1200 packages, whereas the marketing junior target can sell 1200 packages, according to optimization simulation findings using the simplex approach.

Keywords: optimization, simplex, linier programing

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1. INTRODUCTION

The intense competition between businesses will cause a decline and increase in turnover for each organization. As a result, businesses require a plan to raise profits by taking into account both strengths and weaknesses and running optimization simulations using a variety of techniques, such as marketing performance improvements, promotion techniques, and corporate service improvement (Jatiningrum, 2019). The company's marketing performance has to be improved since marketing works best when it interacts directly with customers or through social media. (Sari, 2020)Companies can undertake factor analysis using a variety of approaches, including an analytical hierarchy process (Hozairi, 2019).

The Tembung region is serviced by the business PT. Bistion Ponsel, which sells various internet data package products. The firm employs 20 (two twenty) people in marketing who are responsible for sales campaigns in Deliserdang's Bandar Khalifah, Sei Rotan, Medan Estate, and Bandar Setia Regencies. twenty marketing There are 4 marketing apprentices/contracts, 8 marketing juniors, and 8 marketing seniors in this group. By making the most of its 20 staff, PT. Bistion Ponsel aims to sell 3000 data packages to customers each month. The challenge facing PT. Bistion Ponsel is how to maximize business profit while selling the targeted 3000 data packages with a little staff. Therefore, PT. Bistion Ponsel requires an answer to its problem.

An mathematical process used to calculate and store data is called the simplex technique. Numerous figures in the current iterations are considered while choosing the following iterations (Saryoko, 2016). A technique to do anything is called simplex. Numerous inequalities and numerous variables are present in linear programming issues (Haslan, 2018). When utilizing the simplex method The linear programming model must be modified to a universal form known as "standard form" in order to solve the linear programming issue (Rumetna M. S., 2020). The conventional form of the linear program model is all barriers expressed as an equation with a non-negative right side, with the aim being either maximization or minimization (Aprilyanti, Optimasi Keuntungan Produksi Kemplang Panggang Menggunakan Linear Programming Melalui Metode Simpleks, 2018).

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The goal of the study is to maximize business earnings and staff assignment distribution, with a cap of 3000 data package goods sold every month. The researcher employed an Excel solver in the simulation process optimization utilizing the simplex linear programming approach to address the issues raised above. One of the additional features offered by Microsoft Excel is called Solver, and it helps you determine the best value for a formula in just one cell (also known as the target cell) on an Excel worksheet.

In this study, the author employs solver add-ins to determine firm earnings and to solve optimization issues related to marketing and distribution. This solution was chosen by the author because it is free, doesn't need to be constructed, is simple to use, and is simple to obtain—specifically, solver add-ins for Microsoft Excel. Previous research has shown that the simplex method can be applied to a variety of problems, including maximizing bread sales (Lina, 2020) maximizing billboard production, maximizing the increase in production profits (Rumetna M. L., 2019).

2. RESEARCH METHOD

The goal of this study is to solve difficulties at PT. Bistion Ponsel with the aim of maximizing corporate profitability while taking into consideration personnel restrictions and company success goals. Research stages are depicted in Figure 1. It has numerous steps, including: (1) identifying the business problem By identifying choice factors, research limitations, and goals research, as well as by applying the linear method simplex programming and using simulation to solver excel, PT. Bistion Ponsel, (2) did a literature study of various prior works and collected data from PT. (3) In order to increase data package sales turnover, businesses should (4) analyze the simplex optimization findings for the applicability of methodologies, variables, and research restrictions, and (5) choose the best course of action. Excel solvers are the tools used to model research issues. A tool called Solver is an add-in for Microsoft Excel that may be used for what-if analysis. The optimal (highest or least) value for formulae inside a single cell, known as the destination cell, must be subject to the constraints given, and this is done by using a solver.

3. RESULTS AND DISCUSSION

Based on data that will be used as a measurement, including the number of marketing department employees, the price of each incentive paid at the marketing level for each data package sold, and the monthly number of cards used for installing data packages (Ary, 2017).

A. Data description for fields

A large number of marketing employees, various levels of marketing, incentive money given to each level of marketing for each Internet package sold, the number of devices required to install an Internet package for a month, and the terms and conditions of the target that must be met by each marketing department employee are among the data used as a measurement tool.

Table 1. Employee data for the marketing division of PT. Bistion Mobile

No	Marketing Level	Amount	incentive(Rp.)
1	Senior Marketing	8	5000
2	Junior Marketing	8	2500
3	Marketing Intern	4	1000

Twenty marketing personnel work at PT. Bistion Ponsel, and there are three marketing levels: Senior Marketing, Junior Marketing, and Intern Marketing, as shown in Table 1. Four sub-districts—Bandar Khalifah, Sei Rotan, Medan Estate, and Bandar Setia Regencies—are responsible for marketing. Based on the quantity of items offered each month, data package sales and marketing goals are set. As a monthly minimum sales objective, there are 3000 cards available in data packages that are ready for marketing.

Each member of the marketing department must meet the following criteria in order to meet the target:

1. Senior marketing sales objectives must be higher than those of junior and apprentice marketing sales targets.

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2. Senior marketing sales objectives must be twice as large as junior marketing sales targets, and
3. Junior marketing sales targets must be double the size of apprenticeship marketing sales targets.

B. Determination of variables, constraints and objective function

Researchers utilized the Simplex approach helped by Adsin Solver in Microsoft Exel to determine the quantity of internet data package sales per month by Facebook marketing maximum income and minimal business expenditures for reward money are acquired for personnel in the marketing department (Warman, 2021). Following are the steps for the solution:

- Define variables
  The data for the variable is determined by the number of cards sold according to the level marketing, including:
  X^1 = The number of cards sold by senior marketing
  X^2 = The number of cards sold by junior marketing
  X^3 = The number of cards sold by the marketing apprentice
- Define the objective function
  Based on Table 1 above, the target function is to maximize incentive funds from all three tiers of marketing, specifically:
  $Z = 5000X^1 + 2500X^2 + 1000X^3$
- Define boundaries
  - Constrain_1 = jumlah kartu yang harus terjual oleh ketiga tingkatan marketing, maka: $X^1 + X^2 + X3 \leq 3000$
  - Constrain_2 = target marketing senior harus lebih besar dibandingkan dengan marketing junior, maka: $X1 \geq X2$
  - Constrain_3 = target marketing senior dua kali lebih besar dibandingkan dengan marketing magang, maka: $X1 \geq 2X3$
  - Constrain_4 = target marketing junior dua kali lebih besar dibandingkan dengan marketing magang maka : $X2 \geq 2X3$
- The description of the mathematical model
  Purpose Function:
  $$Maksimumkan\ Z = 5000X^1 + 2500X^2 + 1000X^3$$
  Constraint Function:
  $X^1 + X^2 + X^3 \leq 3000$
  $-X^1 + X^2 \leq 0$
  $-X^1 + 2X^3 = 0$
  $-X^2 + 2X^3 = 0$

C. Excel solver simulation results with the simplex method

Using the Simplex technique and the Ads-in Solver in Microsoft Excel, a simulation will be run based on the variable data, objective function, constraint function, and mathematical model of the issue.

1. Enter data values according to the mathematical model above into Excel

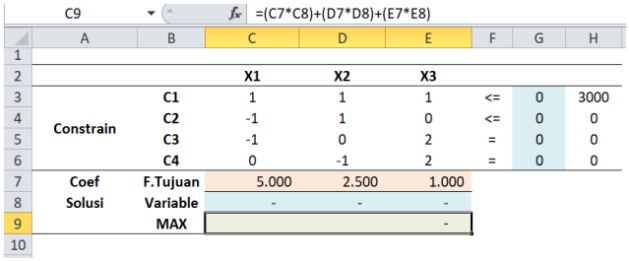
Fig. 1 Input data according to the mathematical model

	A	B	C	D	E	F	G	H
1								
2			X1	X2	X3			
3	Constrain	C1	1	1	1	<=	0	3000
4		C2	-1	1	0	<=	0	0
5		C3	-1	0	2	=	0	0
6		C4	0	-1	2	=	0	0
7	Coef	F.Tujuan	5.000	2.500	1.000			
8	Solusi	Variable	-	-	-			
9		MAX			-			
10								

2. Enter the Maximum formula, namely F.Purpose x Variable =((C7*C8)+(D7*D8)+(E7*E8)) so that it produces a value of 0 before the solver is carried out. The results of writing formulas and display in excel can be seen in Figure 2.

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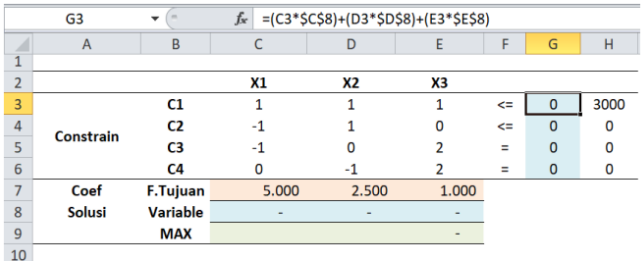
Fig 2. Calculating the maximum value



	A	B	C	D	E	F	G	H
1								
2			X1	X2	X3			
3	Constrain	C1	1	1	1	<=	0	3000
4		C2	-1	1	0	<=	0	0
5		C3	-1	0	2	=	0	0
6		C4	0	-1	2	=	0	0
7	Coef	F.Tujuan	5.000	2.500	1.000			
8	Solusi	Variable	-	-	-			
9		MAX			-			
10								

3. To determine the limit value, enter the Constrain x Abs Variable formula =(C3*C8)+(D3*D8)+(E3*E8)) do the same until the last boundary so that the resulting value is 0 before the solver. Results of formula writing and display in excel can be seen in Figure 3.

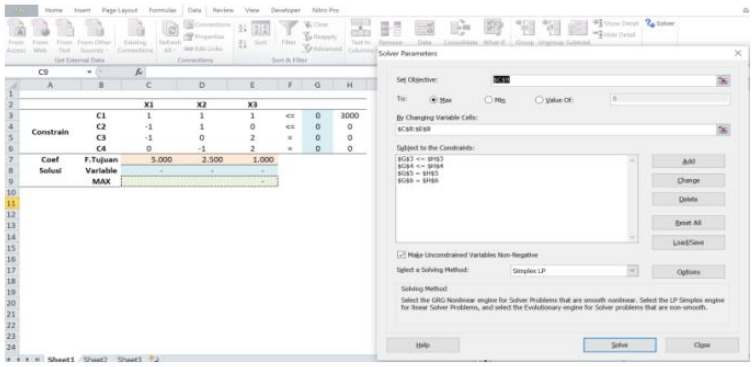
Fig. 3 Calculating the limit value



	A	B	C	D	E	F	G	H
1								
2			X1	X2	X3			
3	Constrain	C1	1	1	1	<=	0	3000
4		C2	-1	1	0	<=	0	0
5		C3	-1	0	2	=	0	0
6		C4	0	-1	2	=	0	0
7	Coef	F.Tujuan	5.000	2.500	1.000			
8	Solusi	Variable	-	-	-			
9		MAX			-			
10								

4. After finishing entering the maximum formula and limit formula, we do the solver by way of Data -> Solver. The results as shown in Figure 4.

Fig. 4 Simplex simulation process with solver



5. After completing the solver simulation using the LP Simplex method, then optimization results will be displayed in accordance with the objective function and the constraints entered. The results of the excel solver calculation can be seen in Figure 5.

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Fig. 5 Results of Excel Solver Calculation

	A	B	C	D	E	F	G	H
1								
2			X1	X2	X3			
3	Constrain	C1	1	1	1	<=	3000	3000
4		C2	-1	1	0	<=	0	0
5		C3	-1	0	2	=	0	0
6		C4	0	-1	2	=	0	0
7	Coef	F.Tujuan	5.000	2.500	1.000			
8	Solusi	Variable	1.200	1.200	600			
9		MAX			9.600.000			
10								

The highest incentive payment for staff members of the marketing department is Rp 9,600,000 per month, as evidenced by the solver calculations results in Figure 6. The sales goal distribution for senior marketing is 1,200/8, or 150 internet data packages, for junior marketing is 1200/8, or 150 internet data packages, for marketing apprentices it is just 600/4, or 150 internet data packages. Each Marketing will receive incentive money in accordance with the distribution plan as follows:

- Marketing senior (number of data packages x incentives) = 150 x 5000 = Rp. 750.000,-/month
- Marketing junior (number of data packages x incentives) = 150 x 2500 = Rp. 375.000,-/month
- Marketing apprenticeship (number of data packages x incentives) = 150 x 1000 = Rp. 150.000,-/month

This indicates that in order for the company PT. Bistion Ponsel to meet its monthly sales goal of 3000 internet data packages, it must provide an incentive payment of Rp. 9,600,000 to all marketing firms located throughout 4 (four) districts. If the corporation can sell 3000 data packages in one month and make a profit of Rp. 10.000,- per package on each internet package sold, the total profit for the month would be Rp. 30,000,000,- (10,000 x 3000)..

4. CONCLUSION

This study has demonstrated the effectiveness of the simplex technique in helping marketing firms determine how to distribute internet data package sales objectives in order to increase business income by giving the marketers more incentives. The findings indicated that 150 data packages with an incentive of 750,000 per month for senior marketing, 150 data packages with an incentive of 275,000 per month for junior marketing, and 150 data packages with an incentive of 150,000 per month for marketing internships represented the ideal distribution of sales targets for each level of marketing. The corporation issues 9,600,000 in total incentives each month, and it makes 30,000,000 in total profits each month.

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The Development of Interactive Multimedia Using Smart Apps Creator Applications in Class VII Junior High School Informatics Subjects

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ABSTRACT

This research was motivated by challenges that are often faced by students, namely difficulty understanding the subject matter. This is due to several factors, such as the dominance of learning approaches that involve oral explanations from teachers in class, activities to record or summarize lessons, the material presented in teaching material books is only concise, and the lack of use of learning media-based teaching materials by teachers and schools. The purpose of this study is to create interactive multimedia based on appropriate development procedures, adhering to standards of validity and practicality criteria. Thus, the end goal is to produce interactive multimedia that can be considered appropriate for use in the learning process. The type and method of research used in this study is research and development (Research and Development-R & D) by applying a 4-D model. The development process in this study consisted of four stages, such as Define, Design, Development, and Disseminate). The evaluation of product validity was carried out through the participation of three experts, consisting of two validator experts in the media field and one validator expert in the material field. In addition, the product practicality test was carried out involving 16 students from grade VII of SMP Pertiwi 2 Padang. The results of this study showed that the evaluation of media validator experts was declared as "Very Valid", with the average value of the first validator of 4.93 or 98.6% and the second validator with the same average value. Meanwhile, the assessment from expert material validators also received the "Very Valid" category, with an average score of 4.79 or 95.6%. Practicality tests on interactive multimedia show that the product is in the "Very Practical" category, with an average score of 4.73 or 94.6%. In conclusion, the interactive multimedia developed for class VII Informatics subjects has proven to be very valid and practical. Thus, this interactive multimedia is feasible to be used in the learning process.

Keywords: Development, Interactive Multimedia, Smart Apps Creator

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1. INTRODUCTION

Human presence is always tied to the learning experience. From the very beginning of birth, a child begins to recognize such processes as crawling, walking, and talking. The experience develops in a variety of ways, both intentional and unexpected, and is ongoing, encouraging student adjustment. This developmental process refers to long-term behavioral changes that include new information, the search for new knowledge, abilities, and tendencies acquired by the individual. As they get older, children learn various things, especially through the educational process they undergo.

Education is an effort to optimize the development of potential and skills, and is one of the important assets in realizing the progress of the nation and improving human ethics. Education is now a very essential thing in our lives. Excellent education will create a young generation who is expected to be the hope and main pillar of the country in achieving development in various fields. This concept is in line with the contents of Law No. 20 of 2003 concerning the national education system which explains that:

"Education is a conscious and planned effort to realize the learning gym and learning process so that students actively develop their potential to have spiritual strength, religion, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state."

As mentioned earlier, in essence, education is an effort to improve the quality and capability of individual humans. Thus the instructive cycle that takes place should seek to cultivate the possibilities of each person who is an essential component in creating and transforming assisted individuals through pathways of direction, education and inspiration. To make it happen starts from formal quality education obtained from schools. School education is a forum to support the improvement of the quality of human resources.

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If you look at the current situation and condition of education, technological developments always overshadow the development of education. This can be seen in updates to aspects of education including materials and media use. The development of technology and the era of the industrial revolution that is increasing have an impact on life, including education. Smartphones and computers are one of the tools that can be used to support learning itself.

Technological developments that occur also make schools must be able to adapt to these developments. The more advanced technology certainly makes the competition tighter. Every school needs to make improvements and reforms to produce the best graduates. To update the learning process used, this is one way to achieve learning and educational goals.

This is in line with the improvement and renewal of the implementation of learning at SMP Pertiwi 2 for Informatics subjects that apply an independent curriculum. The independent curriculum has been prepared based on the objectives of the national education system and national standards of education, while integrating the profile of Pancasila learners. In the 2013 curriculum, Informatics subjects are represented by ICT Guidance as electives, but in the independent curriculum, Informatics subjects are part of the subjects that must be followed.

Based on the author's observations in class VII Informatics subjects at SMP Pertiwi 2 Padang on November 14, 2022, during the learning process there are several problems, problems that are often faced are that students have difficulty understanding the material because it is caused by several things including The learning method is still mostly centered on oral explanations by teachers in the classroom, followed by activities to record or summarize the subject matter. Books used as learning resources only convey material briefly, and until now, the use of teaching materials based on learning media is still not commonly done by teachers and schools.

Until now, there has been no record of teachers implementing learning media with the support of the Smart Apps Creator application in the teaching process. This situation causes students to experience burnout, show a lack of enthusiasm in learning, and do not take enough interest in the learning material. Meanwhile, if students have the motivation to learn, it is very useful to master the subject matter. For this reason, it is necessary for teachers to take advantage of the conditions that occur by using media that are still rarely used in Informatics learning, namely in the form of learning media using the Smart Apps Creator application to create an effective and efficient learning process.

With the development of increasingly sophisticated technology to make learning fun is not a difficult thing. To create fun learning, you can use technology, such as making interactive multimedia to support the fun learning process. Interactive learning media is an efficient teaching media when viewed from the way it is used itself. Interactive multimedia can be used in all subjects, one of which is Informatics.

According to Sutopo (2012: 112), interactive multimedia refers to a form of multimedia that involves a controlling device so that users can control the multimedia process. In this case, the process of running multimedia is determined by the choices and decisions made by the user. A relevant example of this interactive multimedia concept is the learning presentation, where users have the ability to deliver learning material in an engaging and entertaining way. According to Criticos in Daryanto (2013: 4), media or tools are elements of communication that are tasked with conveying stimuli from communicators (teachers) to recipients of communication (students). Balance in communication has a crucial role, because if communication is disrupted, the message proposed by the teacher will be difficult for students to understand. However, if communication is carried out efficiently and effectively, then learning objectives can be achieved more optimally.

One way to stimulate the enthusiasm and independence of student learning through learning media is to develop interactive multimedia. Interactive multimedia can be interpreted as an interactive system that combines various elements such as sound, computer graphics, animation, video clips, still images, and text (Tashpulatovich, 2021). Interactive multimedia has the potential to be used as a substitute option in the delivery of messages by teachers to students.

One software that can be used in making interactive multimedia is the Smart App Creator application. Smart App Creator is software that can be used to create simple applications that do not need to use coding in making applications. Smart App Creator is one of the applications that supports the creation of interactive multimedia. The interactive multimedia generated from Smart Apps Creator is in the form of an application. Applications that have been generated can be installed on Smartphones or computers. This application will help the learning process because this application is

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not only glued to writing but can also insert images, videos, audio, and animations into interactive multimedia. Smart Apps Creator focuses more multimedia into the form of applications that will later increase student motivation in understanding the subject matter. Based on the previous presentation, the author intends to conduct research entitled "Development of Interactive Multimedia Using Smart Apps Creator Applications in Class VII Junior High School Informatics Subjects"

2. RESEARCH METHOD

This research adopts research and development (R&D) methods with a focus on product creation, production, or development. The process begins with a needs analysis to design a specific product, which is then evaluated for its feasibility in society. This research utilizes the Smart Apps Creator application and adopts a 4-D development model. Some of the advantages that make this model attractive to researchers are: first, the 4-D model is suitable for developing learning media, not for learning systems; secondly, the model details the steps in a structured manner; Third, the development phase involves evaluation by experts, allowing improvement of learning materials based on their inputs, suggestions, and views before field trials are conducted.

According to Thigarajan, Semmel, and Semmel in Trianto (2012: 93) Data collection techniques involve Smart Apps Creator applications in a 4-D development model, which consists of four stages. The first stage, "Define", focuses on curriculum analysis, student analysis, and concept analysis as the basis for learning media design. The second stage, "Design", involves selecting media, format, and initial design to ensure the content of the learning media is appropriate. The third stage, "Development", continues product development with validity tests and practicality tests involving media experts and students as assessors. The final stage, "Dessiminate", focuses on disseminating products to teachers and students for use in learning. Data from validity tests and practicality tests are analyzed using statistical methods with formulas

$$\bar{x} = \frac{\Sigma x}{n}$$

3. RESULTS AND DISCUSSION

Interactive multimedia is applied in teaching Informatics subjects in class VII, adjusted to learning objectives in order to attract students' interest. In this case, students will be actively involved in learning activities. In order to produce valid and practical learning media, researchers must carry out validity assessments by media experts and material experts, as well as practicality tests through the use of questionnaires with Likert scales filled out by students.

A. Interactive Multimedia Validity Results

Table 1. Media Expert Validity Results

Variable	Media Expert I (%)	Media Expert II (%)
Text	4,67	5
Animation	5	4,67
Audio	5	5
Figure	5	5
Video	5	5
Average	**4,93**	**4,93**

The results of the media validation assessment by the first media expert and the second media expert for text, animation, audio elements, images, and video variables have shown the criteria of "Very Valid".

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B. Material Validity Results

Table 2. Materia Expert Validity Result

Variable	%
Content and Purpose	5
Presentation of material	4,5
Test	5
Efficiency	4,5
Average	**4,79**

The results of the material validation assessment by material experts for content and purpose variables, material presentation, tests, and efficiency have shown the criteria of "Very Valid".

C. Practicality Test Results

Table 3. Practicality Test Result

Variable	%
Usage	4,78
Benefits	4,69
Display and Language	4,70
Material Presentation	4,75
Rata-rata	**4,73**

The results of the practicality test conducted by 16 grade VII students of SMP Pertiwi 2 Padang with these results are included in the criteria of "Very Practical".

4. CONCLUSION

Based on the results of the validity test conducted by two media experts and one material expert with “very valid” validity results and the practicality test conducted by 16 grade VII students of SMP Pertiwi 2 Padang with the results of the practicality test is “very practical”. So it can be concluded that interactive multimedia using the smart apps creator application in class VII Junior High School Informatics subjects that have been developed is “very valid” and “very practical”. Then interactive multimedia is worth using in the learning process.

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Triangular Microstrip Patch Antenna with Back-to-Back Structure to Obtain Bi-Directional Radiation Pattern

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ABSTRACT

In this research, a triangular patch microstrip antenna with a back-to-back structure technique has been designed to obtain Bidirectional radiation patterns operating at a frequency of ADSB 1090 MHz. The back-to-back structure technique using 2 substrate layers stacked together to form a single microstrip antenna component. As a result, the antenna has 2 patches on both sides of the microstrip, and the feedline is located between the 2 substrate layers. This antenna was designed using simulation software with an FR-4 substrate material. The parameter values obtained from the simulation at a frequency of 1090 MHz are: Return loss -15.4 dB, VSWR 1.4, Bandwidth 17.2 MHz, and Impedance 46.02 Ω.

Keywords: Triangular Patch, Gain, Bandwidth, ADS-B, Surveillance, Back-to-back structure.

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1. INTRODUCTION

An antenna is a crucial component in receiver equipment, as it functions to receive electromagnetic signals present in free space (Faizin & Wildan, 2022). Antennas come in various forms, such as wire antenna, reflector antenna, aperture antenna, and microstrip antenna (Balanis, 2005). One of the antennas that has relatively compact dimensions and is easy to fabricate is the microstrip antenna (Surjati, 2010). The microstrip antenna has three essential parts: Patch, Substrate, and Groundplane(Saputra et al., 2019). The square and flat shape of microstrip antennas gives rise to several drawbacks(Andhika et al., 2016). One of these drawbacks is that the radiation pattern of microstrip antennas tends to be directional, oriented towards a specific direction (Muhammad & Yusnita, 2017).

To generate a bi-directional radiation pattern, one approach is by using the back-to-back structure method. This method uses 2 layers of substrate, with patches placed in front of and behind the microstrip antenna components. While the feedline and ground plane are placed between the two substrates(Wei et al., 2017)(Reguna et al., 2016).

Research on microstrip antennas used as ADSB receiver antennas has been conducted by Abd. Rahman Abubar, et al (Abubar et al., 2020). They produced a design for a Left Handed Metamaterial (LHM) microstrip antenna that operates at the ADSB receiver frequency of 1090 MHz, with specifications a return loss value -16.09 dB, VSWR 1.38, bandwidth 92.7 MHz, and directional radiation pattern. Research on the back-to-back method in microstrip antennas has been carried out by Hisao Iwasaki (Iwasaki, 1998). This resulted in the design of a microstrip antenna capable of omnidirectional radiation patterns at a working frequency of 1897 MHz.

In this study, microstrip antennas were designed to obtain return loss < 10 dB, VSWR < 2, bandwidth < 30 MHz, and bi-directional radiation patterns. The patch design is configured in an equilateral triangle shape, and the substrate material employed is FR-4 with a thickness of 1.6 mm. Differences in dielectric materials can have an impact on antenna parameters (Saiful Islam et al., 2015). FR-4 was chosen as the substrate material due to its cost-effectiveness and easy availability in the market (ICAO, 2020).

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2. RESEARCH METHOD

In this study, the author employed an experimental method, which aims to test the influence of one variable on another variable (Ramdhan, 2021). The study utilized simulation software for antenna design and simulation to assess antenna performance. This software also provides insights into the values of Return Loss, VSWR, Bandwidth, and the radiation pattern shape of an antenna. The initial antenna design used a single-layer PCB, followed by a design with a stacked two-layer PCB, observing differences in parameter values between the two antenna designs.

3. RESULTS AND DISCUSSION

Before proceeding with the design, antenna dimensions are calculated. The calculated dimensions are then optimized to achieve optimal results in accordance with the desired operating frequency. Here is the calculation of the equilateral triangle-shaped patch dimensions (Nur Tri Yuliarto & Wagyana, 2021) :

$$a = \frac{2c}{3f\sqrt{\varepsilon_r}} = \frac{2 \times 3 \times 10^8}{3 \times 1090 \times 10^6\sqrt{4{,}3}} = 0{,}0884\ m = 88{,}4\ mm$$

Next, the calculation for the feedline. The feedline used is a 50 Ω transmission line that connects the patch to the connector. To find the width of the 50 Ω feedline, use the following equation (He et al., 2014):

$$B = \frac{60\pi^2}{Z_0\sqrt{\varepsilon_r}} = \frac{60(3{,}14)^2}{50\sqrt{4{,}3}} = 5{,}70570$$

The width of the feedline can be calculated using the following equation:

$$W_f = \frac{2h}{\pi}\left\{B - 1 - In(2B-1) + \frac{\varepsilon_r - 1}{2\varepsilon_r}\left[In(2B-1)0{,}39 - \frac{0{,}61}{\varepsilon_r}\right]\right\}$$

$$W_f = \frac{2(1{,}6)}{3{,}14}\left\{5{,}7057 - 1 - In(2(5{,}7057)-1) + \frac{4{,}3-1}{2(4{,}3)}\left[In(2(5{,}7057)-1)0{,}39 - \frac{0{,}61}{4{,}3}\right]\right\}$$

$$W_f = 3{,}11\ mm$$

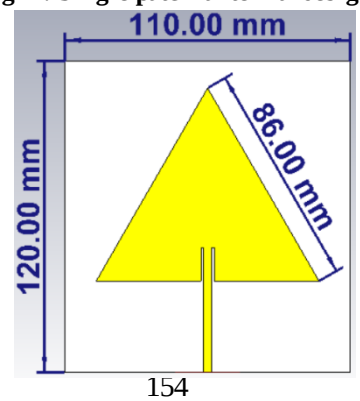
Next, the calculation for the ground plane. To determine the dimensions of the ground plane, you can use the following equation (Nur Tri Yuliarto & Wagyana, 2021):

Width:
$W_g = 2 \times r = 102\ mm$
Length:
$L_g = 2 \times r = 102\ mm$

A. Single Patch Mikrostrip Antenna

The design of the single patch microstrip can be seen in Figure 1. The antenna dimensions obtained from the calculation results are then optimized. The antenna dimension values can be found in Table 1.

Fig 1. Single patch antenna design



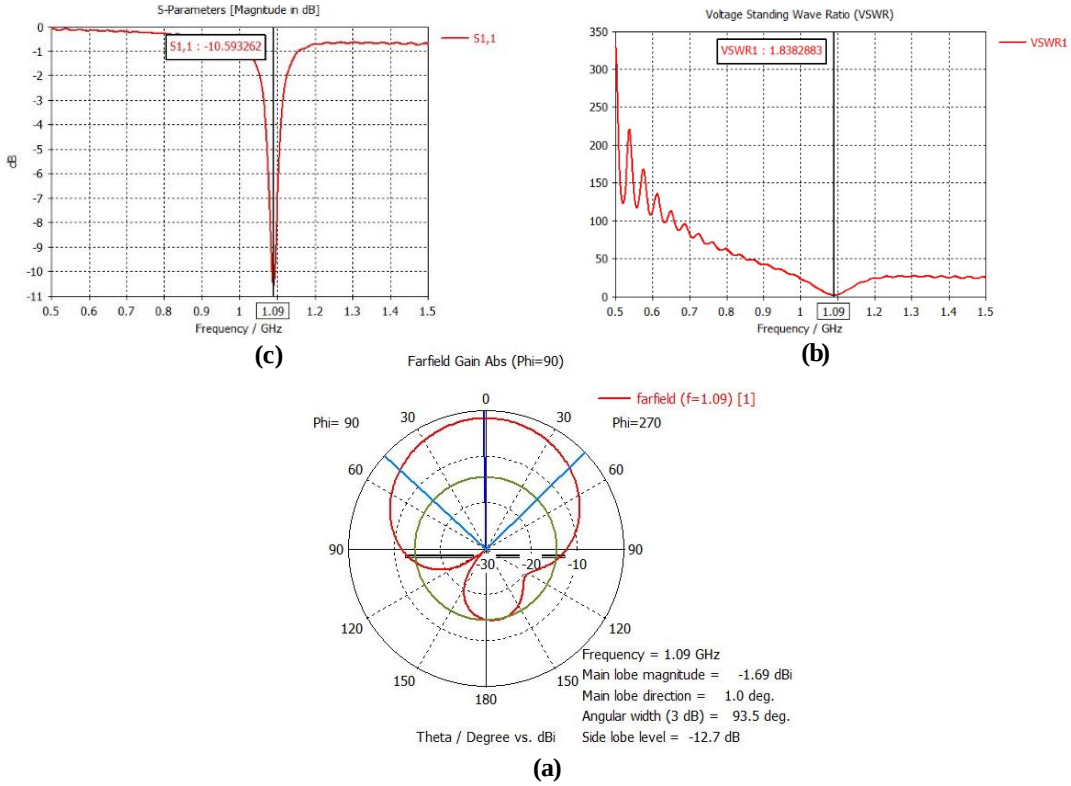
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Table 1. The dimensions of the single patch antenna design

Description	Symbol	Before optimization (mm)	After optimization (mm)
Triangle side length	a	88,4	86
Width of Feedline	Wf	3,11	3
Length of Feedline	Lf	38,1	35,1
Width of Insert Feedline	Wif	1	1
Length of Insert Feedline	Lif	13	13
Width of Groundplane	Wg	102	110
Length of Groundplane	Lg	102	120
thick of Patch	T	0,035	0,035
thick of Substrate	h	1,6	1,6

The simulation results of this design meet the minimum standard values for antenna parameters. The return loss value is -10.59 dB, VSWR is 1.83, bandwidth is 3.1 MHz, and the antenna exhibits a directional radiation pattern. Below is the simulation result image of the triangular single-patch microstrip antenna:

Fig 2. The simulation results of the antenna design (a) Return Loss, (b) VSWR, (c) 2D Radiation Pattern.



B. Single Patch With Back To Back Structure Mikrostrip Antenna

The design of the single patch with back to back structure mikrostrip antenna can be seen in Figure 3. The antenna dimensions obtained from the calculation results are then optimized. The antenna dimension values can be found in Table 2.

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Fig 3. Single patch antenna design with With Back To Back Structure

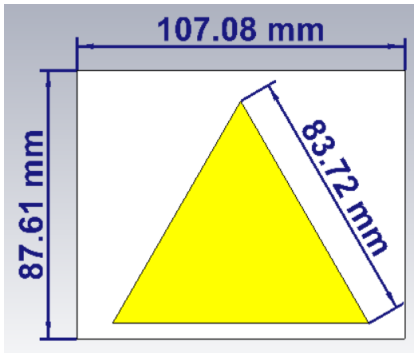
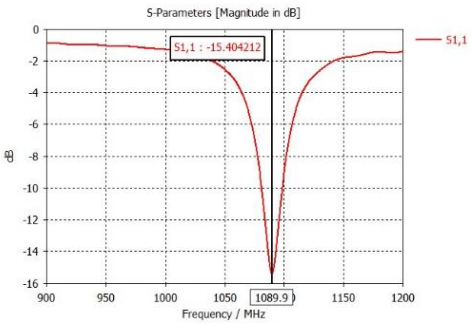


Table 2. The dimensions of the single patch with With Back To Back Structure

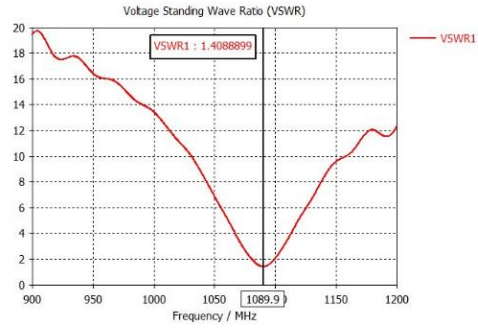
Description	Symbol	Dimension (mm)
Triangle side length	a	83,72
Width of Feedline	Wf	2,73
Length of Feedline	Lf	29,2
Width of Substrate	Ws	107
Length of Substrate	Ls	87,6
thick of Patch	T	0,035
thick of Substrate	h	1,6

The simulation results of this design show an improvement in antenna parameters compared to the previous design. The return loss value is -15.40 dB, VSWR is 1.4, bandwidth is 17.2 MHz, and the antenna exhibits a bi-directional radiation pattern. Below is the simulation result image of the

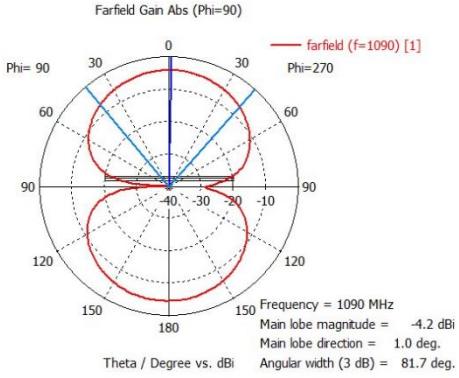
Fig 4. The simulation results of the antenna design (a) Return Loss, (b) VSWR, (c) 2D Radiation Pattern.



(b)



(a)



triangular single-patch microstrip antenna with a back-to-back structure:

(c)

C. Comparison between Single Patch Design and Single Patch Back-to-Back Structure

The simulation results of the single patch microstrip design and the single patch back-to-back structure design exhibit significant differences. Not only the radiation pattern but also other parameters like Return Loss, VSWR, and Bandwidth have improved. Below is a table showing the differences between the single patch design and the single patch back-to-back structure design.

Table 3. Comparison of result values between single patch design and single patch back-to-back structure

Description	Single patch	Single patch back to back structure
Return loss	-10,59	-15,40 dB
VSWR	1,83	1,4
Bandwidth	3,1 MHz	17,2 MHz
Impedance	48,44 Ω	46,02 Ω
radiation pattern	Directional	Bi-Directional

4. CONCLUSION

Based on the description of the results of the research and discussion that has been carried out, it is concluded that :

1. The utilization of the back-to-back method on the microstrip antenna has successfully operated at the ADSB receiver frequency of 1090 MHz, achieving parameter values as expected.
2. The utilization of the back-to-back method can enhance the parameter values of the microstrip antenna compared to the single-patch antenna design with a 1 layer substrate. The achieved parameter values include a Return Loss of -15.40 dB, VSWR of 1.4, Bandwidth of 17.2 MHz, and a resulting bi-directional radiation pattern.

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Optimal Solutions to Improve Teachers' Organizational Citizenship Behavior (OCB) by Strengthening Personality, Interpersonal Communication and Organizational Justice

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ABSTRACT

In educational organizations, teachers are at the heart of the management element. Teachers who successfully carry out their main duties as described in their job descriptions, coupled with an awareness of doing something extra, are key to the success of the organization. Extra activities that are not directly related to the prevailing formal reward system are called OCB (Organizational Citizenship Behavior). Based on preliminary research, it is known that PGRI Vocational High School teachers in Bogor Regency have relatively low OCB. Therefore, research is needed to obtain information on variables related to increasing OCB.

The purpose of this study is to make efforts to increase teachers' OCB by conducting research on the relationship between personality variables, interpersonal communication and organizational justice. This study used correlational statistical analysis method to determine the relationship between the variables studied and SITOREM method for indicator analysis to obtain optimal solutions in efforts to increase teachers' OCB. The research population was 289 teachers from PGRI Vocational High School in Bogor Regency. From this population, a sample was then taken using the Slovin formula to obtain a sample of 168 people.

The results of the analysis using the correlation method show that there is a positive relationship between personality and OCB with a correlation coefficient of $\rho y1 = 0.416$, so that strengthening personality can increase OCB. There is a positive relationship between interpersonal communication and OCB with a correlation coefficient of $\rho y2 = 0.526$, so strengthening interpersonal communication can increase OCB. There is a positive relationship between organizational justice and OCB with a correlation coefficient of $\rho y3 = 0.417$, so strengthening organizational justice can increase OCB.

From the SITOREM analysis, the optimal solution is that out of 23 indicators, 14 indicators are well developed, so they will be maintained or developed, and there are 9 indicators that are still weak, so they need to be improved. The improvement of the weak indicators is also prioritised. The indicators that are already good are: 1) Supportive behaviour, 2) Technical factors, 3) Social status, 4) Friendliness, 5) Self-extraversion, 6) Openness to experience, 7) Emotional stability, 8) Prudence, 9) Wisdom, 10) Equality, 11) Consistency, 12) Ethical, 13) Informative, and 14) Self-esteem, and the indicators that need to be improved in order of priority of treatment are as follows: 1) trust, 2) openness, 3) respect for inspiration, 4) necessity, 5) politeness, 6) civic virtue, 7) conscientiousness, 8) sportsmanship and 9) altruism.

Keywords: OCB, Personality, Communication, Interpersonal, Organizational Justice, SITOREM Analysis

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1. INTRODUCTION

Human resources in educational organizations play a strategic role, based on the belief that individuals are the formulators of organizational goals and at the same time the main drivers to achieve goals. Each individual in the organization has a duty to perform basic tasks in accordance with their responsibilities, and as citizens of the organization, individuals also have a duty to work together as a team to achieve organizational goals. Such behavior is called OCB (Organizational Citizenship Behavior) in modern management.

A good OCB is the behavior of teachers who are able to carry out the main tasks as stated in the job description, coupled with the awareness of doing something that they believe can accelerate the achievement of organizational goals, which is shown through behaviors such as: helping colleagues, being involved in the organisational structure of schools and professional organisations, being tolerant of the situation and always being careful in their behaviour so as not to cause problems.

Based on a preliminary survey conducted by distributing questionnaires to 30 teachers in 6 (six) PGRI Vocational High Schools (SMK) in Bogor Regency, data obtained that there are 41.7% of teachers who are not optimal in helping colleagues (Alturism), There are 36.7% of teachers who are not optimal in preventing problems (Courtesy), There are 35% of teachers who are not optimal in exceeding minimum requirements (Conscientiousness). There are 40% of teachers who have not been optimal in tolerating less than ideal conditions (Sportsmanship), 35% of teachers have not been optimal in contributing to the progress of the organisation or (Civic Virtue).

The above survey results show that teachers' OCB still needs to be improved, and considering that teachers' OCB is an important element related to the achievement of educational goals, this OCB is interesting to study.

The purpose of the study is to produce an optimal solution in improving teachers' OCB by finding the right way or strategy to increase OCB, namely by strengthening the independent variables that have a positive effect on teachers' OCB. These variables are personality, interpersonal communication and organisational justice. The optimal solution found will then be used as a recommendation to related parties, that is, teachers, principals, school supervisors, school management institutions and educational agencies.

Literature Review

A. OCB (Organizational Citizenship Behavior)

Dennis W. Organ [1] states that OCB is a person's behavior that is self-initiated (voluntary), that cumulatively (as a whole) supports the effectiveness of organizational functions, and that behaviour is not directly or explicitly regulated by the formal reward system in place in the organization. The indicators of OCB are: 1) altruism, 2) courtesy, 3) conscientiousness, 4) citizenship.

Fred Luthans [2] suggests that OCB is certain personality characteristics (traits) contained in individuals, namely cooperative traits, like to help and care for others, and seriousness of work. OCB consists of five dimensions, which are 1) altruism, 2) conscientiousness, 3) citizenship, 4) sportsmanship, and 5) courtesy.

McShane and Von Glinow [3] define OCB as various forms of cooperation and helping others that support social organizations and psychological contexts. The dimensions of OCB are: 1) self-learning, 2) participation in social welfare, 3) maintaining interpersonal harmony at work, and 4) compliance with social norms that exist in society. Behavior that is manifested by one's own decisions with the aim of organizational and personal interests.

John M. Ivancevich [4] explains that OCB, as the idea of expecting employees to go the extra mile, has become important as service organizations continue to dominate economic growth. The indicators of OCB are: 1) Alturism, 2) Courtesy, 3) Compliance, 4) Civic Virtue and 5) Sportsmanship.

Bolino and Turnley [5] found that organizations are able to create employee behavior that is not just task focused. The indicators are: 1) Altruism, 2) Courtesy, 3) Sportsmanship, 4) Conscientiousness and 5) Civic Virtue.

Atika and Singh [6] conducted research on OCB and found that OCB behaviors have two common characteristics, namely: these actions are not directly regulated (technically not required as part of one's job), and these actions represent special or extra work that organizations need from their employees in order to be successful.

Jennifer M. George [7] describes OCB as behavior that goes beyond the call of duty, that is not determined by the members of the organization, and that is important for the survival and effectiveness of the organization. OCB consists of five dimensions, namely 1) Civic Virtue, 2) Conscientiousness, 3) Courtesy, and 4) Sportsmanship.

Kinicki et al, [8] stated that OCB is the behavior of employees who indirectly perform work beyond what is required by the organization, such as: 1) Behavior that builds and cares for the organization, a person who likes to help others, 2) Behavior that provides suggestions for the progress of the organization, 3) Behavior that is willing to endure unpleasant circumstances without complaining and attendance above standards. 4) Behavior of directly or indirectly doing work beyond

the requirements set by the organization by promoting awareness of caring for the organization by helping colleagues, making suggestions, and high loyalty is characterized by willingness to endure unpleasant circumstances.

Colquitt et al, [9] suggested that OCB is the voluntary behavior of individuals who are not influenced by the reward system and who contribute to the organization. The indicators are: 1) Altruism, 2) Courtesy, 3) Sportsmanship, 4) Voice, 5) Civic Virtue and 6) Boosterism.

Based on the theoretical study above, it can be summarized that OCB is individual behavior that is manifested on its own accord (voluntary), which cumulatively (as a whole) supports the effectiveness of organizational functions, and this behavior is not regulated, either directly or explicitly, by the applicable formal reward system, which can be measured based on indicators: 1) altruism, 2) courtesy, 3) conscientiousness, 4) sportsmanship, and 5) civic virtue.

B. Personality

Gibson et al, [10] Personality is a set of relatively stable characteristics, tendencies and temperaments that are shaped by heredity and by significant social, cultural and environmental factors. The dimensions of personality are: conscientiousness, which is characterized by a person's hard working, diligent, organised, reliable and persistent behavior; extraversion, which is the extent to which a person is sociable, gregarious and assertive versus quiet, calm and shy, friendly.

Robbins and Judge [11] Personality is the organizational dynamics between within the individual and the psychophysical systems that determine unique adaptations to their environment with indicators: 1) conscientiousness, 2) extraversion, 3) agreeableness, 4) emotional stability and 5) openness to experience.

Luthans [12] explains that personality is how a person affects others and how they understand and see themselves, as well as how their internal and external character is measured, measuring internal and external measurable traits and interactions between situations with indicators: 1) conscientiousness, 2) extraversion, 3) agreeableness, 4) neuroticism, and 5) openness to experience.

Hellriegel and Slocum [13] explain that individual personality can be described by a set of factors known as the Big Five personality factors. Specifically, the personality factors describe an individual's level of emotional stability, sociability, openness, conscientiousness, and openness to experience.

Richard M. Ryckman [14] explains that Personality is the dynamic organisation that a person possesses that uniquely influences cognition, motivation, and behaviour in different situations.The five dimensions of personality include: 1) conscientiousness, 2) extraversion, 3) agreeableness, 4) neuroticism, 5) openness to experience.

Schermerhorn et al, [15] also explained that personality is an overall combination of characteristics that capture the unique nature of a person as that person reacts and interacts with others. Personality combines a set of physical and mental characteristics that reflect how a person sees, thinks, acts and feels.

Based on the above descriptions, it can be summarized that personality is a tendency within a person to explain the characteristics of their consistent behavior patterns with indicators, which are 1) conscientiousness, 2) extraversion, 3) agreeableness, 4) neuroticism, and 5) openness to experience.

C. Interpersonal Communication

According to Anderson [16], interpersonal communication is at the heart of the organisation because it creates a structure that then influences what else is said and done and by whom. In order for interpersonal communication to be effective, there are several aspects that need to be considered by those involved in interpersonal communication, namely 1. Openness, 2. Empathy, 3. Supportiveness, positive, 5. Equality.

Schermerhon et al [17] communication is an interpersonal communication activity in the form of a process of sending and receiving symbols in the form of messages achieved by them. This communication aims to convey messages quickly and briefly through symbols in person, there are

four dimensions that affect interpersonal communication, namely self-image, the image of the other party, the physical environment and the social environment.

Schermerhon et al [18] explained that interpersonal communication in organizations is information that uses sophisticated technology and is supported by continuous developments in information technology. The communication context has four dimensions, namely physical, cultural, socio-psychological and temporal dimensions.

McShane [20] suggests that interpersonal communication depends on the sender's ability to get the message across and the receiver's performance as an active listener. The successful implementation of communication is strongly influenced by several factors, namely the factor of selecting the type of information and factors related to the technique of delivering or sending data.

Burleson [21] argued that interpersonal communication refers to dyadic (two-way) communication in which two individuals share the role of sender and receiver who are connected by mutually beneficial activities. The indicators are: technical factors, behavioral factors, situational factors, time constraints and psychological distance/social status.

John M Ivancevich et al [22] say that interpersonal communication is the delivery and receipt of information and understanding that flows from one individual to another in a variety of ways, carried out face to face and in a particular group in the delivery of messages quickly. Some factors that influence interpersonal communication are: trust, supportive behavior and open attitudes.

Fred Luthans [23] explains that interpersonal communication is between communication media and technology on the one hand and non-verbal communication on the other. Communication is a dynamic interpersonal process involving behavior change. Interpersonal communication emphasizes the transfer of information from one person to another, with indicators: self-image, image of others, physical environment, social environment, physical condition and body language.

Devito [24] suggests that interpersonal communication is the sending of messages by one person and the receiving of messages by another person or group of people, where the indicators are: a. openness, b. empathy, c. support, d. positive feelings, and e. equality with direct effects and feedback.

Based on the description of the concept above, it can be synthesized that interpersonal communication is an activity of sending and receiving messages reciprocally carried out by individuals who have a close relationship to achieve the desired goals in the organization with indicators 1). Technical factor, 2). Openness, 3). Trust, 4). Positivity and 5). Social status.

D. Organizational Justices

Robbins and Judge [25] Organisational justice is the total perception of justice in the workplace. Organisational justice has 3 (three) forms, namely: 1). distributive justice, 2). procedural justice, and 3). interactional justice.

Schultz and Schultz [26] defined organizational justice as the perception of how fairly employees are treated by the organization. With indicators: lower job satisfaction, lower organizational commitment, unfair conditions, high stress and looking for another job.

Jerald Greenberg [27] organizational justice is the science of people's perceptions and reactions to justice and injustice in organizations. The indicators are: assignment of tasks, distribution of tasks, performance appraisal, and determination of pay increases, positions and rewards.

Ivancevich [28] explains that organizational justice is an area of organizational research that focuses on employees' perceptions and evaluations of the fairness of the processes and decisions of the organization to which they belong. The factors of lack of justice in the organization are: performance appraisal is not done fairly, setting salary increases that are not transparent, unfair promotions and rewards.

George and Jones [29] Organizational justice is the employee's perception of the overall fairness in their organization. Organizational justice is divided into 4 dimensions, namely 1). Distributive justice, 2). Procedural justice, 3). Interpersonal justice, and 4). Informational justice.

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Organizational justice is divided into 4 dimensions, such as 1) distributive justice, 2) procedural justice, 3) interpersonal justice and 4) informational justice.

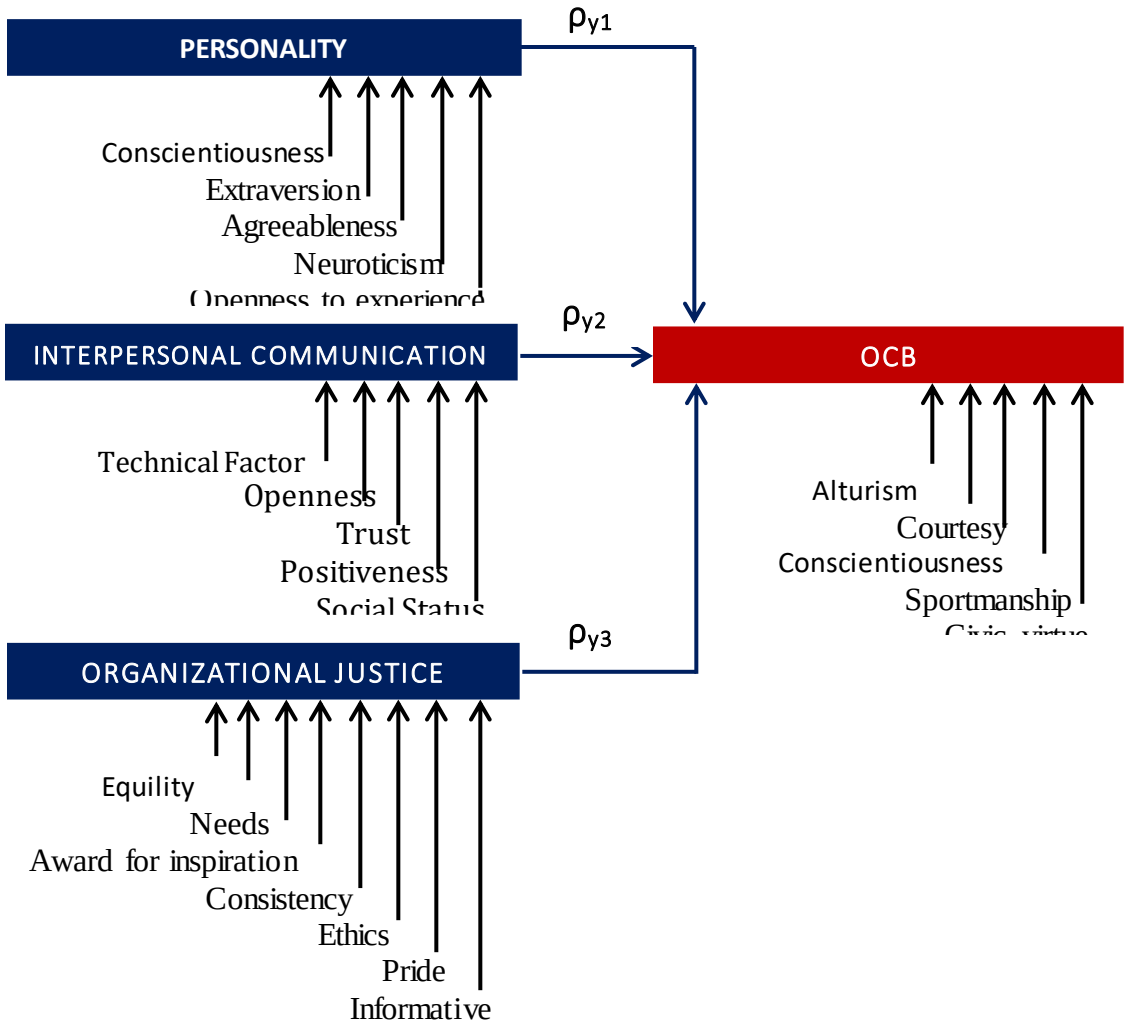
Based on various previous explanations, it can be summarized that organizational justice is a person's perception that the organization or leader treats them fairly. Indicators of organizational justice are: 1) equality, 2) needs, 3) reward for inspiration, 4) consistency, 5) ethics, 6) pride, 7) information and 8) wisdom.

2. RESEARCH METHOD

As described above, this study aims to find ways to improve teachers' OCB by exploring the strength of the relationship between OCB as the dependent variable and personality, interpersonal communication and organizational justice as the independent variables. The research method used is the survey method with a correlational statistical approach to test statistical hypotheses and the SITOREM method for indicator analysis to determine the optimal solution for improving teachers' OCB.

The research constellation of the variables studied and their indicators is as follows

Fig 1. Constellation of relationships between variables and indicators studied



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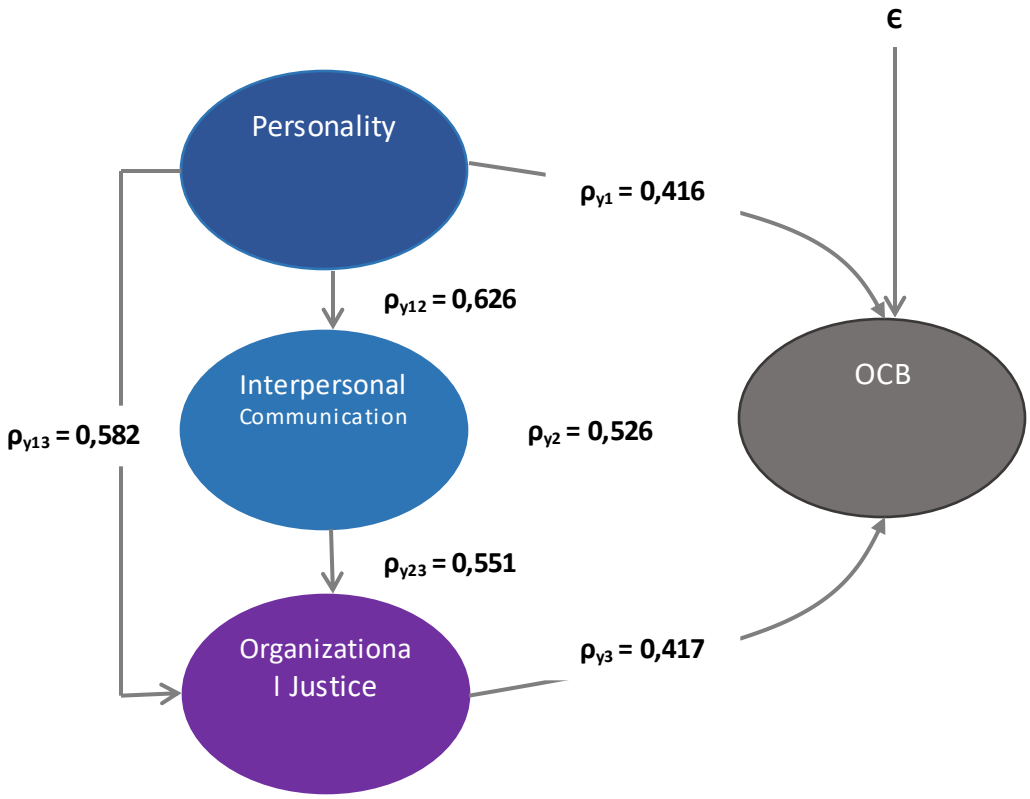
The research was conducted on teachers of PGRI Vocational High School in Bogor Regency with a population of 289 teachers, with a sample of 168 teachers calculated using the Slovin formula taken from Umar [30].

Data collection in this study used research instruments in the form of questionnaires distributed to teachers as research respondents. The items of the research instrument are derived from the research indicators to be studied. Before the research instrument was distributed to the respondents, it was first tested to determine its validity and reliability [31]. The validity test was carried out using the Pearson Product Moment technique, while the reliability test was calculated using the Cronbach Alpha formula. After data collection, homogeneity test, normality test, linearity test, simple correlation analysis, coefficient of determination analysis, partial correlation analysis and statistical hypothesis testing were carried out.

In addition, the indicators were analyzed using Hardhienata's SITOREM method [32] to determine the priority order for improving the indicators as a recommendation to the stakeholders resulting from this research. SITOREM uses three criteria to determine the order of priority for dealing with indicators, namely (1) the strength of the relationship between variables obtained from hypothesis testing, (2) the order of priority for dealing with indicators obtained from expert judgment, and (3) the value of the indicators obtained from data calculations based on the responses of research participants.

3. RESULTS AND DISCUSSION

Fig 2. Correlation test results



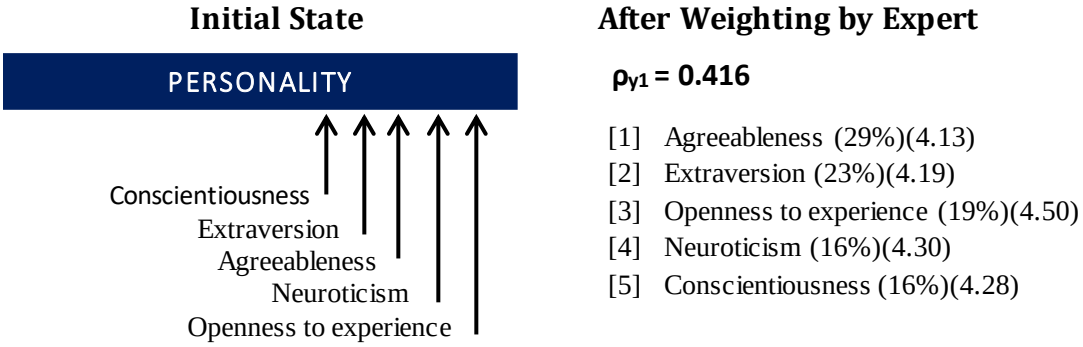
A. Relationship between Personality and OCB

The results of data processing through statistical hypothesis testing show that there is a very significant positive relationship between personality and OCB, with a correlation coefficient of 0.416 and a coefficient of determination of 0.093. This means that the higher the personality, the higher the OCB. The implication is that in order to increase OCB, it is necessary to increase personality.

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The experts' assessment of the priority of the indicators of the personality variable, taking into account the factors of cost, benefit, importance and urgency, resulted in indicators that are in good condition so that they can be maintained or developed, which are 1) courtesy, 2) civic virtue, 3) conscientiousness, 4) sportsmanship and 5) altruism.

Fig 3. Indicator Scoring Results and Personality Indicator Scores

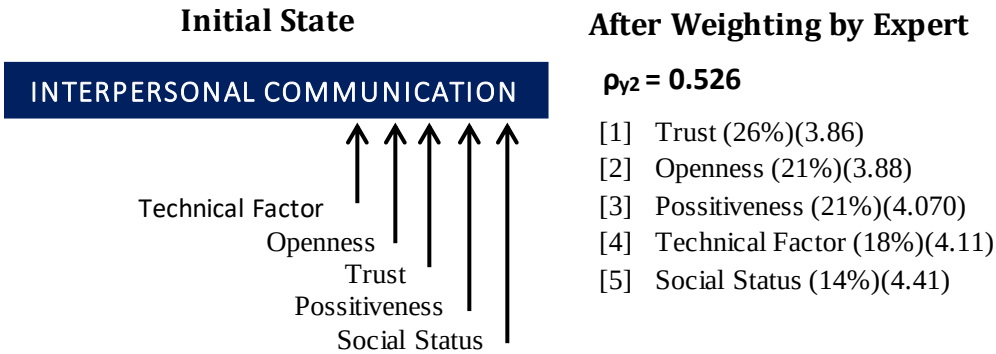


B. Relationship between Interpersonal Communication and OCB

The results of data processing through statistical hypothesis testing show that there is a very significant positive relationship between interpersonal communication and OCB, with a correlation coefficient of 0.526 and a coefficient of determination of 0.161. This means that the higher the interpersonal communication, the higher the OCB. The implication is that if OCB is to be improved, it is necessary to strengthen interpersonal communication.

The experts' assessment of the priority of the indicators of personality variables, taking into account the factors of cost, benefit, importance and urgency, resulted in the following order of priority treatment 1) trust and 2) openness, while indicators that are already in a good condition to be maintained or developed are 1) dominance, 2) technical factor and 3) social status.

Fig 4. Indicator Scoring Results and Interpersonal Communication Indicator Scores



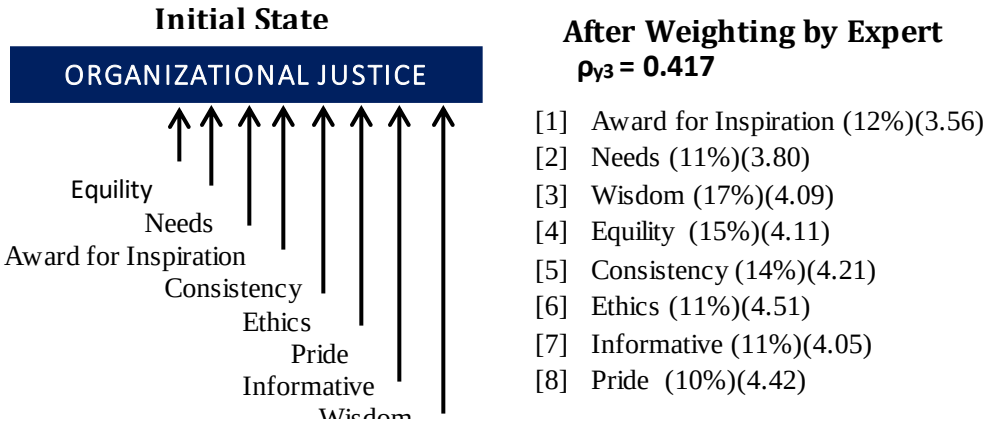
C. Relationship between Organizational Justice and OCB

The results of data processing through statistical hypothesis testing show that there is a very significant positive relationship between organisational justice and OCB, with a correlation coefficient of 0.417 and a coefficient of determination of 0.047. This means that the higher the organisational justice, the higher the OCB. The implication is that in order to increase OCB, it is necessary to increase organisational justice.

The experts' assessment of the priority of the indicators of personality variables, taking into account the factors of cost, benefit, importance and urgency, resulted in the following order of priority treatment such as 1) Award for Inspiration, and 2) Needs. The indicators that are in good condition to be maintained or developed are 1) Wisdom, 2) Equality, 3) Consistency, 4) Ethics, 5) Informative and Pride.

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Fig 5. Results of scoring and weighting of organizational justice indicators



D. Optimal Solution to Improve the Teacher's OCB

Based on the results of the statistical hypothesis testing, the determination of indicator priorities and the calculation of indicator values described above, a recapitulation of the research results can be made, which is the optimal solution in strengthening teachers' OCB, as shown in Table 1 below:

Table 1. The result of the SITOREM analysis, which is the optimal solution in increasing teacher OCB

ORGANIZATIONAL CITIZENSHIP BEHAVIOUR (OCB)

	Indicator in Initial State		Indicator after Scoring by Expert	Indicator Value
1	Altrurism	1st	Courtesy (22%)	3.73
2	Courtesy	2nd	Civic virtue (20%)	3.63
3	Conscientiousness	3rd	Conscientiousness (24%)	3.24
4	Sportmanship	4th	Sportmanship (18%)	3.13
5	Civic virtue	5th	Altrurism (16%)	2.94

PERSONALITY (X_1) (ρ_{y1} = 0,306) (Rank II)

	Indicator in Initial State		Indicator after Scoring by Expert	Indicator Value
1	Conscientiousness	1st	Agreeableness (26%)	4.13
2	Extraversion	2nd	Extraversion (23%)	4.19
3	Agreeableness	3rd	Openness to experience (19%)	4.50
4	Neuroticism	4th	Neuroticism (16%)	4.30
5	Openness to experience	5th	Conscientiousness (16%)	4.28

INTERPERSONAL COMMUNICATION (X_2) (ρ_{y2} = 0,402) (Rank I)

	Indicator in Initial State		Indicator after Scoring by Expert	Indicator Value
1	Technical Factor	1st	Trust (26%)	3.86
2	Openness	2nd	Openness (21%)	3.88
3	Trust	3rd	Positivity (21%)	4.07
4	Positivity	4th	Technical Factor (18%)	4.11
5	Social Status	5th	Social Status (14%)	4.41

ORGANIZATIONAL JUSTICE (X_3) (ρy_3 = 0,217) (Rank III)

Indicator in Initial State		Indicator after Scoring by Expert		Indicator Value
1	Equility	1st	Award for Inspiration (12%)	3.56
2	Need	2nd	Need (11%)	3.80
3	Award for Inspiration	3rd	Wisdom (17%)	4.09
4	Consistency	4th	Equility (15%)	4.11
5	Ethics	5th	Consistency (14%)	4.21
6	Pride	6th	Ethics (11%)	4.51
7	Informative	7th	Informative (11%)	4.05
8	Wisdom	8th	Pride (10%)	4.42

SITOREM ANALYSIS RESULT

	Priority order of indicator to be Strengthened	Indicator remain to be maintained
1st	Trust	Positivity
2nd	Openness	Technical Factor
3rd	Award for Inspiration	Social Status
4th	Need	Agreeableness
5th	Courtesy	Extraversion
6th	Civic virtue	Openness to experience
7th	Conscientiousness	Neuroticism
8th	Sportsmanship	Conscientiousness
9th	Altruism	Wisdom
10th	-	Equility
11th	-	Consistency
12th	-	Ethics
13th	-	Informative
14th	-	Pride

4. CONCLUSION

From the results and discussion described above, the following conclusions can be drawn:

1. There is a positive relationship between personality and teachers' OCB with a correlation coefficient of 0.416, so that strengthening personality can increase teachers' OCB.
2. There is a positive relationship between interpersonal communication and teacher OCB with a correlation coefficient of 0.526, so that strengthening personality can increase teacher OCB.
3. There is a positive relationship between organizational justice and teachers' OCB with a correlation coefficient of 0.417, so personality enhancement can increase teachers' OCB.

The implication of the above conclusion is that in order to improve teachers' OCB, it is necessary to strengthen personality, interpersonal communication and organizational justice.

From the results of the SITOREM analysis, the optimal solution is obtained as follows:

1. The order of priority for dealing with indicators to strengthen personality, interpersonal communication and organisational justice is as follows: 1. trust, 2. openness, 3. inspiration, 4. need, 5. politeness, 6. civic virtue, 7. conscientiousness, 8. sportsmanship and 9. altruism.
2. Indicators that are already in good condition, so that they can be maintained or developed, are as follows: 1) Positivity, 2) Technical Factor, 3) Social Status, 4) Agreeableness, 5) Extraversion, 6) Openness to Experience, 7) Neuroticism, 8) Conscientiousness, 9) Wisdom, 10) Equality, 11) Consistency, 12) Ethics, 13) Informativeness, and 143) Pride.

Suggestions or recommendations that can be given to relatives are as follows:

1. Teachers need to increase OCB by strengthening personality, interpersonal communication and organizational justice by improving trust, openness, prize for inspiration, need, courtesy, civic virtue, conscientiousness, sportsmanship and altruism.

2. Principals, school supervisors, school management institutions and education offices need to support teachers in improving OCB by providing appropriate guidance to strengthen personality, interpersonal communication and organizational justice in accordance with the results of this study.

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