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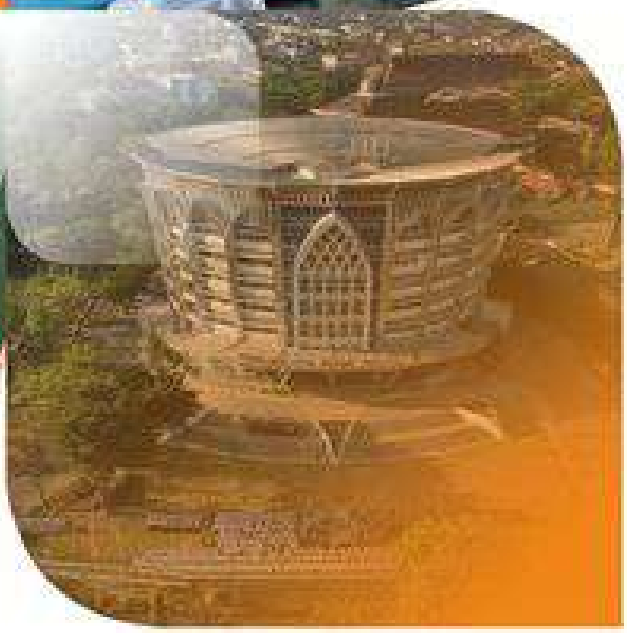

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THEME

EDUCATION EQUITY AND ACCESS: BRIDGING GAPS, EMPOWERING COMMUNITIES

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Evaluating Education Cost Indices in Indonesia: A Comparative Analysis of Construction Cost Index and Purchasing Power Parity Using Empirical Methods

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Keyword

Education Cost Index, Construction Cost Index (CCI), Purchasing Power Parity (PPP).

Abstract

This study employs an empirical methodology to investigate the calculation of indices for determining the unit costs of equivalent education. This study compares the Construction Cost Index (CCI) and Purchasing Power Parity (PPP) in order to evaluate their relative effectiveness. A review of the existing literature on these indices reveals a need for more refined calculation and comparison methods. The study employs data from the Indonesian Central Statistics Agency (CSA), including CCI and PPP figures from 2021 and allocations for School Operational Assistance (SOA) for non-formal education in 2022, to examine the relative significance of the CCI and PPP. The findings indicate that the CCI exerts a greater influence than the PPP. Furthermore, the application of a relative importance approach through multiple regression analysis reveals a robust positive correlation between the CCI and PPP, underscoring their intricate interrelationship.

INTRODUCTION

The paradigm of education for poor and marginalised communities needs to change. Efforts to equalise education should not only support individuals in poor conditions, but also include those with limited access to education (Sutisna, 2016). The right of every child in Indonesia to a quality education is a principle that should be upheld. Through the Ministry of Education, Culture, Research and Technology (Kemendikbudristek), the government provides various options to accommodate the implementation of education in formal and non-formal forms, including equality education (Directorate of Community Education and Equality Education, 2020). Since 2016, the government has been promoting the improvement of equality education. As part of this effort, the government is considering an eligibility standard that institutions providing equality education must meet. These eligibility standards cover aspects such as the legality of the institution, the number of participants, the quality of educators, the governance of the institution and the existing infrastructure. The government also pays particular attention to the document management process for prospective students and educators.

To improve the quality of education in Indonesia, the government needs to develop appropriate policies. It shows that policy development must be based on a strong focus on the objectives set. The Indonesian government's policies in the education sector are not limited to legal regulations. Education policy covers the entire process and outcomes of formulating strategic steps in education. These steps are outlined based on the educational vision and mission to achieve educational goals in the context of the society within the specified time period.

The Education Operational Assistance (EOA) policy refers to the provision of financial assistance and additional resources by the government to provide financial support and

ISSN (Online): 2961-9602

operational resources to educational institutions. This policy aims to improve the quality of education, increase accessibility and help maintain the operational continuity of educational institutions. Educational Operational Assistance (EOA) can be provided at different levels of education, including primary, secondary, tertiary, equivalency and non-formal education. This form of support can vary according to the policies and priorities of local governments.

In the context of Equal Education, Educational Operational Assistance (EOA) provides financial support for the implementation and maintenance of equal education programs. This support can include funding for school operating costs, support for teaching materials, teacher training, curriculum development and other relevant components. Equivalent education refers to a range of educational programs aimed at adults who need the opportunity or access to complete their formal education at primary or secondary level. The design of this program is aimed at promoting the acquisition of qualifications parallel to a primary or secondary education diploma.

In addition to implementing institutional improvements, the government is also providing operational support for gender education. One of the focal points of this policy is the non-physical Special Allocation Fund (SAF) 2022 initiated by the Ministry of Education, Culture, Research and Technology (Kemendikbudristek), namely the distribution of operational support for gender equality education. The distribution of this aid is regulated to be carried out directly to educational institutions according to their region. This success shows an extraordinary achievement of the Ministry of Education, Culture, Research and Technology (Kemendikbudristek), because the amount of operational assistance is calculated on the basis of the Construction Cost Index (CCI) and the Student Index (SI) at the district/city level, which is used as the basis for calculating the operational assistance for the provision of early childhood education and gender equality education (Cabinet Secretariat, 2021). In 2021, the calculation of Operational Assistance (EOA) for the Equality Program will be carried out uniformly throughout the year in all districts/cities (see Table 1).

In the future, the provision of Operational Assistance (EOA) for the Equality Program will take a different approach, depending on the needs of each region. This support will also be more flexible and comprehensive, adapted to the needs of the organisers. According to a statement quoted by Kompas (2021), Coordinating Minister for the Economy Airlangga Hartarto said, "This program helps schools in its implementation and has a positive impact on improving the quality of education." The Implementation Operational Assistance (EOA) in the Equality Program is flexible in its use for various needs in the school environment. These funds cover several aspects, including student admissions, school administration, improving the teaching process and the welfare of educational staff, paying for subscription services, and various other things. In addition, the EOA under the Equality Program can also support the implementation of Face-to-Face Learning (FFL) on a limited basis by referring to the checklist established by the competent authority (Kemendikbudristek, 2021). Apart from the allocations described above, the Education Operational Assistance (EOA) policy in the Equality Program makes a positive contribution by providing funds for operational costs in the implementation of Teaching and Learning Activities (TLA) in Package A, Package B and Package C. Priority is given to the age group 7 to 21 years, which covers 12 years of compulsory education. This step is an integral part of the government's commitment to improving the quality standards of human resources with a global perspective. The main objective of this program is to reduce the burden on participants in this educational initiative. An equally important aspect is to ensure that the needs of children interrupted in their education are met so that they can continue their education. The Education Operational Assistance (EOA) program initiative in the Equality Program has been implemented since 2016. In the period 2016-2018, the funding provided for Package A was IDR 970,000.00, Package B was IDR 1,400,000.00 and Package C was IDR 1,700,000.00.

Table 1. Amount of Equivalent EOA Funds for Each Student per Year

ISSN (Online): 2961-9602

No.	Education Unit that organizes Equal Education	Fund (Rp)/student/year
1	Package A is equivalent to Elementary School	Rp. 1,300,000.00
2	Package B is equivalent to Junior High School	Rp. 1,500,000.00
3	Package C is equivalent to Senior High School	Rp. 1,800,000.00

Source: *Permendikbud 9 of 2021*

One hindrance to implementing the Equality Operational Assistance (EOA) unit cost variant is the unavailability of sufficient statistical measures that markedly influence the education sector. Currently, the Construction Cost Index (CCI), ascertained by the Central Statistics Agency (CSA), is the sole index accessible to compute unit education costs. This index denotes the inflation proportion of construction expenses in a specific location. Data on the Construction Cost Index (CCI) was gathered via a series of price surveys, focusing on elements such as materials for construction, construction labour wage rates, and heavy construction equipment rental rates. The Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) utilises the CCI data to compute the unit cost of school operational assistance, Early Childhood Education operational assistance, and various equality education initiatives in 2022. The importance of using the Construction Cost Index remains a debatable topic for scholars and professionals alike, particularly in the context of the Education sector's unit cost.

In this study, we compared data on the Construction Cost Index (CCI) and the realization of school activity plans and budgets, which includes the components of Implementation Operational Assistance (EOA), alongside data on Purchasing Power Parity (PPP). The latter refers to the ability to purchase goods and services. Therefore, conducting correlation tests is necessary to construct a regression model that yields the most optimal and statistically significant results. After conducting correlation testing, the subsequent stage is to calculate the composite index. Once the composite index has been successfully generated, the following stage is to determine the operational assistance unit cost (EOA) per district/city. Research is required in this context to appraise policy implementation, specifically to ascertain the EOA unit costs for equivalency education. The acquisition of unit costs should align with the principles of fairness, completeness, and sustainability. This study centres on meeting operational needs to generate optimum advantages, particularly when costs closely align with the actual requirements of students in terms of diversity and nominal values, and are distributed suitably.

The following section presents a summary of previous literature that discusses terminology from different perspectives and the application of indices in unit cost calculations through an empirical approach in the context of equity education. This is followed by an explanation of the methodology used. The paper then describes the empirical study and the results obtained. The final section presents the conclusions and recommendations of this research.

LITERATURE ON EDUCATIONAL EQUITY AND UNIT COST INDICES

In this section, we present a review of previous literature on the terminology related to educational equity and the use of educational cost indices in calculating educational cost estimates. This review has been carried out by examining different perspectives on the definition of equity in education. It then explains how previous literature has carried out empirical analysis.

Equal Education Terminology

ISSN (Online): 2961-9602

(1) Informal education becomes a lifelong learning journey in which individuals acquire attitudes, values, skills and knowledge through a range of experiences, educational influences and resources available in their environment. Specific resources include family and neighbourhood circles, work and leisure activities, interactions in the market environment, opportunities for access to library facilities and content presented by mass media. The role of informal education is fundamental to the formation of individual personalities and to the trajectory of life over time. (2) Formal education is a hierarchical and chronological sequence of education from primary to tertiary level. This framework includes various general academic programs, specialisation programs and full-time vocational and technical training institutions. (3) Non-formal education is a set of structured educational activities outside the formal framework, which may exist as an independent entity or as an integral part of a more comprehensive program. Non-formal education aims to provide services to identified target groups and to achieve specific educational goals (Bacquelaine & Raymaekers, 1991). This last definition is the most relevant in this context, given the different definitions proposed by different authors.

Non-formal education is defined as education that takes place outside the formal school context, as explained by Adams et al. (2020), Werquin (2012), Jackson (2016), Kalenda (2015) and Kalenda and Kočvarová (2022). However, non-formal education is not new. The current development of understanding shows that the term reflects a pre-existing concept with a different approach. The understanding of non-formal education can be interpreted from three core perspectives: process, system and context (Zikargae et al., 2022). As a process, non-formal education focuses on the learning aspects and active participation of participants. In the context of the system, non-formal education experiences significant differences from formal education through five dimensions, namely objectives, time period, material, implementation and control (Pienimäki et al., 2021), which gives the two entities a distinctive identity based on their characteristics. From a context (setting) perspective, non-formal education recognises the importance of the informal atmosphere in the dynamics of non-formal education, such as the flexibility and non-formal character inherent in the learning process. It draws attention to the fact that not all participants in non-formal education are always adults (Kedrayate, 2012). Non-formal education can also be interpreted as a structured and regular learning process initiated by non-formal institutions within a set time limit to provide students with understanding and skills, all supported by appropriate facilities (Milana & Nesbit, 2015). According to Gloria et al. (2014) and Willems (2015), non-formal education can take different forms, including 1. Second chance education, which is provided on a part-time basis to those who are unable to attend regular classes. 2. Youth clubs with a focus on substantive education. 3. Adult education and training. 4. Community education focusing on local needs. 5. The individual development plan includes initiatives such as cultural programs, sports and fitness activities, vocational programs and job-oriented programs for the unemployed and for updating the skills of the workforce. Those providing non-formal education may include a variety of entities, including public institutions, partnerships between the private sector and public institutions, workers, trade unions, media organisations, civil social communities, NGOs and international organisations (Latchem, 2014).

According to Law Number 20 of 2003 on the National Education System, Indonesia values three educational pathways: formal education, non-formal education, and informal education. These pathways complement each other and enhance the richness of our educational system. Article 13, Paragraph 1 of the law illustrates this principle. Additionally, Article 26, Paragraphs (3, 4, and 6) provide detailed explanations of non-formal education pathways. Article 26, Paragraph (3) highlights that non-formal education encompasses a range of educational forms such as life skills, early childhood education, youth empowerment, women's empowerment, literacy education, skills mastery, job training, equality education, as well as other forms of education that aim to enhance the academic abilities of students. Thus, the National Education System Law offers a distinct legal foundation for cultivating non-formal learning in Indonesia. According to Article (4), non-formal education units comprise course providers, training centres,

ISSN (Online): 2961-9602

study groups, community learning facilities, taklim councils, and other comparable educational organisations. Article (6) "Non-formal education outcomes can be deemed equal to formal education program outcomes provided they undergo an evaluation and equalization procedure by an organization designated by the government or regional government, guided by national assessment standards." The National Education System Law lays down a well-defined legal framework for the expansion of non-formal education in Indonesia. Article (4) Non-formal education units include course institutions, training institutions, study groups, community learning activity centres, taklim councils and similar educational units. Article (6) Non-formal education outcomes can be regarded as comparable to those of formal education programs after undergoing an assessment and equalisation process by an institution appointed by the government or regional government in accordance with national assessment standards.

One form of non-formal education that holds great importance is that of equality education. Equivalency education can be defined as an organized system that exists outside the boundaries of formal education, with regular structures and levels (Henschke, 1998; Gloria et al., 2014; Marques & de Freitas, 2016). This educational model offers educational services to children who are unable to access formal education due to poverty, remote location, or delayed development (Boyadjieva & Trichkova, 2022). Technical term abbreviations are explained when first used. Biased, emotional, or ornamental language is avoided in favour of a formal register, with positions on subjects made explicit through hedging. The educational services provided comprise of the Package A Program, which is equivalent to the primary school level; the Package B Program, which corresponds to the lower secondary school level; and the Package C Program, which is equivalent to the upper secondary school level. The educational services offered are objectively assessed and exclude the use of subjective evaluations, ensuring clear, concise, and necessary information is presented in simple sentences. Furthermore, the text follows conventional academic sections and employs consistent formatting features including citation and footnote style. The sentence structure is standard, and causal connections between statements are necessary to ensure a logical flow of information. Lastly, precise word choices have been used, and the text is free of grammatical, spelling, and punctuation errors. Through these programs, the focus is on enhancing students' knowledge, abilities, and skills, whilst fostering positive attitudes and personality traits. The programs are organized by the government and the community through a range of institutions, such as the Learning Activity Studio (LAS), Learning Activity Development Centre (LADC), Community Learning Activity Centre (CLAC), Course Training Institute (CTI), Social Organisations, Community Organisations (Ormas), Non-Governmental Organisations (NGOs), and Islamic Boarding Schools (Hermawan, 2012). This education program aims to provide access to formal education for individuals residing in remote locations, migrant workers, and those who had to drop out of school due to economic constraints (Meijer & Watkins, 2019). The text is free from grammatical errors, follows a conventional structure and adheres to the prescribed style guide. This education program aims to provide access to formal education for individuals residing in remote locations, migrant workers, and those who had to drop out of school due to economic constraints (Meijer & Watkins, 2019). Clear and logical progression of information is maintained in the text, with no bias or subjective evaluations. Technical abbreviations are explained when first introduced, and formal language is used throughout. The initiative by Herlyna et al. (2019) enables students to attend weekend classes without impacting their work productivity. This educational initiative aims to broaden educational access by recognizing that access to education is an intrinsic human right that endures throughout one's lifetime (Choi, 2021). The implementation of equitable education holds paramount importance as it can adapt to various circumstances that restrict access to formal education, including financial limitations, time constraints stemming from the need to earn a living, far-flung geographic areas (such as ethnic minority communities and isolated tribes), the desire to pursue further studies in a pesantren setting, and socio-legal impediments that hinder entry to formal academic institutions (Munawwir & Hanip, 2021).

ISSN (Online): 2961-9602

The implementation of equal education plays a pivotal role in maximising students' potential with a focus on mastering academic knowledge and relevant functional skills, alongside developing professional attitudes and character (Alamsyah et al., 2022). Equal education can fulfil the skills requirements of students amidst the constant changes in the current global landscape (Merriam et al., 2006; Syaefuddin et al., 2019). Equality education aims to provide high-quality primary education for children facing disadvantages, including those who have dropped out of school, not continued their education, or who have never received formal education. These targets also prioritise disadvantaged groups, such as girls and ethnic minority communities, as well as children who reside in remote, marginalised, or difficult-to-reach areas due to geographical location and/or transportation barriers (Fauzi & Siregar, 2021). Overall, the objective of introducing equality education, particularly in the Programs A, B, and C, is to enhance students' comprehension, abilities, and values, leading to the development of positive character traits, ultimately impacting their future prospects in a positive manner (Suhaenah, 2016). Additionally, Pangestu et al. (2021) reported other objectives of the equality program, including

1. Ensure the fulfillment of learning needs for all young and adult individuals through equitable access to learning and life skills programs,
2. Address gender disparities in primary and secondary education, and
3. Providing adaptive services for students who need academic education and life skills to improve quality.

The implementation of equal education by communities, as presented by Hermawan (2012), has heterogeneous variations in dynamics and quality. This factor arises from the disparity of students' abilities, the diversity of organising institutions, and the conditional environment that affects the quality of equality education graduation in the region. In order to maintain higher quality standards for the services of equal education and to reduce potential problems that may arise, the government has set competency standards that must be achieved by graduating students. In addition, content standards, learning processes and assessment systems for students will be defined (Suryana, 2020). Equal education, as an alternative to the education system, specifically targets students who face five barriers: economic barriers, time barriers, geographical barriers, belief barriers and social/legal barriers. The students targeted by Equal Education include school-age children and adults who have not completed formal education. Economic barriers arise due to poverty, which affects various groups such as farmers, fishermen, labourers, domestic workers, women workers, slum dwellers and people living in poverty in urban areas. Meanwhile, time constraints arise from their work as artisans, labourers and other unskilled workers. Geographical barriers include isolated tribal communities, ethnic minorities and remote communities on islands or in remote forest areas. Religious barriers include people from Islamic (Salafiyah) boarding schools that do not provide formal education. On the other hand, social and legal barriers include street children, children in correctional institutions and children with other social challenges. Despite these obstacles, the learning process provided to the students still meets the graduate competency standards and other regulations, all of which are done to improve the quality of graduates so that they have strong independence, creativity and professionalism (Harlinda et al., 2020). Equal education services provide opportunities to all citizens who have not completed primary and secondary education, regardless of differences in ethnicity, religion, race or social group, and are not limited by certain age limits, as long as these individuals still have the interest and motivation to continue the learning process. (Dewi, 2019).

A number of fundamental characteristics distinguish equivalence education from formal education. According to Oong Komar (2006), these differences can be identified in the form of flexibility in the delivery of education, including aspects of time and duration of the learning process, age range of students, learning materials, methods of delivery of materials and assessment of learning outcomes. In the context of equitable education, learning outcomes can be recognised as equivalent to the outcomes of formal education programs through equivalence

ISSN (Online): 2961-9602

assessment procedures by institutions appointed by the government or regional government. This process refers to national education standards, as Hermawan (2012) noted. In order to ensure the equivalence education program meets the expectations, the structure of the education curriculum in the equivalence program is regulated by the government to meet the graduate competency standards according to the provisions of Permendiknas No. 23 of 2006. These graduate competency standards focus on providing workshops to achieve functional skills that are characteristic of the Package A, Package B and Package C programs. Specifically, the Package A program aims to provide skills that are relevant to the needs of daily activities; the Package B program aims to provide skills that meet the demands of the labour market; and the Package C program aims to provide skills in entrepreneurship.

The existence of equitable education in the future will face increasingly complicated and complex challenges, as noted by Wahidin et al. (2022). Some of these challenges include the complexity of society's needs in the education sector, rapid and large-scale changes in the unstable business world, as well as an increase in poverty rates due to the COVID-19 pandemic, and high unemployment rates among productive age groups who have not yet been integrated into the labour market. Thus, in the future, gender education services must focus on developing skills to support individual development in society, as Yanti and Sunarti (2021) argue.

Unit Cost of Education

Education, at all levels, is a crucial policy for a country with substantial public expenditure (Dewi, 2019). From an economic perspective, education and training are valuable investments for the government. Any rise in employment, productivity, and other positive effects can contribute to Gross Domestic Product (GDP) growth and net social benefits, affecting the size of government expenditure (Griffin, 2016).

Cost is the expense incurred for producing and manufacturing a specific product, estimated from the viewpoint of the producer and measured in nominal currency (Ngadirin, 2011). The cost can be influenced by market dynamics, resulting in an increase or decrease in the value (Olajide et al., 2018). The term "cost" has multifaceted applications in various contexts and relates to economic assets that hold intrinsic value (Fauzi, 2020). The cost function is crucial in generating profits (Nurdiyanti, 2021). Within educational institutions, cost refers to the total expenses necessary for producing or providing set services (Budi, 2020). Costs are composed of direct and indirect components, with direct costs typically encompassing direct materials and labour expenses that have a clear and accurate association with a specific cost object. Indirect costs cannot be attributed solely to a defined cost object with precision, as per Novák et al. (2017). Meanwhile, Gaspersz's (2003) alternative perspective regarding cost definition, as presented by Ferdi W. P. (2013), shows that costs reflect production system efficiency from a managerial economics standpoint. The concept of cost is intricately tied to production in this context. However, under the cost concept framework, the quantification of inputs is calculated in the form of economic value referred to as costs. Within the educational context, the cost approach delineates educational institutions as stakeholders who produce educational services. These services comprise various components, including expertise, skills, knowledge, character, and values which students internalize (Hasibuan & Pendi, 2021). Educational institutions acquire human resources as input, which are then developed through various educational and training processes ultimately leading to producing output capable of meeting the demands of the labour market. According to Ţaran-Moroşan, et al (2010), the cost of education encompasses two key components; the actual expenditure and the opportunity cost incurred by individuals investing in education. Education costs involve the income that must be foregone during one's lifetime to attain education. In the educational context, actual expenses can be determined through easily measurable investments such as tuition fees, book purchasing, and travel costs incurred for educational purposes (Hariyanto, 2020). Building on Mutegi's (2015) perspective, education costs are defined as the precise resources required, involving sacrifices and financial allocations,

ISSN (Online): 2961-9602

to foster educated individuals (Dewi & Indrayani, 2021). Ferdi W. P. (2013) outlines that in the field of education, cost components consist of both direct and indirect costs. Direct costs comprise expenses incurred in implementing teaching activities, maintaining learning facilities, providing transportation and compensating teaching staff. These costs are covered by the government, parents or students. Meanwhile, the indirect cost comprises of missed opportunities, including expenditures on pocket money and educational equipment, forfeiting potential profits during the educational process.

As a follow-up to Fironika's (2011) study within the education concept framework, two aspects need analysis: the total cost of education and the cost per unit for each student. The cost per unit includes the aggregate costs contributed by the government, parents, and the community to support education for one academic year in formal educational institutions. The concept of unit costs provides an objective measure of effective fund allocation at educational institutions to support students' educational process (Wakhid, 2020). Clear causal connections are made between these statements for easy comprehensibility. Precise subject-specific vocabulary is utilized where appropriate. The unit cost of education refers to the amount of funds allocated to each student and is calculated by dividing the total expenditure incurred by the institution for a particular period by the number of students (Fattah, 2009). Technical term abbreviations are fully explained on first use. The language is formal, objective, and value-neutral, with no filler words, bias, figurative, or emotional language. The text adheres to conventional structure, citation, footnote, and formatting features. Finally, the text is completely free of grammatical, spelling, or punctuation errors. Educational unit costs can be defined as the operational expenses allocated by educational institutions, divided by the number of active participants during a defined period. Evaluation should use clear objective language, avoiding figurative language, emotional expressions, or ornamental phrases. These expenses are calculated regularly within the academic year, which is split into two semesters (Alwi, 2017). The process involves avoiding any subjective evaluations, employing clear and concise language, and adhering to formal language protocols. It is essential to maintain logical and balanced content with clear causal connections between statements. Technical terms should be explained, grammatical errors, spelling or punctuation mistakes corrected, and academic sections appropriately structured in line with established style guides. Ekanem and Ekpiken (2013) define unit costs of education as costs calculated per unit, playing an essential role in education management for achieving predetermined goals. The identification of unit cost education components entails per student cost, per graduate cost, program costs, tuition costs, material costs, and per capita education costs in various community settings.

Unit costs are calculated on the basis of routine or operational costs associated with educational activities. The unit cost per student is a measure that describes the effective allocation of resources by educational institutions for the benefit of students in educational activities (Moscarola & Kalwij, 2021). The total funds received by educational institutions, or the total costs received by educational institutions, can be divided by the number of students. The aim is to obtain the cost per student unit. Based on the explanation provided, the unit cost of education estimates the average cost incurred by each student in a given period of time to obtain an education. The unit cost is a benchmark that is used as a guideline to meet the educational needs of each student in educational institutions. Furthermore, the unit cost per student refers to the average cost incurred by each student in an educational institution during a given period. Knowledge about the amount of cost per unit event, based on the level and type of education, is of great value in evaluating different policy alternatives to improve the quality of education. According to Anwar (2018) and Jaelani et al. (2021), the calculation of the cost of education should be carried out with the highest level of accuracy, taking into account the components of the activity and the unit cost.

Reference Index for Calculating Unit Cost of Education

ISSN (Online): 2961-9602

Apart from education inflation, an important economic indicator used as a reference in the calculation of unit costs is the economic index in each region. The existence of this index is essential in order to take account of variations in the price levels of goods and services in each region. All three references are now available as a means of monitoring this variation. **First**, the Education Cost Index (ECI) is specified in the Regulation (Permendiknas) No. 69/2009 of the Minister of National Education on standards for non-personnel operating costs (Minister of National Education, 2009). The ECI can be classified as a spatial index that illustrates the comparison of non-personnel operating costs of education between regions for a given period. The Education Cost Index (ECI) calculates the standard cost of education between districts/cities. However, this index has become outdated as it has not been updated for quite some time and is therefore no longer relevant as a reference guide. The various concepts and definitions used in the 2009 ECI calculations refer to the academic analysis of the Minister of National Education's Regulation (*Permendiknas*) No. 69/2009.

1) Education Cost
   "Education costs" refers to the nominal amount in Rupiah currency spent to accommodate all the resources needed to carry out the education process.
2) Education Operational Costs
   Educational operational costs refer to expenditures directed towards acquiring educational resources that will be used up within one year or less, as well as expenditures that must be realized repeatedly yearly. Several aspects are included in the scope of educational and operational costs, including remuneration and incentives for teaching staff, acquisition of objects with a life of less than one year, maintenance of physical infrastructure and equipment, and expenses related to energy resources and services.
3) Personnel Education Operational Costs
   Personnel education operational costs refer to expenses allocated to support the welfare and development of personnel involved in the learning process in the school environment. This personnel includes various roles involving educators, educational staff (such as laboratory assistants and librarians), administrative staff (such as school principals and administrative employees), and other employees (such as school guards and gardeners) who are involved in implementing or supporting the learning process.
4) Non-Personnel Education Operational Costs
   Non-personnel educational operational costs refer to the expenditure required to meet the needs for materials, equipment, and supplies involved in the learning process, including the budget allocated for maintaining facilities and infrastructure.
5) Education Cost Index (ECI)
   The Education Cost Index (ECI) is a number that compares the operational costs of non-personnel education in a district/city with the operational costs of non-personnel education in the city of Jakarta, which is used as a benchmark.

Second, The Construction Cost Index (CCI) is an index compiled by the Central Statistics Agency (CSA) and plays a role in representing the level of construction costs in a particular area. CCI is an index number that compares the value of goods and services included in the CCI commodity collection, both between one district/city or province and another district/city or province. Based on its conception, the Construction Cost Index (CCI) can be grouped as a spatial index that reflects price comparisons between different regions within a specific time period. Data relating to CCI was obtained through a price survey process that focused on construction costs, wages for construction work, and heavy equipment rental rates (CSA 2018). This index corrects unit cost values based on regional inflation rates in various geographical areas, from provincial to district/city levels. The Central Statistics Agency (CSA) periodically updates the Construction Cost Index (CCI) yearly. In this study, 2021 CCI data published by CSA was used. Furthermore, Semarang City has been designated as a reference region with an index value of

ISSN (Online): 2961-9602

100% in this analysis. According to CSA, Semarang City has an index closest to the national average. **Third,** Purchasing Power Parity (PPP) is an economic concept introduced by classical economist David Ricardo and popularized by Swedish economist Gustave Cassel in 1920 amid high inflation in European countries. The concept is based on the principle of the law of one price. This principle stipulates that prices of identical goods in two countries are identical when evaluated using the same currency. Using the law of one price principle, we can establish the total value of comparable goods and services in two different countries.

Secondary data from the three references for calculating unit costs are available for each Regency/City. The Central Statistics Agency (CSA) updates the Construction Cost Index (CCI) and Purchasing Power Parity (PPP) data annually, taking into account local conditions. The government advocates for the use of unit education costs based on regional factors in the future.

Regression by Using Relative Importance and Winsorization Approach

The term "relative importance" refers to the process of quantifying the contribution made by each predictor variable to a multiple regression model. The evaluation of the relative importance of a multiple regression model is determined by the contribution of each predictor variable to the model's R2 value. This signifies that the statistical R2 value of the multiple regression model is subdivided into the portions associated with each predictor variable (Groemping, 2006).

In general, two common methods can be employed to address outliers in the data: the trimming method and the winsorization method. The trimming method involves removing or deleting observations with extreme values, thereby eliminating these values from the dataset. This method is most suitable for survey data with a large sample size, where outlier values do not accurately reflect the object under investigation. If the outlier values are an accurate representation of the object being surveyed within the context of limited data and have a spatial dimension, deletion of these objects is not recommended. Instead, the winsorization method is the preferred method to handle these outliers. This method involves adjusting very extreme x values towards a lower direction or shallow values towards a higher direction while leaving moderate values unchanged (Chambers et al., 2000).

METHOD

Data Source

To calculate the Sustainable Development Index, certain criteria must be met by the variables/indicators used. These include being issued by a legitimate agency, continuous publication, and relevance to education costs. In accordance with these criteria, the Construction Cost Index (CCI) and Purchasing Power Parity (PPP) will be employed as indicators when determining the ECI. Both the CCI and PPP are published by the Central Statistics Agency (CSA). The Sustainable Development Index model is validated against the Family Welfare Index and Gross Regional Domestic Product (PPPB) using target variables. In this context, School Activity Plan and Budget Application (ARKAS) data on school operational assistance funds is utilized.

Construction Cost Index (CCI)

The Construction Cost Index (CCI) is a spatial index that functions as a number to describe the comparison of the level of construction costs in a district/city compared to a reference city. The CCI was formed using data from the Construction Feasibility Price Survey (CFP), an annual activity carried out by the Central Statistics Agency (CSA). Price data included in the Construction Feasibility Price (CFP) survey involves the price of building or construction materials, heavy construction equipment rental costs, and the value of wages for construction services. Apart from these data, data regarding the realization of the Regional Revenue and Expenditure Budget at the district/city level, as well as Detailed Unit Prices (Bill of Quantity - BoQ) from completed projects,

ISSN (Online): 2961-9602

are also collected as weighting factors for the District/City Welfare Index (CCI) both at the district/city and provincial levels. This data was obtained through simultaneous surveys conducted in all districts/cities in Indonesia, with an average sample size of 15 trader respondents in each district/city in four different periods: January, April, July, and October. The interpretation of the Regency/City Welfare Index (CCI) value can be expressed as follows: if the CCI value=100, this indicates that, in general, the price of construction materials in a regency/city has a similar level to the reference city; if the CCI value is > 100, this indicates that in general the price of construction materials in a district/city is at a higher level than the reference city, whereas if the CCI value is <100, this indicates that in general the price of construction materials in a district/city has a lower level than the reference city. The CCI data from 2021, with the city of Makassar as a reference.

Purchasing Power Parity (PPP)

GrossRegional Domestic Product Per Capita (PPP) refers to the purchasing power of people for goods and services. The PPP calculation involves using 96 types of commodities, comprising of 96 distinct food commodities and 30 types of non-food commodities. The writing is free of grammatical and spelling errors, and bias has been avoided throughout. The data used for PPP is from 2021 and South Jakarta is the reference city. Technical abbreviations employed are explained within the text. As assumed by the Regency/City Welfare Index (CCI), which correlates the price of building materials with the cost of education, the prices of both food and non-food commodities forming the Gross Regional Domestic Product Per Capita (PPK) Index are also believed to be correlated with education costs.

School Operating Assistance (SOA) Fund Usage Data

To verify the suitability of the Regency/City Welfare Index (CCI) and Gross Regional Domestic Product Per Capita (PPC) as constituents of the synthesized Human Development Index (HDI), as well as establishing the weight distribution for each component, a target variable that effectively captures education-related expenditures at the education unit level is required. As the District/City Welfare Index (CCI) and Gross Regional Domestic Product Per Capita (PPC) concentrate on the district/city administrative unit level, it is necessary that the target variables share the same unit basis. Therefore, the solitary viable choice for the target variable is to report data regarding the School Operational Assistance Funds (SOA) usage by each educational unit, conveyed through the RKAS (Realization of School Activities and Budget) Application. Details on the usage of School Operational Assistance (SOA) funds extracted from ARKAS are explicated thoroughly, in alignment with the components articulated in Permendikbudristek Number 2 of 2022 regarding Technical Instructions for Management of Operational Assistance Funds for Offering Early Childhood Education, School Operational Assistance, and Operational Assistance for Implementing Equal Education (Table 2). In addition to the data pertaining to the use of SOA funds, information on the quantity of students, teachers, and teacher status was gathered.

Table 2. Components of Use of SOA Funds

Component	Information
Component 1	Acceptance of New Students
Component 2	Library Development
Component 3	Implementation of Learning and Extracurricular Activities
Component 4	Implementation of Learning Assessment and Evaluation Activities
Component 5	Implementation of Administration of School Activities
Component 6	Professional Development of Teachers and Education Personnel
Component 7	Power and Service Subscription Financing

ISSN (Online): 2961-9602

Component	Information
Component 8	Maintenance of School Facilities and Infrastructure
Component 9	Provision of Learning Multimedia Tools
Component 10	Organizing Skills Competency Improvement Activities
Component 11	Organizing Activities to Support Graduate Absorption
Component 12	Honor Payments

Analysis Stages

The following are the stages of data analysis carried out.

a. Calculate the actual expenditure of School Operational Assistance (SOA) funds for each component per student. This calculation is carried out by dividing the value of each component by the number of students in each school as recorded in Table 3.

Table 3. Variables for Realization of Expenditure and SOA for Each Component per Student

No.	Variable	Unit
1	Component 1 per student	Rupiah/person
2	Component 2 per student	Rupiah/person
3	Component 3 per student	Rupiah/person
4	Component 4 per student	Rupiah/person
5	Component 5 per student	Rupiah/person
6	Component 6 per student	Rupiah/person
7	Component 7 per student	Rupiah/person
8	Component 8 per student	Rupiah/person
9	Component 9 per student	Rupiah/person
10	Component 10 per student	Rupiah/person
11	Component 11 per student	Rupiah/person
12	Component 12 per student	Rupiah/person
13	Total cost per student	Rupiah/person

b. Calculate the variable percentage of Civil Servant (PNS) teachers at each school.

c. Calculate the variable percentage of total honorarium (component 12) to total expenditure. This variable is calculated using the following formula:

$$\text{Percentage of total honorarium} = (\text{Component 12} / \text{Total Fees}) \times 100\%$$

d. Filtering school data that will be used as a sample in calculating the composite index. In this case, there are 3 alternatives used, namely:
   i. Alternative 1: Based on an analysis of the percentage of school expenditure on honorariums, the school data considered is schools that show a percentage of expenditure on honorariums of less than 30%.
   ii. Alternative 2: Based on the number and percentage of State Civil Service (ASN) teachers, with the minimum limit referring to the information listed in Table 4.

Table 4. Minimum Filtering Limit for Alternative 2

No	Level	Min. The number of students	Min. Percentage of Civil Service Teachers
1	Elementary School	336	80%
2	Junior High School	384	80%

ISSN (Online): 2961-9602

3	Senior High School	324	80%
4	Vocational School	324	80%

iii. Alternative 3: Based on the number and percentage of ASN teachers, the minimum limit is based on Table 5.

Table 5. Minimum Filtering Limit for Alternative 3

No	Level	Min. The number of students	Min. Percentage of Civil Service Teachers
1	Elementary School	504	70%
2	Junior High School	576	70%
3	Senior High School	432	70%
4	Vocational School	432	70%

e. Calculate the average realization of the use of School Operational Assistance (SOA) funds per component per student and per district/city area.
f. Combine data in stage e, with CCI and PPP data
g. Data exploration is carried out at stage f. The data exploration process includes creating a histogram of the Urban Poverty Index (CCI) and Gross Regional Domestic Product per Capita (PPP) variables, as well as calculating the correlation value between the average of each component per student with the CCI and PPP variables.
h. Determine a target variable (dependent variable) that reflects a proxy for variations in actual education unit costs: either per component or an aggregation of several relevant components. The target variable chosen is the one that has the highest correlation with the Urban Poverty Index (CCI) and Gross Regional Domestic Product per Capita (PPP) variables. At this stage, the CCI and PPP variables are explored with the aim of enabling handling steps if outlier values are detected.
i. Carry out linear regression analysis between components that have a high correlation with the CCI and PPP variables, then evaluate the R2 value. A high R2 value means that the model formed is able to explain the diversity of the target variable, namely the high component expenditure per selected student.
j. The best model is selected based on the highest coefficient of determination (R2). After that, the relative importance weights were calculated for the Urban Poverty Index (CCI) and Gross Regional Domestic Product per Capita (PPP) variables. (Groemping, 2006).
k. The calculation of the Education Cost Index (ECI) for each district/city is carried out based on the relative importance weights that have been generated at stage j.

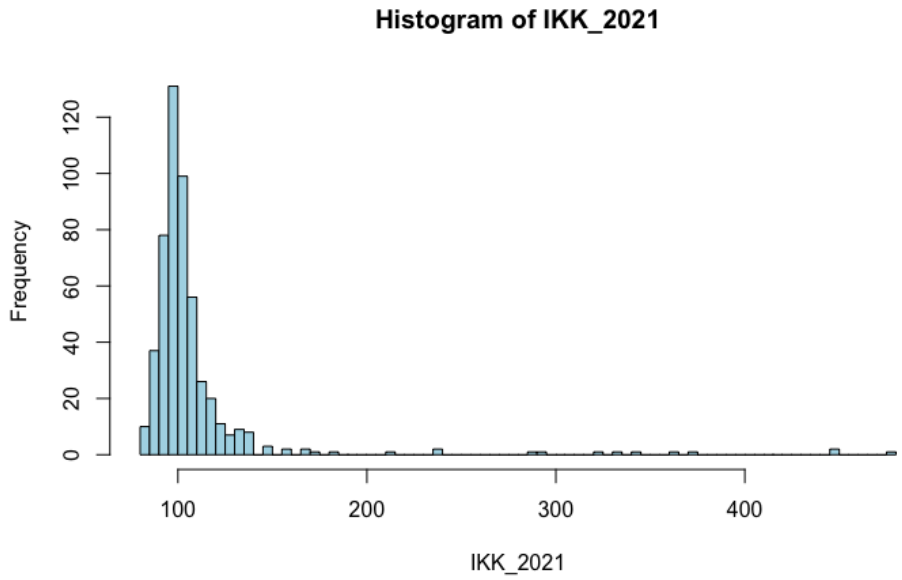
RESULTS AND DISCUSSION

Data Exploration

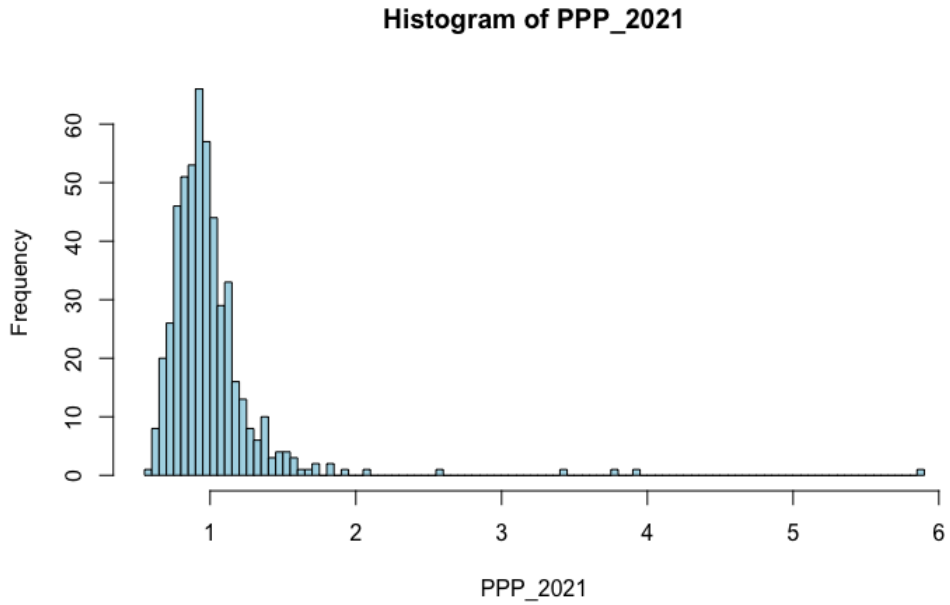
Figure 1 displays a histogram for the CCI variable (Figure 1(a)) and the PPP variable (Figure 1(b)). In general, the distribution pattern of these two variables can be said to be right skewed, where there are several extreme observations (outliers).

Figure 1. Histogram of Variables: (a) CCI, (b) PPP

ISSN (Online): 2961-9602



(a)



(b)

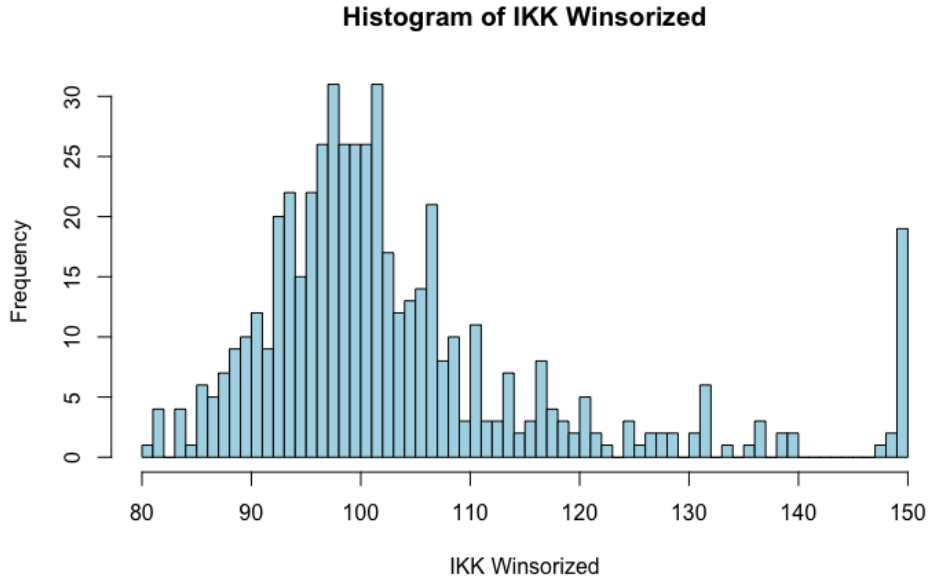
In summary, there is a range of minimum and maximum values for the City Poverty Index (CCI) variable of 80.99 to 478.12, which has a significant difference. In addition, the Gross Regional Domestic Product per Capita (PPP) variable has a minimum and maximum value range between 0.567 and 5.875, which also shows quite a significant difference. In this study, efforts were made to handle outlier observations using the one-sided winsorization method (Chambers et al., 2000).

In applying the winsorization method, a limit value is determined, which is used as the cut-off value. In the CCI variable, a cut-off value is set *to K=150*. As a result, districts/cities with a CCI value > 150 will have their CCI value adjusted to 150. In the PPP variable, a cut-off value is set *as K=1.5*. As a result, districts/cities with a PPP value > 1.5 will have their value adjusted. The

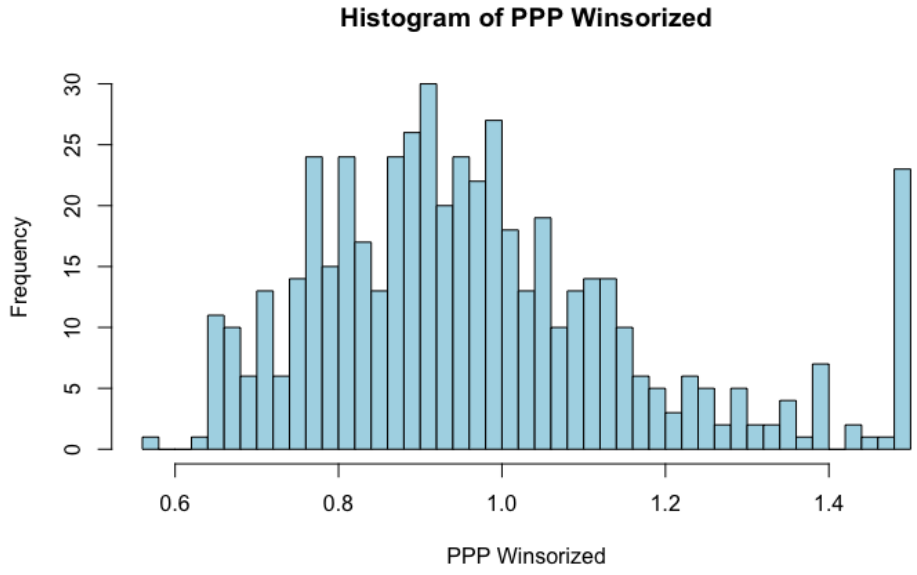
ISSN (Online): 2961-9602

PPP becomes 1.5. The choice of this *K* value is due to making the data distribution of the CCI and PPP variables more symmetrical (Figure 2).

Figure 2. Histogram After One-sided Winsorization Process for Variables: (a) CCI, (b) PPP



(a)



(b)

Furthermore, the variables City Poverty Index (CCI) and Gross Regional Domestic Product per Capita (PPP) which have gone through the winsorization process are also taken into account in determining the regression model used to form the composite index. This analysis approach was carried out on data from the Junior High School and Senior High School levels.

ISSN (Online): 2961-9602

EOA Analysis Results

The number of schools contained in the School Activity Plan and Budget Application (ARKAS) which are part of the EOA is 196,978 schools. The next step is to carry out the filtering process, with the following results:

EOA Analysis Results for CLAC and SKB Levels

After filtering the levels of Community Learning Activity Centers (CLAC) and Special Schools (SKB), a total of 7,471 schools meeting the criteria were identified. Additionally, following the aggregation process of average components per student per district/city, the results revealed that 501 districts/cities were included in this analysis.

Table 6 below contains the correlation value between each component average per student with the CCI and PPP variables before and after the winsorization process was applied.

Table 6. Correlation Value Between Each Component Average per Student on CCI and PPP for CLAC and SKB Levels

Variable	CCI	CCI Winsor	PPP	PPP Winsor
Average Component 1 per student	0.160	0.142	0.272	0.220
Average Component 2 per student	0,000	-0.026	-0.024	-0.047
Average Component 3 per student	-0.054	-0.033	-0.113	-0.125
Average Component 4 per student	-0.057	-0.036	-0.100	-0.105
Average Component 5 per student	0.025	0.079	-0.055	0.089
Average Component 6 per student	-0.040	-0.050	-0.047	-0.045
Average Component 7 per student	-0.116	-0.087	-0.113	-0.129
Average Component 8 per student	-0.041	-0.047	-0.085	-0.033
Average Component 9 per student	-0.147	-0.126	-0.148	-0.174
Average Component 10 per student	-0.146	-0.106	-0.175	-0.181
Average Total Cost per student	-0.177	-0.122	-0.251	-0.234

Based on the table above, it can be seen that the correlation value between each component average and the PPP and CCI variables shows a relatively low level of correlation. Therefore, the decision was taken not to continue exploration at this stage.

EOA Analysis Results for CLAC and SKB Levels with Alternative 1

At this stage, a filtering process is carried out at the Community Learning Activity Center (CLAC) and Special School (SKB) levels, as has been done previously. Apart from that, the first filtering alternative is also applied, namely applying filtering to the percentage of expenditure/realization for honoraria (component 10) which is less than 20%. As a result, 1,225 schools met these criteria. After aggregating the average components per student per district/city, data was obtained from 341 districts/cities.

Table 7 below shows the correlation value between each average component per student and the CCI and PPP variables before and after the winsorization process.

Table 7. Correlation Value Between Each Component Average per Student on CCI and PPP for Alternative CLAC and SKB level 1

Variable	CCI	CCI Winsor	PPP	PPP Winsor
Average Component 1 per student	0.083	0.094	0.056	0.124
Average Component 2 per student	0.068	0.086	0.003	0.029

ISSN (Online): 2961-9602

Variable	CCI	CCI Winsor	PPP	PPP Winsor
Average Component 3 per student	-0.047	-0.030	-0.090	-0.142
Average Component 4 per student	0.008	0.032	-0.034	-0.047
Average Component 5 per student	0.014	0.078	0.010	0.138
Average Component 6 per student	-0.069	-0.095	-0.032	-0.032
Average Component 7 per student	-0.099	-0.070	-0.081	-0.104
Average Component 8 per student	-0.080	-0.068	-0.061	-0.050
Average Component 9 per student	-0.080	-0.032	-0.097	-0.033
Average Component 10 per student	-0.044	-0.053	-0.029	-0.075
Average Total Cost per student	-0.033	0.009	-0.078	-0.066

However, based on the table above, it can be concluded that the correlation value between each component average for the PPP and CCI variables indicates a relatively low level of correlation. This condition resulted in the decision not to continue further exploration at this stage.

EOA Analysis Results for All Levels

In this exploration, all levels of EOA were involved, namely Early Childhood Education, Community Learning Activity Centers, and Special Schools (SKB), with a total of 196,978 schools. After that, at the aggregation stage, the average component per student per district/city was 514 districts/cities.

Table 8 below describes the correlation value between each average component per student and the CCI and PPP variables, both in conditions without the winsorization process and after the winsorization process has been carried out.

Table 8. Correlation value between each component average per student on CCI and PPP for all EOA levels

Variable	CCI	CCI Winsor	PPP	PPP Winsor
Average Component 1 per student	0.524	0.319	0.475	0.433
Average Component 2 per student	0.271	-0.010	0.118	0.061
Average Component 3 per student	0.008	-0.009	-0.001	-0.030
Average Component 4 per student	0.059	0.075	0.015	0.033
Average Component 5 per student	0.230	0.231	0.177	0.330
Average Component 6 per student	0.005	0.022	-0.048	-0.037
Average Component 7 per student	0.314	0.150	0.067	0.127
Average Component 8 per student	0.321	0.132	0.318	0.140
Average Component 9 per student	0.147	0.026	0.096	0.093
Average Component 10 per student	0.056	0.058	0.100	0.164
Average Total Cost per student	0.346	0.149	0.315	0.175

Based on the results of the correlation values that have been analyzed, the three component averages that show the most excellent correlation are selected to be included in the process of forming the composite index. The three components are Average Component 1 per student, Average Component 5 per student, and Average Component 8 per student. Due to the significant correlation between the two, the modeling for the formation of the composite index

ISSN (Online): 2961-9602

was carried out by utilizing the CCI and PPP variables without carrying out winsorization. Therefore, a linear regression analysis was carried out to investigate the relationship between the target variables of the selected components and their totals with the CCI and PPP variables

Table 9 presents a summary of the results of the regression analysis for each component that has been selected using the CCI and PPP variables, along with the associated R2 values. From the results obtained, it can be concluded that the model that includes the target variable, average component 1 per student, shows the highest R2 value, namely 31.16%.

Table 9. Estimated values of regression coefficients and coefficients of determination (R2) calculated for a number of models that consider the predictor variables Construction Cost Index (CCI) and Purchasing Power Parity (PPP) at all levels of Educational Operational Costs (EOA).

Model	Y	Intercept	CCI	PPP	R2
1	Comp. 1	-9281.83	100.95	16844.72	31.16%
2	Comp. 5	65028.39	56.04	21131.80	5.51%
3	Comp. 8	-402740	2184	248386	12.65%
4	Total Comp 1, 5, 8	-346993.6	2340.7	286362.3	15.44%

EOA

Analysis Results for All Levels with Alternative 1

In this exploration, all levels of EOA were used, namely Early Childhood Education, Literacy and Equity Education, and Special Problem Schools (SKB). This use was carried out by applying filter alternative 1, resulting in 86,008 schools. Furthermore, after the data was aggregated based on the average component per student per district/city, there were 508 districts/cities in this analysis.

Table 10, the section below, presents the correlation values between each average component per student and the Construction Cost Index (CCI) and Purchasing Power Parity (PPP) variables, both those that have not undergone the winsorization process and those that have gone through this process.

Table 10. The correlation value between each average component per student and the Construction Cost Index (CCI) and Purchasing Power Parity (PPP) variables has been calculated for all levels of Educational Operational Costs (EOA) using the first alternative model.

Variable	CCI	CCI Winsor	PPP	PPP Winsor
Average Component 1 per student	0.488	0.270	0.312	0.370
Average Component 2 per student	0.322	0.035	0.191	0.105
Average Component 3 per student	-0.007	-0.010	-0.017	-0.037
Average Component 4 per student	0.020	0.026	0.015	0.010
Average Component 5 per student	0.282	0.255	0.290	0.431
Average Component 6 per student	0.027	0.036	-0.001	0.018
Average Component 7 per student	0.349	0.152	0.117	0.170
Average Component 8 per student	0.166	0.091	0.174	0.069
Average Component 9 per student	0.207	0.074	0.168	0.197
Average Component 10 per student	0.234	0.075	0.204	0.161
Average Total Cost per student	0.036	0.013	0.025	-0.014

Based on the results of the correlation values listed above, the two-component averages that showed the highest correlation, namely Component Average 1 per student and Component

ISSN (Online): 2961-9602

Average 5 per student, were selected to be implemented in the context of forming a composite index. The modeling process to form a composite index utilizes the CCI variable without using the winsorization method and the PPP variable because both show more significant correlation values. Next, linear regression analysis is applied to investigate the relationship between the target variables originating from the selected components and the total, using the CCI variable, which has not experienced winsorization, and the PPP variable.

Table 11 summarizes the regression analysis results for each selected component involving the CCI variable, which has undergone the winsorization method and the PPP variable. In addition, the coefficient of determination (R2) value is also presented. These results reveal that the model involving the target variable, which includes the total between the average component 1 and the average component 5 per student, produces the highest R2 value, namely 27.24%.

Table 11. Estimated regression coefficient values along with determination values (R2) for several models that consider CCI and PPP predictor variables at all levels of Educational Operational Costs (EOA), with the first alternative model.

Model	Y	Intercept	CCI winsor	PPP	R2
1	Comp. 1	-22098.80	227.36	20460.89	25.72%
2	Comp. 5	-51639.4	1453.0	11290.7	19.08%
3	Total Comp 1.5	-73738.2	1680.3	31751.6	27.24%

Based on the data recorded in Table 9 and Table 11, the conclusion that can be drawn is that the most optimal model is model 1, which is recorded in Table 9. This regression model utilizes the target variable in the form of an average of 1 component per student, with the variable predictor of CCI and PPP. This model was applied to data covering all Educational Operational Costs (EOA) levels and obtained a coefficient of determination (R2) of 31.16%. Therefore, based on this framework, the LMG method (Groemping, 2006) is used to identify the relative contribution of R2, which is then calculated as the average of the sequence of predictor variables. The results of the composite index obtained based on this relative contribution are as follows:

$$IBP = \beta_1 CCI + \beta_2 PPP$$

$$\text{ECI} = (0.42 \times \text{CCI}) + (0.58 \times \text{PPP})$$

ISSN (Online): 2961-9602

CONCLUSION

Overall, this study concludes that improvements are needed in managing Equality Education Operational Costs (EOA), especially in calculating the EOA index. More specifically, this conclusion can be explained based on the focus of the study, which will be explained as follows. From the various indicators considered, this research resulted in the developing a composite index. The index consists of the Construction Cost Index (CCI), which has previously been used in policy, and Regency/City Purchasing Power Parity (PPP), which acts as a balancing factor for the nature of the CCI. By integrating the District Welfare Index (CCI), which emphasizes the physical dimension, and Purchasing Power Parity (PPP), which focuses on the non-physical dimension, it is hoped that the composite index, namely the Education Operational Costs (EOA) index, can be more potent in presenting the variety of prices that play a role in influencing the EOA unit costs in each district/city. The test was carried out by observing the correlation coefficient and the R2 value in the regression between each indicator and the amount of expenditure per student on each component of SOA expenditure, which comes from data from the School Activity Plan and Budget Application (ARKAS). The District Welfare Index (CCI) and Purchasing Power Parity (PPP) used in preparing the EOA index have undergone a transformation using the winsorization method in order to reduce the asymmetric nature and skewness towards the right (positive skewness) inherent in these two indicators. If this transformation is not implemented, there is potential for several districts/cities with EOA indexes to reach very high numbers. It could have an impact on regional divisions as well as the capability of educational institutions to manage significant cost increases. Furthermore, this winsorization process contributes to an increase in the correlation coefficient and coefficient of determination (R2), which indicates a closer relationship between the District Welfare Index (CCI) and Purchasing Power Parity (PPP) with expenditure patterns in the educational environment.

ACKNOWLEDGEMENT

Efforts are required to determine the cost of the Equality EOA unit in order to achieve fairness in different regions. This analysis proposes a cost magnitude framework that takes into account differences in unit cost magnitudes based on geographic location. This scheme identifies EOA unit costs by considering variations in unit costs for each district/city. The EOA index calculation incorporates the District Welfare Index (CCI) and Purchasing Power Parity (PPP) without subjective evaluations. Technical term abbreviations will be explained upon initial use. This revised approach is expected to outperform the uniform (flat) scheme currently in use. The existing EOA unit cost calculation scheme references the 2021 regular SOA unit costs, which only account for CCI. Furthermore, according to the EOA index calculation, which takes into account the CCI and PPP, it is essential to re-evaluate the implementation guidelines based on the level of activity of the institution and the price increases in the region.

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Understanding the teacher's intention to use artificial intelligence for accounting learning

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Keyword

artificial intelligence, accounting learning, teacher's intention to use, perceived usefulness, extended TAM

Abstract

This research aims to analyze the factors that determine accounting teachers' intentions to use artificial intelligence in learning using the technology acceptance model (TAM) that has been developed. The research respondents were high school and vocational school accounting teachers in Semarang City, Central Java, Indonesia. 73 units of data were obtained using accidental sampling techniques. Questionnaires developed by previous researchers were used to obtain research data. SEM-PLS is used as a data analysis method. The research results indicate that only perceived usefulness can determine the level of teacher intention to utilize AI in learning. Other variables were not proven to have a significant influence. Some respondents thought that using AI was not an easy thing to do. Facilities and social support cannot encourage them to utilize AI in learning. Respondents also do not have sufficient IT competency, so they appear worried and less confident about utilizing AI in learning. The practical implication of this research is the importance of training and education for teachers so that they can utilize AI in learning because they are already convinced of the benefits of AI.

INTRODUCTION

Artificial intelligence (AI) is a technology that has developed rapidly in recent years and has made significant contributions in many fields. AI has changed several sectors and increased the accessibility of sophisticated tools used in everyday life, including education (Moura & Carvalho, 2024). In education, AI can also change society's fundamental understanding and practices of teaching and learning (An et al., 2023). AI systems are technologies that can imitate human intelligence. The education sector is no exception to the fields currently using AI through machine learning in developing and automating processes (Adelana et al., 2024). One of the most significant benefits of AI technology is that it offers solutions to problems in various areas of society. Education is one of the fields where innovative applications of AI are being used (Yilmaz et al., 2023).

Recent studies show that through the benefits provided by AI, teachers can be relieved of tedious teaching tasks such as homework correction, error analysis, personalized weakness analysis, and even basic teaching knowledge (Niu et al., 2024). Despite growing interest in AI, AI is still poorly understood in many fields (Moura & Carvalho, 2024). Despite the growing importance of artificial intelligence (AI) education at the K-12 level, a lack of teacher preparedness hinders the integration of AI in schools (Park & Kwon, 2024). Even though it has many benefits, AI technology and applications are still underutilized in teaching and learning (Zulkarnain & Yunus, 2023).

The technology acceptance model (TAM) is a theory that is widely used to understand the behavior of teachers and students in accepting and using technology. TAM is a general theoretical

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framework that explains two important factors influencing user acceptance of technology (Yu, 2024). The extended TAM model is the most frequently used theory to assess user acceptance of AI technology (Chocarro et al., 2023). In addition, the Unified theory of acceptance and usage of technology (UTAUT) model was also developed to better understand user behavior in using information technology (Emon et al., 2023). Previous researchers also used the Technology Continuance Theory, an integrative theory developed from a combination of TAM, the Expectation Confirmation Model, and the Cognitive Model for predicting the long-term usage of technological innovations (Zulkarnain & Yunus, 2023). Interpretative phenomenological analysis (IPA) is also used to understand user behavior qualitatively (Al-Mughairi & Bhaskar, 2024).

Previous studies developed extended TAM to analyze factors influencing the intention to use AI-powered ChatGPT to support metacognitive self-regulated learning (Dahri et al., 2024). They used it to explore factors influencing the acceptance of ChatGPT for English language teaching (Dehghani & Mashhadi, 2024). Other researchers enriched the TAM model to investigate various factors influencing teacher education students in information-based teaching (Ma & Lei, 2024). The TAM model, augmented with teacher data, investigates the factors influencing science teachers' use of AI (Nja et al., 2023). The TAM 3 model was developed to evaluate students' intentions to adopt AI-based robots in education (Algerafi et al., 2023).

This research analyzes the intention to use AI in accounting learning by developing the TAM and UTAUT models, adding factors such as teacher experience and IT competence. The variables developed from TAM include convenience and usefulness factors, while the variables developed from UTAUT are facility support and social influence. These four variables will be added with IT experience and competence so that they will explain the factors that determine the level of accounting teachers' intention to utilize AI.

The convenience and usefulness factors are the two main variables in the TAM model, which can determine whether someone accepts and utilizes technology in their activities (Davis, 1989; Davis et al., 1989). Teachers will use AI in learning if they think AI is easy to use. Teachers will also take advantage of AI if they think AI can be useful for improving their learning performance. Easy use of AI will further increase teachers' intentions to continue using it. The increasing benefits of using AI in learning will encourage teachers to study and use AI in learning. Previous studies have provided empirical evidence that these two TAM constructs significantly influence teacher and student intentions in taking advantage of AI. Research results show that perceived convenience and usefulness lead to greater acceptance of text-based virtual assistant chatbots (chatbots) (Chocarro et al., 2023). Perceived usefulness is significantly related to ESL elementary school teachers' continued intention to use AI technology in their teaching and learning processes (Zulkarnain & Yunus, 2023).

UTAUT was developed to understand better the factors that influence the acceptance and use of technology by adding the constructs of facilitating conditions and social influence in addition to the performance expectancy (usefulness) and effort expectancy (ease of use) factors (Venkatesh et al., 2003). Teachers will increasingly utilize AI in learning if they have supporting facilities such as the availability of gadgets (computers, smartphones, internet). Adequate facility support will make it easier and more enthusiastic for teachers to master and use AI in learning. Support factors from peers and other social environments will also encourage teachers to be able to utilize AI in learning. Fellow teachers who have utilized AI will encourage and support other teachers so they can utilize AI in learning. Empirical studies have provided evidence that facilitating conditions and social influence are significant factors in teachers' intentions to utilize AI in learning. Intention to use ChatGPT among professionals in Bangladesh is significantly influenced by UTAUT dimensions (Emon et al., 2023). Other findings also show that the UTAUT dimensions are an important factor in the intention to adopt Artificial Intelligence Tools in Education (EAIT) (Abdelmoneim et al., 2024). It was revealed that academics' BI in using ChatGPT was significantly influenced by UTAUT dimensions (Strzelecki et al., 2024).

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IT experience and competence are also important predictors of utilizing AI for learning. Teachers with sufficient IT experience will increasingly encourage them to continue utilizing AI in learning. They will not have significant difficulty utilizing AI. Likewise, teachers' competence will be a determining factor in the level of teacher intention in utilizing AI for learning. Teachers will not worry about utilizing AI because they have adequate IT competence. However, teachers with low IT experience and competence will tend to be afraid and will not dare to use AI in their learning. Research findings have indicated that IT experience and competency determine teachers' level of intention to utilize AI. Another study recommended that teachers receive more in-depth training on using AI in their practice (Moura & Carvalho, 2024). Other opinions also emphasize that teachers need more knowledge about the operation of ChatGPT as one of the most popular AIs to ensure correct use and maintain the quality of the education system (Lozano & Blanco Fontao, 2023).

METHOD

This research uses a quantitative approach (SEM-PLS model) to analyze the factors influencing teachers' intentions to utilize AI in their learning. The research respondents were accounting teachers at high schools and vocational schools in Semarang City. 73 teachers filled out the research questionnaire distributed via Google Forms. Descriptions of respondents are presented in Table 1. Respondents were mostly women or 69.86%; more were over 40 years old, or more than 85%. Based on the length of teaching, most research respondents were those who had taught for more than 20 years, or 58.80%.

The dependent variable in the research is the teacher's intention to use AI, measured by three statement items. The independent variables consist of perceived ease of use, perceived usefulness, facilitating conditions, social influence, IT experience, and IT competence. Each variable is measured with three statement items on a 5 Likert scale. The research questionnaire was developed based on the opinions of previous researchers to collect research data. The research questionnaire has been tested for validity and reliability. The data analysis method used is SEM-PLS with a model as in Figure 1 below.

Table 1. Respondent description

No.	Description	Amount	Percentage
1.	Gender		
	Male	22	30.14
	Female	51	69.86
	Amount	73	100%
3.	Age		
	Less than 30 years	2	02.74
	31-40 years	9	12.32
	41-50 years	31	42.47
	51-60 years	28	38.36
	More than 60 years	3	04.11
	Amount	73	100%
3.	Learning Experience		
	Less than 5 years	2	02.74
	5-10 years	3	04.11
	11-20 years	25	34.25
	21-30 years	37	50.68
	More than 30 years	6	0822
	Amount	73	100%

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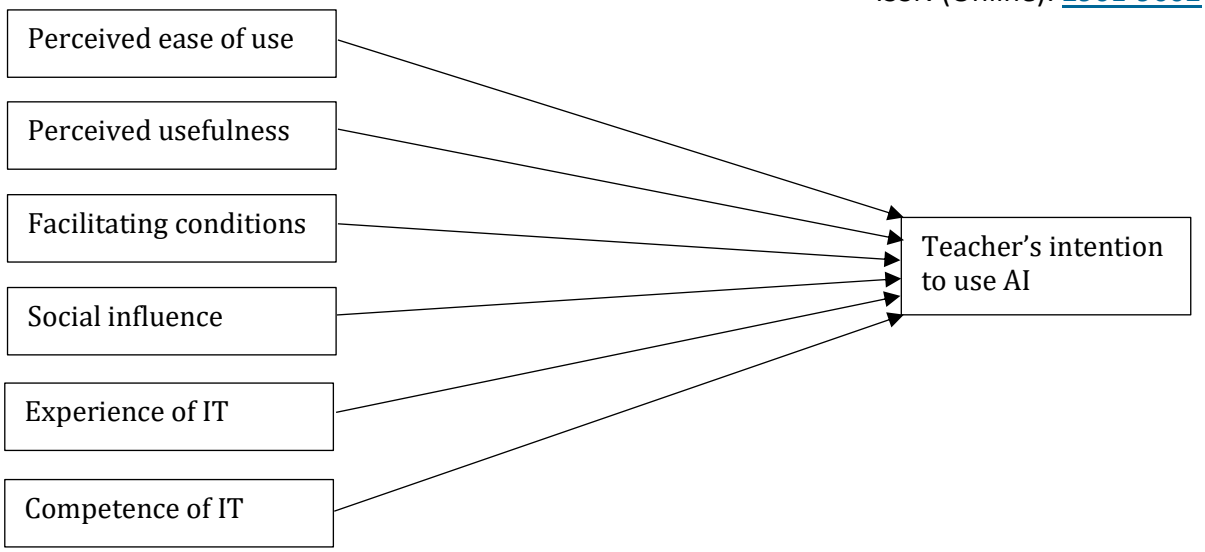

Figure 1. Research model

RESULTS

The results are presented from descriptive statistics of research variables, validity and reliability testing, model suitability, and hypothesis testing results. Table 2 shows the descriptive statistics of the research variables and indicates that the teacher's level of intention to use AI for accounting learning is in the high category. The average score is 11.19, with a maximum score of 15. Most teachers think that using AI is still not easy. The average value of the ease-of-use variable is 9.73 out of a maximum value of 15. Likewise, the teacher IT competency variable is also classified as needing improvement. The mean value is 9.26 out of a maximum score of 15.

Table 2. Descriptive statistics

No.	Variables	N	Minimum	Maximum	Mean	Std-Dev.
1.	Intention to use AI	73	3	15	11.19	2.504
2.	Ease of use	73	3	15	9.73	2.652
3.	Ease of usefulness	73	5	15	11.44	2.478
4.	Facilitating conditions	73	6	15	11.81	2.283
5.	Social influence	73	6	15	11.07	2.137
6.	Experience of IT	73	3	15	10.23	2.606
7.	Compete of IT	73	3	15	9.26	3.046

Hypothesis testing in this research is the SEM-PLS model using the SmartPLS application. The stages begin with testing the validity and reliability of the instrument, which is presented in Table 3 and Table 4; analysis of the goodness of fit test and model suitability test, which are presented in Table 5, as well as the results of the research hypothesis testing which are presented in table 6. Table 3 shows the results of outer loading and indicates that all statement items are valid. The AVE (Average variance extracted) value for all variables is more than 0.05, which indicates that all valid indicators converge in forming their respective variables. Table 4 also shows that Cronbach's alpha value for each variable is more than 0.06, so it can be stated that all variables and items used in this research meet reliability in variable measurement. Thus, the research variables have met the validity and reliability tests.

Table 3. The result of outer loading analysis

	Competence of IT	Ease of Use	Experience of IT	Facilitating Condition	Intention to Use AI	Social Influence	Usefulness
Compete1	0.922						

ISSN (Online): 2961-9602

	Competence of IT	Ease of Use	Experience of IT	Facilitating Condition	Intention to Use AI	Social Influence	Usefulness
Compete2	0.926						
Compete3	0.837						
Ease1		0.925					
Ease2		0.919					
Ease3		0.927					
Exper1			0.902				
Exper2			0.922				
Exper3			0.814				
Facil1				0.946			
Facil2				0.939			
Facil3				0.803			
Intention1					0.932		
Intention2					0.958		
Intention3					0.948		
Social1						0.829	
Social2						0.838	
Social3						0.823	
Usef1							0.896
Usef2							0.956
Usef3							0.937

Table 4. The result of construct reliability and validity analysis

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Competence of IT	0.876	0.88	0.924	0.803
Ease of Use	0.914	0.919	0.946	0.853
Experience of IT	0.86	0.919	0.912	0.775
Facilitating Condition	0.878	0.894	0.926	0.807
Intention to Use AI	0.941	0.944	0.962	0.895
Social Influence	0.778	0.793	0.869	0.689
Usefulness	0.922	0.93	0.95	0.865

The next analysis tests goodness of fit by looking at the R-square and adjusted R-square in Table 5 below. The R-square value (coefficient of determination) of the intention to use the AI variable is 0.707, which means that the independent variable in this study can explain the intention to use the AI variable by 70.70%. Table 5 also shows the results of the model suitability test by looking at the Q^2predict score, RMSE (root mean square error), and MAE (mean absolute error). The Q^2predict value is 0.663 or more than 0, which means the research model has a relevant predictive model. The RMSE score is 0.592 and is quite close to 0, so the model in this study is quite suitable.

Table 6 shows the results of the research hypothesis testing and indicates that only the usefulness variable positively and significantly influences the intention to use AI. The P value is 0.000 with T statistics of 9.016 and a path coefficient of 0.639. The P-value of the other variables

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is more than 0.05, which means it is not proven to have a significant effect on the intention to use AI.

Table 5. The result of r-square and q-square analysis

	R-square	**R-square adjusted**	
Intention to Use AI	0.707	0.691	
	Q^2predict	**RMSE**	**MAE**
Intention to Use AI	0.663	0.592	0.451

Table 6. Path coefficient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Competence of IT -> Intention to Use AI	-0.069	-0.074	0.095	0.731	0.465
Ease of Use -> Intention to Use AI	0.128	0.128	0.106	1.206	0.228
Experience of IT -> Intention to Use AI	0.087	0.098	0.116	0.749	0.454
Facilitating Condition -> Intention to Use AI	0.041	0.035	0.08	0.515	0.606
Social Influence -> Intention to Use AI	0.103	0.11	0.076	1.364	0.172
Usefulness -> Intention to Use AI	0.639	0.628	0.071	9.016	0.000

DISCUSSION

The research results provide empirical evidence that only perceived usefulness can influence teachers' intentions to utilize AI in their learning. These results support the TAM and UTAUT models, which confirm that perceived usefulness will influence users' future use of technology. Accounting teachers in Semarang City high schools and vocational schools believe that using AI in learning will improve their performance. Therefore, they will continue to use AI in learning. The benefits of AI in learning are numerous and can increase student interaction and involvement in learning. The learning designs they create will be more diverse and enjoyable for students. Teacher performance in learning will improve by utilizing AI.

The research results align with previous findings, which found a significant influence of perceived usefulness on teachers' intentions to use AI in learning. Previous findings show that perceived usefulness leads to greater acceptance of text-based virtual assistant chatbots (chatbots) (Chocarro et al., 2023). Perceived usefulness is significantly related to ESL elementary school teachers' continued intention to use AI technology in their teaching and learning processes (Zulkarnain & Yunus, 2023).

The findings in this study cannot prove the TAM and UTAUT models. The experience and IT competency factors were also not proven to have a significant effect. Judging from the respondents' descriptions, it is known that most respondents are teachers with more than 20 years of teaching experience, and most are more than 40 years old. High teaching experience does not prove that teachers can adopt AI developments in learning. Mature age does not encourage teachers to learn creatively by utilizing AI. They consider using AI to be an activity that is not easy to do. This is proven by the average perceived ease of use variable, which is quite low.

These results do not support previous findings, which indicate a significant influence of IT experience and competence on teachers' intention to utilize AI in learning. Empirical studies confirm that facilitating conditions significantly influence teachers' and students' behavioral

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intentions to use AILP (Xiaohong et al., 2024). Another study found that social influence positively predicts behavioral intention (An et al., 2023). In addition, the same results were also obtained in other studies that show that social influence had a significant and positive effect on behavioral intention (Milicevic et al., 2024).

Previous research shows that successful implementation of Education 4.0 requires significant investment in infrastructure and resources to support integrating new technology into the Education system (Mohamed & Ahmad, 2023). Another opinion recommends the importance of digital literacy at all levels of education to overcome ChatGPT disruption in education (Lozano & Blanco Fontao, 2023). A good understanding of AI will help them make optimal use of ChatGPT so that it can become a tool that supports the learning process rather than being an obstacle. In addition, continuous training and adequate resources are also needed to ensure that all stakeholders can adapt quickly to technological changes.

CONCLUSION

This study attempts to analyze teachers' intentions to utilize AI in accounting learning by combining the TAM and UTAUT models added with experience and competence of IT variables. The results of the analysis indicate that only performance expectancy positively and significantly influences teachers' intentions to utilize AI in learning. High school and vocational school accounting teachers in Semarang City think using AI will improve their learning performance and encourage them to continue using AI. They will try to improve digital competence and literacy to use AI better.

This research failed to support the TAM and UTAUT models, with the dimensions of these two models not being proven to determine teachers' intentions to utilize AI in accounting learning. The convenience factor does not have a significant effect because the use of AI in education is still considered a job that is not easy. Likewise, the factors of supporting facilities and social influence cannot increase teachers' intentions to utilize AI in learning, which is still considered new and requires time to be studied further.

The recommendations that can be given in this research are increasing IT competency and digital literacy so that teachers can reduce their concerns about difficulties in utilizing AI. Training and workshops can be carried out on an ongoing basis, accompanied by assistance for teachers to make better use of AI in learning. Future research can also apply the latest models, such as technology continuation theory, to capture the latest findings about teacher behavior and utilize AI in learning. Many types of AI can be used in learning.

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THE INFLUENCE OF A COOPERATIVE LEARNING MODEL OF TEAM GAMEES TOURNAMENT (TGT) TYPE ON MATHEMATIC CRITICAL THINKING ABILITY THROUGH A SAINTIFIC APPROACH TO STATISTICAL MATERIALS

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Keyword
TGT type Cooperative Learning, Critical Thinking Ability, Statistics

Abstract

This research was conducted on class This study is quantitative research. The data obtained in this research is from the initial test (pretest) and final test (posttest) by taking samples from class X3 as the experimental class and X5 as the control class. The data analysis techniques used are normality test, homogeneity test and hypothesis test. In the decision making criteria for the Mann Whitney U-Test, it is said that if the value of Asymp.Sig. (2-tailed) < 0.05 then H_o is rejected and H_a is accepted. In this study Asymp.Sig (2-tailed) was less than 0.05 (0.034 < 0.05). So H_o is rejected and H_a is accepted. So it can be concluded that using the team games tournament type cooperative learning model can influence students' critical thinking abilities in statistical material.

INTRODUCTION

Human resources are the main key for a nation to continue to develop. Therefore, to make Indonesia's human resources quality, action is needed to improve this quality from an early age. One important aspect in order to improve the quality of human resources is education. Education is an investment in human resources, where increasing skills and abilities is believed to be a supporting factor in human efforts in living life. Education is one step to prepare the nation's sons and daughters so they can compete in the future era of globalization and digital (Lestari, 2019).

Improving the quality of education must start from the formal and non-formal education levels. Formal education is a structured and tiered educational path consisting of basic education, secondary education and higher education. Non-formal education is an educational path outside formal education that can be implemented in a structured and tiered manner. Improving the quality of education in an educational unit is an action taken by an educational unit to improve the results of educational implementation, so that it is in accordance with the direction of educational policy that has been established through increasing the effectiveness and efficiency of the educational processes and activities carried out. The important role of education can be a learning experience where a person learns about various aspects of life, understands different perspectives and tries to apply them in everyday life (Santoso, 2012). Education also has an important role in various fields to develop human resources and technology.

One field of science that has an important role in the development of human resources and technology is mathematics. Mathematics is an important subject, because this lesson is

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very close to everyday life. Apart from that, by studying mathematics a person gets used to thinking systematically, scientifically, logically, critically, increasing their creativity. This agrees with Ahmad Susanto's view, that "mathematics is a science that can improve thinking and reasoning abilities, contributing to solving daily problems and in the world of work" (Safitri, 2020). There is a lot of material in mathematics subjects. One of the materials in mathematics is statistics.

Statistics is a science that was originally used to collect and present data in a way that is easier to understand and has informative properties (Rahmawati, 2020). The aim of learning statistics is so that students can understand how to obtain data, determine the type and size of data, check, round and arrange data to solve problems. The basic competencies that must be achieved include: (1) Reading data in the form of tables and bar, line, circle and ogive diagrams; (2) Presenting data in the form of tables and bar, line, circle and ogive diagrams and their interpretation, (3) Calculating the size of concentration, size of location and size of data distribution, as well as their interpretation. However, there are still many students who have difficulty determining the elements that are known and those that are being asked about, making examples, determining formulas, and making conclusions.

Based on the results of Rosiyanti's research (2022), students still have difficulty working on statistics questions. The difficulties faced by students are the difficulty of understanding and applying the mean, median, mode and difficulty in applying the mean, median and mode formulas to data presented in tabular form. The cause could be due to several factors, for example teachers who do not master the concepts so that the material presented is lacking, students' interest in learning mathematics is lacking, and another cause is a lack of educational resources for learning mathematics. The factors that influence student difficulties are part of the learning process.

Learning is a teaching and learning process created by teachers to grow and develop students' insight, creativity and mindset about science. Learning strategies have three important aspects, namely techniques, methods and approaches (Fahrul, 2023). Apart from that, learning also contains various interconnected components, namely teachers, students, methods, objectives, materials, learning media, and evaluation. Interactions between teachers and students must be carried out fairly. Teachers must provide opportunities for students to communicate and express their opinions. However, in reality, the learning carried out currently is mostly centered on educators, so that students are less active in learning activities in class, especially when learning mathematics. The quality of learning in Indonesia is still very low when compared to the quality of learning in other countries. The main causes are the low quality of teachers and student achievement as well as inadequate facilities and infrastructure. The lack of use of various learning models and the use of interesting media when learning mathematics in class also hinders students from creating a spirit of cooperation and responsibility when learning mathematics. Student participation, which is still low, is a problem that needs to be resolved to encourage students to be more active in learning activities in class.

To overcome the problem of low learning quality, it needs to be resolved so that the quality of learning can improve. One step that can be taken is to implement a creative and innovative learning model so that it can encourage students to be proactive. A learning model is a framework that provides a systematic description for implementing learning to help students learn in certain goals to be achieved (Fahrul, 2023). There are many learning models that are applied, including discovery learning models, problem based learning models, project based learning models, inquiry based learning models, and cooperative learning models. From the learning model currently implemented, the cooperative learning model can provide opportunities for students to express their opinions and students can learn in groups. Cooperative learning is a learning model where students learn and work collaboratively in

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small groups consisting of 4 to 5 students with a heterogeneous group structure. The cooperative learning model provides opportunities for students to use questioning skills and discuss problems, allows students to more intensively conduct investigations regarding a case or problem, develops leadership talents and teaches discussion skills, and students participate more actively in discussions. In cooperative learning, there are various types of models that can be applied, including jigsaw, think pair share, STAD (student team achievement division), group investigation, make a match, listening team, and TGT (Team Games Tournament), (Safitri, 2020). One type of cooperative learning that is fun and can shorten teaching and learning activities is the Team Games Tournament (TGT) cooperative model.

Team Games Tournament (TGT) is a type or cooperative learning method that is easy to implement and involves the activities of all students without needing to differentiate their status, related to student abilities. The role is as a peer instructor and contains elements of play (Sandra, 2022). The TGT type cooperative learning model is a cooperative learning model that is easy to implement and involves all students without any differences. This type involves the role of students as peer instructors, contains game elements that can stimulate enthusiasm for learning. Learning activities are designed using the TGT type learning model to help students learn in a fun atmosphere, while still prioritizing a sense of responsibility, honesty, cooperation, healthy competition and student participation in learning.

Teachers in the learning process need to prioritize personal experience through the process of observing, asking questions, reasoning, and trying to increase students' creativity. Apart from that, it also familiarizes students with working in teams through cooperative learning. One approach that is considered relevant is the scientific approach, because the scientific approach learning stage is designed in such a way that students are active in learning, including actively constructing concepts, laws or principles through the process of observing, asking questions, gathering information, associating and communicating concepts, laws or principles. found (Ramadhana, 2016).

In the scientific approach, teachers no longer simply deliver material by lecturing, but instead the teacher acts as a facilitator and motivator, and invites students to be active in learning. Learning using the scientific method has the following characteristics Ramadhana (2016): (1) Centered on students. (2) Involves scientific process skills in constructing concepts, laws or principles. (3) Involves cognitive processes that have the potential to stimulate intellectual development, especially students' higher-order thinking skills. (4) Can develop students' character and ability to think critically mathematically.

Learning with a scientific approach also has a good influence on critical mathematical thinking skills (Indriani, 2020). Thinking skills improve students' understanding of concepts, reasoning, and critical and creative thinking skills. One of the thinking skills is mathematical critical thinking. Mathematical critical thinking ability is a process of processing information that involves knowledge, reasoning and mathematical proof so that it can solve a problem, especially in mathematics learning. Critical thinking in mathematics learning can minimize the occurrence of errors when solving problems, so that the final result will be a solution with the right conclusion. Every individual needs critical thinking skills to successfully solve problems in difficult situations. The difficulty of critical mathematical thinking skills is also experienced by students at Kedungpring Unity High School. From the results of the researcher's observations and interviews with one of the mathematics teachers at Kedungpring Union High School, it was found that students' mathematical critical thinking skills were still relatively low and students were less active in the learning process. Based on the description of the problem above, researchers are interested in examining the influence of the team games tournament (TGT) type cooperative learning model on mathematical critical thinking skills through a scientific approach to statistical material.

ISSN (Online): 2961-9602

METHOD

This research uses quantitative research. Quantitative research is a method used to test certain theories by examining the relationships between variables. The research method used by researchers in this research is the experimental research method. Experimental research methods are research used to find the effect of certain treatments (Arifin, 2017).

The experimental design used in this research is a quasi experimental design. The purpose of choosing this design is to determine the effect of the team games tournament type cooperative learning model on students' mathematical critical thinking abilities through a scientific approach. The design form of this research is The Nonequivalent Pretest-Posttest Control Group Design, namely a design that provides a pretest before being given treatment, and a posttest after being given treatment in each class.

In this design, the researcher made observations in two classes, namely the class that was treated with the team games tournament type cooperative learning model or referred to as the experimental class and the class that was treated with the conventional learning model or referred to as the control class. Furthermore, in this design, before being given treatment, both classes are given a pretest with the same test, to determine the initial abilities of the two classes.

Then, the experimental class was given treatment, namely using a team games tournament type cooperative learning model. Meanwhile, the control class uses a conventional learning model. After each was given treatment, the researcher then gave a posttest to both classes, to measure students' mathematical critical thinking abilities after following the learning process, as well as comparing the results of the initial test and final test, whether there was an influence or not on students' mathematical critical thinking abilities.

RESULTS

Pretest and posttest data were taken to see the initial and final results of student learning as a whole with the aim of seeing initial and final abilities between the control class and the experimental class. The following are the pretest and posttest results of experimental class students:

Table 1. Frequency Distribution of Pretest and Posttest Results in Experimental and Control Classes

Nilai	Eksperimen		Kontrol	
	Pretest	*Posttest*	*Prestest*	*Posttest*
20 – 30	5	-	7	-
31 – 40	4	-	8	-
41 – 50	9	1	6	13
51 – 60	6	14	3	7
61 – 70	5	12	5	3
71 – 80	-	2	-	6

Based on the calculation results in table 4.11 above, it was found that the experimental class pretest had the highest score range for 9 students out of 29 students with a score range of 41-50. Meanwhile, the lowest value range was for 4 students out of 29 students with a range of values. In the experimental class posttest, it was found that the highest score range was 14 students out of 29 students with a score range of 51-60. Meanwhile, the lowest score range was 1 student out of 29 students with a score range of 41-50.

Meanwhile, the control class pretest had the highest score range for 8 students out of 29 students with a range of 31-40. Meanwhile, the lowest score range was for 3 students with a score range of 51-60. In the control class posttest, it was found that the highest score range was 13 students with a score range of 41-50. Meanwhile, the lowest score range was 3 students with a score range of 61-70.

ISSN (Online): 2961-9602

In this research, hypothesis testing was carried out using the Mann Whitney U-Test. The following are the results of the Mann Whitney U-Test calculation of the posttest results for the experimental class and control class:

Table 2. Mann Whitney U-Test Hypothesis Test

Hasil Kemampuan Berpikir Kritis	*Mann-whitney U*	*Wilcoxon W*	Z	*Asymp. Sig. (2-tailed)*
	285.000	720.000	-2.115	0.034

In the Mann Whitney U-Test decision making criteria it is said that if the Asymp. Sig. (2-tailed) < 0.05 then H_o is rejected and H_a is accepted. It can be seen in table 4.18 that the value of Asymp. Sig. (2-tailed) in this study was less than 0.05 (0.034 < 0.05). So H_o is rejected and H_a is accepted. So it can be concluded that using the team games tournament type cooperative learning model can have an effect on increasing students' critical thinking skills in statistical material.

DISCUSSION

The team games tournament type cooperative learning model can be applied to mathematics learning in class In team games tournaments, students play games with other team members to get scores for their respective teams. The game is structured in the form of a quiz in the form of questions related to the subject matter written on cards attached to the blackboard.

At the first meeting, the researcher gave a pretest in the experimental class and control class with students working on five questions that had been prepared by the researcher. This was done to collect value data that shows students' initial abilities in mathematical critical thinking skills related to statistical material (quartile and interquartile range).

At the second meeting, the researcher conducted classroom learning regarding statistical material (quartile range) using a team games tournament type cooperative learning model in the experimental class and using a conventional learning model in the control class. When this learning model was applied, students responded less enthusiastically and also did not accept the application of the team games tournament type cooperative learning model. This is influenced by the habits of students who still receive the lecture learning model applied by the teacher. Students tend to be less active in the learning process.

At the third meeting, researchers conducted classroom learning regarding statistical material (interquartile range) using a team games tournament type cooperative learning model in the experimental class and using conventional models. When this learning model was implemented, students responded well and were enthusiastic about implementing a learning model that was different from what they usually received. As learning progresses, students slowly begin to adapt to the team games tournament type cooperative learning model and begin to actively follow several learning steps in a good and orderly manner. The steps in team games tournament type cooperative learning begin with student activities in solving initial problems given by researchers regarding the learning material to be studied, providing games in the middle of learning and ending with presenting and giving awards for the results of student discussions.

In the first stage of the team games tournament type cooperative learning model, the researcher explains the objectives, appreciation and motivation of students regarding the material to be discussed. At this stage, students are also given a problem related to statistical material (quartile and interquartile range). Researchers asked students to observe and also solve problems and then discuss them together. Providing a problem at the beginning of learning aims

ISSN (Online): 2961-9602

to stimulate students to start learning and foster students' curiosity about the material to be studied (quartile and interquartile range).

The second stage is organizing students to study. At this stage students are divided into 6 groups consisting of 4-5 students. Researchers provide learning media to be discussed with each group. Next, the researcher asked each group member to work on the questions provided in turns for a duration of 3 minutes. Providing learning media aims to introduce students to learning in a fun way and students can be more active in the learning process. This is in line with the opinion of Novia (2023) that providing learning media for academic games is more interesting and stimulates student activity but still matches the characteristics.

The third stage is guiding the group to work and study. In this third stage, students are required to discuss the question with their group. The researcher instructed students to understand the results of their respective group discussions.

The fourth and final stage of team games tournament type cooperative learning is that the researcher and the students conclude and evaluate the problem solving in learning media and the results of the work done by the students and give awards to the group that has the highest score.

After being given treatment by applying the team games tournament type cooperative learning model for 2 meetings, students were then given a posttest to see the increase in students' mathematical critical thinking skills in the experimental class and control class. From the results of the posttest data analysis of critical thinking skills, it shows that 14 out of 29 students who were taught using the team games tournament type cooperative learning model got a higher score range, namely 51 -60, compared to the score range for students taught using the conventional learning model, namely 13 students out of 29. students got a score range of 41 – 50. This shows an improvement and is reinforced by the results of the u-test. The results of the u-test are Asymp. Sig. (2-tailed) less than 0.05 (0.034 < 0.05). So H_o is rejected and H_a is accepted. So it can be concluded that using the team games tournament type cooperative learning model can have an effect on increasing students' critical thinking skills in statistical material.

Based on the description above, the team games tournament type cooperative learning model provides a positive influence on the development of students' critical thinking skills compared to using conventional learning. This is in line with the results of research conducted by Hanafi (2022) that the TGT learning model has a positive impact in improving students' critical thinking abilities.

CONCLUSION

Based on the research results, data analysis, and discussion in the previous chapter, it can be concluded as follows: (1) The critical thinking abilities of students in the experimental class using the team games tournament type cooperative learning model for 4 students out of 29 students had a score range of 51–60. This value range is higher when compared to the value range before the team games tournament type cooperative learning model was applied, namely 9 students out of 29 students with a range of 41 – 50. Meanwhile, the mathematical critical thinking skills of students in the control class used conventional learning models in 13 students out of 29 students have a score range of 41–50. 8 students out of 29 students had a score range of 31–40 before using the conventional learning model. (2) The team games tournament type cooperative learning model has an effect on increasing students' critical thinking abilities. This can be seen from the critical thinking abilities of students who are taught through learning using the team games tournament type cooperative learning model which is higher than students who are taught using conventional learning models.

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FINKNIGHT: An Educational Game for Character Building in Financial Literacy, Tax Compliance, and Charitable Acts

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Keyword

innovative, educational game, financial literacy, tax, charity, interactive learning

Abstract

Financial literacy, which is the basis for a person's financial behavior, is very important to instill in everyone. The reality shows that people already understand financial literacy, but only a few understand and apply it. Therefore, the development of educational games is necessary to help people to understand them in depth and apply them. FINKNIGHT is an innovative educational game designed to instill financial literacy skills and cultivate character traits related to financial management, tax compliance, and philanthropy. Through immersive gameplay, players are immersed in a virtual board where they must navigate financial challenges, fulfill tax obligations, and engage in charitable acts. By making decisions within the game environment, players learn the fundamentals of budgeting, saving, investing, and tax planning, while also understanding the ethical and social dimensions of financial behavior. FINKNIGHT integrates interactive scenarios, quizzes, and simulations to provide hands-on learning experiences that promote critical thinking and responsible decision-making. By gamifying financial education, FINKNIGHT aims to empower players with the knowledge, skills, and values necessary to achieve financial well-being and contribute positively to society. On the result, a tool called FINKNIGHT is a good tool which means that it can help people, especially students, in the learning financial literacy.

INTRODUCTION

Character-driven behavior is a crucial aspect in the development of individuals who contribute positively to society. One of important dimension in building one's character regarding finance is financial literacy, awareness of tax obligations, and participation in acts of charity. Financial literacy includes an understanding of personal financial management, investment, debt management, and smart financial decision-making. Awareness of tax obligations is a commitment to fulfill tax obligations in accordance with applicable laws, while charitable actions include social contributions for the welfare of society. Both of these forms of smart financial decision-making in financial literacy.

Currently, only a few young people are aware of the importance of financial literacy. This is supported by the data released on the OJK website about the financial literacy survey in 2022 of 49.68%, including only 16.42% of the financial literacy index at the age of 20-29 years spread throughout Indonesia. These index numbers can be interpreted that knowledge and understanding of financial literacy is still very much needed. Many cases in the news and articles present cases of young people who are involved in online loan cases. One reason for this is the lack of understanding of financial literacy. In addition, there are many other cases related to the lack of understanding of financial literacy. In order to improve the financial literacy index, it is necessary to introduce and socialize it continuously. The low financial literacy index is at the age

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of 20-29 years, where students are included in the age group. Therefore, it is necessary to educate students. One form of interesting education can use interesting learning media.

Learning media is defined as a tool used to convey messages or learning materials with the aim of facilitating and improving the effectiveness of the teaching and learning process (Arifin, 2017). Learning media includes various types of tools and resources used to facilitate the learning and teaching process. This media can help convey information, teach skills, and improve understanding. Learning media refers to a variety of tools, sources, and technologies used to convey information, facilitate learning, and support the teaching process. It helps convey subject matter to students, increases engagement, and makes it easier to understand complex concepts. The characteristics of learning media are conveying information, supporting the learning process, interactive and engaging, variety and diversity (Ruswandi & Badarudin, 2018). Learning media plays an important role in modern education by providing various ways to convey information and help students understand the material in a more effective way. Appropriate use of media can increase student engagement, facilitate understanding of concepts, and support the achievement of learning objectives.

Learning media as an interactive resource includes various tools and technologies that enable students' active involvement in the learning process. Interactive learning media are tools and technologies that allow users to interact directly with learning content. It not only conveys information but also engages students in activities that encourage exploration, experimentation and reflection. Interactive learning media plays an important role in modern education by offering a more dynamic and responsive learning experience. Interactive media are tools or resources that allow students to interact directly with the subject matter, thus creating a more active and effective learning experience. This media can be software, applications, or digital tools that allow content manipulation and real-time feedback (Miarso, 2014). Interactive media in a learning context includes all forms of media that provide interaction between the user and the learning material. This includes computer simulations, educational games, and learning applications that allow students to actively participate in the learning process (Arsyad, 2015).

One of the learning media as an interactive resource is educational games. Educational games are a type of game that has learning objectives as part of its design. It is designed to help players learn new knowledge or skills through fun and interactive activities. Educational games use game elements such as challenges, points, levels and feedback to achieve educational goals. Educational games are games designed to fulfill learning objectives by embedding game elements, such as interactive scenarios and feedback, to increase learner engagement and understanding (Kapp, 2012). Educational games are divided into two, namely learning games as games designed to teach certain skills or concepts. The second is simulation games as games that mimic real situations to enable experimentation and learning.

Educational games are games that integrate learning objectives with game elements, such as rules, challenges and feedback. They aim to facilitate learning in an engaging, motivating and interactive way, enabling learners to learn new concepts, improve skills and reinforce their knowledge in a fun context. The characteristics of educational games are that they have learning objectives. Educational games have clear learning objectives and are integrated in the game mechanics. Next is interactivity, which allows players to interact directly with content, overcome challenges, and solve problems. Third is feedback, which provides feedback that helps players understand their progress and correct mistakes. Fourth is motivation and engangement by using game elements such a points, levels, and challenges to players and increase engangement (Rusman, 2017).

In today's digital era, educational approaches using technology, especially educational games, have become an attractive alternative in introducing and internalizing complex concepts to the younger generation. Educational games offer an interactive, entertaining and motivating learning experience, thus changing attitudes and behaviors in a fun and effective way.

ISSN (Online): 2961-9602

This research aims to explore the potential of educational games as a tool for character building through learning financial literacy, tax compliance, and charitable action. With a focus on the development of educational games, this research will also map how educational games can provide improvements in participants' attitudes, values, and behaviors related to these three dimensions.

Previous studies have shown that the use of games in educational contexts can increase learning engagement, strengthen concept understanding and encourage practical application in everyday life. However, few studies have specifically explored the development of educational games relating to character building in relation to financial literacy, tax compliance and charitable acts simultaneously.

Thus, this research is expected to make a significant contribution to the literature on the development of educational games in character education related to important aspects of financial and social life. The implications of this research are expected to inform the development of character education through digital technology, providing practical guidance for game developers, educators, and policy makers to design more effective and sustainable educational strategies

METHOD

This research is a type of research and development. Research and development is one of the means for researchers in formulating the media to be developed so that the resulting product can be applied or implemented according to its usefulness. Leedy & Ormrod (2015) explain research and development is a systematic process that involves research to discover new knowledge and development to apply that knowledge in new products, processes, or systems. In the context of education and instructional design, R&D is often used to develop and evaluate new materials, methods, and technologies to improve the learning process. ADDIE is a model often used in instructional development and learning design. It provides a systematic framework for designing, developing, and evaluating learning materials. ADDIE is an acronym consisting of five main stages: Analysis, Design, Development, Implementation, and Evaluation. The existence of this model can be used for various forms of product development in the learning process such as learning strategies, learning methods, learning models, learning media and teaching materials (Dick et al., 2015). In this study, it is only limited to the development stage so that the product development is carried out up to the feasibility test from material experts and media experts.

- **Analysis**
  It aims to determine training or learning needs, analyze audiences, and identify learning objectives by collecting data on audiences and their needs, analyzing learning objectives and desired outcomes, and assessing the learning context and available resources. The output of the analysis is a needs analysis report, learning objective specification, and audience profile.
- **Design**
  Aiming at designing learning structure and content in accordance with the identified needs and objectives with the form of activities to outline learning materials, determine teaching strategies, methods, and media to be used, develop an assessment plan to measure the achievement of learning objectives, the outputs of the design are design plans, learning scenarios, and storyboards.
- **Development**
  Aiming at designing learning structure and content in accordance with the identified needs and objectives with the form of activities to outline learning materials, determine teaching strategies, methods, and media to be used, develop an assessment plan to measure the achievement of learning objectives, the outputs of the design are design plans, learning scenarios, and storyboards.
- **Implementation**

ISSN (Online): 2961-9602

It aims to disseminate learning materials to the audience and implement the training or teaching plan by organizing and running training or learning sessions, providing technical support and assistance to participants, and conducting training for teachers or facilitators if needed. The outputs of implementation are the execution of the learning program, documentation of the process, and initial feedback from participants.

- **Evaluation**
  It aims to assess the effectiveness of learning materials and processes, and make continuous improvements by collecting and analyzing data on the success of the program, including feedback from participants and evaluation results, assessing the achievement of learning objectives and the effectiveness of teaching methods, and making revisions based on evaluation results to improve future programs. The output of the evaluation is an evaluation report, recommendations for improvement, and revised learning materials.

The ADDIE sequence and instrument grids of this research procedure adopt the ADDIE development model. Researchers decided to choose the ADDIE development model because this type of research is in accordance with the needs of researchers to be able to achieve a predetermined goal. The stages of implementing the ADDIE development model have a relationship between one step and another. Therefore, the use of this model needs to be implemented gradually and thoroughly to ensure the creation of an effective product. This development research procedure uses the ADDIE model, but this research stops at the development stage which will be continued at the implementation and evaluation stages. The following table includes steps and descriptions of activities in each development model:

Table 1: ADDIE stages

Analysis Conduct an analysis of learning activities and needs analysis of educational game-based learning media.	Analyze the problems of learning activities to find out and classify the problems faced in order to improve students' abilities.
Design Determine a design and choose the right model by looking at the design side, the concept side and creativity to support learning activities.	1. Designing an educational game design to facilitate design. 2. Preparation of the design of the design in the form of educational games.
Development Produce and validate the development of educational game-based learning media based on the initial design that has been made.	1. Educational game learning media creation 2. Feasibility test through validation from experts in terms of purpose, design, concept and creativity.

The testing procedure in this study was carried out with 2 tests, namely White-Box Testing, testing the buttons on the system and Black-Box Testing, testing the functions or processes that occur in the system. The data analysis technique that will be used in this research is quantitative data analysis technique. The data is obtained from the results of filling out a set of instrument tools in the form of a questionnaire given to experts to assess the feasibility of the developed system, then the data obtained is analyzed using the formula from McCall's quality to obtain the results of the feasibility test that has been determined into the feasibility category. The measurement scale used in this research is the Likert scale. Likert scale is a measurement method used to measure a person's opinion about social phenomena (Dewi, 2012). The measurement scale used can be seen in Table.

Table 2: Likert Scale

Category	Score
Very Good	5

ISSN (Online): 2961-9602

Good	4
Fair	3
Poor	2
Very Poor	1

Source: Purwanto, 2012

Furthermore, from the five categories, a scale is made. The division of the scale is done by paying attention to the location of the number range (Arikunto, 2015). So that the maximum expected condition is 100%. From this maximum condition, it is made so that each category has a percentage range between 1% value and 100% value divided equally so as to produce a system feasibility category as shown in the following table:

Table 3: System Feasibility Categories

Category	Score in Percentage
Very Feasible	81%-100%
Feasible	61%-80%
Fair	41%-60%
Poor	21%-40%
Very Poor	>21%

Source: Purwanto, 2012

RESULTS

Preliminary Study Stage

The initial stage in this research is to review relevant concepts and theories. Based on the literature review that has been conducted, there are several previous studies that examined learning media. Mustafa (2021) explains that learning media is a tool that plays an important role in stimulating students' attention, activeness, and interaction during the learning process. The forms of learning media that can be used by teachers are video, audio, games, and so on. With an interesting presentation, the use of the above media will certainly increase the attention of students in listening to the subject matter being followed.

Seeing the importance of learning media, it is necessary to develop it so as to create interactive media for students. As stated by Ali (2009), interesting and interactive learning media will give a positive and meaningful impression of the learning done by students. This is because, they experience directly each learning process which ultimately increases their understanding of the subject topics discussed. Of the several forms of learning media, one that is interesting and can be developed is games. As is known, there are many types of games to support learning activities, some are based on mobile applications, websites, to physical objects.

Of the three types above, the most commonly used and quite simple to develop are games with physical objects, one of which is board games. Board game is a set of games with tools and parts that are placed, moved, moved and placed on a flat surface that has been marked and equipped with certain rules (Erlitasari, et al: 2016). In relation to learning media, board games are made according to the subject topics that students are studying. Currently, the relevant and applicable subject for board game media is economics. This is because economics covers topics that are very close to the lives of students and requires all of them to have practical skills. Therefore, the purpose of this research is to develop board game-based learning media on economics material, specifically for the topics of investment, taxes, and money.

Product drafting stage

At the product draft stage, the main purpose of making and developing board game learning media is to create interactive and more interesting economic learning for students. Researchers gave the name for this board game as FinKnight which stands for "Fin", which is "Financial" and "Knight" which means knight. When combined, the meaning of this learning media is a financial

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knight. This naming is not without reason because in the game, players or in this case focused on students, they must be able to strategize to achieve each existing mission. This board game design adopts the concept of a horse game in chess, where the player will move the horse pawn with the letter "L" rule to enter certain boxes so as to reach the finish and targets that have been set.

The FinKnight game can be said to be quite simple because it only uses a chessboard for the game. However, there is a slight modification to the checkerboard pattern, where the color is made brighter with a yellow-red combination, and a number of money is added along with the currency logo, including Rupiah, Euro, Pounds, US Dollar, Rupee, and Zimbawe Dollar. Thus, there are provisions regarding the exchange rates of these foreign currencies against the Rupiah. Not only that, there are several special boxes that players can go through, namely investment, tax, alms, and expenses.

FinKnight also comes with several cards to play with, including Question Card, Investment Card, Tax Card, and Charity Card. First, the Question card, which contains questions about economic and accounting learning that can also be adjusted to the learning topic being studied. The purpose of this card is to hone the player's knowledge of economic learning as well as being a learning evaluation tool related to certain material topics. Then the second, Investment Card, this card is divided into two, the first contains news related to the condition of companies that go public, as it is known that news is one of the signals for investors to consider their investment decisions. The news card on the Investment Card can be selected randomly by the player, then after reading the card the player can make his investment decision, either investing with a small nominal or interested in investing a large nominal. The results of the investment are found on the second card which contains the companies listed in the initial news. This card contains the percentage of profit or loss experienced by the player as a result of the investment that has been made. The purpose of the Investment Card is to provide education for students about the importance of investment and the analysis process so that they can make a profit.

The next card is the Tax Card, which contains a thank you for fulfilling tax obligations with a certain nominal amount paid by the player as the responsibility of a good citizen. The tax is determined progressively, so the more money the player has, the greater the percentage of tax that must be paid. The tax percentage is set from 5% to 35%. Finally, there is a Charity Card, this is a card that contains an invitation to set aside some of the money that has been collected by the player to then be donated by 10%, or in this concept it is the same as tithing. This instills in students the character to share and not just focus on cultivating as much wealth as possible.

FinKnight can be played in two modes, solo and versus. For solo mode, the game is played by one player and only uses half of the board. While versus mode is played by two players and uses the entire board. Regarding the rules and targets of the game, solo mode and versus have one difference, namely versus mode allows capturing/ taking each other's opponents. The rest of the time, the way to play from both modes remains the same.

The game can start from the first row of squares on the chessboard. The square is freely chosen by the player as long as it remains on the first row. After that, players can strategize to determine the next steps with a total of ten (10) opportunities to move in the shape of the letter "L", like a horse on a chessboard. Along the way, players will encounter various challenges and opportunities that will affect the amount of money they have. These challenges include money boxes, investments, alms, and taxes. To get the amount of money on the box, players must be able to answer the Question Card first. In solo mode, the Question Card is submitted by the guard (can be a teacher or another student), then for versus mode it is submitted by the opponent. If the answer is correct, the player will get money. However, if you lose, you will not get the money. The game is played alternately for versus mode.

The ultimate goal of the FinKnight game is to collect a minimum of Rp500,000 in 10 moves. In addition, players are also required to make at least one investment during the game, pay tax obligations, and do alms. This aims to train students in strategy, specifically related to financial management, determining the highest currency exchange rate, investment decision-making, and

ISSN (Online): 2961-9602

how to understand progressive tax calculations. Thus, given the comprehensiveness of the FinKnight learning game, the researcher believes it can provide a positive learning experience and equip students with practical economic skills in their immediate environment. The appearance of the FinKnight game is as follows.

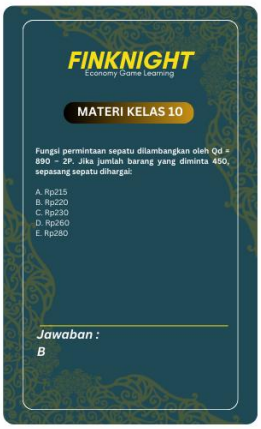
Picture 1. Game FinKnight Logo

Picture 2. How to Play FinKnight

Picture 3. The rules of FinKnight

ISSN (Online): 2961-9602

Picture 4. Game board of FinKnight



Picture 5. Question Card FinKnight

Picture 6. Investment Card (Berita) FinKnight

Picture 7. Investment Card (Hasil) FinKnight

Picture 8. Tax Card FinKnight

Picture 9. Charity Card FinKnight

ISSN (Online): 2961-9602

Table 4. Material Expert Validation Results

No.	Aspects	Score	Precentage	Category
1	Material Substance	4,7	94%	Very Feasible
2	Learning Design	3,9	78%	Feasible
	Average	4,3	86%	Very Feasible

Table 4 shows that the material in FinKnight is included in the very feasible category. This can be seen in the average score of 4.3 or if it is represented by 86%. The material substance aspect is included in the very feasible category. While the learning design aspect is included in the feasible category. Important notes added by material experts to add a variety of questions that are more HOTS, so that students can practice their critical thinking skills. The second expert is a media expert. The results of media expert validation can be seen in table 5 below.

Table 5. Media Expert Validation Results

No.	Aspects	Score	Precentage	Category
1	Physical appearance	3,6	72%	Feasible
2	Utilization of media functions	3,2	64%	Feasible
	Average	3,4	68%	Feasible

Based on the validation results above, FinKnight is included in the feasible category with an average score of 3.4 or a percentage of 68%. The media expert's validation consists of two aspects, namely physical appearance and utilization of media functions, which both get a decent category. The following results are accompanied by expert input, namely the need to add unique patterns to the horse pawns used so that they show their own uniqueness for the FinKnight game.

After the *board game* components and economic content have been developed, researchers will conduct initial testing to determine the suitability and effectiveness of the FinKnight *board game* as a learning medium. The results of this test will be used to make improvements and refinements before the implementation stage. With this development stage, it is hoped that FinKnight can become an effective economic learning media for students.

DISCUSSION

The results showed that the development of board game-based learning media FinKnight can be an effective alternative learning media for economic subjects. The advantage of this FinKnight learning media is its ability to create interactive and interesting economic learning for students. Through this game, students will better understand the learning material because they not only learn economic theories, but can also apply them directly in situations similar to real life. This is supported by research conducted by Maryanti, E., Egok, A. S., & Febriandi, R. (2021) which shows that practical learning media can improve student learning outcomes.

One important aspect of FinKnight is its ability to train students' practical skills in economics, such as financial management, investment decision-making, and understanding of progressive taxation. By making investments, paying taxes, and giving alms in the game, students can learn how to manage finances wisely and responsibly. In addition, the use of thematic cards, such as Question Card, Investment Card, Tax Card, and Charity Card, can also help students to better understand the economic concepts being studied. Through the questions on the Question Card, students can hone their khowledge as well as get immediate feedback on their understanding.

The way to play FinKnight that presents a match or competition situation will bring a new learning atmosphere and spur students' enthusiasm for learning (Darmawan, 2016; Krasna, 2014; Hamzah, 2013). The material delivered using FinKnight is felt to provide more benefits in

ISSN (Online): 2961-9602

the learning process, so that the objectives of deepening material related to economics are achieved. In addition, the positive impact of this game will also open up interactions between students who then train their communication skills.

CONCLUSION

Based on the results of the research and discussion that has been presented, it can be concluded that the development of board game-based learning media with the title "FinKnight" on economic material is proven feasible and can effectively improve students' understanding and skills. This is indicated by the results of the validation test of material experts and media experts who fall into the category of very feasible and feasible. The average validation test of material experts was 4.3, while media experts gave a score of 3.4.

The FinKnight developed has several advantages to be applied to economic learning, including:

1. Provides interactive and interesting economic learning for students through the concept of board games that are easy to understand.
2. Train students' ability to manage finances, make investment decisions, understand tax calculations, and instill character values such as sharing and responsibility.
3. Provide a comprehensive learning experience related to economic topics such as investment, tax, and money.

Thus, the FinKnight board game can be an effective alternative learning media to improve students' understanding and skills in economics subjects. The development of innovative learning media like this is expected to continue to create a more enjoyable and meaningful learning atmosphere for students..

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IMPLEMENTATION OF PROBLEM BASED LEARNING MODELS TO IMPROVE THINKING ABILITY STUDENT CRITICISM REVIEWED FROM LEARNING STYLE

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Keyword

Problem Based Learning, Critical Thinking, Learning Style.

Abstract

The development of students' critical mathematical thinking skills and attention to individual uniqueness in the learning process needs to be given attention, in order to be able to create an inclusive learning environment and support the development of each student's potential. The aim of this research is to determine the differences in the achievement and improvement of students' critical mathematical thinking skills from two different learning models and based on learning styles. The experimental group used a problem-based learning approach, while the control group used a conventional learning approach. This research uses a quantitative quasi-experimental method with a pre-test and post-test non-equivalent group design. This data was collected through a mathematical critical thinking ability test and a learning style questionnaire, which were completed by 40 students of SMP Swasta Sriwijaya Medan. The results of this study showed that students who took part in problem-based learning, as well as students with a kinesthetic learning style, performed better compared to the group who took part in conventional learning. However, if you look at auditory and kinesthetic learning styles, students who take part in problem-based descriptive learning have better performance. Therefore, it can be concluded that problem-based learning is quite effective in developing critical mathematical thinking skills, especially for students with a kinesthetic learning style.

INTRODUCTION

School is a place for fostering human resources in accordance with the development of science and technology. Education is a process of cultivating character or the crystallization of the values of human life. Because until now the world of education is seen as an effective tool in trying to preserve and pass on the values of life. Appropriate curriculum, approaches, methods, strategies and models, adequate facilities and professional human resources are aspects that are interrelated to achieve the planned learning objectives. Education is the only solution to create reliable human resources, smart, and also have high morality that supposed to be able to apply his/her knowledge for human welfare. For that reason human beings must get appropriate education in order to be his/her asset for his/her future

Based on the results of Trends in International Mathematics and Science Study (TIMMS) in 2015 which was carried out in fourth grade elementary school students, Indonesia is ranked 44th out of 49 countries.

Hadi, S., & Novaliyosi, N. (2019) stated that students in Indonesia needs to hone their higher order thinking skills through implementing more meaningful learning. Apart from that, it's wrong Another educational survey is the Program for International Students Assessment (PISA) also shows that students' thinking abilities in our country it is still at a low level. PISA results in 2018

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even decreased compared to the PISA results in 2015. Based on these facts, the learning process is nurturing Students' higher level thinking abilities are very necessary.

The ability to think critically is one of the keys to achieving competencies that are much needed in the 21st era (Annisa et al., 2021). In this case, mathematics teachers also have a role in developing students' critical thinking skills. Critical thinking skills aim to provide academic training to students, one of which is at the junior secondary education level. Critical thinking skills include problem-solving abilities such as creative expression, innovation, as well as the ability to communicate and collaborate.

Problem-based learning is a learning model that focuses on the role of students by giving them tasks or challenges related to real world problems (Dewi & Sahrina, 2021). This aims to facilitate the development of critical thinking abilities, problem solving skills, as well as to gain a deep understanding of essential knowledge and concepts from sequence and series material. The problem-based learning process involves several steps, including: (1) the teacher assigns problems to students, (2) students discuss in small groups, (3) students conduct independent research related to the problem, (4) students return to the initial group to share information, learning with friends, and collaborating in solving problems, (5) students are asked to present the solutions they find, and (6) teachers help students evaluate the entire learning process that has been done (Zakaria, 2022).

The results of the development of students' critical thinking abilities based on the explanation above can be influenced by difficulties that arise during the learning process. One factor that might cause this difficulty is a mismatch in students' learning styles in terms of receiving, organizing and processing new information during learning activities (Cici Marshela & Linda Yarni, 2023). A person's learning style can be categorized into three types: visual, auditory and kinesthetic learning styles, although there may also be a combination of these three types (Sa'adah & Ariati, 2020). Students' learning styles have differences when they do not receive attention in learning strategies so that it can make it difficult for students to understand, organize and process the new information they receive (Zahra, 2022). Variations in student learning styles will also influence learning achievement, including the development of critical thinking skills, both in achievement and improvement (Alexandro & Situmorang, 2021).

A number of research results show that students' critical thinking abilities in the junior high school context are relatively low. Research conducted by (Novita & Hidayati, 2022) revealed the level of students' critical thinking abilities in solving integral calculus description problems. The results of this study show that students' ability to identify and provide reasons is at the level of 7.69%, their ability to generalize reaches 82.05%, while their ability to analyze and evaluate is at 15.38%. Another study conducted by (Edigan, 2018) which identified students' mathematical critical thinking abilities in integral calculus subjects, showed findings that some students could formulate problems correctly, but were still incomplete; They also have not been able to determine the facts of the problem comprehensively and accurately. Apart from that, they are not yet skilled at using appropriate evidence, are not able to draw conclusions that are in accordance with the facts, and are not skilled at providing more in-depth explanations. Furthermore, students are not yet able to integrate their tendencies and abilities in decision making. Similar findings were also found in the results of the calculus exam, with the following indicators: (1) students' ability to analyze data reached 38.70%, (2) in assessing the truth of arguments, 12.91%, (3) in concluding and providing logical argumentation from the analysis results reached 74.20%, and (4) in formulating problem solving strategies reached 48.38%.

Based on the explanation above, the aim of this research is to identify differences in students' mathematical critical thinking abilities in learning based on their learning style factors. This research focuses on how to achieve and improve critical thinking skills students' mathematics in the context of problem-based learning, both in relation to learning styles and to students' overall understanding.

ISSN (Online): 2961-9602

METHOD

Location and Time of Research

The research is conducted at SMA Swasta Sriwijaya Medan. The research is conducted in the second semester of 2023/2024.

Population and Sample

The population of this research is all the students of VIII grade of SMP Swasta Sriwijaya Medan. The sample of the research is 20 the students of the VIII grade from A class and 20 students of the VIII grade from B class of SMP Swasta Sriwijaya Medan.

Research Design

This research used a quasi-experiment with a pretest-posttest non-equivalent group research design. The research instrument used was a test instrument to measure students' mathematical problem solving abilities. This test is in the form of descriptive questions given before treatment (pre-test) and after treatment (post-test). The material used is rows and series. The population that was the subject of this research included class VIII students at SMP Swasta Sriwijaya Medan.

The sampling process for this research used a cluster random sampling technique involving two classes or study groups. The sample was selected from the first group (experimental group) which consisted of 20 students, and the second group (control group) which also consisted of 20 students. The experimental group used a problem-based learning model while the control group followed conventional learning (CL).

Table 1. Learning Style Identification Instrument

No	Statement
1	I prefer to learn through visualizing images, graphs, or diagrams.
2	I prefer to learn through reading and repeating information.
3	I understand the material more easily when listening to verbal explanations.
4	I like discussing with others to understand topics more deeply.
5	I learn better when I do practice or hands-on exercises.
6	I prefer to learn through practical application or real world situations.
7	I feel comfortable studying alone and independently without the help of others.
8	I prefer to learn gradually with clear steps.
9	I always record lesson material completely and neatly.
10	I prefer to study at night when it is quiet.

The next step is to carry out a normality test, homogeneity test, and examine the difference in the average initial abilities of students based on the test results in the two groups. Previously, a pre-test of critical mathematical thinking skills was carried out at the beginning of learning. Then a post-test of critical mathematical thinking skills was given to students. Data regarding pre-test and post-test scores on mathematical critical thinking skills were then analyzed statistically using the Independent Samples t-test Mann-Whitney U test. Normality test scores to evaluate the increase in students' mathematical critical thinking skills were classified based on Table 1 (Rismayanti et al ., 2022).

ISSN (Online): 2961-9602

Table 2. Normalized Gain Score Categories

Score Intervals	Normalized Gain Score Categories
$70 \leq x \leq 100$	High
$30 \leq x < 70$	Middle
$0 \leq x < 30$	Low

RESULTS

Students were classified based on the results of the learning style questionnaire, as shown in Table 2. In this study, only students who fell into the categories of visual, auditory and kinesthetic learning styles were selected as research samples. Based on Table 2, in the problem-based learning group, there are 9 students with a visual learning style, 5 students with an auditory learning style, and 6 students with a kinesthetic learning style. On the other hand, in the Conventional Learning (CL) group, there were 8 students with a visual learning style, 5 students with an auditory learning style, and 7 students with a kinesthetic learning style.

Table 3. Classification of Student Learning Styles

Gaya Belajar	Learning Model		Total
	PBL	**CL**	
Visual	9	8	17
Auditory	5	5	10
Kinestetik	6	7	13
Total	**20**	**20**	**40**

Data from the pretest and posttest of critical mathematical thinking skills are processed and analyzed, both in total and in the context of learning styles. The descriptive statistical graph of students' critical mathematical thinking abilities in problem-based learning can be seen in Figure 1 below.

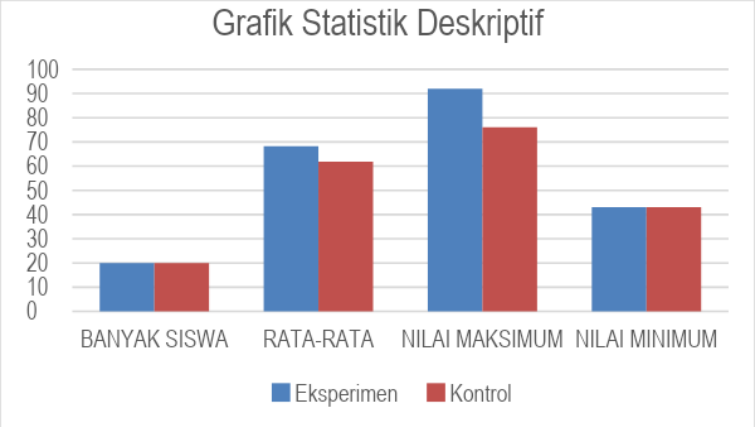

Figure 1. Descriptive statistical graph of Students' Mathematical Critical Thinking Ability in Problem Based Learning Class VIII at SMP Swasta Sriwijaya Medan.

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From the data in Figure 1 above, it can be concluded that the average test results for students' mathematical critical thinking abilities in the experimental class were significantly higher than those in the control class. This shows that the scores of students in the experimental class are superior to the scores of students in the control class. And it can also be seen from the results of the visual, auditory and kinesthetic learning styles questionnaire. This shows that students tend to understand and remember information better when it is presented visually and are able to create mind maps and understand topics more deeply and students are able to involve themselves in physical activities or direct practice as an effective learning method.

DISCUSSION

Based on the results of research regarding the achievement of critical mathematical thinking skills, it was concluded that overall there were significant differences between the two groups. In this context, the achievement of critical mathematical thinking skills of students who use PBL is higher than students who use CL. The difference in the average achievement of students' overall mathematical critical thinking skills illustrates that learning using PBL is more effective than CL in developing students' mathematical critical thinking skills.

From a theoretical perspective, the achievement of critical mathematical thinking skills must be understood in a long-term context that evaluates the impact of Problem-Based Learning on the development of critical thinking skills (Pratama & Lestari, 2017). The short-term empirical findings from this research are consistently in line with the results of research by (Setiana & Purwoko, 2020) which shows that the critical thinking abilities of students with a kinesthetic learning style tend to be superior to students who have a visual and auditory learning style.

Specifically, students with a kinesthetic learning style seem to benefit more from problem practice than other aspects such as problem visualization or interaction with the teacher. This indicates the effectiveness of PBL in improving the critical thinking skills of students who have a kinesthetic learning style, where practice questions have a significant role. It is known that PBL continues to provide a variety of learning activities for students with different learning styles, with the hope that this will have a positive impact on the development of students' critical thinking abilities in junior high school in the long term. The results of this study reflect empirical evidence in the short term. However, in the long run, the results of achievement

CONCLUSION

Based on the results of research that has been conducted, it shows that in terms of achieving and improving critical mathematical thinking skills, problem-based learning and the influence of the kinesthetic learning style are superior to conventional learning. In the problem-based learning (PBL) group, there were 9 students with a visual learning style, 5 students with an auditory learning style, and 6 students with a kinesthetic learning style. On the other hand, in the Conventional Learning (CL) group, there were 8 students with a visual learning style, 5 students with an auditory learning style, and 7 students with a kinesthetic learning style. So the average of students' mathematical critical thinking ability tests in problem-based learning and the influence of learning styles for the experimental class was 68.2 and for the control class 61.8.

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Adopting the Dutch Education System: Innovations to Improve the Quality of Education in Indonesia

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Keyword

education innovation, Dutch education system, Indonesia education system, vocational education, teacher training

Abstract

The study explores the potential of adopting elements of the Netherlands education system to enhance the quality of education in Indonesia. Given the longstanding historical and educational ties between the two countries, this research identifies key innovations from the Dutch system that could be adapted to the Indonesian context. The study examines differences in vocational education, teacher training, and student performance. The methodology involves a descriptive analysis of educational data from both countries, supported by qualitative insights from literature review regarding the issues raised. Results reveal that the Netherlands approach to a strong vocational training, and continuous teacher development leads to higher student satisfaction and academic achievement. These findings suggest several actionable strategies for Indonesia, such as strengthening ties with industries for vocational programs, and enhancing teacher training initiatives. Implementing these recommendations could significantly improve Indonesia's educational outcomes and global competitiveness. The study contributes to the ongoing discourse on educational reform by highlighting practical innovations that can be customized to address local needs and challenges in Indonesia.

INTRODUCTION

In 1899, Van Deventer published an article titled "A Debt of Honor" in the magazine De Gids, stating that the Netherlands should repay the profits they had gained from the Dutch East Indies which is now known as Indonesia. In 1901, this idea was adopted by the Dutch Queen in her speech, marking the beginning of the ethical policy, a new approach that emphasized the Dutch's moral obligation towards the indigenous people. However, this ethical policy conflicted with colonial exploitation and focused on education, irrigation, and transmigration for colonial interests. Education, which became the main pillar of the ethical policy, shifted to a Western system and used Dutch as the language of instruction, benefiting the indigenous elite. Figures like J.H. Abendanon and A.W.F. Idenburg played key roles in developing this education system, including providing free access to education at ELS (European primary schools) for indigenous people, which was utilized by figures like R.A. Kartini.

The relation between Indonesia and the Netherlands has a long and complex history, from the colonial period to modern partnerships in various fields, including education. After independence from the Netherlands in 1945, Indonesia has endeavored to build an independent and quality national education system. However, many challenges remain, such as educational disparities between urban and rural areas, varying teaching quality, and a lack of adequate educational facilities (Tilaar, 2002). On the other hand, the Netherlands is known for its innovative and high-quality education system, which is recognized worldwide. The Dutch education system emphasizes flexibility, personalization and close links with the world of work, which can be a model for improving the quality of education in Indonesia (Westerheijden, et al., 2007).

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One prominent aspect of the Dutch education system is its student-centered approach, where students are given the freedom to explore their interests and develop critical skills. The Netherlands is also known for its strong vocational education system, which prepares students to enter the workforce with relevant practical skills (Cedefop, 2012). On the other hand, Indonesia's education system tends to be centralized with a rigid curriculum approach, which limits students' creativity and innovation (Suryadarma & Jones, 2013). As such, adopting key elements of the Dutch education system can help address some of the key challenges in the Indonesian education system. By studying and adopting key elements of the Dutch education system, it is hoped that Indonesia can improve some of the weaknesses in the current education system and increase students' competitiveness at the global level.

Indonesia as one of the countries that was colonized by the Netherlands also received influence in the field of education from the Netherlands. This can be proven by the same learning strategies as the Netherlands, one of which is at the elementary school level. The Netherlands has a better quality education system compared to the education system in Indonesia (Sari, et al., 2021). In the context of Indonesia-Netherland relations that have evolved into a more equal partnership, the adoption of educational innovations from the Netherlands can strengthen this bilateral relationship. Cooperation in education can be an avenue for mutually beneficial knowledge and experience sharing. This research is expected to contribute to improving the quality of education in Indonesia as well as strengthening the cooperative relationship between the two countries (Gonzalez & Wagenaar, 2003).

METHOD

This research uses qualitative research methods related to the ideas, perceptions, or opinions of the subjects studied, which cannot be measured using numbers. The data used in this study were obtained through a literature review regarding the issues raised. In this research, the object of study is the Dutch education system, including its policies, practices and innovations. The subjects are educators, administrators, students and education policy makers in Indonesia. They are the individuals and entities that interact with or are affected by innovations in the Dutch education system. Their perspectives and experiences are crucial for evaluating the potential effects and benefits of implementing Dutch educational practices in Indonesia. Qualitative research with literature studies emphasizes in-depth assessment of texts and documents where the instrument in this research is through literature review by summarizing, comparing, and evaluating literature relevant to the research topic. The data collection method used in this research is through secondary data (Document Based) and to produce complete data, the author uses sources from third parties such as books, journals, and scientific articles. While the data analysis technique used is through qualitative data analysis techniques, namely by utilizing secondary data that has been accessed online

RESULTS

Based on the 2018 Program for International Student Assessment (PISA) report, students in Indonesia scored lower than the international average in reading, mathematics and science (OECD, 2019). International assessments show that students in the Netherlands tend to achieve better results in science, math and reading than students in Indonesia. In addition, students in the Netherlands report higher levels of satisfaction with their learning experience. The following table shows the 2018 average PISA results for Indonesia and the Netherlands.

Table 1. Differences in academic achievement between students in Indonesia and the Netherlands from the 2018 PISA report (OECD, 2019).

Subject	Indonesia (Average)	Netherland (Average)

ISSN (Online): 2961-9602

Science	396	502
Mathematics	379	519
Reading	371	485

Vocational education in the Netherlands is known to be effective in preparing students for the world of work by providing programs tailored to industry needs. Although Indonesia has vocational education programs, it still faces challenges in terms of program relevance and quality. The table below shows a comparison between vocational education programs in Indonesia and the Netherlands.

Table 2. Comparison between vocational education programs in two countries (Westerheijden et al., 2007).

Aspect	**Indonesia**	**Netherland**
Linkages with Industry	Less connected to the industry	Well integrated, working closely with companies
Program Availability	Limited to certain fields	Diverse, covering various industry sectors

In the Netherlands, teaching quality and teacher training receive special attention, with strong ongoing training programs and professional support for teacher development. Meanwhile, Indonesia still faces challenges in improving teaching quality and providing appropriate training for teachers. The table below provides a comparison of the level of teacher training and development in the two countries.

Table 3. Level of teacher training and development in two countries (Gonzalez & Wagenaar, 2003).

Aspect	**Indonesia**	**Netherland**
Teacher Training Program	Limited, often disconnected	Structured, continuous
Use of New Method	Less exposure to innovative methods	Actively adopt new teaching methods
Professional Support	Minimal	Available, including mentor support

DISCUSSION

The results of the data analysis show that students in the Netherlands tend to achieve higher scores in international assessments such as PISA than students in Indonesia. This shows a more inclusive and adaptive approach to education in the Netherlands may contribute to a better academic outcomes. A conducive and student-centered learning environment can improve learning outcomes by motivating students to be actively involved in the learning process

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(Bandura, 1986). So the education system in Indonesia needs to adopt more student-centered strategies and create a supportive learning environment to improve academic outcomes and student satisfaction.

Vocational education in the Netherlands shows a high level of linkages with industry, which contributes to the student's work readiness. This is in line with human capital theory which states that education should equip individuals with relevant skills to increase economic productivity (Becker, 1964). In contrast, vocational education in Indonesia still faces challenges in ensuring the relevance of the curriculum to industry needs, which impacts the unemployment rate of vocational graduates. Education that is relevant to the labor market can improve labor competitiveness and reduce the gap between education and employment (Boud & Garrick, 1999). Therefore, Indonesia needs to strengthen linkages between vocational education institutions and industry to ensure that curricula reflect the needs of the labor market.

The quality of teaching in the Netherlands is supported by ongoing teacher training programs and strong professional support. This is in line with andragogy theory, which emphasizes the importance of continuing education for educators to improve teaching effectiveness (Knowles, 1980). According to Guskey (2002), continuous professional development for teachers can improve teaching effectiveness and student learning outcomes. In Indonesia, improving teaching quality is hampered by limitations in teacher training and professional support. Hence, the Indonesian government should invest more resources in teacher training and professional development to improve the overall quality of education.

Efforts to improve education in Indonesia require adequate funding, but a major challenge hindering progress is the culture of corruption that harms and reduces the effective use of funds. It comes as no surprise that Indonesia has been contending with corruption as the practice had happened back in the colonial period, where in real time, Indonesia is subtly adopting the Dutch behavior. This phenomenon, rooted in post-colonial theory, reflects a complex process where a newly independent nation emulates aspects of the colonial power that once dominated it, sometimes consciously and other times unconsciously (Angkasa, 2014).

Cases of corruption that existed during the colonial period occurred since the VOC era. At the beginning of the VOC's rule, they routinely reported their finances and it can be said that no cases of corruption occurred. But in the late days of VOC rule their income decreased because it had gone into their personal pockets. Reports related to this corruption case are contained in the colonial government report archive. In the archive, it is stated that the actual acts of corruption that occurred during the colonial period occurred in all circles / layers of society. The upper-class people who had a position and the lower-class people who did not have a position all committed corruption (Loesi, 2022).

Looking back at the Dutch colonial era, Indonesia was once referred to as the Dutch East Indies where around the year of 1830-1870, the Dutch government faced criticism resulting in "The Ethical Policy". Criticism came from figures such as Baron van Hoevell and Multatuli, who, in his book Max Havelaar (1860), depicted the suffering of indigenous farmers. In 1899, Van Deventer wrote an article titled "Een Eereschuld" (A Debt of Honor), suggesting that the Dutch repay their moral debt to the indigenous people through programs of irrigation, emigration, and education. This idea was adopted by Queen Wilhelmina in her speech on September 17, 1901, marking the beginning of the ethical policy (Afandi et al., 2020, 23).

Although this ethical policy focused on the welfare of the indigenous people, it conflicted with colonial exploitation as it emphasized the Dutch's moral obligation to the oppressed society. In reality, the implementation of the ethical policy in the Dutch East Indies benefited the colonial government more than the indigenous people (Afandi et al., 2020, 23). Despite the policies of irrigation, emigration, and education, all were directed towards colonial economic interests. Irrigation was more focused on developing the colonial economy rather than the welfare of the people. Emigration was used to relocate people from densely populated islands like Java to other islands, but the available land was instead used for sugar plantations, not for the welfare of the

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indigenous people. In education, there was discrimination with two types of schools, and education was only aimed at producing low-level workers. Moreover, the budget for indigenous education was very minimal, reflecting a lack of concern for their welfare (Afandi et al., 2020, 24).

Through all these history records, we can pull through a string that every aspect from the colonialism era has an impact on everything that happens in Indonesia now. How it adopts a similar education system to bad deeds such as corruption as a result of post colonialism. However, despite the similar education system, Indonesia still falls into the failed category because of the corruption issue that has yet to be tackled, which Indonesia's government should take a big note of.

CONCLUSION

This research explores the potential of adopting the Dutch education system to improve the quality of education in Indonesia. It reveals that there are several key elements of the Dutch education system that can contribute significantly to the improvement of the Indonesian education system. The main breakthrough of this research is the identification of implementation strategies that can be adapted to the local Indonesian context. In addition, the research underlines the importance of strengthening vocational education and improving the quality of teacher training as a way out of the employment challenge.

As a recommendation, vocational education should be more integrated with industry, involving industry in the planning and implementation of education programs. Then, teacher training and professional development should be prioritized to ensure teaching is high-quality and relevant to the needs of today's students. In addition, further research is needed to examine the implementation of specific elements of the Dutch education system and measure their impact on education outcomes in Indonesia.

By adopting effective elements of the Dutch education system, Indonesia has a great opportunity to improve the quality of education and prepare future generations to face global challenges. The implementation of these recommendations is expected to have a positive impact on the quality of national education, strengthen the competitiveness of Indonesian graduates, and contribute to sustainable development

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INTEGRATING LOCAL CULTURE INTO STEM-BASED LEARNING IN ASEAN ELEMENTARY SCHOOLS: A LITERATURE REVIEW

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Keyword

STEM-Based Leaarning, , Culture, Elementary School.

Abstract

This article examines the implementation of Science, Technology, Engineering, and Mathematics (STEM) learning in several ASEAN countries, such as Singapore, Malaysia, Indonesia, and Thailand. This article uses an integrative literature review method to explore how culture in Southeast Asia (ASEAN) countries contributes to STEM learning in primary schools. Data were analyzed from journals and research relevant to the theme. The literature review indicates that STEM implementation in ASEAN countries has significant differences, influenced by government policies, culture, and language. While some countries, such as Singapore, show substantial progress in integrating STEM into the curriculum, implementation at the primary school level still lags behind in most ASEAN regions. This article emphasizes the importance of cultural integration in STEM learning design to create more engaging, relevant, and meaningful learning experiences for students. This integration involves understanding the context, utilizing local cultural resources, and developing learning materials tailored to students' needs and interests. Developing a cultural analysis framework in STEM approaches for primary school is a crucial step to achieve this. The research concludes that culturally responsive STEM approaches can potentially increase students' motivation, engagement, and understanding of STEM concepts while preparing them for future global challenges. Cultural integration in STEM will create a more inclusive and relevant education system for all students while supporting participation and collaboration in building a broader perspective.

INTRODUCTION

STEM learning is gaining popularity globally as innovative learning. The early introduction of STEM, especially at the elementary school level, is essential in building a learning culture that encourages creativity, active participation, and the ability to solve real-world problems. By integrating the four fields of science, STEM aims to foster comprehensive and innovative understanding among children, equipping them with the necessary skills to face the challenges of the 21st century.

The Industrial Revolution 4.0 has driven major transformations in various fields, including education. The global challenges this revolution poses, particularly in economics and industry, demand fundamental adjustments in learning design. Skills in STEM are increasingly necessary in dealing with these changes. A 2017 report by the U.S. Department of Commerce Economics and Statistics Administration Office of the Chief Economist noted a 17% growth in jobs requiring STEM skills between 2008-2018, compared to a 9.8% growth for non-STEM jobs (Langdon et al., 2011). This data shows that the United States has realized the importance of STEM in improving its citizens' economic and social well-being. The increased focus on STEM in the United States is

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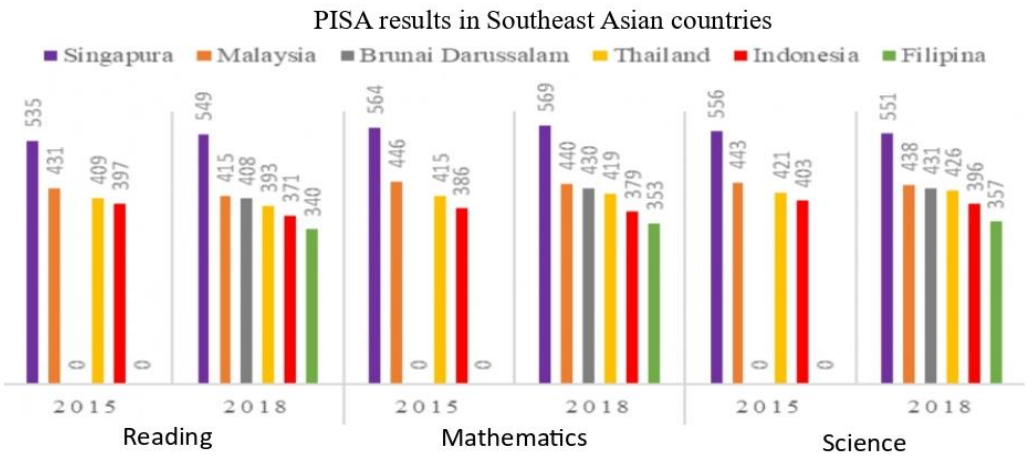
also reflected in their efforts to design STEM-based learning systems from an early age. This reflects the realization that early development of STEM skills is a significant investment to create a generation of innovators who will play an important role in facing an uncertain future.

Successfully integrating the four disciplines in STEM-based learning depends on teachers' understanding and commitment to applying this approach. Teachers play an essential role in encouraging students' critical thinking through problem-solving in basic STEM and equipping them with the academic excellence needed in global competition. As stated by (Srikoom et al., 2018), STEM teaching requires teacher competence in asking challenging questions to motivate students, creating STEM learning contexts that are relevant to real life, and actively engaging students in the design process. Thus, the role of teachers in STEM implementation is critical in creating effective and meaningful learning for students.

While the STEM approach has gained momentum globally, its implementation in some countries, especially ASEAN, faces significant challenges. Reforming STEM education at the classroom level faces obstacles, especially regarding teacher competence in teaching STEM. Many teachers in ASEAN do not have specialized certification to improve science, technology, and mathematics learning, regardless of grade level or subject area (Sorenson, 2010). In developing countries, including ASEAN, STEM implementation is minimal, except Singapore, which successfully implemented this approach. However, STEM-based learning design is still relatively weak in some ASEAN countries. Contemporary STEM learning practices in developing countries have yet to make a significant impact that encourages students to choose careers in STEM in the future (Kalolo, 2016). These challenges underscore the need to improve teacher capacity, develop effective STEM curricula, and encourage investment in STEM research and development in ASEAN countries.

This article investigates the implementation of STEM learning approaches in several Southeast ASEAN countries, particularly Singapore, Malaysia, Indonesia, and Thailand. ASEAN countries are currently focusing on learning design to achieve 21st-century skills, which is critical to improving regional competitiveness, especially in education. Although ASEAN countries have different political backgrounds, ideologies, histories, cultures, and educational structures, they share a common vision to strengthen regional competitiveness. Singapore, which consistently ranks high in the Program for International Student Assessment (PISA) results, is an example of a country strongly committed to designing STEM-based learning. 21st-century competencies are officially integrated into Singapore's education policy initiatives (Cheng, 2017). Singapore, through its strong education policy structure, provides an excellent example for other ASEAN countries in the process of formulating education policies to achieve 21st-century skills through tripartite reforms involving collaboration between the government, education practitioners, and education researchers, with the aim of continuous improvement (Cheng, 2017). Singapore's success in taking STEM-based learning design seriously is evident in the 2018 PISA data.



ISSN (Online): 2961-9602

Figure 1. PISA results data for 2015-2018(OECD, 2015, 2019)

The graphic data above is the result of the PISA achievement of countries in the Southeast Asia Region. There are only 6 countries that participate in the learning assessment index developed by the Organization for Economic Co-operation and Development (OECD), namely Singapore, Malaysia, Brunei Darussalam, Thailand, Indonesia, and the Philippines. Meanwhile, Cambodia and Myanmar are not yet affiliated with the assessment conducted by the OECD. The graphic data above shows that Singapore is one of the ASEAN countries with the second-highest score in the world after China. For the ASEAN region, Singapore is in the top position. Singapore, which is ranked top in the ASEAN region and second highest in the world after China, experienced an increase in reading and mathematics scores between 2015 and 2018 but a decrease in science (Organization for Economic Co-operation and Development, 2015)

Malaysia ranked second in ASEAN, showed a decline in scores across all domains between 2015 and 2018. In third place is Brunei Darussalam, where the indexation in Reading in 2018 reached a score of 408; in Mathematics, it reached a score of 430; and in Science, it reached 43 (Organization for Economic Co-operation and Development, 2019). Specifically for Brunei Darussalam their involvement in the OECD learning assessment began in 2018. Thailand ranked fourth in ASEAN and showed a decline in reading scores, an increase in mathematics, and an increase in Science between 2015 and 2018. (Organization for Economic Co-operation and Development, 2019). Indonesia ranked fifth in ASEAN, showed a decline in scores across all domains between 2015 and 2018. ((Organization for Economic Co-operation and Development,, 2015). The Philippines, which only participated in PISA in 2018, showed relatively lower scores than other ASEAN countries (Organization for Economic Co-operation and Development, 2019). The same thing happened to Brunei Darussalam when the Philippines was involved in the learning assessment indexation organized by the OECD starting in 2018.

The Program for International Student Assessment (PISA) results show fluctuations in learning outcomes across ASEAN countries, with Singapore as the best-performing country. The PISA results show the need for ASEAN countries to design learning to improve 21st-century skills, with the STEM approach as one alternative. However, considering that PISA only focuses on students aged 11-15 (middle grades), it is essential to review how to strengthen reading, mathematics, and science learning from elementary school. The STEM approach is considered to have a strong correlation in supporting the achievement of skills in these three areas because building a solid foundation early on can help students hone 21st-century skills.

Implementing the STEM approach in elementary schools is essential to equip students with basic skills, knowledge, and curiosity about STEM concepts, ultimately preparing them to actively and skillfully participate in STEM fields at the next level of education (Hattie, 2016). However, implementing STEM in elementary schools, especially in developing countries such as the ASEAN region, faces several significant challenges. These challenges include more government policy support to encourage STEM learning, the lack of cultural adaptation to critical learning, language barriers, limited science and technology facilities, and uneven STEM teacher competencies in various ASEAN countries. Therefore, the following discussion will focus on implementing STEM in ASEAN countries, considering cultural characteristics different from those of developed countries

METHOD

This article uses the literature review method to analyze the implementation of STEM in ASEAN countries. More specifically, the literature review method used is an integrative literature review (Torraco, 2005). Integrative literature reviews, critiques, and synthesizes representative literature on a topic in an integrated manner, resulting in new frameworks and perspectives (Torraco, 2005). On the other hand, Cooper, et al (2018) offer a systematic review of literature

ISSN (Online): 2961-9602

methods. *Systematic literature* is defined as a systematic search for studies that fit the topic of discussion. The aim is to report the results of identifying existing studies transparently so that the reader understands what has been done in the studies and how the review findings are placed within the relevant evidence. Several literature reviews of research results on STEM approaches in ASEAN countries, especially at the elementary school level, are essential references in this study. Through an integrative literature review, this article will contribute to our knowledge of how STEM is implemented in ASEAN countries with different cultural characteristics from those of developed countries such as the United States, Finland, and other European countries.

The writing of this article follows the method presented by Torraco, which uses the integrative literature method. The determination of integrative literature, as Torraco (2005) stated, has four forms that need to be taken seriously so that the article's writing remains focused on the intended discussion objectives. The following are four forms of synthesis of integrative literature review (Torraco, 2005).

1. A research agenda: In this section, the research agenda is expected to flow logically through a critical analysis of the literature on which the research is based. It should pose provocative questions (or propositions) that provide direction for future research.
2. A taxonomy or other conceptual classification of constructs: In this section, taxonomies or other conceptual classifications are interpreted as constructs often developed to classify previous research. In turn, this section lays the foundation for new theories.
3. Alternative models or conceptual frameworks: This section discusses alternative models or conceptual frameworks. The integrative review addresses new ways of thinking about the topic. Alternative models or conceptions proposed by researchers or authors should be derived directly from the critical analysis and synthesis provided.
4. Metatheory: This section integrates and synthesizes the literature review to develop a metatheory across theoretical domains that is expected to serve as a framework for future research.

The literature study in writing this article is directed at "a research agenda." The results of research on STEM in several ASEAN countries and reports from several countries are used as references to see how the implementation of STEM in several ASEAN countries with different cultures and cultures with American and European countries that have first conducted such learning. This is important to explore because different cultural characteristics will contribute significantly to research plans that raise the theme of learning using the STEM approach, specifically at the elementary school level.

STEM PHILOSOPHY

STEM education has a solid philosophical foundation, covering ontology, epistemology, and axiology. Ontologically, STEM refers to a conceptual understanding of these fields and the relationships between them (Chesky & Wolfmeyer, 2015). Epistemologically, the focus lies on the best methods for STEM teaching, while axiologically, it centers on the purpose of STEM learning for students. STEM learning approaches are driven by the desire to actively engage students in addressing global issues, such as social and environmental crises. Chesky & Wolfmeyer (2015) suggest the responsive use of technology in STEM education, where scientific knowledge is applied in a global and social justice context. Axiologically, STEM education fosters aesthetic awareness, environmental sensitivity, and critical awareness of cultural, gender, and class issues.

Key to STEM education is building students' ability to understand and apply knowledge to conclude, interpret results, develop explanations and solutions, and think critically and metacognitively (Franco & Patel, 2013). STEM embodies three dimensions: cognitive strategies through project-based learning (PBL) and inquiry, content knowledge through interdisciplinary curriculum, and academic skills through collaborative and cooperative structures.

To maximize student engagement, supporting their initiative and curiosity with teacher guidance is necessary, thus enabling them to achieve higher academic achievement. Student engagement

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can be seen from academic (knowledge and cognitive strategies), behavioral (academic performance and cognitive strategies), and emotional (feeling connected to the school) aspects. Emotional engagement arises when students feel part of the school community and realize the importance of the school's role. Studies show that students who experience STEM education tend to show higher cognitive engagement in academic content and problem-solving and greater social engagement than students in traditional schools.

RESULTS

The literature review used in this article refers to the research results on the implementation of STEM learning in ASEAN countries with different cultural characteristics. The demands of the 21st century emphasize the importance of technology integration in learning to hone students' critical thinking skills in understanding the world's reality. The STEM approach is relevant in producing a generation that can adapt to technological advances. However, a technology-based approach without considering culture and social environment can be counterproductive.

Anhalt et al., (2018) gave an example of how one aspect of STEM, namely mathematics, tries to redefine how a general understanding of culture is currently fundamental in the development of mathematics learning. Taylor (Anhalt et al., 2018) defines *culture* as the abilities and habits humans acquire as members of society. This concept shows the importance of cultural integration in scientific thinking, which serves as a marker of social difference. Cultural thinking embedded in people's daily lives must be integrated with science-based approaches. The following literature review shows that culture is an essential element in the analytical framework of the STEM approach to learning.

Table 1. Results of the literature review

Country	STEM Learning Themes	Research Findings
Malaysia	STEM ASEAN Project to Promote 21st Century Teaching and Learning. (Baharin & Kamarudin, 2017)	This study implemented collaborative project-based STEM learning between students from two ASEAN countries, Malaysia and Myanmar, on the topic of "Endangered Species in ASEAN Countries." Eleven groups of students were formed, each choosing an endangered animal found in ASEAN countries. Once the endangered animals were selected, research was conducted through information gathering and collaborative learning. Collaboration between students from different countries and info sharing was facilitated through Skype and Microsoft One Note software. Upon completing the task, the groups created simple presentations as tangible evidence to exemplify their understanding of their research. This project shows that collaborative STEM learning can be done even between different countries, although there are undeniably various challenges, such as different cultures and languages, in the project.
Malaysia	Preliminary Review On Preparations In Malaysia To Improve Stem Education (Chong, 2019)	This article analyzes Malaysia's readiness to implement STEM Education and compares it with the preparation of East Asian countries. This research aims to understand the extent of Malaysia's efforts to achieve the Sustainable Development Goals (SDGs). The results show that the effectiveness of learning methods in Malaysia needs to be systematically improved by using

ISSN (Online): 2961-9602

		the STEM approach to achieve learning that is aligned with the SDGs' demands in Malaysia
Singapora	International comparison of K-12 STEM teaching practices (Tawbush et al., 2020)	This article compares the implementation of STEM learning at the secondary level in Italy, India, and Singapore. The results show that Singapore's STEM learning practices are more student-centered than India's.
Singapura	STEM Education Landscape: The Case of Singapore (Teo, 2019)	STEM approaches have been integrated into the curriculum in many secondary schools, particularly in STEM-focused career and technical education. As a concrete example, schools in Singapore have collaborated with the Shell Singapore company to encourage creative ideas to create vibrant, healthy, and clean cities for the future. This collaboration is realized through competitions and workshops designed to stimulate innovative thinking.
Vietnam	Students And Teachers' Perspective Of The Importance Of Arts In Steam Education In Vietnam (Hau et al., 2020)	The findings of this study show that STEM-based learning in Vietnam emphasizes the creative role in problem solving. Some schools in Vietnam integrate arts in STEAM (Science, Technology, Engineering, Arts, and Mathematics) education to enhance creativity and innovation.
Vietnam	Integrated Science, Technology, Engineering and Mathematics (STEM) Education through Active Experience of Designing Technical Toys in Vietnamese Schools (Quang et al., 2015)	This article discusses integrating STEM education with creative activity design and practical experience in Vietnamese education. Schools in Vietnam have implemented a practical learning model by integrating STEM into teaching technology in secondary schools, particularly through developing technical games. This practical model is implemented through STEM learning and is designed with technical games for Vietnamese secondary school students.
Philippina	Social Equity and Access to a Philippine STEM School (Talaue, 2014)	This research discusses how the Philippines made tremendous efforts to establish STEM schools to develop a scientific workforce geared towards advancement in the economic and technological fields in the long run.
Thailand	Approaches for Implementing STEM (Science, Technology, Engineering & Mathematics) Activities among Middle School Students in Thailand. (Changtong et al., 2020)	This article compares three different models for implementing STEM activities of secondary school students in Thailand: the stand-alone engineering model, the linear model, and the jigsaw model. The results show that the linear and jigsaw models are significantly superior in solving problems in STEM learning compared to the stand-alone engineering design models.
Indonesia	Implementation Of Stem Education In Indonesia: Teacher Analysis Result Of Stem Education (Suwarma & Kumano, 2014)	This article analyzes teachers' perceptions of STEM coherence in curriculum implementation. The results show that the 2013 Curriculum in Indonesia has higher coherence compared to the Education Unit Level Curriculum (KTSP).

ISSN (Online): 2961-9602

Indonesia	The Types of STEM Education Implementation in Indonesia (Arlinwibowo et al., 2020)	This study aims to identify variations in STEM implementation in Indonesia. The findings show that STEM implementation in Indonesia is divided into three types: STEM integration at the school scale, the establishment of STEM subjects, and STEM integration within a subject. Each type of implementation in schools has characteristics influenced by factors such as principal commitment, school facilities, student characteristics, and peer support.

DISCUSSION

Based on the literature review results above, there are differences in the implementation of STEM learning in ASEAN countries with diverse cultural characteristics. Singapore shows better readiness to integrate STEM into the curriculum with the support of government policies. Singapore also has a more advanced technology infrastructure and a dominant English language, reducing language barriers. Malaysia also appears better prepared than Vietnam, Thailand, the Philippines, and Indonesia. Malaysia has integrated STEM into the education curriculum and linked STEM learning to the Sustainable Development Goals (SDGs). The culture of Malaysian citizens also contributes to supporting STEM-based learning, with parents giving their full support.

On the other hand, Indonesia, Vietnam, and the Philippines have similarities in developing STEM-based learning. In terms of culture, these three countries are still developing towards better education. These three countries show their characteristics in applying STEM in the learning process. In Indonesia, STEM is integrated with Curriculum 2013, while in the Philippines and Vietnam, the implementation of STEM involves different techniques, such as through art activities to solve problems in learning.

The STEM approach can be integrated in various ways, including with existing cultural values. The argument is not without reason because technological advances will directly relate to various aspects of human life in the economic, social, political, and cultural fields. In practice, STEM educators lack a cohesive understanding of the STEM approach Kelley & Knowles (2016).

It seems that STEM is only geared toward answering technology-related challenges, which may lead to individualistic goals. As a result, students are often disinterested in science and math when they learn isolated and disconnectedly, missing connections to cross-cutting concepts and real-world applications. Therefore, (Kelley & Knowles, 2016) suggest using a STEM approach that integrates other theories to build a comprehensive STEM education framework. Combining STEM approaches with interdisciplinary subjects such as culture and history is an alternative to removing the negative stigma of STEM, which only focuses on producing the generation of "workers" needed to face global demands. Ironically, educational institutions such as schools and universities have yet to recognize the need to integrate STEM with cultural and historical aspects.

In many countries, efforts to integrate STEM with culture are gaining attention. For example, Aronson and Laughter (Lopez, 2016) have formulated the concept of "culturally relevant education" as a synthesis of education that integrates math, science, social studies, and language arts. This concept describes a system of social justice-oriented pedagogy, otherwise known as culturally responsive teaching. An important question is how the process of synthesizing culturally relevant education can be applied in STEM. Aronson dan Laughter (Lopez, 2016) revealed four main aspects of synthesizing culturally relevant education with STEM approaches:

1. Building Cultural Bridges: Using constructivist methods to connect students' cultural references with academic skills and concepts.
2. Critical Reflection: Engage students in critical reflection on their lives and society.

ISSN (Online): 2961-9602

3. Cultural Competence: Facilitating students in achieving cultural competence means "helping students to recognize and respect their own cultural beliefs and practices while gaining access to broader cultures" and STEM cultures (Ladson-Billings in Lopez, 2016);
4. System Deconstruction: Unmasking and exposing oppressive systems through critiquing the discourse of power.

Cultural integration in STEM is essential to creating a more inclusive and relevant education system for all students. This approach will help eliminate cultural gaps in education and create a generation with the necessary skills and insights to face future global challenges. STEM approaches should be encouraged to support participation through real-life experiences. This will enhance collaboration and generate a broader perspective, allowing STEM to resonate with other approaches, including integrating cultural values. Cultural integration in STEM will connect scientific concepts with real-life aspects without compromising academic value. The following is the design of a culturally responsive STEM approach.

Table 2: Design of culturally responsive STEM approach

STEM is Culturally Responsive	Example of Culturally Responsive STEM Implementation
Field of Mathematics	Development of Understanding and Action**:** Students select relevant topics for inquiry and utilize mathematical analysis to affect social change in their communities.
	Math in Context: Students solve math problems connected to their daily lives and communities, enhancing their understanding of the practical applications of math.
	Collaboration and Application**:** Students engage in collaborative projects with families, focusing on real-world applications, such as construction and other social projects, enhancing their understanding of the application of math and the development of collaborative skills.
	Inequality Analysis**:** Students use mathematical analysis to examine inequalities in social life, increasing their awareness of social issues and developing their analytical skills.
Science of Field	Application of Scientific Principles to Social Problem Solving**:** Students apply scientific principles to analyze and seek solutions to social injustices, such as local water pollution, encouraging their engagement in seeking scientifically-based solutions to social problems.
	Integration of Culture and Scientific Concepts: Students make connections between traditional cultural practices, such as arrow making and throwing, and science concepts, such as accelerated motion, demonstrating how science can be understood in a cultural context.
	Cultural Awareness and Instructional Relevance**:** Students explicitly express how their linguistic and cultural experiences and values relate to science through instructional appropriateness, increasing their awareness of the importance of connecting culture to science.
	Development of Scientific Inquiry Skills: Students develop their lines of scientific inquiry, which, combined with authentic models of scientific inquiry, enhance their scientific inquiry skills and enable them to develop scientific ideas independently.
	Engineering Applying Scientific Concepts in Real Contexts: Students apply scientific concepts learned in school in real-world contexts in their immediate

ISSN (Online): 2961-9602

Engineering and Technology of Field	environment, connecting theory with practice and enhancing their understanding of the applications of science.
	Integration of Traditional Knowledge and Innovation: Students learn from the traditional knowledge held by elders in their community (e.g., tribal elders), who introduce them to traditional ways of seeking solutions to local problems. Students then use new or traditional tools and approaches to develop solutions to similar problems, integrating traditional knowledge with modern approaches.
	Development of Culture-Based Solutions: Students imbibe the cultural values of their community, including the desire to help their family and community and the courage to overcome adverse structures. They apply engineering and technical principles to manage existing resources to find culturally-based and sustainable solutions.

Source: Tate 1995, Ensign 2003, Razfar 2012, Civil & Khan, 2001, Gutstein 2003, Dimick 2012, Grimberg & Gummer 2013, Buxton 2006, Lee & Buxton 2013, Wilson-Lopez, Mejia,Hasbún & Kasun 2016, Kern, Howard, Brasch, Fiedler, & Cadwell 2015, Samuelson & Litzler, 2016 (in Lopez, 2016)

The description of the table above provides an understanding of how STEM is applied by integrating existing cultural values through the analysis of math, science, and engineering. Of course, this will tremendously impact students because it places students as subjects directly dealing with existing realities. Learning from a cultural context involves the concept of self and others, social relationships, and the concept of knowledge. Therefore, it will undoubtedly be better for learning because it incorporates logical thinking and creative problem-solving skills, which are then transformed into communication skills and employability skills into the inputs needed for success in STEM-based education development outcomes (Hossain & Robinson, 2012)

Each country has characteristics in terms of culture and other local wisdom values. For ASEAN countries, the STEM approach integrates distinctive local cultural values, creating many learning opportunities. However, a literature review shows minimal research on STEM implementation in primary schools, especially those considering cultural integration.

The study results of STEM learning implementation in ASEAN countries are still too focused on middle and high school levels. Studies on STEM implementation at the primary school level are still relatively minimal. This raises an important question: Why is the implementation of STEM learning in primary schools still lagging? The need for further exploration of the factors that hinder STEM implementation at the primary level is an essential agenda for further research. Understanding how STEM learning can be effectively designed for primary school students in ASEAN countries with diverse cultural characteristics is essential.

ISSN (Online): 2961-9602

Developing a cultural analysis framework in STEM approaches for primary school can be a crucial starting point. This involves: 1) Understanding the cultural context**:** Understanding the prevailing cultural values, traditions and languages in each ASEAN country to ensure that STEM learning is aligned with the local culture; 2) Utilization of local cultural resources: Incorporating local cultural resources such as folklore, traditional games, and cultural objects in STEM learning activities to enhance engagement and relevance; 3) Development of relevant learning materials: Designing STEM learning materials tailored to the needs and interests of students in primary schools, taking into account relevant cultural aspects.

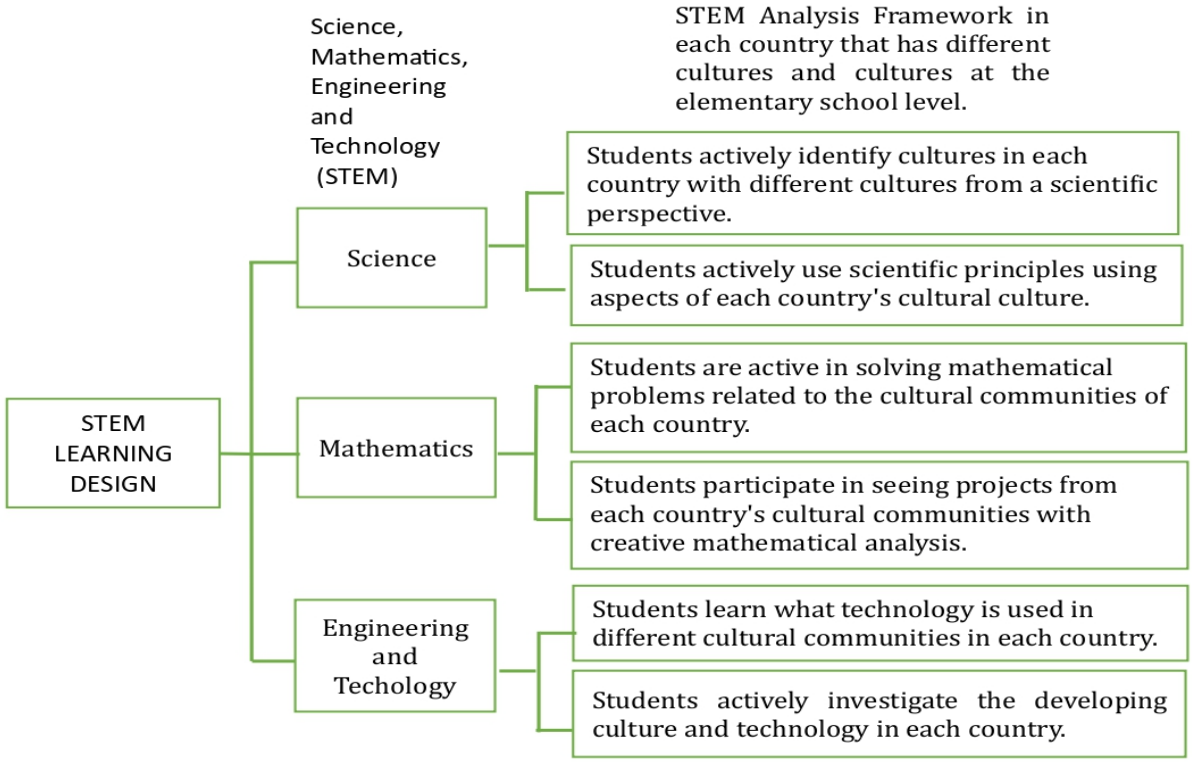

Figure 1. Cultural analysis scheme in the stem approach in elementary schools

By building a deeper understanding of the cultural context and designing learning strategies responsive to primary school students' needs, the potential of STEM education in the ASEAN region can be maximized. Further research focusing on the implementation of STEM in primary schools can contribute to driving educational progress in the ASEAN region. The following is a schematic design of cultural analysis using the STEM approach at the primary school level. The figure-1 explains how the characteristics of cultural values owned by each country are used as a framework for analyzing STEM learning approaches in elementary schools. Activity is vital in STEM learning at the primary level, so the design of this approach should not ignore students' outward instincts.

Put, science, math, and technology activities must be combined with a series of play activities to support a fun and meaningful learning process for students. The challenge lies in the ability of primary school teachers to design STEM learning designs that take into account students' characteristics and relate their cultural dimensions. The next question is how primary school teachers implement cultural relevance in STEM teaching. Brown et al. (2019) emphasized that teachers must have a concrete understanding of cultural information (including values and habits) to integrate it with STEM approaches. By understanding and integrating culture in STEM

ISSN (Online): 2961-9602

learning, teachers can create more engaging, relevant, and meaningful learning experiences for students, thus increasing their motivation and understanding of STEM concepts.

CONCLUSION

This article highlights the importance of integrating cultural values in STEM approaches to create more engaging, relevant, and meaningful learning experiences for students. This cultural integration involves understanding the cultural context, utilizing local cultural resources, and developing learning materials tailored to students' needs and interests. Further research focusing on the implementation of STEM in primary schools by considering the diverse cultural contexts in ASEAN can significantly contribute to promoting educational progress in the region. Developing a cultural analysis framework in the STEM approach for primary schools is a crucial first step. This article concludes that culturally responsive STEM approaches can potentially increase students' motivation, engagement, and understanding of STEM concepts while preparing them to face future global challenges. Integrating culture in STEM will create a more inclusive and relevant education system for all students while supporting participation and collaboration in building a broader perspective.

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DEVELOPING INDONESIAN E-MODULE ASSISTED BY STORYTELLING PODCAST CONTAINING CHARACTER EDUCATION

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Keyword

e-module, Indonesian, podcast, education, character, elementary school.

Abstract

The aim of this paper was to develop an Indonesian e-module with the help of a storytelling podcast containing character education in elementary schools. The study used ADDIE model research and development (R&D) method. The research phase was designed in five stages, namely (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. The study result was a product of Indonesian e-module and storytelling podcast containing character education. ADDIE model R&D method showed that e-module was effective in increasing students' knowledge. This Indonesian e-module assisted by a storytelling podcast containing character education is very suitable in student learning in elementary schools.

INTRODUCTION

Education has experienced a very rapid development through digital learning by utilizing the development of information and communication technology. Our society has now envolved from digital immigrant to digital native generation (Pensky, 2001). Innovations from the use of technology need to be adopted into the curriculum and learning.

Learning in elementary schools in the Merdeka curriculum requires teaching modules that contain learning objectives, steps, and media, as well as assessments needed in one unit/topic based on the Learning Objective Flow (Kemdikbudristek, 2023). Apart from being a learning resource and learning media, the module also acts as an intermediary or liaison from the information provider, namely the teacher to the recipient of the information or students which aims to stimulate students to be motivated, and able to participate in the learning process in a complete and meaningful way (Hasan et al., 2021). Problems occur when the modules provided by the Ministry of Education, Culture, and Research to be used are very limited in number. As a result, it is necessary to develop teaching modules by teachers to accommodate the needs. The next problem is the use of student worksheet books made of opaque paper. These teaching materials are very boring and uninteresting for students. In addition, the use of student worksheet emphasizes too much on the cognitive side and memorization, while learning in the Merdeka curriculum also emphasizes the development of student's character. The cultivation of character value in the Merdeka curriculum is synthesized with the project of strengthening the Pancasila student profile which consists of six dimensions, namely 1) faith, devotion to God Almighty, and noble character, 2) independence, 3) mutual cooperation, 4) global diversity, 5) critical reasoning, and 6) creative (Keputusan Badan Standar, Kurikulum, Dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi Nomor 009/H/KR/2022

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Tentang Dimensi, Elemen, Dan Subelemen Profil Pelajar Pancasila Pada Kurikulum Merdeka, 2022).

Based on the background mentioned, the use of technology in learning becomes more urgent to be applied. The design of digital learning modules is important to be applied to learning. Electronic modules are one of the digital-based non-print teaching material products that are independently designed to be studied by students (Kuncahyono, 2018). Modules must also be prepared by considering the cultivation of character values. Character education is the intentional, proactive effort by schools, districts, and states to instill in their student important core, ethical values such as caring, honesty, fairness, responsibility, and respect for self and others (Singh, 2019). The cultivation of character values can be done well through stories. Storytelling can be an effective medium to teach character to Indonesian children (Hendarman, 2020). Stories that are interesting and rich in character values can influence the personality of students. Stories that are routinely obtained by children, it is hoped that the process of internalizing good character as shown by the characters will occur within the children (Nayla et al., 2023).

The combination of modules as teaching materials and as storytelling media, will be delivered through podcast media. A podcast is a form of episodic digital audio that is uploaded to an online platform to be enjoyed by the general public (Phillips, 2017). Learning media using podcasts can also increase student's interest in learning because it is something new and varied so that students do not feel bored in carrying out learning (Heshmat et al., 2018). The added value that can be carried out from this study is the combination of digital modules and podcasts that contains character values.

METHOD

Educational development research is conducted to produce electronic module learning products. The electronic module is then tested for feasibility before being used in learning (Gall et al., 1996). The purpose of this research is to produce an Indonesian learning module in the form of electronic module assisted by storytelling podcast containing character education that feasible to be applied to learning. Product development refers to the steps of ADDIE model research and development method. The development of the ADDIE model is carried out in five stages. Based on the development model, the developer applies it into the development procedure (Chaeruman, 2008), namely analysis, design, development, implementation, and evaluation.

Based on the data to be used, the data divided into two types, namely narrative data (qualitative) and numerical data (quantitative). Data collection technique in this study used document study techniques, interview techniques and filling out questionnaires, and test techniques. The research subjects in this study were teachers, principals, and students in total 20 students of SDN 4 Sampang, Sempor sub-district, Kebumen district.

Qualitative analysis techniques in the form of comments, suggestions, and input from validators on e-module products. Quantitative analysis in this study was a data analysis for questionnaires of material experts and media experts with the following formula. The qualitative analysis technique consists of comments, suggestions, and feedback from validators on the e-module product. The quantitative analysis in this research involved data analysis for the questionnaires from material experts and media experts using the following formula.

1) Data formula per item

   P = $\frac{X}{X_1}$ x 100%

   Description:

   P : Percentage (%)

   X : Number of answer scores from respondents

   X_1 : Total scores of the instrument

2) The formula for processing data for all item is

ISSN (Online): 2961-9602

$P = \frac{\sum X}{\sum X_1} \times 100\%$

Description:

P : Percentage (%)

$\sum X$: Total score of all respondent's answer

$\sum X_1$: Total number of maximum scores in the whole instrument

After obtaining the results of the data processed using the formula above, the results were compared with the eligibility criteria as follows:

Table 1. Criteria for the feasibility level of web-based teaching materials (Sugiyono, 2016)

Category	Percentage	Qualification	Equivalent
4	86% - 100%	Not revised	Very Feasible
3	76% - 85%	Not revised	Worth
2	56% - 75%	Needs revision	Decent Enough
1	≤ 55%	Must be revised	Not Feasible

Test effectiveness through the research design model regarding the effectiveness of learning using the One Group Pretest-Posttest Design which can be seen in table 3 follow:

Table 2. Effectiveness Design Model

Class	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2

RESULTS

This study aims to develop an electronic module or e-module of Indonesian with the help of podcast storytelling containing character education for elementary school students. The analysis stage included document analysis to find out the available learning documents. Based on the analysis of existing documents, it was concluded that the teaching module used by the school was not available. The school only relied on lesson books and student worksheet books. Analysis of the needs of teachers and students concluded that there was a need for learning modules to support the learning process.

The design stages included determining learning objectives, determining product specifications, and creating product prototypes. Product development was done using Canva for Education while podcast creation used the Spotify for Podcaster application. The podcast audio was recorded using The Dolby On application. Afterward, the recording results were processed using The Audacity application to create storytelling containing character education. The following is the interface of the electronic module.

ISSN (Online): 2961-9602

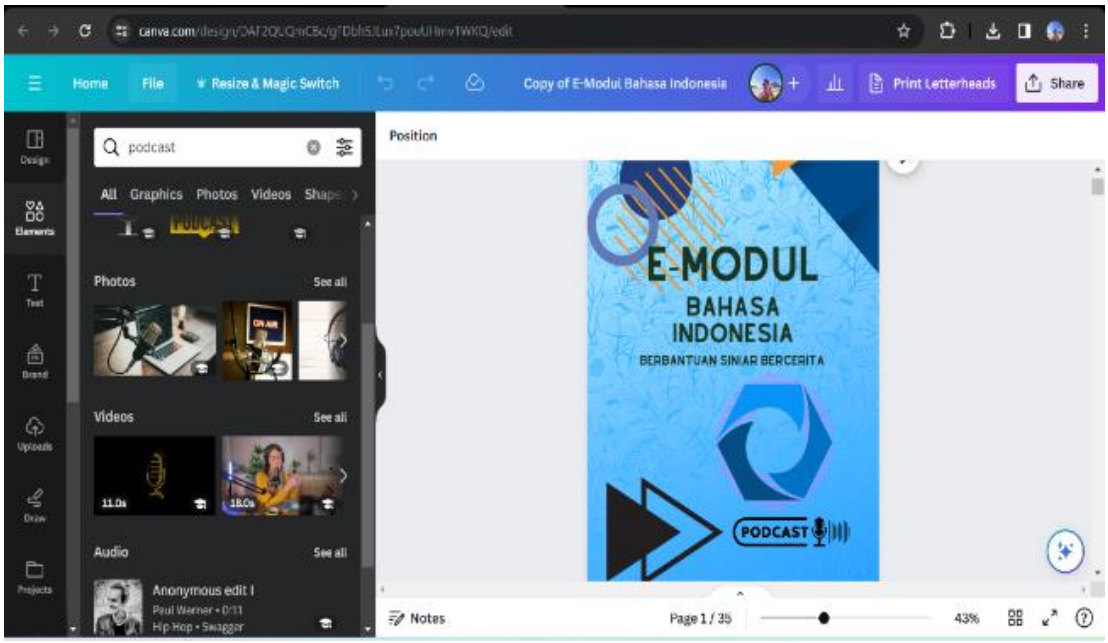

Figure 1. E-Module Creation View in Canva

The development stage carried out through the product feasibility validation process. The validation included material expert validation and media expert validation. The results of the material expert validation presented in table 3 below.

Table 3. Material Experts Validation Results

No.	Aspects	Total Score	Conclusion
1	Content Component	42	Very suitable for use without revision
2	Language Component	15	
3	Material Presentation Component	27	
4	Media Component	66	
	Total	150	
	Maximum Score	160	
	Assessment and Eligibility Criteria	94%	

The results of the media expert validation presented in the table 4 below.

Tabel 4. Media Expert Validation Results

No.	Assessment Indicator	Assessment Score					Conclusion
		1	2	3	4	5	
1.	The module tittle represents the overall material to be learned				√		Very suitable for use without revision
2.	Module tittle interests the reader					√	
3.	Module pages are well organized					√	
4.	Typeface selection makes it easier for students to read					√	
5.	Attractive font selection					√	
6.	Font size selection makes it easy					√	
7.	Ease of accessing and using the device					√	
8.	Practicality of using e-modules assisted by storytelling podcasts					√	

ISSN (Online): 2961-9602

9.	Ease of operating the e-module	√	
10.	Systematic order of the e-module		√
11.	Easy access to audio storytelling podcasts		√
12.	Audio quality on storytelling podcast	√	
13.	Use of sentences and words according to good and correct Indonesian	√	
14.	Accuracy in the use of effective and efficient sentences.		√
Total score		66	
Total Maximum Score		70	
Validity Assessment and Criteria		94%	

The implementation stage carried out by testing the feasibility of the product on teacher and students. The results of the feasibility test presented in the table 5 below.

Table 5. Feasibility Test Results

No.	Aspects	Total Score		
		R1	R2	Average Score
1	Content Component	42	43	42,5
2	Language Component	15	15	15
3	Material Presentation Component	27	26	26,5
4	Media Component	66	68	67
	Total	150	152	151
	Maximum Score	160	160	160
	Assessment and Eligibility Criteria	94%	95%	94%

The evaluation stage carried out in learning to determine the effectiveness of the electronic module. Indicators of the effectiveness of the use of Indonesian e-modules assisted by storytelling podcast containing character education measured through learning outcomes or tests. The difference in effectiveness before using the product and after using the product assessed using a T-test analysis (independent sample T-test). The following were the results of the significance hypothesis test in this study.

Table 6. Descriptive Statistics Results

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Indonesian Pretest	63,80	20	9,578	2,142
	Indonesian Posttest	81,00	20	6,207	1,388

Table 7. T-test Results

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Indonesian Pretest –	-17,200	4,124	,922	-19,130	-15,270	-18,650	19	,000

ISSN (Online): 2961-9602

Indonesian	
Posttest	

Based on the output table of the T-test results, the sig value = 0.000 is obtained, which means it is smaller than α 0,05. Thus H_0 is rejected and H_1 is accepted. H_0 = there is no difference in Indonesian test scores before and after using the Indonesian e-module product assisted by storytelling podcast containing character education. H_1 = there is a difference in Indonesian test scores before and after using the Indonesian e-module product assisted by storytelling podcast containing character education.

Based on the results of the descriptive analysis, the average value of student's pretest was 63.80 and posttest was 81. This indicated an improvement in the Indonesian test scores after using the Indonesian e-module product assisted by storytelling podcast containing character education. Thus, it can be concluded that the use of Indonesian e-module product assisted by storytelling podcast containing character education has a significant effect on improving Indonesian scores.

DISCUSSION

Based on the study that has been conducted, it was found that the use of Indonesian e-module product assisted by storytelling podcast containing character education is effective to be applied in student's learning in elementary schools. This result is in line with the character of the module which is able to foster creativity, productive thinking habits, create active, effective, innovative and fun condition (Budiarti et al., 2016). Electronic modules are also self-instructional, self-contained, stand alone, adaptive, and user friendly (Kementerian Pendidikan dan Kebudayaan, 2008)

CONCLUSION

This research and development produced a product, namely an Indonesian e-module product assisted by storytelling podcast containing character education. This research and development process used the ADDIE model. The results of the material expert validation of this e-module obtained assessment data from the total of all aspects is 94% with very feasible criteria. The results of media expert validation of this e-module obtained assessment data from the total of all aspects are 94% with very feasible criteria. The results of the effectiveness test using the percentage of completeness scores were 80% of students complete. Hypothesis testing using data analysis of experimental research design one group pretest-posttest average value of 81. The class average score after using the product increased by 17,20 from 61,80. Hypothesis testing on the T-test stated a significant difference before and after using the e-module.

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Building The Bridge for Teacher-Parents Collaboration in Enhancing Children Critical Literacy Skills: A Systematic Literature Review

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Keyword
teacher-parent collaboration, critical reading, critical reading strategies

Abstract

This study aimed to analyze the impact of collaboration between teachers and parents on enhancing students' critical reading abilities. It examines existing literature on the collaboration between teachers and parents in primary schools, particularly emphasizing critical reading proficiency. A systematic search was conducted across five databases using specific criteria to select studies for further analysis. The findings suggest that collaborative efforts between teachers and parents significantly contribute to advancing and diversifying students' critical reading skills. Various strategies can be employed to facilitate this collaboration. Moreover, teachers and parents alike must enhance their knowledge not only on methods to improve children's critical reading skills but also on understanding each other's perspectives and backgrounds. Further research is essential to grasp these factors comprehensively and to develop and assess the impact of parental or teacher beliefs on children's critical reading abilities. Notwithstanding the existing disparities, the outcomes of this review underscore the potential of teacher-parent collaboration in enriching children's critical reading capability.

INTRODUCTION

In today's educational landscape, there is a growing recognition of the significance of teacher and parent collaboration in fostering critical literacy skills among students (Griffiths et al., 2021). Educators and parents are increasingly aware that by working together, they can create a more holistic approach to education and ensure that students develop the necessary skills to analyse and critically evaluate information. This collaboration allows for a seamless integration of critical literacy strategies both at school and in the home environment, establishing a consistent and supportive learning experience for students (Sahiruddin & Herminingrum, 2021). Furthermore, it strengthens the connections between classroom learning and real-life application, enabling students to better contextualize and apply their critical thinking or critical reading abilities (Sahiruddin & Herminingrum, 2021).

Critical reading skills plays such a crucial role in children's overall academic development. Not only does it enhance their language and communication skills, but it also equips them with the necessary tools to navigate through complex texts and comprehend various subject matters (Alencar et al., 2021). Many students, however, struggle with comprehension, particularly when it comes to content areas (Wells et al., 2022). As such, it is imperative for teachers and parents to collaborate in order to support and guide children in their critical reading journey (Mudzielwana, 2017).

To begin with, teachers have the theoretical knowledge and strategic planning skills required to create an environment conducive to learning. They can structure their lessons in a way that promotes active participation and engagement from the students. This can include incorporating

ISSN (Online): 2961-9602

various reading strategies and techniques, such as predicting, questioning, summarizing, and making connections (Idulog et al., 2023). Teachers can also utilize a variety of instructional materials and resources to cater to different learning styles and abilities (LeCompte et al., 2017). Additionally, teachers can foster a love for reading by exposing students to a wide range of genres and encouraging independent reading outside of the classroom (Minor, 2023). However, teachers alone cannot fully meet the needs of their students. Parents play a vital role in supporting their children's critical reading skills (Senechal & Young, 2008).

Parents can provide a supportive home environment by creating a designated reading space and setting aside regular time for reading. Furthermore, parents can act as reading role models by openly discussing their own reading habits and sharing their love for books with their children (Barza & Suchodoletz, 2016; K. DeLoatche et al., 2015). Moreover, parents can collaborate with teachers by staying informed about their child's reading progress and participating in parent-teacher conferences or meetings (Brown & Poortman, 2018). This collaborative effort between teachers and parents allows for a more holistic approach to children's critical reading development. In this collaboration, teachers can provide guidance and support based on their expertise, while parents contribute by creating a conducive home environment and actively participating in their child's reading journey (Højholt & Kousholt, 2019).

The collaboration between teachers and parents in children's critical reading is crucial for their academic success (Saracho, 2017). It allows for a comprehensive and cohesive approach to developing critical reading skills, as both teachers and parents bring unique perspectives and resources to the table. Moreover, by working together, teachers and parents can create a consistent and reinforcing environment that encourages students to practice and refine their critical reading skills both in and out of school (Bruns & Luque, 2014; Garmston & Wellman, 2016). By collaborating and supporting each other, teachers and parents can ensure that children have the necessary skills and strategies to comprehend complex texts, make connections, and construct meaning from what they read (Sarce, 2021). Additionally, the collaboration between teachers and parents can help to address any challenges or difficulties that students may encounter in their critical reading journey (Louick et al., 2016). By working together, teachers and parents can identify areas of improvement, share strategies, and provide targeted support to help students overcome obstacles and strengthen their critical reading skills (Minor, 2023). In conclusion, the collaboration between teachers and parents in children's critical reading is essential for fostering academic success (Pantao, 2021). It ensures a comprehensive approach to developing critical reading skills and provides support for students in both the school and home environments (Graham & Bellert, 2004).

Numerous research studies have indicated that the collaboration between teachers and parents plays a pivotal role in improving students' reading abilities (Friesen et al., 2014; Walpole et al., 2004). However, a significant gap remains in understanding the specific strategies and approaches that can effectively foster this collaboration, particularly in the domain of critical reading skills (De Jong & Hawley, 2012). One area that requires further exploration is the integration of research-based instructional practices within the collaborative process between parents and teachers. While studies have examined the benefits of evidence-based interventions, such as Collaborative Strategic Reading (CSR), the extent to which these strategies are implemented and sustained through parent-teacher collaboration is not well-documented (Minke et al., 2014; Sime & Sheridan, 2014). Researchers have also noted the need to investigate the contextual factors that facilitate or hinder successful collaboration, including school culture, sociocultural factors, administrative support, and the dynamic between individual parents and teachers (Hodges et al., 2016; Salako, 2023).

This systematic literature review aims to examine the present status of research on the collaboration between teachers and parents in the context of children's critical reading. The primary focus is on addressing the following research question:

ISSN (Online): 2961-9602

1. How does collaboration between parents and teacher can improve children critical reading skills?
2. What kind of collaboration and strategies can teacher and parents use for enhance children critical reading skills?

METHOD

In the pursuit of this systematic review following the PRISMA guidelines, our objective was to examine the efficacy of collaboration strategies utilized by parents and teachers in improving children's critical reading abilities. We extensively explored five databases namely: ScienceDirect, SAGE, ERIC database, Taylor and Francis, and Semantic Scholars by employing specific keywords associated with different types of collaboration between teachers and parents (such as collaboration between teachers and parents, parental or teacher involvement) and critical reading skills (encompassing critical literacy, critical reading in primary education). Our inquiry was customized to pinpoint research works released between 2014 and 2024 that were accessible in the English language. We sought out research on identification that specifically concentrated on the collaboration between teachers and parents, with the aim of enhancing children's critical reading skills and targeting elementary school students.

The criteria for inclusion were specific, giving preference to studies that presented clear indications of parents and teacher collaboration and were readily available in complete form on the internet. Conversely, studies focusing on elementary school students were omitted, as were review articles, case studies, or those not listed in either the Web of Science or Scopus, two prominent databases for citations. This exclusion also applied to studies lacking complete online access. The criteria for selection and exclusion, in addition to the search process and results, are illustrated in Figure 1, offering a visual overview of our systematic review approach and the subsequent process of selecting studies (Alanazi & Abdulkader, 2024). First, research studies undergo a screening process that involves evaluating their titles and abstracts against specific inclusion and exclusion criteria. This stage is intended to identify studies that are irrelevant and can be excluded, as well as those that meet the criteria for a more detailed examination of the complete text. Subsequently, the entire document is scrutinized to ascertain its relevance to the research question and its alignment with the predetermined requirements.

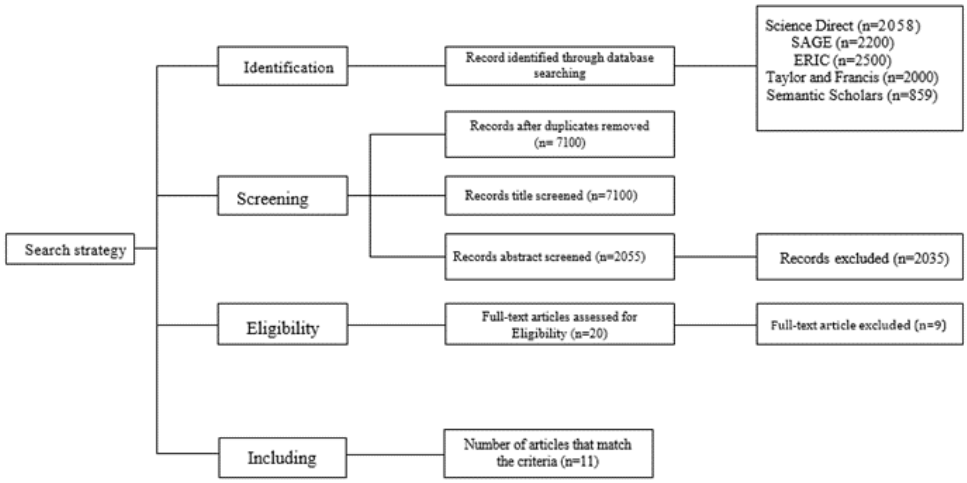

Figure 1. Study selection flowchart

In this systematic literature review, the researcher focused on selecting studies that examine the impact and the strategies for teacher parent's collaboration in enhancing children critical

ISSN (Online): 2961-9602

reading skills. The following criteria were utilized to determine which papers would be included in the review: (1) In order to ensure the reliability and academic credibility of the findings, only studies that have been published in peer-reviewed journals were considered. (2) The articles were published within the last ten years, starting from 2014 until 2024. (3) The term of teacher-parents collaboration was broadly defined as how teacher and parents involve or make contribution to children literacy (as such as the literacy strategies, media literacy, home or school literacy). (4) The scope of reading skills was specifically focused on critical reading in the classroom and home settings (education settings) (5) The studies were focused on elementary school students, parents and teacher are included. Kindergarten settings are acceptable as long as the subject was children between 6 until 8 years old. Middle and high school were excluded (6) The language of article is English and the type of article is a full empirical paper.

After applying our specific keywords, the results were initially filtered. First, the databases showed the identification of 9,617 research studies. Following the application of our set inclusion criteria, the outcomes were initially sieved. The elimination of 3, 517 replicated publications led to a remaining pool of 7,100 studies for subsequent scrutiny. Screening of titles was performed on these publications to ascertain their alignment with our predefined criteria. Following this procedure, a total of 3,000 studies were excluded because they were classified as either case reports or review articles, making them unsuitable for our analysis. An additional 2,045 studies were excluded from our deliberation on the grounds that despite having titles and abstracts in English, the complete manuscripts were presented in languages other than English, thereby impeding accessibility for our review. The process of screening led to 2,055 studies advancing to a more comprehensive assessment. During this phase, 1,015 articles were eliminated due to their lack of emphasis on critical reading skills, while another 1,020 were disregarded for not including the full paper.

Following a comprehensive examination and evaluation, only 11 articles satisfied all the criteria for inclusion, synthesis, and thorough analysis in our systematic exploration of the literature. Two instruments were utilized to evaluate the overall caliber of each article in this investigation: the Evaluative Tool for Quantitative Research Studies and the Review Form for Qualitative Research (Flemming, 2010; Gall, 2014). The study's setting, sample size, research methods and results were scrutinized and extracted.

RESULTS

Table 1 presents an overview of 11 research studies that investigated the impact of collaborative efforts between teachers and parents on enhancing critical reading abilities. These studies demonstrate a range of differences of research samples, type and duration of interventions, method and the results obtained. The first question asks about how does collaboration between parents and teacher can improve children critical reading skills. In most cases, the response to this question is indeed positive, since the majority of research findings show the beneficial outcomes of teacher-parent collaboration on children's literacy development, and also on children's critical reading skills. On the other hand, some scholarly works also identify hurdles or shortcomings in the execution or assessment of the cooperation between parents and teacher, for example, communication difficulties, parental lack of knowledge, and other contributing aspects.

Table 1. The summary of the selected studies

Reference	Sample size	Sample age	Intervention/ Methode	Group or individual intervention	Results
(K. J. DeLoatche et al., 2015)	26 children	6-8	Quasi Experiment	Group	The parental-guided early literacy intervention as a strategy to promote

ISSN (Online): 2961-9602

					parental involvement in activities within the home among families participating in the Head Start program.
(Egger et al., 2015)	39 teacher	8-10	Interview (Qualitative)	Individual	Educators present three distinct perspectives on the relationship between school and family. These include viewing schools and families as separate entities in the socialization process, considering them as distinct participants in socialization, and recognizing cooperation as a collaborative effort within a professionalized working relationship.
(Harji et al., 2017)	25 children & parents	6-8	Interview (Qualitative)	Individual	The greater the collaboration between parents and teachers, the more pronounced the advancement in children's reading skills.
(Jackson & Doell, 2017)	3	9-10	Interview (Qualitative)	Individual	An examination of an intervention process exposed the methods through which the researcher and individual parents forged a collaborative partnership, leading to the parents' creation and utilization of reading coaching strategies that were appropriate within the given context to enhance their child's reading progress.
(Javier & Jr, Jubay, 2019)	10	11	Quasi experiment	group	There is a significant difference of children reading skills before and after the exposure to parent-teacher collaboration.
(Huang, 2019)	10	7-8	Qualitative	Individual	Parent-child reading is crucial for children's language learning and social development
(Ntoulia, 2020)	450	9-12	Survey (Quan)	Group	Teacher-parents collaboration is crucial for children reading improvement
(Hamengkubuwono et al., 2022)	30	9-12	Quasi Experiment	Group	The experiment showed that teacher collaboration had a more positive and

ISSN (Online): 2961-9602

					significant effect on students' critical thinking skills.
(Syazwan et al., 2022)	100 parents		Survey	Individual	By using teaching aid for children in the learning process, children can gain more experience through teaching and learning from the parent.
(Myende & Nhlumayo, 2022)	10 parents		Qualitative	Individual	The findings suggest that we need to question the current dominant notion of what parental involvement is and consider roles that parents from different contexts can play when collaborating with teachers.
(Bernal et al., 2023)	191	12	Survey	Individual	Didactic strategy mediated by memes and parents' involvement can strengthened the students' critical reading skills

DISCUSSION

Collaboration between parents and teachers plays a crucial role in enhancing children's critical reading skills (Sahiruddin & Herminingrum, 2021). Research has shown that parent-child reading activities significantly promote language development and social skills in children (Harji et al., 2017; Javier & Jr, Jubay, 2019). Additionally, structured programs that involve both parents and teachers, such as the Smart Partnership in Reading in English (SPIRE) project, have been successful in fostering a culture of reading among children. The SPIRE project demonstrated that when parents and teachers work together to scaffold children's reading development through activities like reading storybooks at home, children benefit greatly, showing improved reading progress and critical thinking skills (Hamengkubuwono et al., 2022). Ultimately, the combined efforts of parents and teachers create a supportive environment that nurtures critical reading skills in children, leading to better academic outcomes and overall development (Huang, 2019).

When parents and teachers work together, they can provide consistent support and guidance to children in developing their reading abilities (Ntoulia, 2020). Parents can share information about their child's reading habits and preferences with teachers, allowing educators to tailor instruction and provide appropriate reading materials (Capotosto et al., 2017). Teachers can also provide parents with strategies and techniques to support their child's reading at home, such as engaging in shared reading activities, asking open-ended questions to promote critical thinking, and providing a print-rich environment (Syazwan et al., 2022).

Although several studies state that collaboration between teachers and parents is mutually beneficial, other research also shows that a common understanding is needed between teachers and parents regarding patterns and forms of collaboration and cooperation that can mutually support each other in optimizing children's reading abilities (Myende & Nhlumayo, 2022). In this case, teachers need to ensure and truly understand the different backgrounds of parents before collaborating. By understanding these different backgrounds, the collaboration that is formed will be in accordance with the students' needs and situations. This collaboration will ensure that children receive comprehensive learning both in school and at home. Additionally, collaboration

ISSN (Online): 2961-9602

between parents and teachers allows for a holistic approach to literacy development (Swain & Cara, 2017).

The second question ask about what kind of collaboration and strategies can teacher and parents use for enhance children critical reading skills. The strategies that parents and teacher can do, one of them is make a regular communication (K. J. DeLoatche et al., 2015; Egger et al., 2015). Teachers and parents should communicate regularly to discuss the child's progress in reading, areas of improvement, and strategies that can be implemented both at home and in the classroom. Not only that, teacher and parents can utilize a variety of reading materials, with diverse reading materials, including books from the school library, local storybooks, and children's books brought from home (Jackson & Doell, 2017). In this reading activities, teachers and parents can work together to create engaging and interactive reading that encourage critical thinking and analysis. Teachers and parents also can teach and reinforce specific reading comprehension strategies, such as making predictions, summarizing, making connections, and asking questions while reading (Bernal et al., 2023; Sahiruddin & Herminingrum, 2021). Teacher also can encourage parents to have an active role in their child's reading development by reading with them, discussing books, and providing support and feedback (Jackson & Doell, 2017).

Sahiruddin & Herminingrum (2021) mention in its research that teachers and parents can collaborate on reading projects or book clubs where they select and read books together, discuss them, and share their thoughts and insights. Both teachers and parents also can emphasize the importance of independent reading and provide children with opportunities to choose their own books and explore their interests (Syazwan et al., 2022). Teachers and parents also can work together to monitor the child's progress in reading and provide constructive feedback to help them improve their critical reading skills. Meanwhile, teachers and parents can share resources, such as reading materials, online resources, and educational apps, to support children's critical reading skills (Syazwan et al., 2022). Not only that, sharing the knowledge and experiences by workshop or training together can help both teacher and parents in learning the effective strategies for enhancing children's critical reading skills and share their knowledge and experiences with each other (Hamengkubuwono et al., 2022).

Teachers and parents share a common goal of ensuring that children become proficient readers who can comprehend and analyze texts critically (Saracho, 2017). By working together, they can create a supportive and enriching learning environment that fosters the development of these skills. This collaboration can take place through various activities and practices. Reading literacy programs in schools can provide structured opportunities for students to develop their critical reading skills (Fauziyyah et al., 2020). Additionally, regular coordination between teachers and parents through parent-teacher conferences, progress reports, and other forms of communication can ensure that they are on the same page about the child's progress in critical reading skills (Lyesmaya et al., 2020).

CONCLUSION

In this systematic review, eleven studies were chosen based on pre-established criteria for inclusion and exclusion. The participants' age span in the studies ranged from 6 to 12 years, also teacher and parents as a subject of research. The study sample sizes varied from 3 to 450 students, predominantly consisting of student and parents groups. The findings derived from this review predominantly align with the notion that teacher parents collaboration indeed have a crucial effect on children critical reading ability.

The findings from the sources suggest that teachers and parents play important roles in promoting reading literacy and creating a supportive reading environment for children. Teachers utilize various resources and strategies such as local story books, character-building books, and reading literacy programs to enhance children's reading skills. Additionally, teachers and parents engage in regular coordination and partnership through parent-teacher conferences, progress reports, and communication channels. This collaboration allows for monitoring and facilitating

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students' reading literacy development. It is evident that the collaboration between teachers and parents in children's critical reading skills is highly beneficial. This collaboration helps create a consistent and supportive reading environment for children, enhances their reading skills, and improves their overall academic achievement.

Nevertheless, the cooperation among teacher and parents may not consistently enhance the critical reading abilities of students. Prior to establishing collaborative endeavors, specific factors must be taken into account. Among these is the necessity for teacher to reflect on their backgrounds, objectives, and values, while also ensuring parity in the teacher-parent relationship. Furthermore, alignment in perspectives and trust levels between teacher and parents can further enhance the effectiveness of the resulting collaboration.

The implication for school can facilitate teachers and parents to work together to improve students' critical reading skills. The facilities provided can be in the form of providing knowledge and skills for teachers and parents related to the development of critical reading skills. Schools are also expected to encourage teachers and parents to develop cooperation without ignoring cultural backgrounds or values.

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DEVELOPMENT OF POWTOON ANIMATION WEB-BASED LEARNING MEDIA FOR ADAPTIVE EARLY CHILDHOOD LEARNERS DIGITAL LITERACY IN THE FACE OF A DESTRUCTIVE ERA

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Keyword

Powtoon, Preschool Learners, Adaptive, Destructive

Abstract

The research aims to explain the effectiveness of PAUD teachers in using powtoon animation web-based video media by promoting adaptive children in facing the destructive era . The method in this study uses development that produces products in the form of powtoon animation web-based learning video media. Before using the media, a validation test was carried out by media expert validators and material expert validators. Based on the results that have been obtained, powtoon web-based learning video media is a medium that can and should be used by teachers in teaching at Aisyiyah PAUD throughout Surakarta City. This is indicated by the results of media feasibility which reached an average score of 96.30. Suggestions for PAUD teachers are that this media is expected to be able to facilitate students to learn independently accompanied by parents at home because the ease of technological developments that are right on target will be able to combat destructive content.

INTRODUCTION

Early childhood education is a fundamental construct for a child's growth. A child must be able to choose a proper education and certainly in accordance with current developments. In fact, with current developments, teachers and parents have not been able to fully control the disclosure of information that is increasingly unavoidable. Therefore, an educator, whether teacher or parent, must be able to master technology in the current era. So that educational institutions must be adaptive to current technological developments [1]. The development of information and communication technology has penetrated all lines, including the world of education. In an effort to improve the quality of education, one that can be achieved by utilizing technological sophistication, especially in the learning process and delivery of material. Especially in the current digital era, children have struggled in the online world, so it is necessary to develop learning media. Aisyiyah PAUD teachers throughout Surakarta City are currently familiar with digital literacy but need to teach students with more creative, innovative and adaptive media. A teacher is required to be able to follow the development of a child, because in today's open era children can access everything. So there needs to be collaboration between teachers, parents and stakeholders to be able to develop learning that can foster children's interest in learning seriously. Researchers have explored learning programs supported by new technologies to improve learners' abilities in productive and collaborative knowledge. [2].

In the teaching and learning process, learning media can also arouse the enthusiasm for learning and high interest of students, besides that it can also arouse students' learning motivation, and even have a psychological influence on students. [3]. The use or use of media can also increase students' understanding of lessons at school. Media is used to have the position of

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teacher aids in the teaching process, for example slides, photos, graphs, films, and learning using computers that are useful for capturing, processing, and reassembling visual and verbal information [4]. [4].

As an aid in teaching, the media is also expected to provide concrete experiences, motivation to learn, increase the absorption and retention of students' learning. According to [5] the development of learning media requires that teachers/instructors are able to use the tools provided by the school, and it does not rule out the possibility that these tools are in accordance with the development and demands of the times. The learning system is implemented through a personal computer (PC) or laptop device connected to an internet network connection. Educators can conduct joint learning at the same time using groups on social media such as WhatsApp (WA), telegram, instagram, zoom application, google meet or other media as learning media. In addition, there are also several other media that can be used to support the implementation of online learning, for example, in virtual classes using Google Classroom, Edmodo, and Schoology services (Enriquez, 2014). [6]. Thus, PAUD educators can ensure that students can follow the learning at the same time, although in different places but also need assistance from parents.

However, many cases occur when implementing the use of online learning, including the uneven distribution of students and parents of students who are good at operating online media, then not all parents of students can afford to buy internet kouta, internet signals in students' homes are not affordable, most parents of students whose economic conditions are mediocre, and also do not have smart phones or smartphones as a means of learning online for their children. In addition, the cause of low learning outcomes is the selection of learning methods and media used by teachers in the learning process is very inappropriate and the management of learning activities that are still unable to generate optimal student motivation. [7].

Learning through online media is now widely used, especially many who use social media. Another social media utilization is also applied at the University of Romania. In an article entitled *"social media literacy in Romanian universities-are we ready yet?"* in 2014 showed that the importance of social media literacy for Romanian students. Satisfaction was found regarding the Social Media utilization of their professors. Many media documents posted by professors such as authors, distributors, sources, advisors and architects were considered relevant and useful by the students. Among other social media utilization are as (1). Means of learning, listening, and conveying; (2). Means of documentation, administration and integration; (3). Means of planning, strategy and management; and as (4). Means of control, evaluation and measurement. In utilizing the media, if it is used properly, it will have a positive impact on both knowledge and individual skills. [8].

Learning media is a tool or intermediary that is useful to facilitate the teaching and learning process, in order to streamline communication between teachers and students. This is very helpful for teachers in teaching and makes it easier for students to receive and understand lessons. This process requires teachers who are able to harmonize between learning media and learning methods. The use of learning media in the teaching and learning process can also arouse new desires and interests for students, arouse learning motivation, and even have a psychological influence on students in particular. In addition to increasing students' learning motivation, the use or utilization of media can also increase students' understanding of lessons. The media utilized has a position as a teacher's aid in teaching. For example, graphics, movies, slides, photos, and learning using computers. The point is to capture, process, and reorganize visual and verbal information. As an auxiliary tool in teaching, the media is expected to provide concrete experiences, motivation to learn, increase the absorption and retention of students' learning.

Based on the results of observations conducted by researchers at Aisyiyah PAUD institutions throughout Surakarta City, it is considered that there is still a lack of digital literacy in the learning carried out and the lack of learning media used because the learning media used only use Power Point in the form of images and videos, or text, and also lectures only, so that the learning conditions in the classroom are boring for students who are still children.

Media is a source of learning and broadly speaking, learning media can be interpreted as people, objects or events that allow students to acquire knowledge and skills. Media itself is a

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communication tool to further streamline the teaching and learning process. [9]. Media is a tool that can be in the form of anything to serve as a channel for messages to achieve learning objectives. According to Hamalik as referenced by [10] the presence of learning media is one of the components in the learning process that is indispensable, given that the position of the media is not just a teaching aid, but rather an integral part of the learning process. In addition to being able to replace some of the duties of educators as presenters of material, the media also has unique potentials that can help students learn. [11].

The use of audio-visual media can increase children's attention with an attractive display, this makes students interested in the course of the video learning and remain in a state of concentration and attention. Audio-visual media that displays the reality of the material can provide real experience to students when learning it so as to encourage self-activity. Learning Media Function According to Oemar Hamalik in [12]"The use of learning media in the teaching and learning process can arouse new desires and interests, arouse motivation and stimulation of learning activities, and even have psychological effects on students." The learning message conveyed by the teacher without using the media will feel bland and will not make an impression if it does not use the media. Likewise, the enthusiasm of students to learn is very low and can even be said to be absent. When learning has reached a saturation point and there is no enthusiasm for students to continue learning activities, then the presence of a media will feel very helpful and indispensable. This explains that learning media that use elements of images, writing and sound can increase attention, bring learners to understand ideas and get information that is very complex and requires its own explanation, and can overcome the limitations of time, size and place [13]. [13]. Thus, the right and appropriate media is needed so that it can be understood and understood easily by students.

The selection of appropriate learning media will make students not bored and motivated to learn. Learning media is very good for the benefits of students because it adds knowledge and can foster a spirit of learning for students. [14]. The use of well-designed learning media can arouse motivation and stimulation of learning for students and improve understanding of learning materials so that it will have an impact on improving the quality of education [14]. [5]. The average learning in every school that does not use learning media makes students less motivated to learn and makes students bored. This will have an impact on the low learning outcomes of students.

In reality, in developing the potential of PAUD students, they still cannot develop properly, they are still dependent on the teacher in discovering their potential. Where the text power point media used by PAUD teachers tend to be saturating for students, thus making students less creative in capturing the material that has been delivered by the teacher through the power point, and less effective in learning. Therefore, it is necessary to develop creative learning media that can increase the attractiveness of students to learn.

Thus, learning media is important in realizing an effective and efficient learning process so that learning objectives can be achieved. This is similar to Kemp and Dayton who state that the positive impact of using media includes learning to be more effective, interactive, and the quality of learning outcomes can be improved. [15]. Thus, learning media is important in realizing an effective and efficient learning process so that learning objectives can be achieved.

One of the interesting web animations to use as a presentation or learning media is Powtoon. This application is a web app to create presentations or cartoon animation videos in an easy way. Powtoon has interesting animation features, including handwriting animation, cartoon animation, and livelier transition effects and easier timeline settings. Powtoon media can clarify the presentation of messages or material that will be used in learning.

Technology can present new opportunities for modeling, simulation, and/or recreating complex environments in which learners are likely to find themselves. [16]. In this digital era, there are many multimedia applications that can be utilized as learning media, for example the use of Camtasia, Edmodo, Moddle and many more. These various multimedia applications provide a large selection of images and are able to include videos and animations in them, so that the resulting media can have more variety. PowToon as one of the multimedia applications that

ISSN (Online): 2961-9602
can be used as learning media has various advantages such as having very interesting animation features including handwriting animation, cartoon animation and livelier transition effects and very easy timeline settings. PowToon is very suitable to be developed as a learning media, although it is made online, but the results can be used offline both in the form of presentations and in pdf form.

METHOD

This research aims to develop animated web-based video media using the powtoon platform. The research aims to explain the effectiveness of PAUD teachers in using powtoon animated web-based video media by promoting adaptive children in the face of a destructive era, where this research procedure uses the ADDIE development model which consists of five stages, which include analysis *(analysis)*, design (*design), development (development)*, implementation (*implementation),* and evaluation (*evaluation*). [17].

The reason for choosing the ADDIE model is because the ADDIE development model is considered very effective, dynamic and simple and can support the performance of the program itself (Warsita, 2011). The ADDIE model consists of five components that are interrelated and systematically structured. These five stages are very simple when compared to other design models. Its simple nature and systematic structure make this design model easy to understand and apply. There are 5 stages or development steps in using this ADDIE model, including according to the words that form it, namely *Analysis,* Design, *Develop, Implement*, and *Evaluate [18].* [18].

Development is the process of creating or developing learning resources and validating them. This stage is a real stage in working on learning resources. At this stage the researcher carried out five research steps, as follows:

a. Conceptualize Learning

Creating learning concepts in the form of opening, core and closing in video delivery. Learning concepts are made so that teachers understand how to deliver material using animated web video media.

b. Making the developed Video Media

This step is the creation of animated web-based video media. This process starts from the stages of 1) needs analysis, 2) media design, 3) media manufacturing, 4) testing process. The needs analysis stage is the creation of a list of needs that are used as media content. The design stage is the creation of the scheme, layout and flow of the media. The manufacturing stage is the stage of realizing the media that has been designed. And the testing stage is carried out to test that the media made is in accordance with the plan or not.

c. Animation and face-camera video development

At this stage researchers use Powtoon animation media and added with facecame, so that when learning is carried out, the results of the animated media can be explained by the teacher using an explanation using the face-camera app. The procedure for developing Web Animation Media is as follows:

1) Analysis

The analysis carried out is a needs analysis that emphasizes the powtoon.com web to be created. In order for the development to understand the nature of the program to be created, the developer must understand the necessary commands, performance actions, and the interface of the program applying the contents of the web. Input from the powtoon web is in the form of template selection, customize mode, character selection and character motion effects.

2) Design

At the design stage there are several steps to design powtoon animation media. Among them; a) Template design, b) Character design, c) Material design, d) Face-camera placement design.

3) Making a Teacher's Manual

The teacher's manual is more directed at tutorials for making web video media with teaching materials used in learning. This book also explains in detail how to use learning media.

4) Conduct Formative Revision

ISSN (Online): 2961-9602

Formative revision is an initial revision to collect information and data before the implementation process. This revision is an initial trial process to find errors in the learning resources that have been developed. In this step, the finished learning resources are tested by media experts and material experts then the trial results will be processed to make revisions to the previous learning resources and are ready for the implementation stage. However, before the data collection process, the research data collection tool must first be validated for reliability. This aims to ensure that the aspects to be measured in the media can be measured.

5) Implementation

After the learning media is well controlled and then finished and declared feasible by media experts and material experts, then the application is carried out in the learning process. implementation is carried out by Aisyiyah PAUD teachers in Serakarta City to their students. Implementation is carried out to test the feasibility level of animated web video media. In this stage there are two steps that are carried out before the implementation process is carried out, the first is preparing PAUD teachers and the second is preparing students. Preparing PAUD teachers includes providing understanding material about animated web videos. Preparing learners includes providing information to learners to bring equipment that supports the implementation process. This preparation will affect the implementation process so that there are no obstacles outside the research.

6) Evaluation

The evaluation conducted in this research and development is a formative evaluation. The formative evaluation is related to the evaluation conducted by model experts using a media validation questionnaire, and design experts using a design validation questionnaire, teachers also participate in evaluating using a response questionnaire to identify responses to the learning media used. According to [18] there are three criteria in evaluating, namely 1) perception evaluation, 2) learning evaluation, and 3) ability evaluation. While evaluation tools include surveys, questionnaires, interviews, Likert scales, open-ended questions, exams, role plays, observations, simulation exercises, authentic tasks performance checklists, supervisor assessments, peer observations, and others. The evaluation criteria chosen by the researcher is the perception evaluation. Perception evaluation is an evaluation to find out how much students change about the existence of learning media using animated videos.

The second step is to determine the evaluation tool. The evaluation tool chosen by the researcher is a questionnaire or questionnaire with a four-choice Likert scale. And the third step is the evaluation process by giving a questionnaire to PAUD teachers after using learning media using powtoon animation videos. After making improvements at the evaluation stage, the powtoon animation web-based video media that has been tested for validity and is said to be feasible as a learning medium.

RESULTS

Frequency Analysis of Expert Validator Answers

Frequency Distribution Table of Expert Validator Answers

Item	STS		TS		S		SS		Rata-rata
	f	%	f	%	f	%	f	%	
X1	0	0	0	0	1	25	3	75	3,75
X2	0	0	0	0	3	75	1	25	3,25
X3	0	0	0	0	1	25	3	75	3,75
X4	0	0	0	0	0	0	4	100	4,00
X5	0	0	0	0	0	0	4	100	4,00
X6	0	0	0	0	2	50	2	50	3,50
X7	0	0	0	0	1	25	3	75	3,75
X8	0	0	0	0	0	0	4	100	4,00
X9	0	0	0	0	1	25	3	75	3,75
X10	0	0	0	0	1	25	3	75	3,75
X11	0	0	2	50	2	50	0	0	2,50
X12	0	0	2	50	2	50	0	0	2,50
X13	0	0	2	50	0	0	2	50	3,00
X14	0	0	3	75	0	0	1	25	2,50
X15	0	0	2	50	1	25	1	25	2,75

ISSN (Online): 2961-9602

Item	STS		TS		S		SS		Rata-rata
	f	%	f	%	f	%	f	%	
X16	0	0	2	50	1	25	1	25	2,75
X17	0	0	1	25	2	50	1	25	3,00
X18	0	0	2	50	2	50	0	0	2,50
X19	0	0	1	25	2	50	1	25	3,00
X20	0	0	1	25	0	0	3	75	3,50
X21	0	0	2	50	0	0	2	50	3,00
X22	1	25	2	50	0	0	1	25	2,25
X23	0	0	1	25	2	50	1	25	3,00
X24	1	25	1	25	0	0	2	50	2,75
X25	0	0	0	0	0	0	4	100	4,00
X26	0	0	0	0	0	0	4	100	4,00
X27	0	0	0	0	0	0	4	100	4,00
X28	0	0	0	0	0	0	4	100	4,00
X29	0	0	0	0	1	25	3	75	3,75
X30	0	0	0	0	0	0	4	100	4,00
X31	0	0	0	0	1	25	3	75	3,75
X32	0	0	0	0	1	25	3	75	3,75

Source: Primary research data processed in 2024

Based on the table above, it can be seen that the results of the answers to the questionnaire statements given in item X.1 The media design has a neatness that is easy to understand, obtained as many as 3 expert validators (75%) who answered strongly agree, then those who answered agreed as many as 1 expert validator (25%), Item X1.1 has an average of 3.75.

In item X.2 Media using easy-to-read fonts, the results were obtained as many as 1 expert validator (25%) who answered strongly agree, then those who answered agreed as many as 59 respondents (62.8%), then those who answered disagreed as many as respondents (6.4%), and then those who answered disagreed as many as 1 respondent (1.1%). This X.2 item has an average of 3.25. In item X.3 The distance between images and writing has the right size, the results were obtained as many as 3 expert validators (75%) who answered strongly agree, then those who answered agreed as many as 63 respondents (67%), and then those who answered disagreed were 1 respondent (1.1%). This X.3 item has an average of 3.75. In item X.4 Evidence explaining that the media used is correct, the results were obtained as many as 4 expert validators (100%) who answered strongly agree, then those who answered agreed as many as 55 respondents (58.5%), and then those who answered disagreed were 1 respondent (1.1%). This X.4 item has an average of 4.00.

In item X.5 Having an explanatory statement on each media item used, the results were obtained as many as 4 expert validators (100%) who answered strongly agree, then those who answered agreed as many as 45 respondents (47.9%), then those who answered disagreed were 1 respondent (1.1%). This X.5 item has an average of 4.00. In item X.6 The use of components in the media has the right message, the results were obtained as many as 2 expert validators (50%) who answered strongly agree, then those who answered agreed as many as 61 respondents (64.9%), then those who answered disagreed were 1 respondent (1.1%). This X.6 item has an average of 3.50. In item X.7 The component in each media item has a meaning obtained as many as 3 expert validators (75%) who answered strongly agree, then those who answered agreed as many as 57 respondents (60.6%), and then those who answered disagreed were 1 respondent (1.1%). This X.7 item has an average of 3.75.

In item X.8 Coloring in the media does not mess with you in understanding the entire material, the results were obtained as many as 4 expert validators (100%) who answered strongly agree, then those who answered agreed as many as 55 respondents (58.5%), and then those who answered disagreed were 2 respondents (2.1%), and those who answered disagreed as many as 2 respondents (2.1%). This X.8 item has an average of 4.00. In item X.9, the coloring of the writing makes it easier for users to remember the learning material, the results were obtained by 3 expert validators (75%) who answered strongly agree, then those who answered agreed as many as 43 respondents (45.7%). This X.9 item has an average of 3.75.

ISSN (Online): 2961-9602

In the X.10 Graphic item according to the theme presented, the results were obtained as many as 3 expert validators (75%) who answered strongly agree, then those who answered agreed as many as 62 respondents (66%), and then those who answered less were 2 respondents (2.1%). This X.10 item has an average of 3.75. In item X.11 The size of the media presented is easy to read by users, the results were obtained as many as 0 expert validators (0%) who answered strongly agree, then those who answered agreed as many as 61 respondents (64.9%), then those who answered disagreed were 3 respondents (3.2%), and then those who answered disagreed as many as 1 respondent (1.1%). This X.11 item has an average of 2.50.

In item X.12 Images and writings have a proportional size, as many as 0 expert validators (0%) answered strongly agree, then those who answered agreed as many as 65 respondents (69.1%), then those who answered disagreed were 10 respondents (10.6%), then those who answered strongly disagree as many as 1 respondent (1.1%). This X.12 item has an average of 2.50. In item X.13 The function in the image in the media is in accordance with what is expected to be obtained, as many as 2 expert validators (50%) who answered strongly agree, then those who answered agreed as many as 59 respondents (62.8%), and then those who answered disagreed were 8 respondents (8.5%), and then those who answered disagreed as many as 1 respondent (1.1%), and those who answered strongly disagree with 1 respondent (1.1%). This X.13 item has an average of 3.00.

In item X.14 Media design can be presented easily without having to ask the media creator obtained results as many as 1 expert validator (25%), Item X.14 has an average of 2.50. In item X.15 Easy-to-access media operations obtained as many as 1 expert validator (25%), Item X.15 has an average of 2.75. In item X.16 The use of media is easy to run obtained as many as 1 expert validator (25%), Item X.16 has an average of 2.75. In the X.17 Media item, it is not easy to error when used, the results are obtained by 1 expert validator (25%), this X.17 item has an average of 3.00. In the X.18 item User's guide that is easy to understand, the results are obtained as many as 0 expert validators (0%), this X.18 item has an average of 2.50. In item X.19 program guide using good and correct Indonesian, the results were obtained by 1 expert validator (25%), Item X.19 has an average of 3.00. In the X.20 Media item, this media can increase the enthusiasm of students, the results of 3 expert validators (75%), this X.20 item has an average of 3.50. In the X.21 Media item, this media can increase the students' enthusiasm for learning, the results are obtained by 2 expert validators (50%), this X.21 item has an average of 3.00. In item X.22 has uniqueness so that students have an interest in this media, the results were obtained by 1 expert validator (25%), this item X.22 has an average of 2.25. In item X.23 This media is able to overcome students' problems about learning boredom obtained results as many as 1 expert validator (25%), this item X.23 has an average of 3.00.

In item X.24 Media has image and sound effects that can foster students' enthusiasm for learning, the results were obtained by 2 expert validators (50%), this X.24 item has an average of 2.75. In item X.25 Students are able to get useful material from this media obtained results as many as 4 expert validators (100%), this X.25 item has an average of 4.00. In item X.26 this media is easy to learn by students for the understanding of the material, the results are obtained by 4 expert validators (100%), this item X.26 has an average of 4.00. In item X.27 Students' competence will be better when using this media obtained results of 4 expert validators (100%), Item X.27 has an average of 4.00. In item X.28 The material in the media has a different variation from other media, the results were obtained by 4 expert validators (100%), this X.28 item has an average of 4.00. In item X.29 has an element of entertainment in media that is not only about material obtained results from 3 expert validators (75%), Item X.29 has an average of 3.75. In the X.30 item Variations in the media have a curiosity to continue to learn about it, the results of 4 expert validators (100%), this X.30 item has an average of 4.00. In item X.31 Teachers are easier in compiling material, the results of 3 expert validators (75%), Item X.31 has an average of 3.75. In item X.32 The delivery of material to learning participants can provide an easier understanding to obtain results as many as 3 expert validators (75%), Item X.32 has an average of 3.75.

ISSN (Online): 2961-9602

The summary of the results of the validation of the student's parents is more detailed as follows:

Summary Table of Student Parent Validation

Aspects	Question Number	Indicator	X	Xi	(%) Percentage
Effectiveness	1-15	Clarity of the Solidification model Clarity of material Clarity of learning methods	74	80	92,5
Efficiency	16-20	Ease of learning	40	40	100
Attraction	21-25	The appeal of communication in the learning model	38	40	95
Total Score			**152**	**160**	
Average					**95,83**

Information:
X : Number of scores assessed by the validator
Xi : The maximum number of scores assessed by the validator
% : Percentage of validator evaluation results

The conclusion from the answers obtained from the 75 students in the sample was that learning can be done anywhere with an average of 3.28. so that it is easier for students to carry out learning without being limited by a particular room.

Some aspects that have been validated by media expert validators, material expert validators, and PAUD teacher validators themselves are summarized below:

Table Media Feasibility Results

No.	Assessed Aspect	Average (%)	Criteria	Description
1.	Media Design	90,29	Very Valid	Usable
2.	Operation	100	Very Valid	Usable
3.	Media Usability	96,66	Very Valid	Usable
4.	Material Quality	99,18	Very Valid	Usable
5.	Expediency	97,78	Very Valid	Usable
6.	Effectiveness	97	Very Valid	Usable
7.	Efficiency	96	Very Valid	Usable
8.	Attractiveness	93,5	Very Valid	Usable
TOTAL AVERAGE		**96,30**	**Very Valid**	**Usable**

(Source: Created by researcher)

DISCUSSION

The development of powtoon animation web-based video media is considered to have been effective for learning in PAUD Aisyiyah Surakarta City, because with this powtoon animation learning video media it can be easier to do learning, besides that this media can also make an innovation to motivate teachers to be more creative in the learning process. The current digitalization period is indeed needed in terms of creativity in the digital field, especially on the website. Learning with websites in the current era, especially for students who are still at an early age, is very relevant to use because the results of research from [19] stated that the application of digital literacy has an influence on improving learning. Based on the research results obtained, R is 0.669, which shows that the relationship between the application of digital

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literacy (variable X) and learning improvement (variable Y) is relatively strong. The results of the F test prove that F count 69.688> Ftable 4.39, then the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected. Thus, it can be stated that the application of digital literacy has an influence on improving learning.

The development of animated web-based video media produces a product, namely media that can be used by PAUD teachers using video animation that can be accessed online. Accompanied by a guidebook for the use of the media. The web-based animated video media is implemented online by utilizing internet technology assisted by hardware in the form of devices (smartphones and/or computers), as well as software in the form of web browser applications such as Google Chrome, Internet Explore, Operamini and so on. The web browser is used in the delivery of material and is used by PAUD students in opening material that has been delivered by the teacher.

The material used in the development of this animated web-based video media is learning to count using objects around. From this, the teacher will find it easier to visualize what has been conveyed. This is relevant to the opinion of [20] that there are 5 functions of learning media that must be fulfilled when teachers choose a teaching medium. The five functions are: 1) as a means of helping to realize a more effective learning situation. 2) as one of the components that are interconnected with other components in order to create the expected learning situation. 3) accelerate the learning process. 4) improve the quality of the teaching-learning process. 5) concretize the abstract so as to reduce the occurrence of verbalism disease.

Based on the research and development of animated web-based video media, in addition to producing a learning media model, it is also equipped with a guidebook for implementing the learning model. The guidebook for the implementation of the developed learning model is printed with A5 size, using AP250 art paper type which consists of approximately 20 pages. The learning model implementation guidebook contains a description of Web-based video learning media, how to use, and materials related to powtoon-based animated videos.

The media expert validation instrument that researchers use to determine the validity level of the learning video media trials in this study is a questionnaire. The number of items used is 32 items with the lowest alternative answer is 1 and the highest alternative answer is 4. The highest average score is 4 while the lowest average score is 2.25.

The results of the media expert validator's answers can be concluded that the size of the media presented still needs to be improved so that it is easier for users to read because the question item has an average of 2.25. As well as images and writings lack proportional size, therefore it needs improvement by enlarging images and fonts to be more proportional.

The material expert validation instrument that researchers use to determine the level of validity of the learning video media trials in this study is a questionnaire. The number of items used is 30 items with the lowest alternative answer is 1 and the highest alternative answer is 4. The highest average score is 3.80 while the lowest average score is 2.60.

The conclusion from what has been found in the material expert validator is that it is still difficult to prepare material when using this web-based video media, because the lowest average is 2.6. So it needs to be even easier in making videos or made as simple as possible in making material in this web-based video.

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The conclusion of what has been found in PAUD teachers related to the application of powtoon web-based learning media is about the level of understanding of digital literacy, the measurement indicators of which are obtained from theory [21]. The understanding of digital literacy, especially in the use of this media owned by PAUD Aisyiyah Surakarta City teachers, has generally achieved sufficient understanding, because the average obtained has reached an average of above 80%. The highest answer that has been obtained is in the indicator of easy to follow the latest developments with a percentage of 96.4%, this illustrates that PAUD Aisyiyah Surakarta City teachers know what should be done with digital media.

The conclusion on the answers obtained from 75 PAUD Aisyiyah Surakarta City teachers conducted by random sampling, that learning can be done anywhere with an average of 3.28. so that students are easier to do learning which is certainly with the cooperation of parental supervision.

CONCLUSION

Web-based learning video media is a medium that can be used by PAUD Aisyiyah Surakarta City teachers in the learning process at PAUD institutions. Based on the results of research and development of powtoon web-based learning video media, the following conclusions can be drawn.

1. Development Process

The process of developing web-based learning video media refers to the ADDIE development model, namely (1) analysis; (2) design; (3) development; (4) implementation; (5) evaluation. The first step is analysis. Step 1 Analysis Analysis of the needs of PAUD Aisyiyah Surakarta City teachers whether they can use new media and can be accepted by all levels of teachers and students themselves by paying attention to the comfort of learning students and not getting out of the essence of existing material. The second stage is design, this design stage is a step of making a design, in this case the design of a web-based learning video is formed starting from the idea process which is then realized by practicing directly but only experiments. In the case of this design, the researcher analyzes the existing learning media and then realizes it by means of development. The third stage is the development stage, the development stage is a process of realizing the design that has been made at the design stage into reality. At this stage everything needed or that will support the learning process must all be prepared. Researchers have carried out direct development related to web-based learning videos by making usage guidelines as well so that users do not feel difficulties when using them. The fourth step is Implementation. The implementation stage is a real step to implement the learning system created. At this stage all the things that have been developed are arranged in such a way.

In accordance with their respective roles and functions to be implemented. When the product is ready, the next step is to test it. Trials were conducted on media expert validators, namely lecturers, then material validators, namely seniaor teachers in PAUD itself then to all PAUD Aisyiyah teachers in Surakarta City. Then after the experiment, the next step is revision or improvement. The fifth step is Evaluation *(Evaluate)*, the evaluation stage is a process of this development that aims to find out whether the web-based learning video media that is being

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developed is successful in accordance with initial expectations or not. So that it can make improvements if there are still shortcomings in making this web-based learning media.

2. Validity

The valid criteria in the research and development of this web-based learning video media learning model are met because the assessment of expert validators and curriculum validators has met the requirements because the average answer has met 50% and above of the questionnaire that has been filled in but there are still some improvements that must be met.

3. Effectiveness

The effectiveness of web-based learning videos has been obtained from the data collected. The learning outcomes themselves are related to the report cards of paudud students in the form of motor and sensory development. Based on the learning outcomes of students with previously not using web-based learning video media and after the use of web-based learning media, the following data is obtained: Learners who used to only be able to understand numbers from a text or image from visuals are now able to analyze virtually as well.

4. Applicability

The criteria for feasibility and applicability in research and development of web-based learning video media are met because the applicability assessment using questionnaires and secondary data from report card recapitulation scores. Based on this, it can be seen that the learning model developed is feasible and applicable.

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Based on the research and development of powtoon web-based learning videos, teachers should be able to implement the learning model by utilizing various learning media, in order to increase the attractiveness of students in participating in the learning process. PAUD teachers must also be able to facilitate students to learn independently with the accompaniment of parents at home because the ease of targeted technological developments will be able to combat destructive content.

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SEM ANALYSIS: INTERNAL CONTROL QUALITY AND DECISION-MAKING QUALITY AT VOCATIONAL HIGH SCHOOL

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Keyword
internal quality audit, internal control quality, decision-making quality

Abstract

The study aimed to examine (1) internal quality audit relationship between internal control quality at Vocational High School and (2) internal quality audit relationship between decision-making quality at Vocational High School. The study, which relied on the quantitative approach, targeted 57 of A-accredited public and private Vocational High School in Solo Raya, which includes Surakarta City, Sukoharjo Regency, Karanganyar Regency, Sragen Regency, Klaten Regency, and Boyolali Regency. The questionnaires were adopted as a tool for data collection and the Structural Equation Modelling (SEM) with SmartPLS 3.0 Version software was used to analyses data. The study found that internal quality audit has a positive and significant relationship between internal control quality at Vocational High School. The study also found that internal quality audit has a positive and significant relationship between decision-making quality at Vocational High School.

INTRODUCTION

Education plays a crucial role in creating high-quality human resources. Indonesian education has undergone significant changes, transitioning from centralized management to decentralized management, impacting the broader management of education and allowing for the development of local educational strategies to achieve high-quality educational outcomes. However, granting autonomy to local governments often leads to conflicts of interest between central and local authorities in several countries (Irtanto, 2021). This occurs due to the reduction of local dependency on the central government, which simultaneously diminishes central authority. Transparency International (2015) shows that poor governance between central and local governments increases the risk of corruption. In Indonesia, corruption in the education sector remains prevalent. According to Indonesia Corruption Watch (ICW, 2021), the country suffered a loss of Rp1.6 trillion from corruption in the education sector between 2016 and 2021.

The misuse of School Operational Assistance (BOS) funds is frequent within schools. The National Coordinator of the Indonesian Education Monitoring Network (JPPI) revealed that cases of BOS fund corruption have been increasing, with 23 cases in 2019, 29 cases in 2020, 44 cases in 2021, and 93 cases in 2022 (Arrahmah, 2022). Corruption in the education sector negatively affects the quality and efficiency of educational services. Therefore, addressing the misuse of BOS funds is crucial as it impacts the program's objective of supporting schools to achieve optimal educational success and quality. Research by Rahmadhani and Suparno (2020) indicates that internal control systems significantly influence the prevention of fraud in BOS fund management. Ineffective internal controls can lead to fraud detrimental to the entity (Prihandoko and Rusdi, 2020).

The problem of BOS funds corruption is attributed to the lack of public transparency and cooperation within school communities in managing the funds. This aligns with findings by Elvira (2021) and Welch (2020), which indicate that a lack of transparency in decision-making

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contributes to BOS funds corruption. Internal quality audits are fundamental management tools used to verify objective evidence of processes, evaluate how well processes are implemented, assess the effectiveness of achieving set objectives, and provide evidence of problem areas. School internal quality audits play a crucial role in school management by providing quality information on strategic plan implementation for better managerial oversight.

Internal auditors, through independent and objective assessments, help identify weaknesses or nonconformities in internal control systems, providing relevant recommendations and assisting schools in implementing necessary steps to optimize internal controls (Nurjanah and Suryatimur, 2023). Research by Agustina (2020) found that the internal quality audit has a positive and significant relationship between the internal control system effectiveness.

Internal quality audit assists in decision-making through independent assessment evidence of activities, policies, and operations implementation in the organization (Januri et al., 2018). Alqudah et al. (2023) explains the significant role of internal auditors in producing quality internal audit results that support diverse decision-making.

This research aims to explore the relationship between internal quality audits with internal control quality and decision-making quality. Therefore, this study will focus on internal control quality and decision-making quality at Vocational High School in Solo Raya.

METHOD

This study used a quantitative descriptive approach. Quantitative approach research is research that uses data in the form of numbers and emphasizes the measurement of objective results using statistical analysis (Sugiyono, 2019). Data was collected using survey techniques by distributing questionnaires about internal quality audit variable (X), internal control quality variable (Y1), and decision-making quality (Y2) to respondents.

The population in this study were all A-accredited public and private Vocational High School in Solo Raya, which includes Surakarta City, Sukoharjo Regency, Karanganyar Regency, Sragen Regency, Klaten Regency, and Boyolali Regency with total of 72. Sampling of the study population was carried out using simple random sampling, which is a sampling technique that is done randomly without regard to the strata in the population (Sugiyono, 2019). The number of samples used in this study were 57 respondents. Convergent validity and discriminant validity were used for validity test of instruments, whereas the composite reliability and cronbach's alpha were used for reliability test of instruments. The Structural Equation Modelling (SEM) with SmartPLS 3.0 Version software was used to analyses data.

RESULTS

This test was conducted to understand the relationships among constructs, significance values, R-square values, and the research model. Hypothesis testing was performed by using the bootstrapping method to observe the significance of coefficients. The first analysis was conducted by examining the R-square values, followed by examining the P-value.

The R-square value is used to explain the influence of exogenous manifest variables on endogenous manifest variables. The R-square criteria of 0.75, 0.50, and 0.25 respectively indicate strong, moderate, and weak model (Hair et al., 2021, p.118). The R-square analysis results of the research model are presented in the following table.

Table 1. R-Square Values for Internal Control Quality and Decision-Making Quality at Vocational High School

Variable	R-Square	Description
Y1	0.143	Weak
Y2	0.154	Weak

ISSN (Online): 2961-9602

Based on the table above, the R-square value for internal control quality is 0.143, categorized as weak as it is below 0.25. This means that internal quality audit can explain 14.3% of internal control quality, while the remaining 85.7% is explained by other variables outside the study. The R-square value for decision-making quality is 0.154, also categorized as weak, indicating that internal quality audit explains 15.4% of decision-making quality, with the remaining 84.6% explained by other variables.

A significance coefficient value is ≤ 0.05 (Hair et al., 2021). The following are the results of the T-statistic and P-value analysis.

Table 2. Significant Coefficient Values for Internal Control Quality and Decision-Making Quality at Vocational High School

Hypothesis	Variable	Original Sample	T-Statistic	P-Value	Description
H_1	X -> Y1	0.378	2.981	0.003	Significant
H_2	X -> Y2	0.393	3.685	0.000	Significant

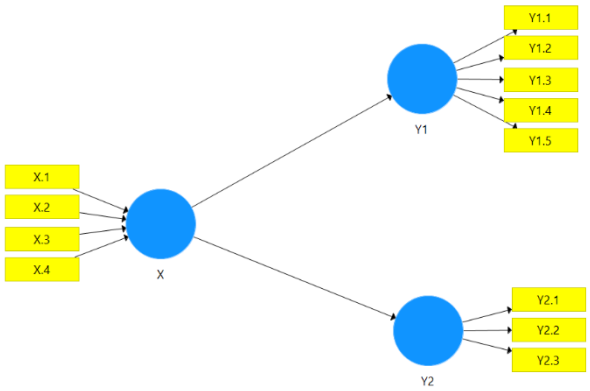

Figure 1. SEM-PLS Model

Based on the table above, it is evident that internal quality audit has a positive and significant relationship between internal control quality, with an original sample value of 0.378. The significance value of 0.003 is less than the alpha level of 0.05. This is also shown by a T-statistic value of 2.981, greater than 1.960. The results also indicate that internal quality audit has a positive and significant relationship between decision-making quality, with an original sample value of 0.393. The significance value of 0.000 is less than the alpha level of 0.05. This is also shown by a T-statistic value of 3.685, greater than 1.960.

DISCUSSION

Based on hypothesis testing and data analysis, the results show that internal quality audit has a positive and significant relationship between internal control quality and decision-making quality. The analysis of internal quality audit with internal control quality and decision-making quality is presented as follows:

1. **Relationship Between Internal Quality Audit and Internal Control Quality**

Hypothesis testing shows a positive and significant relationship between internal quality audit and internal control quality at Vocational High School. This is supported by the correlation between latent variables, with an original sample value of 0.378. The positive correlation means a direct and aligned relationship. The significance value obtained is ≤ 0.05, which is 0.003, indicating a significant relationship between internal quality audit and internal control quality.

ISSN (Online): 2961-9602

Hence, H_0 is rejected, and Ha is accepted, indicating a positive and significant relationship between internal quality audit and internal control quality at Vocational High School.

This aligns with stewardship theory, which emphasizes the involvement of all school committees in creating effective internal quality audit. Internal quality audit is an essential part of the management system and quality standards. The role of all school committees in creating effective internal quality audit ensures a good internal control quality within the school. Internal auditors play a crucial role as an input in stewardship theory to achieve good internal quality audit. The internal audit function operates effectively when auditors possess high professionalism. Internal auditors significantly impact the effectiveness of internal control systems by assessing and evaluating their effectiveness. Through testing, monitoring, and providing recommendations, internal auditors can identify weaknesses in internal control systems and offer necessary recommendations for improvement, helping schools implement steps to optimize internal controls (Nurjanah and Suryatimur, 2023).

According to Kristanti et al. (2023), internal quality audit positively and significantly affects the effectiveness of internal control systems. This is supported by research from Agustina (2020), Apandi and Nasution (2022), Chang et al. (2019), Jung and Cho (2022), which also found a positive relationship between internal quality audit and internal control quality. High-quality internal audit includes meeting relevant audit standards, such as planning, executing, and timely, accurate reporting. High-quality internal audits give management confidence that the internal control system is functioning well, helping to identify risks and opportunities. With high-quality internal audits, schools can identify and correct deficiencies in their internal control systems, thereby enhancing their effectiveness. Effective internal controls provide benefits to schools in planning and controlling operational activities (Wu et al., 2024). Based on this, it can be concluded that there is a positive and significant relationship between internal quality audit and internal control quality at Vocational High School.

2. Relationship Between Internal Quality Audit and Decision-Making Quality

Hypothesis testing shows a positive and significant relationship between internal quality audit and decision-making quality at Vocational High School. This is supported by the correlation between latent variables, with an original sample value of 0.393. The positive correlation means a direct and aligned relationship. The significance value obtained is ≤ 0.05, which is 0.000, indicating a significant relationship between internal quality audit and decision-making quality. Hence, H0 is rejected, and Ha is accepted, indicating a positive and significant relationship between internal quality audit and decision-making quality at Vocational High School.

This aligns with stewardship theory, which emphasizes the involvement of all school committees in creating effective internal quality audit due to the alignment of managerial objectives with the school's objectives. This relationship is based on managers acting upon the headmaster's requests, thus playing a significant role in improving internal quality audit (Al-Khasawneh et al., 2022). Alzeban and Gwilliam (2014) explain that internal quality audit plays a crucial role in supporting school activities to ensure operational effectiveness and efficiency. The school's internal auditor conducts assessments developed independently with the aim of testing and evaluating the activities in the school operational sector. The school's internal auditor systematically and objectively evaluates whether operational information is accurate and reliable as a basis for better managerial decision-making by the school committee.

School internal auditors must possess the necessary skills to control the internal control system by ensuring the delivery of accurate and well-communicated information for all school operational levels and external parties in appropriate manner and thus it can be used in rational decision-making. Good quality internal audits are expected to assist school management in making decisions based on analysis, evaluation, objective, and independent recommendations, therefore the school objectives can be achieved. Alqudah et al. (2023) explains the significant role of internal auditors in producing high-quality internal audit results, providing a diverse range of decision-making options.

ISSN (Online): 2961-9602

The results of this hypothesis testing empirically align with the findings of previous research conducted by Anwar and Amyar (2020), Nugroho and Bayunitri (2021), Jayawardene et al. (2021), Christensen et al. (2020), and Januri et al. (2018) which concluded that there is a positive and significant relationship between internal quality audit and decision-making quality. Based on what has been described, it can be concluded that there is a positive and significant relationship between internal quality audit and decision-making quality in Vocational High School.

CONCLUSION

There is a positive and significant relationship between internal quality audit with internal control quality at Vocational High School. Internal quality audits are carried out to evaluate the adequacy, efficiency, effectiveness of management, control, and school governance, thus can improve a sustainable internal control quality.

There is a positive and significant relationship between internal quality audit with decision-making quality at Vocational High School. Internal quality audit is needed for planning and reporting, the results of internal quality audit are used as an independent source of information in making objective decisions by the school committee.

The limitation of this study is that researchers cannot control respondents in filling out questionnaires according to the respondent's criteria that researchers expect. Appropriate respondents in the questionnaire of internal quality audit variable and internal control quality variable are school internal auditors or school quality control circle, while appropriate respondents on decision-making variable are school principals.

The research recommends that further research should be able to continue this research by providing solutions to school related to internal control quality and decision-making with respondents who are more representative. Further research is also expected not to be fixated only on the variables in this study, although can increase other variables outside this study that have relationship to internal control and decision-making.

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THE EFFECT OF FLAG CEREMONY IMPLEMENTATION ON THE NASIONALISM ATTITUDE OF STUDENT OF PUTERA HARAPAN THREE LANGUAGE ELEMENTARY SCHOOL

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Keyword

students, flag ceremony, nationalism attitude.

Abstract

These This study to determine how the implementation of the flag ceremony affects the nationalism attitude of students at the Putera Harapan Purwokerto Three Language Elementary School, which is predominantly of ethnic Chinese descent. Data collection and processing using quantitative research methods with questionnaires. The questionnaire is a measuring tool used to measure student attitudes with a Likert scale, with answer items: a) STS = Strongly Disagree, b) TS = Disagree, c) N = Neutral, d) S = Agree, el) SS = Strongly Agree, in using a research scale the conversion guidelines for PAN can use a scale of four, five, nine and so on (Nurgiyantoro, 2012). The results of this study indicate that there is an effect of the implementation of the flag ceremony on students' nationalism attitudes which shows that 10 students (33.3%) are in the very good category, 10 students (33.3%) are in the good category, 8 students (26.7%) are in the poor category and 2 students (6.7%) are in the very poor category. This data shows that the distribution of student attitude scores about the flag ceremony is obtained above the average, so it can be said that the majority of students' national attitudes towards flag ceremony activities are in the good category.

INTRODUCTION

Indonesia is a multi-cultural and multi-ethnic country. Nationalism based on ethnicity and tribe will greatly hinder national unity because each group will only be oriented towards its own group. For nationalism to be successful, leaders must create a national identity that goes beyond ethnic and/or racial identity, and society must accept this and work together to make their country great, one of which is through formal education platforms implemented by schools. Schools have several roles to play. in instilling an attitude of nationalism through the assimilation of values in curriculum content, certain subjects such as Citizenship Education, and also ceremonial activities such as flag ceremonies which also train the discipline of the younger generation.

Aimee Dawis (2015) in her historical study explains that: "Ethnic Chinese have existed in Indonesia for centuries, they have mixed with the local population who have a long history of ups and downs which is not easy. Ethnic Chinese are immigrants even though they came centuries ago, so their existence is not new. Most Chinese people in Indonesia come from southern China who call themselves Tang, while northern Chinese call themselves Han. The ancestors of Indonesian Chinese migrated in waves thousands of years ago through trading activities. Then settle down by marrying local residents and have children by assimilating with local residents and carrying on the legacy of ancestral traditions."

Civil nationalism as practiced in national life in Indonesia is based on the idea that society can unite as a nation based on shared political and civic values, in contrast to ethnic nationalism,

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which is based on shared heritage or ethnicity. Civic nationalism puts forward the idea that anyone can join a country if they uphold common ideals and values, regardless of their ancestry or culture, including citizens of Chinese descent, which means that if they merge, they are obliged to prioritize national interests over tribal spirits. based on the philosophy of national unity (Sianturi 2021).

The reform era noted that it must be acknowledged that ethnic Chinese in Indonesia are freer to express their identity, no longer restricted, let alone having to be afraid after the elimination of discriminatory regulations by Gus Dur through Presidential Decree (Keppres) Number 6 of 2000. Ten years after reform, ethnic Chinese activities have increasingly increased. lively and diverse. For example, apart from religious ceremonies at temples, Chinese people also hold various celebrations with modified oriental nuances, such as the Chinese New Year Festival.

There is a prejudice that arises as a result of the state dualism that occurred in the past regarding the loyalty of the Chinese people whether they will side more with the interests of their ancestral political entity the People's Republic of China or the Unitary State of the Republic of Indonesia, as their homeland (Carey P., 2008).

Researchers saw that there was more enthusiasm for cultural events, the school was the grand event that peaked compared to the activities of cultivating nationalism through ceremonies. These conditions underlie the author's feeling of being inspired to carry out research that discusses the nationalistic attitudes of ethnic Chinese students at the Putra Harapan Primary 3 Language School, Purwokerto.

METHOD

This research used quantitative approach in which involves collecting and analyzing numerical data to answer research questions or test hypotheses. According to Sugiyono (2013), this approach is characterized by its emphasis on measurement, statistical analysis and objective assessment of phenomena. Following are the main features and aspects associated with quantitative research approaches; Quantitative research relies on objective measures and standards to collect data. These measures may include surveys, questionnaires, experiments, or other structured instruments designed to measure variables. Molelong (2010) states that quantitative research is research that often involves a larger sample size to ensure the findings represent the population studied. This increases the generalizability of the results.

The researcher carries out direct interaction with the main data source. These activities include interviews, analysis, and monitoring of the objects studied so that clearer and more meaningful information is obtained. The activities carried out are then documented in sound recordings, photographs and field notes, as well as survey or questionnaire entries. The reason this research uses a quantitative research method is to describe the situation that is the research topic in order to answer the hypothesis of the influence on nationalist values through ceremonial activities. Meanwhile, the method used in this research is a survey method with data collection using questionnaires. So the researcher examines data that comes from the results of students' answers to questionnaires, field notes, and research photos.

Population is the total elements used as a generalized area. Population is not simply the number of objects or subjects studied but includes the entire characteristics or properties possessed by the subject or objects studied (Sugiyono, 2020). The population in this research were students in grades 4, 5 and 6 of SD 3 Bahasa Putera Harapan, Purwokerto, totaling 120 students.

The sample is part of the number and characteristics of the total population. If it is not possible for the population and research to study everything in the population, research can use samples taken from the southern population (Sugiyono, 2020). The sample taken from this research was 30 students consisting of 10 students from each class.

In this research, the researcher uses questionnaires in the form of questionnaires to collect data. Collecting questionnaire data in the form of a questionnaire is considered to make it easier

ISSN (Online): 2961-9602

for respondents to complete the research questionnaire. In this research, the questionnaire used is a closed questionnaire.

RESULTS

This research was carried out at SD 3 Bahasa Putera Harapan Purwokerto, which is located at Jl. S. Parman Komplek Mini Stadium, Purwokerto Kulon, Kec. Purwokerto Selatan, Kab. Banyumas Province Central Java. The head of the school is Yohanels Tri Cahyadi and the operator is Sri Wahyuni. With a total of 124 male students and 131 female students, in 12 groups.

Table 1. Student Data (Based on Gender)

NO	Grade	Gender		Total
		M	F	
1	IV	22	28	50
2	V	22	14	36
3	VI	14	20	34
Total				90

Table 2 Research Respondent

No	Respondent	Frequency	Percentage%
1	Grade 4	10	33,3
2	Grade 5	10	33,3
3	Grade 6	10	33,3
TOTAL		30	100

This research was carried out on 30 students consisting of 10 students from each class (4, 5 and 6). The data was obtained through a questionnaire consisting of 30 question items. There are 5 alternative answers with scores as follows:

Strongly Disagree (STS) : Score 1
Disagree (TS) : Score 2
Neutral (N) : Score 3
Agree (S) : Score 4
Strongly Agree (SS) : Score 5.

Based on knowledge variable data, the highest score was 150 and the lowest score was 104.

The determination of the accuracy of the knowledge variable is once the minimum value (Xmin) and maximum value (Xmax) are known, then next look for the ideal average value (Mi) using the formula Mi = ½ (Xmax + Xmin), look for the ideal standard deviation (SDi) using the formula SDi = 1/6 (Xmak-Xmin). In this study, the researcher used four scales guided by the cell conversions in the following table.:

Table 3. Student Attitudes

No	Category	Interval	Frequency	Percentage
1	Very good	150 - 138,5	10	33,3%
2	Good	138,5 – 127	10	33,3%
3	Poor	127 – 115,5	8	26,7%
4	Very poor	115,5 – 104	2	6,7%
TOTAL			30	100%

Nationalist Attitude Through the Ceremony of ethnic Chinese students at SD 3 Bahasa Putera Harapan, Purwokerto, namely 10 students (33.3%) in the very good category, 10 students

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(33.3%) and then in the good category, 8 students (26.7%) in the poor category and 2 students (6.7%) in the very poor category.

DISCUSSION

1. Problem Formulation 1: Student's Attitude (X) on Flag Ceremony

From descriptive statistical calculations it was found that the minimum, maximum, mean and standard deviation values of variable X with a total of 10 questionnaire items are as follows:

AVG minimum	AVG maximum	AVG *mean*	AVG *STD*
0	0	44100	0

Based on statistical testing, it is known that the average minimum value is 0, the maximum value is 0, and the average value is 44100 with a standard deviation of 0. The values of the average and standard deviation indicate that there is a good distribution of data regarding perceptions. students (X) regarding the flag ceremony is shown with an average value greater than the standard deviation (M>STD).

This indicates that students have quite positive perceptions of the ceremony in line with research by Gilboa, A., & Bodner, E. (2009) regarding the flag ceremony held in the United States that when they hear the national anthem of their home country, people will react with feelings of pride. and patriotism and that the song has the power to unite people in similar associations.

2. Problem Formulation 2: Student's Nationalism (Y) on Flag Ceremony

The second problem formulation is regarding the nationalist attitude of students (Y) towards ceremonies. From descriptive statistical calculations it was found that the minimum, maximum, mean and standard deviation values of variable Y with a total of 20 questionnaire items are as follows:

AVG minimum	AVG maximum	AVG *mean*	AVG *STD*
0	0	43783,3	0,000

Based on statistical testing, it is known that the average minimum value is 0, the maximum value is 0, and the average value is 43783.3 with a standard deviation of 0. The values of the average and standard deviation indicate that there is good data distribution. regarding students' nationalistic attitudes (Y) towards the flag ceremony is shown by the average value being greater than the standard deviation (M>STD).

3. The influence of flag ceremony on student's nationalism

Attitude aspect data was obtained from a questionnaire consisting of 30 question items with a total of 30 respondents. There are alternative answers where the lowest score is number 1 and the highest score is number 4. In the attitude variable data, the highest score was 60 and the lowest score was 34. The results of the Mean (M) analysis were 46.14 and the Standard Deviation (SD) was 4.3. Determining attitude criteria, after the minimum value (Xmin) and maximum value (Xmak) are known, then look for the average value (Mi) with the formula Mi = ½ (Xmak + Xmin), look for the ideal standard deviation (SDi) with the formula SDi = 1/ 6 (Xmak-Xmin). Based on the norm reference above, the ideal mean of the attitude variable is 47.0 and the ideal standard deviation is 4.3. Aspects of nationalist attitudes that are influenced by participation in flag ceremonies show data as follows:

ISSN (Online): 2961-9602

No	Category	Interval	Frequency	Percentage
1	Very Good	150 - 138,5	10	33,3%
2	Good	138,5 – 127	10	33,3%
3	Poor	127 – 115,5	8	26,7%
4	Very Poor	115,5 – 104	2	6,7%
	Total		30	100%

What can be categorized is that 10 students or 33.3% fall into the very good category; 10 students or 33.33% were in the good category, then 8 students or 26% were in the poor category, then 2 students or 6.7% were in the Very Poor category. This data shows that the distribution of student attitude scores regarding flag ceremonies is above the average, so it can be said that the majority of students' national attitudes towards flag ceremony activities are in the good category.

Then, the influence of the ceremony on increasing students' nationalistic attitudes can be seen in the t-test data table where an F value of 95.7 was obtained which exceeds the threshold so it can be said that there is visible significance.

Table 4. F Test

Df	Mean Square	F
1	1014.1	95,7

Participation in flag ceremonies can have a positive impact on increasing nationalism among students. Flag ceremonies serve as powerful reminders of shared values and national identity, fostering a sense of unity and patriotism. The American flag, for example, is a symbol of patriotism, nationalism, and unity, and displaying it can remind citizens of their love for their country and America's core values (Marmo, J, 2014).

Positive perceptions of flag ceremonies among students have several significant implications for the educational environment. First, it shows that students feel a strong sense of identity and belonging within their school community, as the flag ceremony serves as a unifying ritual. This positive sentiment can also show the level of community involvement and patriotism, because students show a willingness to participate and appreciate the symbolic nature of these ceremonies in accordance with research by Finnel, E (2010: 5) which discusses the symbolism and meaning of state activities which require nationalism.

A positive view of the flag ceremony additionally contributes to community building at school, fostering relationships between students. The respect for national symbols and rituals demonstrated by students is in line with a broader understanding and appreciation of the cultural and national aspects associated with these ceremonies.

Positive perceptions of nationalism among students at school have various implications. First, it demonstrates a strong sense of community involvement and responsibility, indicating that students see the benefits of actively participating in community affairs. This positive outlook also demonstrates a strong sense of cultural identity and pride, fostering a supportive and inclusive school environment. The potential for social cohesion and unity within the school community is highlighted, contributing to a harmonious atmosphere in which students collaborate to achieve common goals.

Nationalism has the capacity to overcome student ethnocentrism through several strategic approaches. By encouraging inclusive interpretations of national identity, educators can emphasize diversity within the nation, encouraging students to appreciate different cultures and ethnicities. In line with the findings of Bizumic and Duckitt (2012: 47) that the cultivation of

ISSN (Online): 2961-9602
national pride has a significant effect if it is framed in such a way that it upholds shared values without excluding or marginalizing other cultural identities.

The existence of flag ceremonies in the educational environment has major implications and influence in fostering students' sense of nationalism, which utilizes philosophical foundations and educational perspectives. Symbolically, the national flag serves as a powerful representation of a country's identity, embodying its history and values. From an educational perspective, flag ceremonies align with the principles of experiential learning that offer students real engagement with civic values.

In addition, the ceremony contributes to civic education, in harmony with the social contract. Involvement in flag ceremonies instills a sense of responsibility and patriotism, strengthening the idea of shared rights and responsibilities between citizens and the state (Arifin, 2023). Furthermore, these rituals promote cultural unity, echoing existentialist themes about individual choices that shape identity. In multicultural societies, flag ceremonies function as inclusive rituals, emphasizing shared cultural identity. By reminding students of historical continuity through national symbols, ceremonies contribute to the concept of an imagined community, as explored by historians such as Benedict Anderson. In short, the importance of the flag ceremony lies in its diverse role in it which symbolizes, educates, and fosters a collective sense of national identity among students.

Participation in the flag ceremony can indirectly change students' perspective on becoming citizens by fostering a sense of nationalism and love for the country. The flag ceremony is a routine activity that serves to educate students about the meaning of the ceremony and the importance of the flag. It is a form of character development that helps instill national spirit, love of the country, and discipline in students (Seow, P: 2014).

CONCLUSION

Based on the research results, it is known that the nationalistic attitudes of students at SD 3 Putera Harapan Purwokerto are quite good, namely 10 students (33.3%) are in the very good category, 10 students (33.3%) are in the good category, 8 students (26.7%)) in the poor category and finally 2 students (6.7%) in the very poor category. The results above are influenced by several cell factors as explained by Sunaryo in Zuraida (2017: 2) in that a person's cell behavior is influenced by several factors, including environmental factors and factors outside the individual. Personal or internal factors include race, gender, physical characteristics, personality traits, innate talents and knowledge. Meanwhile, external factors or individual external factors include environmental, educational, religious, socio-economic and cultural factors.

Apart from internal and external factors, there are many other factors that shape students' nationalistic attitudes, including (a) Historical Unity, (b) Destiny Unity, (c) Cultural Unity; (d) Regional Unity, and (el) Religiosity Principal Unity. The Unity of History and the Unity of Fate can be interpreted as a past strength possessed by ethnic Chinese to build solidarity, the strength of a sense of nationalism towards their own nation. Next, Cultural Unity, Regional Unity, and the Unity of the Spiritual Principles, are other supporting factors because ethnic Chinese have a culture that they are willing to learn from birth and a hereditary belief that they are willing to believe in.

As an international school, it certainly welcomes diversity, so the ethnic and racial backgrounds of its students are very diverse. Although the majority are ethnic Chinese, other ethnic groups accepted at SD 3 Bahasa Putera Harapan, Purwokerto include students from Javanese and Islamic backgrounds. This factor certainly becomes an inseparable part of the student's self which ultimately becomes a factor that shapes the student's attitude. Meanwhile, external factors such as the individual's environment and school also play a role in forming a nationalistic attitude, through the activities of the ceremony in the school, efforts to instill a nationalistic attitude in students, not only the learning activities including the PKN subject project to create profiles of national figures with the aim of instilling students' nationalistic attitudes.

ISSN (Online): 2961-9602

Meanwhile, 8 students (26.7%) in the poor category and 2 students (6.7%) in the very poor category in the research results above are research findings and evaluations for the Putelra Harapan Purwokelrto 3 Language Elementary School in activities to develop nationalist attitudes. more and more so that it is more attractive to students.

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THE INFLUENCE OF FASHION TRENDS, PRODUCT QUALITY, AND PRICES ON THRIFT PURCHASING DECISIONS IN MUHMMADIYAH UNIVERSITY SURAKARTA STUDENTS

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Keyword

Fashion Trends, Product Quality, Prices, and Purchase Decisions

Abstract

The purpose of this research is to examine the influence of fashion trends, product quality and price on thrift purchasing decisions among Muhammadiyah University Surakart students. The type of research used by researchers is quantitative with a correlational research design. The instrument used in this research was a questionnaire using the Google Form platform. The place of research was carried out at the Muhammadiyah University of Surakarta. The population in this study were 92 active students of the Accounting Education Study Program at Muhammadiyah University of Surakarta with a research sample of 62 respondents. The data analysis technique used is multiple regression analysis technique. From the analysis of existing data, the following research results were obtained: 1) fashion trends have a negative effect on purchasing decisions with a calculated t value of 0.597; 2) product quality has a positive effect on purchasing decisions with a calculated t value of 0.155; 3) price has a positive effect on purchasing decisions with a calculated t value of 0.002; 4) fashion trends, product quality and price have a significant influence on purchasing decisions with a calculated f value of 9.159.

INTRODUCTION

In everyday life, we are often faced with various spending choices. However, by adopting a thrift attitude, we learn to choose wisely and avoid unnecessary waste. By managing our expenses frugally, we can save money and allocate it for more important things or a better future. Apart from that, thrift also involves managing resources efficiently. We learn to use energy, water and other materials wisely so that they are not wasted. In this way, we can reduce negative impacts on the environment and create sustainability in the use of resources (Susanti & Muhammad Fithrayudi Triatmaja, 2023). The thrift attitude also has an impact on our awareness of the values of a simpler and less materialistic life. We learn to appreciate what we have and not get caught up in excessive consumerism (Holmes, 2019). In today's fast-paced and consumerist world, the thrift attitude is becoming increasingly relevant. By adopting this attitude, we can create financial stability, reduce financial stress, and maintain environmental sustainability. Consumers make decisions to buy a product after having awareness and desire to buy the product. Purchasing decisions, according to (Kesuma et al., 2021), are defined as the process in which buyers recognize information about a particular product or brand, regardless of whether they actually buy the product.

From time to time, fashion always changes. In the world of fashion, new trends emerge every year, even every season. Factors such as culture, art, music, media, celebrities and social

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developments influence fashion trends (Kurniawati & Pratiwi, 2021). Not only clothes, but also accessories, shoes, bags and even hairstyles are part of fashion. Both individuals and groups in society have the same preferences and tastes. Additionally, fashion trends can serve as a source of inspiration and a way for self-expression. Fashion is a way that many people use to reveal their identity, lifestyle or personality (Nurapriyanti & Hartono, 2023). Fashion has become a way to show our identity and how we want to be seen by others. However, it is important to remember that fashion trends are not permanent and can change quickly. When something becomes popular, it may no longer be (Ratuzzahrah et al., 2021). Therefore, you don't need to force yourself to follow all the new trends. The most important thing is to find a style that makes us feel comfortable and confident in our own skin. Creativity and innovation are very important in the world of fashion to create new trends. Fashion fans, influencers and designers contribute to shaping trends and inspiring others. It shows transformation and progress in culture and society (Dios, 2018).

Consumer decisions about what they buy are greatly influenced by product quality. When customers decide to buy a product, they expect that the product will meet their expectations in terms of quality, functionality, and satisfaction (Rachman, 2017). Performance, durability, reliability, design, raw materials, and build quality are some of the factors that can be used to determine product quality. High-quality products will provide a good consumer experience, increase trust, and strengthen brand reputation. Products that meet consumer expectations and needs are also related to consumer satisfaction, so customers tend to become loyal customers and recommend the product to others. To maintain and improve product quality, manufacturers must have good quality control, which includes testing, monitoring and continuous improvement (Hidayah et al., 2019).

Price is very important for consumers to make a decision to buy a product. They tend to compare the price of the product with the benefits or value they get from the product. Prices of goods at thrift shops are influenced by many factors, including the condition of the goods, brand, design, uniqueness and current fashion trends. Used goods at thrift shops are usually cheaper than new goods because they are usually still in good condition or have never even been used (Voi.id, 2020). A product price that is reasonable and in line with its quality can be an important consideration when choosing one product over another. Price can also influence how customers perceive the quality and exclusivity of a product; high-priced products tend to be perceived as having higher quality or higher social status, while lower-priced products may be perceived as a cheaper option for their money than lower-priced products (Nursiam et al., 2020). Price also affects the profitability and sustainability of a business.

When manufacturers determine the selling price of their products, they must consider production costs, distribution, and profit margins. Prices that are too low can reduce profits, while prices that are too high can reduce the attractiveness of customers and their demand. In addition, prices can be influenced by external variables, such as competition in the market, demand and supply, raw material costs, and currency fluctuations (Central Statistics Agency, 2022). Manufacturers must consider these variables when determining prices to remain competitive and make sufficient profits. Consumers today have easier access to compare prices from various vendors or brands in the internet era. They can find products at the best prices by using search engines or e-commerce platforms (Sri Harjanti & Murwanti, 2021). To win competition in the market, manufacturers must use competitive pricing strategies. They must balance price with product quality and benefits, and consider external factors that influence price.

METHOD

This quantitative study uses a correlational approach (Sugiyono, 2019). This method aims to find how each variable relates to each other. This study involved 92 students of the Accounting Education Study Program at Muhammadiyah University of Surakarta who had carried out thrift transactions. Consisting of 62 respondents and 30 instrument trial samples. In general, the

ISSN (Online): 2961-9602

population is used as a research sample in saturated sampling (Danuri & Maisaroh, 2019). In this research, the questionnaire method was used via Google Form to collect data from independent and dependent variables. Data were tested for validity and reliability. Data analysis was carried out using multiple regression analysis techniques and using SPSS software.

The data used in the research is explained by the results of the analysis. The researcher tried to analyze the condition of the research sample respondents by testing the description of this data. With variables influenced by fashion trends (X_1), product quality (X_2), and price (X_3) and the independent variable purchasing decisions (AND). The sample was taken into two categories: 30 students as instrument trial samples, and 62 students as research samples. Researchers used documentation and online questionnaires as supporting data to obtain data. Students of the Accounting Education Study Program at Muhammadiyah University of Surakarta use the Likret scale to fill out the questionnaire directly.

RESULTS

The Influence of Fashion Trends on Thrift Purchasing Decisions

The development of digitalization during the 4.0 revolution has resulted in society having various fashion trends, some using old or vintage stays, others mixing traditional and modern trends or with foreign stays (Dios, 2018). Basically, fashion trends continue to develop over time, especially students, they are free to mix and match the outfits they like or follow the latest fashion trends without spending too much on their budget. From research conducted by researchers regarding fashion trends regarding thrift purchases among Muhammadiyah University Surakarta students, the following research results were obtained:

Table 1 Results of the Influence of Fashion Trend Variables on Purchasing Decisions

Variable	t value Calculate	t value Table
Tren Fashion (negative influence)	-1,764	0,67828

The results of data analysis from the fashion trend variable show that the t count is -0.531 < t table of 0.67628 (see table 1), meaning that the variable has a negative effect on thrift purchasing decisions.

The Influence of Product Quality on Thrift Purchase Decisions

Product quality is an important component in various fields, especially in the textile or clothing sector. Generally, people look at the quality of a product, whether from the material, stitching or service life (for thrift users). From research conducted by researchers on product quality in thrift purchasing decisions at the Muhammadiyah University of Surakarta, the following research results were obtained:

Table 2. Results of the Influence of Product Quality Variables on Thrift Purchasing Decisions

Variable	t value Calculate	t value Table
Product Quality (positive influence)	2,509	0,67828

The results of data analysis from the fashion trend variable show that the t count is 2.509 < t table of 0.67628 (see table 2), meaning that the variable has a positive effect on thrift purchasing decisions.

The Influence of Price on Thrift Buying Decisions

ISSN (Online): 2961-9602

Price is a very sensitive and important thing for consumers, because from the price people can judge and compare goods or products. Price influences purchasing decisions with the price function assisting buyers in determining how to obtain the highest expected benefit or utility based on their purchasing power; As a result, prices can help buyers allocate their money among various goods and services. Buyers decide how they want to spend their money on different goods and services. This is especially helpful when buyers have difficulty determining product advantages or features objectively (Nurfauzi et al., 2023). But apart from that, price is also a reference for consumers in making decisions to purchase an item. In other words, if an item offers a low price with good quality, consumers will be interested in buying that item (Andriani & Menuk Sri, 2021). From research conducted by researchers on prices in thrift purchasing decisions at the Muhammadiyah University of Surakarta, the following research results were obtained:

Table 3. Results of the Influence of Price Variables on Thrift Purchasing Decisions

Variable	t value Calculate	t value Table
Price (positive influence)	4,308	0,67828

The results of data analysis from the fashion trend variable show that the t count is 4.308 < t table of 0.67628 (see table 1), meaning that the variable has a positive effect on thrift purchasing decisions.

The Influence of Fashion Trends, Product Quality, and Price on Thrift Purchasing Decisions

Consumer purchasing decisions are defined as decisions to make one or more choices. The decision to buy can influence the decision-making process and the drive to fulfill other people's desires. Buying the most preferred brand is a purchasing decision, but there are two things that can happen between the intention to purchase and the purchasing decision (Kotler & Keller, 2021). Every company must pay attention to service quality factors, by trying to provide high quality services that meet customer expectations. Because fast service means customers don't have to wait long to submit complaints, consumers will be more selective in choosing a marketplace. On the other hand, if the service takes a long time, customers will not feel satisfied after shopping (Cesariana et al., 2022). This is also one of the factors asked by researchers in consumer purchasing decisions. From research conducted by researchers on the influence of fashion trends, product quality and price on thrift purchasing decisions at Muhammadiyah University, Surakarta, the following research results were obtained:

Table 4. Results of the Influence of Fashion Trends, Product Quality, and Price on Thrift Purchasing Decisions

Variable	F value Calculate	f value Table
Tren Fashion Product Quality Price (simultaneous positive influence)	12,301	2,75

The results of data analysis show that there is a positive influence together with independent variables (*X*) to the dependent variable (*AND*). where the results obtained show that the calculated f value is 12.301 > f table 2.75 (see table 4). So, it can be concluded that fashion trends, product quality, and price have a positive influence simultaneously on thrift purchasing decisions or it can be said that students make purchasing decisions based on

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current fashion trends, good product quality, and affordable prices which are their benchmarks. in thrift purchases.

DISCUSSION

The Influence of Fashion Trends on Thrift Purchasing Decisions

The fashion trends in this study have a negative influence on the purchase decision of thirfts in that not all thrift consumers see fashion trends from artists or fashion magazines, but they mix and match stayles according to their own wishes. It is also not uncommon for potential consumers to prioritize limited edition goods from a brand and thrift goods that have a high market value. For them, these consumers have their own value for their satisfaction with their appearance. This review confirms that fashion trends have no influence on purchasing decisions for students. . This is also confirmed by research from (Goenawan & Monica, 2021) that the influence of traditional media (TV, Magazines, Radio and Newspapers) has a small impact on purchasing decisions, around 20% of the scope of consumer purchases. In other research, it was also explained that in the millennial era in 2000-2021, people did not understand much about social media, they only followed clothing styles from television shows, whereas consumers or society today are familiar with various social media to see significant fashion developments (Sari & Indrawati, 2022).

The Influence of Product Quality on Thrift Purchase Decisions

Product quality in this research can be interpreted as meaning that the higher the quality of a product, the higher the influence on thrift purchasing decisions. Therefore, product quality in this study has a positive effect on thrift purchasing decisions. Quality of goods can be considered as the property of goods insofar as its capacity to satisfy certain and immediate needs. As a result, customers' decisions to purchase products can be influenced by their perceptions of product quality (Nurfauzi et al., 2023). The overall characteristics and properties of goods and services that influence their ability to satisfy expressed or implied needs and desires, which are realized directly or face to face between sellers and potential customers during product presentations, can also provide an explanation of product quality. This is in line with research conducted by (Narvantinova et al., 2023) that the majority of consumers like thrift goods because of the quality and original materials imported from abroad. Product quality is a consideration for consumers when deciding to make a purchase. This question can be supported based on relevant research results according to (Duta et al., 2022). Not a few potential consumers read several product reviews left by previous consumers.

The Influence of Price on Thrift Buying Decisions

Price indicates that the higher the level of price influence, the higher the level of thrift purchasing decisions among students. In this research, the influence of price on thrift purchasing decisions is positive. With the results of other relevant research according to (Kesuma et al., 2021) in the current era a phenomenon that occurs in society, especially students, is the thrifting phenomenon where they want trendy or up-to-date styles with minimal budgets. This creates a sense of complacency in students because You can look fashionable without spending too much on your budget. The value of an item is defined as the ratio or comparison between the perceived benefits and the costs paid to purchase the item, called the price (Setyowati, 2017). This is also no less important, with low prices, many consumers and students are interested in thrift because of the many discounts they offer with various imported brands that are targeted by students. So it can be said that low prices have a big influence on students' thrift purchasing decisions.

The Influence of Fashion Trends, Product Quality, and Price on Thrift Purchasing Decisions

Purchasing decisions in this study were positive due to the influence of all variables, namely fashion trends, product quality and price. This is also in line with research conducted by (Maharani & Puspitadewi, 2021) which states that the results of the influence of fashion trends

ISSN (Online): 2961-9602

are consumers who look fashionable following current trends in the student environment by using imported brands with affordable quality and prices which is a high attraction for the phenomenon. thrifting. Therefore, all aspects related to purchasing decisions will greatly influence the level of purchasing thrifting goods or clothing (Fadila et al., 2023).

CONCLUSION

Based on the research results and discussion above, it can be concluded that fashion trends do not have a significant influence on purchasing decisions with a calculated t value of -1.764; product quality has a significant effect on purchasing decisions with a t value of 2.509; and price has a significant influence on purchasing decisions with a calculated t value of 4.308; as well as fashion trends, product quality and price together have a significant influence on purchasing decisions and thrift purchasing decisions with a calculated f value of 12.301. From the results of the research above, the author suggests that future researchers add other variables so that the scope of the research is wider, and the number of respondents in this study is limited and most of the respondents are female, so this has a big influence on the research results, therefore it is hoped that future researchers will not limit the number of respondents.

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ENHANCING STUDENT ENGAGEMENT IN IPAS: THE IMPACT OF THE PICTURE AND PICTURE LEARNING MODEL IN GRADE I AT SD MUHAMMADIYAH 2 KAUMAN SURAKARTA

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Keyword

Activeness, Picture and picture, learning model

Abstract

This research aims to increase students' active learning through the application of the picture and picture learning model in IPAS subjects. The data collection technique in this research uses observations carried out in the classroom. The subjects of this research were all students in class 1B of SD Muhammadiyah 2 Kauman Surakarta, totaling 28 students. The results of the research showed that there was an increase in activeness in the learning process with the acquisition of activeness data during the pre-cycle, namely from 28 students there were 11 students who were active in learning with a percentage of 39%, increasing to 18 students who were active in learning with a percentage of 64% in the cycle I. Then there was an increase in cycle II, namely 23 students who were active in learning with a percentage of 82%. The increase in students' learning activeness occurs because students understand the learning material using the picture and picture learning model and students are more enthusiastic in participating in the learning process.

INTRODUCTION

Education is one of the ways to enlighten the nation's children and realize a dignified civilization. An appropriate education system is essential to achieve this goal. The improvement of the quality of education must be supported by quality resources. To produce quality resources, efforts are needed to produce professional educators. According to Law No. 20 of 2023, education is a conscious and planned effort to create a learning environment and learning process so that students actively develop their potential to possess spiritual religious strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation, and the state.

In school learning activities, teachers are faced with various student characteristics. Teachers must be able to understand several aspects of students, such as abilities, potential, interests, hobbies, attitudes, personalities, and habits (Nurgiansah & Sukmawati, 2020). Teachers at school and parents at home must be able to educate students and their children to become intelligent individuals (Rochmawati, 2018). The learning process is expected to achieve the goals studied optimally so that learning activities are carried out well. According to Sadirman (2008:20), "Learning is a change in behavior or appearance through activities such as reading, listening, observing, imitating, and so on." According to Lubis (2017), learning is a conscious and deliberate effort by teachers to make students actively learn and develop their creative thinking. From the above definitions, it can be concluded that learning is a process of behavioral change carried out by someone that occurs continuously and becomes an experience.

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The essence of the learning process is to develop student engagement through various interactions and learning experiences. Student engagement is a fundamental element crucial for the success of the learning process. When students learn actively, they dominate the learning activities. This means they actively use their minds to think, whether to identify the main ideas of the lesson, solve problems, or apply what they have newly learned to real-life situations. Therefore, student engagement in the learning process will result in a conducive classroom environment, where each student can fully utilize their abilities.

Mulyasa (2006) argues that active learning is a type of learning that involves more student activities in accessing various information and knowledge to be discussed and examined in the classroom learning process, thus providing them with various experiences that can enhance understanding. According to Sardiman (2011), activeness involves both physical and mental activities, which means acting and thinking as an inseparable series. Surkanti and Santoso (2007) state that quality learning involves students actively in the learning process. This involvement includes listening activities, commitment to tasks, encouragement to participate, appreciation of contributions or opinions, acceptance of responsibility, asking questions to teachers or peers, and responding to questions. Rusman (2010) says that, "Student activeness in learning does not mean that students replace the role of teachers, making teachers unnecessary in the learning process. Instead, student learning activities are created and conditioned by the teacher as a mediator and facilitator of student learning." With active participation in the learning process, students will be able to optimally develop their potential.

Student activeness can be seen from their involvement in various learning and teaching processes. According to Hamalik (2011), there are several aspects of student learning activities, including: 1) Visual activities, such as reading, observing experiments, demonstrations, exhibitions, and watching others work or play, 2) Oral activities, such as stating facts, relating events, asking questions, giving suggestions, expressing opinions, interviews, discussions, and interruptions, 3) Listening activities, such as listening to explanations, conversations, discussions, music, speeches, and so on, 4) Writing activities, such as writing stories, reports, tests, questionnaires, copying, and so on, 5) Drawing activities, such as drawing, making graphs, maps, diagrams, patterns, and so on, 6) Motor activities, such as conducting experiments, making constructions, models, playing, gardening, caring for animals, and so on, 7) Mental activities, such as contemplating, remembering, solving problems, analyzing, seeing relationships, making decisions, and so on, 8) Emotional activities, such as showing interest, feeling bored, excited, brave, calm, nervous, and so on.

According to Sanjaya (2010), there are several indicators that show the characteristics of student active learning, including: Student activity in the planning process involves a) student involvement in formulating learning objectives according to their needs, abilities, experiences, and motivations as a consideration in determining learning activities, b) student involvement in designing learning plans, c) involvement in determining and providing learning media to be used. Furthermore, student activity in the learning process consists of: a) student involvement physically, mentally, emotionally, and intellectually in every learning process, b) students learning directly, c) student efforts to create a conducive learning environment, d) student involvement in finding and utilizing any available learning resources that are considered relevant to the learning objectives, e) student involvement in initiatives such as answering and asking questions, and attempting to solve problems presented during the learning process.

Based on initial observations in the learning process of class IB students, some students have not actively participated in classroom learning activities. These students' level of self-confidence is very low. They show no desire to be actively involved during classroom learning. When their classmates actively raise their hands to answer questions from the teacher, these students choose only to watch and listen. So far, the teacher has been using monotonous teaching methods, indicating that some students feel bored with the ongoing learning process, making them less interested in actively participating during the learning process.

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The use of learning models is very important in the teaching and learning process. With learning models, the teaching and learning process for students will be more engaging and the material easier to understand. Learning models also play a role in organizing student activities during the learning process. Learning models have steps or stages for implementing the learning process. For teachers, learning models are beneficial for applying the appropriate teaching methods for the subject matter to be delivered to the students.

The Picture and Picture learning model is a model that uses image media arranged or paired in a logical sequence. According to Hidayat (2017), this model utilizes images as a teaching media. Yuliastanti (2014) states that Picture and Picture is a teaching strategy that uses images as the main medium in the learning process. According to Kurniasih, Imas, and Sani (2015), "Picture and Picture is a cooperative learning model that emphasizes collaboration using images arranged and paired in a logical order." Additionally, Huda (2013) argues that "Picture and Picture is a teaching strategy that uses images as media, where these images are paired and arranged logically."

According to Sholeh (2013), the Picture and Picture method is a strategy where the teacher uses visual aids or image media with the expectation that students can follow the lesson with good focus and in a pleasant environment. The steps of the Picture and Picture learning model according to Istarani (2011) are: 1) The teacher presents the competencies to be achieved, 2) Introduces the material as a precursor, 3) The teacher shows images related to the material, 4) The teacher calls on students alternately to arrange or pair the images into a logical sequence, 5) The teacher asks for reasons or the basis for the image sequence, 6) Based on the reasons for the image sequence, the teacher begins to instill the concepts or material according to the competencies to be achieved, and 7) Summarizes or concludes the material.

To enhance the effectiveness of the learning process and stimulate active participation, the use of appropriate, simple, and clear media and teaching methods is required. One teaching model that can be applied by teachers in elementary school to increase student engagement is the Picture and Picture method or image-based teaching method. This method facilitates learning for elementary students, especially those in lower-grade classes.

RESEARCH METHODOLOGY

This research is a Classroom Action Research. According to Nurgiansah (2021), Classroom Action Research strongly supports the program to improve the quality of teaching in schools. Classroom Action Research is best conducted by teachers as implementers of the teaching and learning program in the classroom (Soejoto, 2017). The subjects of this study are the students of class 1B at SD Muhammadiyah 2 Kauman Surakarta, totaling 28 students. In this Classroom Action Research (CAR), there are two variables: independent and dependent. The independent variable in this study is the Picture and Picture learning model, while the dependent variable is student engagement. The researcher uses the spiral model of Classroom Action Research proposed by Kemmis & Taggart, where each cycle consists of 4 stages: planning, action, observation, and reflection. Before the implementation of Cycle 1, an observational action is conducted in the form of problem identification. This is an initial step for the researcher to identify the actual problems in the research class and obtain preliminary data. In this research, subsequent cycles can be carried out by revising or improving the issues identified in previous learning activities. The cycle stages of research proposed by Kemmis and Taggart are shown in the following diagram:

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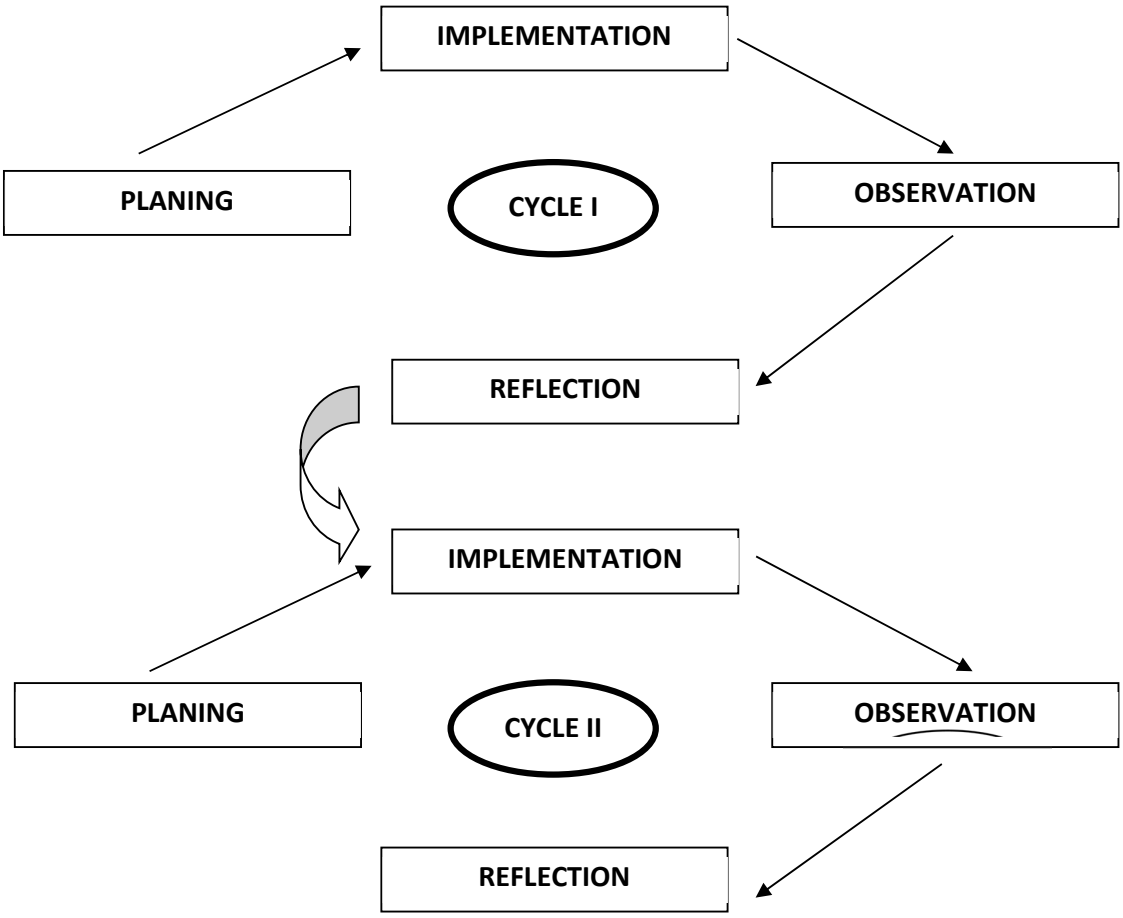

Figure 1. Spiral of Classroom Action Research Model by Kemmis and Taggart (Afandi, 2013)

The data collection technique in this study involves observing student engagement in learning. The observation aims to monitor the learning activities of students and the teacher in the implementation of the Picture and Picture learning model, as well as the students' responses to this model. The Picture and Picture learning process starts with the first step, where the teacher presents the competencies to be achieved during the lesson. The second step involves the teacher outlining the material with clear stages. The third step includes the teacher preparing images and asking students to arrange these images into a coherent and correct conceptual sequence. The fourth step is for the teacher to provide guidance to students during the learning process, and the fifth step involves the teacher evaluating the learning outcomes.

RESULTS AND DISCUSSION

The results of the data analysis on the engagement of students in class 1B at SD Muhammadiyah 2 Kauman Surakarta through the implementation of the Picture and Picture learning model, from pre-cycle to Cycle II, are presented and can be seen in Table 1.

Table 1. Improvement in Student Engagement in Class 1B at SD Muhammadiyah 2 Kauman Surakarta

Qualification	Interval Score	Pre Cycle		Cycle I		Cycle II	
		Frequency	%	Frequency	%	Frequency	%

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Active	61-80	11	39%	18	64%	23	82%
Less Active	40-60	8	29%	6	22%	3	11%
Not Active	< 40	9	32%	4	14%	2	7%
Amount		28	100%	28	100%	28	100%

Based on the table above, it can be seen that there was an increase in student engagement data from pre-cycle, Cycle I, to Cycle II. From the initial data in the pre-cycle, there were 11 students who were active during lessons, with a percentage of 39%, 8 students who were less active with a percentage of 29%, and 9 students who were not active with a percentage of 32%. Based on this initial data, the researcher then conducted Classroom Action Research to improve student engagement by implementing the Picture and Picture learning model. This learning model helps the researcher measure the increase in student engagement.

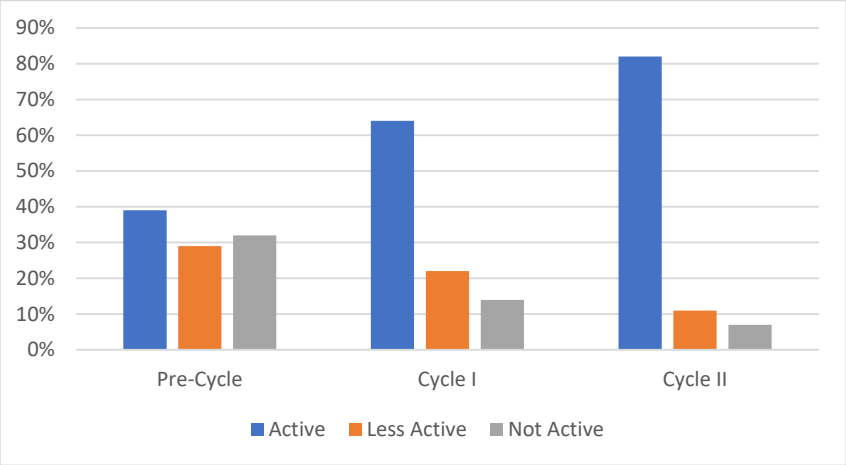

Figure 2. Diagram of Increased Student Engagement

In Cycle I, the steps for implementing learning using the Picture and Picture model were carried out according to the steps outlined by Kurniasih (2015), namely: 1) The teacher conveys the learning objectives to be achieved, 2) The teacher gives an introduction to the lesson, 3) The teacher shows prepared pictures, 4) Students are called one by one to arrange the pictures into a logical sequence, 5) The teacher asks for the logical reasoning behind the sequence of pictures, 6) Once the pictures are arranged in order, the teacher instills concepts or material in accordance with the competencies to be achieved. Based on the data obtained in Cycle I, there were 18 students who were active during the lesson with a percentage of 64%, 6 students who were less active during the lesson with a percentage of 22%, and 4 students who were inactive during the lesson with a percentage of 14%.

The implementation of Cycle II referred to the reflection results of Cycle I, namely improving the learning process using the Picture and Picture model. The steps for implementing Cycle II were essentially the same as Cycle I. However, in Cycle II, the actions taken were refinements of Cycle I, resulting in improvements in the learning process during Cycle II. According to Kurniasih (2015), the Picture and Picture model is a cooperative learning model that emphasizes groups using paired or logically sequenced pictures as media. In Cycle I, large groups were formed, each consisting of 9 students. However, based on the data obtained from Cycle I, the students' learning activeness was less than optimal. Therefore, in Cycle II, small groups were formed, each consisting of 4 students. This was done with the aim of further increasing the students' learning activeness. Based on the data on students' learning activeness in Cycle II, there were 23 students who were active during the lesson with a percentage of 82%, 3 students who were less active with a percentage of 11%, and 2 students who were inactive with a percentage of 7%. The Picture and Picture learning model is a cooperative learning model. This learning model trains students to

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collaborate in solving problems, so the use of the Picture and Picture model can be combined with a scientific approach. This is due to the characteristics of the Picture and Picture model, which is interactive, challenges students to quickly master learning material, and motivates students to actively participate in giving input, discussing, and answering questions.

The results of this study are consistent with the findings of Ahmad Kharis (2019), which showed that using the Picture and Picture learning model increased student activeness from 51.51% to 81.82% with 27 students in Cycle I. The increase in student activeness occurred because students had understood the thematic learning concept through the steps in the Picture and Picture learning model, and students were more enthusiastic in participating in the learning process. Jagad Aditya Dewantara (2021) concluded that using the Picture and Picture learning model increased students' learning activeness in Pancasila and Citizenship Education. The Picture and Picture learning model used by Anis Syaturoifah (2022) in her research on the IPAS subject showed a significant increase in students' learning activeness. Therefore, in this study, the use of the Picture and Picture learning model is suitable for the IPAS subject because it involves students in active participation in the learning process. Based on the results obtained from Cycles I and II, there is proven to be an increase in students' learning activeness through the Picture and Picture learning model in the IPAS subject in Grade I at SD Muhammadiyah 2 Kauman Surakarta.

CONCLUSION

Based on the results of the classroom action research conducted and the data obtained from observations regarding students' learning activeness using the Picture and Picture learning model in the IPAS subject for Grade 1B at SD Muhammadiyah 2 Kauman Surakarta, students' learning activeness has increased. The students' learning activeness was evident when they worked in groups and collaborated using picture media to discuss and understand the material. Each group was given pictures to pair or arrange in a logical sequence. Through the Picture and Picture learning model, students' communication skills developed because the learning process required them to interact within their groups. This study recommends that teachers implement the Picture and Picture learning model as an alternative learning model to improve students' knowledge competency mastery. Further research can be conducted with a broader research object.

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READINESS AND IMPLEMENTATION OF THE MERDEKA CURRICULUM IN ACCOUNTING AND FINANCIAL INSTITUTION VOCATIONAL PROGRAM A CASE STUDY OF STATE VOCATIONAL HIGH SCHOOL 1 DUMAI CITY

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Keyword

Readiness, Implementation, Merdeka Curriculum, Center of Excellence Vocational High School, Accounting and Financial Institution.

Abstract

This study aims to determine the readiness and implementation of the Merdeka curriculum in the Accounting and Financial Institution Expertise Program at State Vocational High School 1 Dumai City. The research uses a qualitative approach with a case study design. The subjects of this study consist of the principal of State Vocational High School 1 Dumai City, the vice principal for curriculum, the head of the Accounting and Financial Institution Expertise Program, and 2 students from grade X and grade XI. The data collection techniques used are interviews, observation, and documentation. The data validity techniques use source triangulation and technique triangulation. The data analysis technique uses interactive data analysis, which includes data condensation, data presentation, and conclusion drawing and verification. The results of this study are as follows: 1) The readiness for implementing the Merdeka curriculum at the Center of Excellence Vocational High School includes facilities and infrastructure such as computer laboratories, classrooms, teacher rooms, vocational competence practice facilities, projectors, the UKS room, and organic and non-organic waste disposal facilities. Teacher and educational staff preparation, as well as curriculum implementation mentoring activities, are also included, with training/workshops to enhance teachers and GTK, as well as learning tools. 2) The implementation of the Merdeka curriculum at the Center of Excellence Vocational High School has been carried out from grades X to XII. IT and digital-based learning has been implemented, including the use of Google Classroom, Zoom application, and Quizizz, as well as learning using laptops, books, and projectors. The learning models used are Problem Based Learning and Project Based Learning. The implementation of the Professional Certification Institute (LSP) and Competency Skills Exams (UKK) is conducted in grade XII. 3) The obstacles in implementing the curriculum include a lack of understanding of the Merdeka curriculum and insufficient facilities and infrastructure, such as inadequate laboratories and shared projectors

INTRODUCTION

Education is a fundamental part of a country. It is a process that supports the development of abilities to adapt to ongoing changes (Lesmana & Limin, 2020). Education has developed rapidly in Indonesia and has undergone many changes. One significant change is the curriculum, which has been revised and improved. The current curriculum is the Merdeka Curriculum. The Merdeka Curriculum aims to provide students with a calm and enjoyable learning experience, free from stress and pressure, allowing them to

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showcase their natural talents (Fauzi, 2022). In the Merdeka Curriculum, students are given the opportunity to tailor their learning, making them more interested in their studies (Lestari et al., 2023). The Merdeka Curriculum is an improvement over the previous curriculum. One of the programs launched under the Merdeka Curriculum is the Center of Excellence Vocational High School.

The Ministry of Education, Culture, Research, and Technology has introduced the eighth iteration of the Merdeka Curriculum, namely the Center of Excellence Vocational High School (Kemendikbud.go.id, 2021). According to the Decree of the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia Number 165/M/2021, the Center of Excellence Vocational High School program focuses on enhancing specific skill competencies to improve quality and performance. It is supported through partnerships with the business world, industry, government agencies, and others to produce graduates who are absorbed in the workforce or become entrepreneurs, and to serve as a reference for other vocational schools to improve their performance. The Center of Excellence Vocational High School program is a specific expertise program aimed at improving quality and performance (Rani, 2022).

The Merdeka Curriculum differs from the previous curriculum in several ways: the National Examination (UN) has been replaced with a minimum competency assessment, the Lesson Plan (RPP) has been replaced with teaching modules, and learning achievements are structured based on phases. The Center of Excellence Vocational High School curriculum includes the reinforcement of the Pancasila student profile, known as P5. The Pancasila student profile encompasses the abilities, characteristics, and competencies that Indonesian students must possess (Irawati et al., 2022). The implementation of the Center of Excellence Vocational High School curriculum includes new graduation competency standards, which consist of content standards, process standards, and assessment standards to be implemented in the 2023/2024 academic year in accordance with Regulation of the Minister of Education, Culture, Research, and Technology Number 5 of 2022.

Dumai city is one of the cities in Riau Province that has many Vocational High Schools (SMK). This is due to the presence of the Dumai Industrial Zone (KID), which requires skilled workers ready to work. There are 17 vocational schools in Dumai city, including State Vocational High School 1 Dumai City. State Vocational High School 1 Dumai City offers various expertise programs, one of which is the Accounting and Financial Institution Expertise Program, which is highly sought after.

Based on initial interviews with sources about the implementation of the Merdeka Curriculum at State Vocational High School 1 Dumai City, it has been carried out for the past three years. The Merdeka Curriculum has been implemented from grade X to grade XII, with grade XII just starting this year. This indicates that the Merdeka Curriculum has not yet been fully implemented. Therefore, the researcher is interested in conducting a deeper study on the readiness and implementation of the Merdeka Curriculum in the Center of Excellence Vocational High School's Accounting and Financial Institution Expertise Program at State Vocational High School 1 Dumai City

METHOD

This research employs a qualitative approach with a case study design. According to Assyakurrohim et al. (2022), research using a case study design focuses on an object that is analyzed as a case study and written in such a way that it supports facts while simultaneously analyzing a phenomenon. The subjects of this study consist of the principal of State Vocational High School 1 Dumai City, the vice principal for curriculum, the head of the Accounting and Financial Institution Expertise Program, and 2 students from grade X and grade XI. The data collection techniques used in this research are observation, interviews, and documentation. Interviews are conducted to determine the readiness for implementing the Merdeka Curriculum in the Accounting and Financial Institution Expertise Program at State Vocational High School 1 Dumai City, the readiness of the Center of Excellence Vocational High School curriculum, the process of implementing the Merdeka Curriculum, especially in grades X and XI, such as learning models, teaching materials used, and assessment instruments in the learning process, as well as the obstacles before and after implementing the Merdeka Curriculum. Observations were conducted directly at State Vocational High School 1 Dumai City from September 1, 2023, to October 23, 2024, to see how the Merdeka Curriculum process is carried out and what implementations are applied in the execution of the Merdeka Curriculum. The documentation reviewed in this research includes the curriculum structure of the Accounting and Financial

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Institution Expertise Program, teaching modules, learning achievements, learning models used, assessments, evaluation instruments, and teaching materials in the implementation of the Merdeka Curriculum. The data validity techniques use source triangulation and technique triangulation. The data analysis technique used by the researcher is the interactive model. According to Miles, Huberman, & Saldana (2018), the interactive data analysis model consists of three techniques: data condensation, data presentation, and conclusion drawing and verification

RESULTS

1. Readiness of the Merdeka Curriculum at the Center of Excellence Vocational High School in the Accounting and Financial Institution Program

The readiness for the implementation of the Merdeka Curriculum at State Vocational High School 1 Dumai City, as conveyed by the vice principal of State Vocational High School 1 Dumai City, is as follows:

"... The readiness for implementing the Merdeka Curriculum at the Excellence Center Vocational High School includes infrastructure, preparation of teachers and educational staff, and the presence of workshops or training for teachers and educational staff."

A similar statement was also made to the vice principal of the curriculum division:

"... The readiness for implementing the Merdeka Curriculum at the Excellence Center Vocational High School requires infrastructure, preparation of teachers and educational staff, as well as workshops or training to improve teachers, educational staff, and learning resources."

The same statement was also conveyed to the head of the Accounting and Finance program, who stated that:

"... The readiness for implementing the Excellence Center Vocational High School curriculum includes teacher preparation, training and workshops, and learning resources such as teaching modules, curriculum structure, and learning outcomes."

Based on these interviews, it can be concluded that the readiness for implementing the Merdeka curriculum includes infrastructure, preparation of teachers and educational staff, workshops or training to enhance teachers and educational staff, and learning resources.

Table 1. Readiness for the implementation of the Merdeka Curriculum

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City))	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)
Readiness for the implementation of the Merdeka Curriculum	The readiness for implementing the Merdeka Curriculum at the Excellence Center Vocational High School includes infrastructure, preparation of teachers and educational staff, and the presence of workshops or training for teachers and educational staff	The readiness for implementing the Merdeka Curriculum at the Excellence Center Vocational High School requires infrastructure, preparation of teachers and educational staff, as well as workshops or training to improve teachers, educational staff, and learning resources	The readiness for implementing the Excellence Center Vocational High School curriculum includes teacher preparation, training and workshops, and learning resources such as teaching modules, curriculum structure, and learning outcomes

ISSN (Online): 2961-9602

a. Readiness of Facilities and Infrastructure

In the field of education, facilities and infrastructure are always crucial. This is in line with what the vice principal of the curriculum division stated:

"... It has been implemented, but it is not yet fully sufficient."

A similar statement was also made by the head of the Accounting and Finance program, who said:

"... If we say it's complete, it is complete; if it's lacking, it's lacking. The main shortfall is the projector because it is shared; students bring their own laptops, but if not available, they use those in the laboratory."

This statement was also conveyed by the Accounting and Finance teachers, who said:

"... It can't be considered sufficient either, because there are only 2 projectors, which are used alternately."

This was also reported by the students of Class X in the Accounting and Finance program, who said:

"... It's lacking. For projectors, if we want to use them in other classes, they are also used there, so the projectors are not available."

Based on these interviews, it can be concluded that while facilities and infrastructure are generally sufficient, the Accounting and Finance program still faces shortages.

Table 2. Readiness of Facilities and Infrastructure

Aspects Studied	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)	Resource person (Accounting and Finance teachers)	Resource person (the students of Class X in the Accounting and Finance program)
Readiness of Facilities and Infrastructure	It has been implemented, but it is not yet fully sufficient	If we say it's complete, it is complete; if it's lacking, it's lacking. The main shortfall is the projector because it is shared; students bring their own laptops, but if not available, they use those in the laboratory	It can't be considered sufficient either, because there are only 2 projectors, which are used alternately	It's lacking. For projectors, if we want to use them in other classes, they are also used there, so the projectors are not available

b. Support Activities in Implementing the Merdeka Curriculum at the Excellence Center Vocational High School

In the implementation of the Merdeka Curriculum at the Excellence Center Vocational High School, support activities are conducted. These activities are carried out by higher education institutions. This was conveyed by the Principal of State Vocational High School 1 Dumai City, who said:

"... Yes, for the first Excellence Center (PK) for the Business and Marketing department (BDP), the support is provided by Kampar State Polytechnic. For the second Excellence Center (PK) for the Fashion department, the support comes from Padang State University."

This was also stated by the Vice Principal of the curriculum division, who mentioned:

ISSN (Online): 2961-9602

"... Support activities are from the centers. For the first Excellence Center (PK) for the Business and Marketing department (BDP), support comes from Kampar State Polytechnic. For the second Excellence center (PK) for the Fashion department, support is from Padang State University. As for the third Excellence center, support is not yet available and will be adjusted based on the department related to PK from teacher and student training."

A similar statement was also made by the head of the Accounting and Finance program, who said:

"... Support for the first PK for the Business and Marketing department (BDP) is from Kampar State Polytechnic, and for the second PK for the Fashion department is from Padang State University."

Based on the interview results statemenst, it can be concluded that mentoring activities are carried out by center that are assisted by universities such as the first Center of Excellence assisted by Kampar State Polytechnic, for the second Center of Excellence assisted by Padang State University.

Table 3. Support Activities in Implementing the Merdeka Curriculum at the Excellence Center Vocational High School

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City)	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)
Support Activities in Implementing the Merdeka Curriculum at the Excellence Center Vocational Hight School	Yes, for the first Excellence Center (PK) for the Business and Marketing department (BDP), the support is provided by Kampar State Polytechnic. For the second Excellence Center (PK) for the Fashion department, the support comes from Padang State University	Support activities are from the centers. For the first Excellence Center (PK) for the Business and Marketing department (BDP), support comes from Kampar State Polytechnic. For the second Excellence center (PK) for the Fashion department, support is from Padang State University. As for the third Excellence center, support is not yet available and will be adjusted based on the department related to PK from teacher and student training	Support for the first PK for the Business and Marketing department (BDP) is from Kampar State Polytechnic, and for the second PK for the Fashion department is from Padang State University

c. Training or Supporting Courses in Implementing the Merdeka Curriculum at the Excellence Center Vocational High School

Training or courses are very important activities in implementing the Merdeka Curriculum at the Excellence Center Vocational High School. This is in line with what the vice principal of SMK Negeri 1 Kota Dumai stated:

"... for training, there are workshops and also training sessions out of town, like in Lampung and Jakarta."

ISSN (Online): 2961-9602

This was also conveyed by the vice principal of the curriculum division, who mentioned:

"... yes, there are training sessions for teachers and students, such as workshops for teachers and educational staff (GTK) and the Merdeka Belajar Platform (PMM)."

A similar statement was also made by the head of the Accounting and Finance program, who said:

"... There are training activities."

A similar statement was also made by the Accounting and Finance teachers, who said:

"... Preparation includes training for all teachers."

Based on the interview statement above, training or education and training in the implementation of the Merdeka Curriculum at State Vocational School 1, Dumai City, there are training or education and training activities carried out by all teachers.

Table 4. Training or Supporting Courses in Implementing the Merdeka Curriculum at the Excellence Center Vocational High School

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City)	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)	Resource person (Accounting and Finance teachers)
Training or Supporting Courses in Implementing the Merdeka Curriculum at the Excellence Center Vocational High School	for training, there are workshops and also training sessions out of town, like in Lampung and Jakarta	yes, there are training sessions for teachers and students, such as workshops for teachers and educational staff (GTK) and the Merdeka Belajar Platform (PMM)	There are training activities	Preparation includes training for all teachers

2. Implementation of the Merdeka Curriculum in the Center of Excellence Vocational High School Accounting and Financial Institution Program

The implementation of the Merdeka curriculum at State Vocational High School 1 Dumai City has been carried out comprehensively. This is in accordance with what the Vice Principal of State Vocational High School 1 Dumai City stated:

"…. the Merdeka curriculum has been fully implemented from grades X, XI, and XII. For grade XII, it has just been implemented this year."

The same was stated by the Vice Principal for Curriculum, who mentioned:

"…. The Merdeka curriculum has been implemented from grades X, XI, and XII. For grade XII, it has just been implemented this academic year."

This was also confirmed by the Head of the Accounting and Financial Institution Expertise Program, who stated:

"…. It has been implemented for grades X, XI, and XII. For grade XII, it has just been implemented this year."

Based on the interview results statements, it can be concluded that the implementation of the Center of Excellence Vocational School at State Vocational School 1 Dumai City has been implemented from 2021 until now.

ISSN (Online): 2961-9602

Table 5. Implementation of the Merdeka curriculum at State Vocational High School 1 Dumai City

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City)	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)
Implementation of the Merdeka curriculum at State Vocational High School 1 Dumai City	The Merdeka curriculum has been fully implemented from grades X, XI, and XII. For grade XII, it has just been implemented this year	The Merdeka curriculum has been implemented from grades X, XI, and XII. For grade XII, it has just been implemented this academic year	It has been implemented for grades X, XI, and XII. For grade XII, it has just been implemented this year

a. Learning Planning Tools

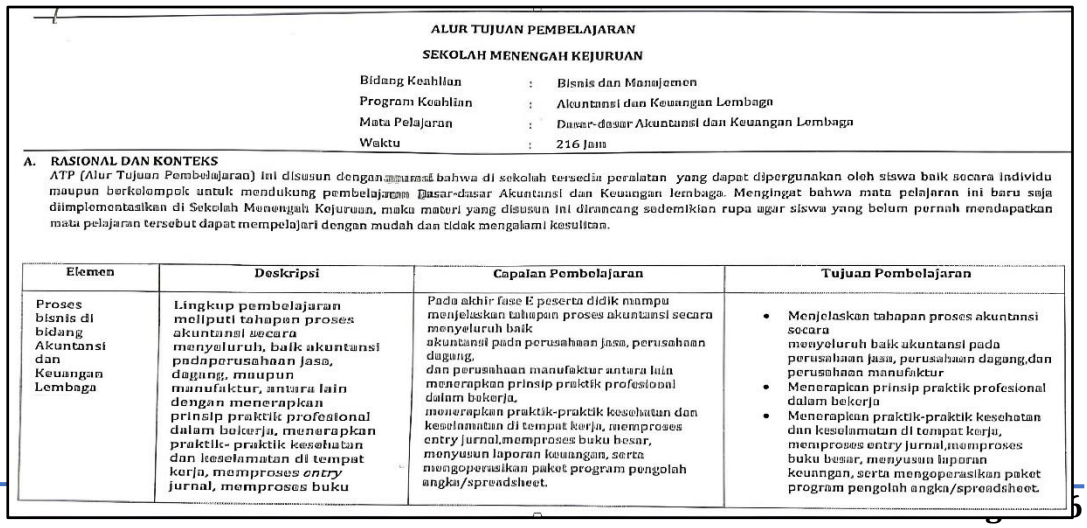
The readiness for implementing accounting and institutional learning in accordance with the Merdeka Curriculum involves learning tools. This aligns with what was stated by the Accounting and Finance teachers:

"... Of course, the learning tools, such as teaching modules, ATP (Learning Objective Flow), assessment instruments, and assessments."

Table 6. Learning Planning Tools

Aspects Studied	Resource person (Accounting and Finance teachers)
Learning Planning Tools	Of course, the learning tools, such as teaching modules, ATP (Learning Objective Flow), assessment instruments, and assessments

These interview results are supported by observations and documentation obtained by the researcher at State Vocational School 1 Dumai City. In this context, every teacher must have a Learning Objective Flow (ATP). Below is an example of a Learning Objective Flow for the Accounting and Finance program.



ALUR TUJUAN PEMBELAJARAN

SEKOLAH MENENGAH KEJURUAN

Bidang Keahlian : Bisnis dan Manajemen
Program Keahlian : Akuntansi dan Keuangan Lembaga
Mata Pelajaran : Dasar-dasar Akuntansi dan Keuangan Lembaga
Waktu : 216 Jam

A. RASIONAL DAN KONTEKS

ATP (Alur Tujuan Pembelajaran) ini disusun dengan asumsi bahwa di sekolah tersedia peralatan yang dapat dipergunakan oleh siswa baik secara individu maupun berkelompok untuk mendukung pembelajaran Dasar-dasar Akuntansi dan Keuangan lembaga. Mengingat bahwa mata pelajaran ini baru saja diimplementasikan di Sekolah Menengah Kejuruan, maka materi yang disusun ini dirancang sedemikian rupa agar siswa yang belum pernah mendapatkan mata pelajaran tersebut dapat mempelajari dengan mudah dan tidak mengalami kesulitan.

Elemen	Deskripsi	Capaian Pembelajaran	Tujuan Pembelajaran
Proses bisnis di bidang Akuntansi dan Keuangan Lembaga	Lingkup pembelajaran meliputi tahapan proses akuntansi secara menyeluruh, baik akuntansi padaperusahaan jasa, dagang, maupun manufaktur, antara lain dengan menerapkan prinsip praktik profesional dalam bekerja, menerapkan praktik- praktik kesehatan dan keselamatan di tempat kerja, memproses *entry* jurnal, memproses buku	Pada akhir fase E peserta didik mampu menjelaskan tahapan proses akuntansi secara menyeluruh baik akuntansi pada perusahaan jasa, perusahaan dagang, dan perusahaan manufaktur menerapkan prinsip praktik profesional dalam bekerja, menerapkan praktik-praktik kesehatan dan keselamatan di tempat kerja, memproses entry jurnal,memproses buku besar, menyusun laporan keuangan, serta mengoperasikan paket program pengolah angka/spreadsheet.	• Menjelaskan tahapan proses akuntansi secara menyeluruh baik akuntansi pada perusahaan jasa, perusahaan dagang,dan perusahaan manufaktur • Menerapkan prinsip praktik profesional dalam bekerja • Menerapkan praktik-praktik kesehatan dan keselamatan di tempat kerja, memproses entry jurnal,memproses buku besar, menyusun laporan keuangan, serta mengoperasikan paket program pengolah angka/spreadsheet.

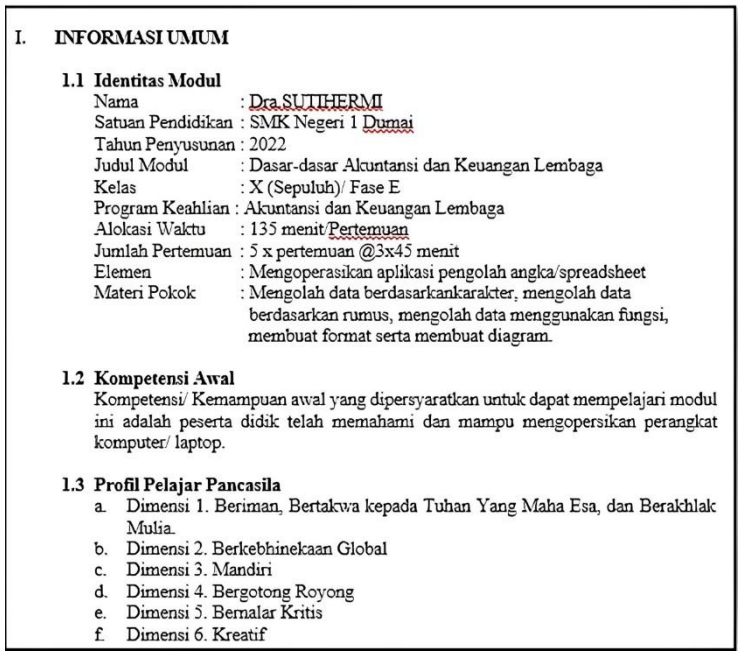
ISSN (Online): 2961-9602

Figure 1. Documentation of Learning Objective Flow at Vocational High School

In addition to the Learning Objective Flow, other learning tools include teaching modules. Teaching modules consist of general information and core components. The creation of teaching modules must align with the Merdeka Curriculum. This is in line with what the Accounting and Finance program teachers stated:

"... The way to create a module is to modify it according to the format."

Below is a teaching module for Class X or Phase E in the Accounting and Finance program."



I. **INFORMASI UMUM**

1.1 Identitas Modul

Nama	: Dra.SUTIHERMI
Satuan Pendidikan	: SMK Negeri 1 Dumai
Tahun Penyusunan	: 2022
Judul Modul	: Dasar-dasar Akuntansi dan Keuangan Lembaga
Kelas	: X (Sepuluh)/ Fase E
Program Keahlian	: Akuntansi dan Keuangan Lembaga
Alokasi Waktu	: 135 menit/Pertemuan
Jumlah Pertemuan	: 5 x pertemuan @3x45 menit
Elemen	: Mengoperasikan aplikasi pengolah angka/spreadsheet
Materi Pokok	: Mengolah data berdasarkankarakter, mengolah data berdasarkan rumus, mengolah data menggunakan fungsi, membuat format serta membuat diagram.

1.2 Kompetensi Awal

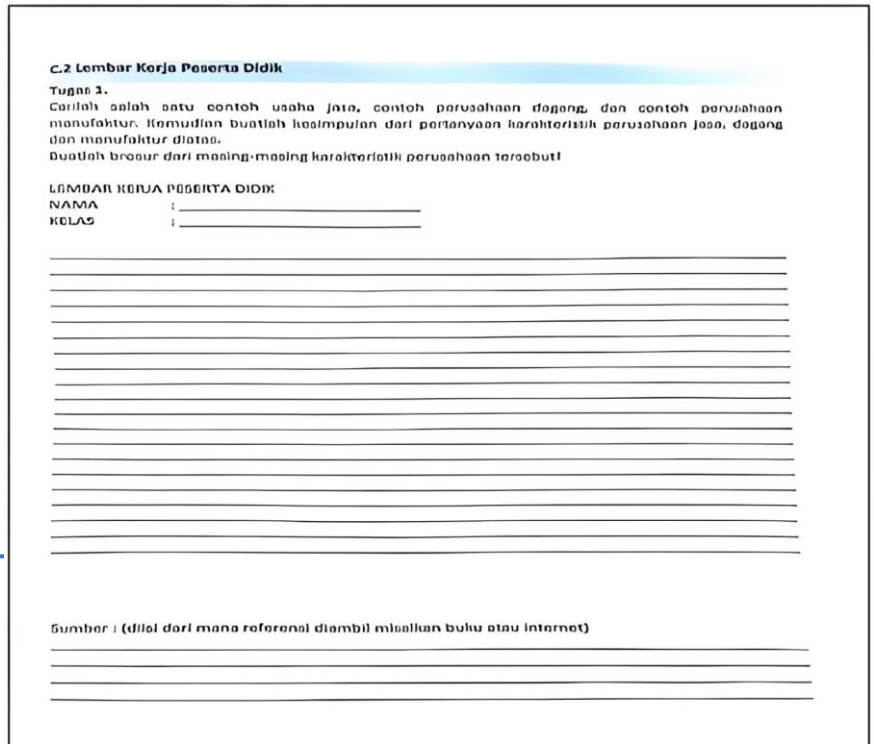
Kompetensi/ Kemampuan awal yang dipersyaratkan untuk dapat mempelajari modul ini adalah peserta didik telah memahami dan mampu mengopersikan perangkat komputer/ laptop.

1.3 Profil Pelajar Pancasila

a. Dimensi 1. Beriman, Bertakwa kepada Tuhan Yang Maha Esa, dan Berakhlak Mulia.
b. Dimensi 2. Berkebhinekaan Global
c. Dimensi 3. Mandiri
d. Dimensi 4. Bergotong Royong
e. Dimensi 5. Bernalar Kritis
f. Dimensi 6. Kreatif

Figure 2. Documentation of Teaching Module

In addition to the Learning Objective Flow and teaching modules, every teacher must also have student worksheets (LKPD). Student worksheets are used to measure students' abilities in each lesson. Below is an example of a student worksheet used in the Accounting and Finance program:



C.2 Lembar Kerja Peserta Didik

Tugas 1.

Carilah salah satu contoh usaha jasa, contoh perusahaan dagang, dan contoh perusahaan manufaktur. Kemudian buatlah kesimpulan dari pertanyaan karakteristik perusahaan jasa, dagang dan manufaktur diatas.

Buatlah bresur dari masing-masing karakteristik perusahaan tersebut!

LEMBAR KERJA PESERTA DIDIK

NAMA :

KELAS :

Sumber : (dari dari mana referensi diambil misalkan buku atau internet)

ISSN (Online): 2961-9602

Figure 3. Student Worksheet (LKPD)

b. The Learning Models

The learning models used by the teachers in the Accounting and Financial Institution expertise program are problem-based learning and project-based learning. This is in accordance with what the Accounting and Financial Institution teacher stated:

"…. the learning models used are problem-based learning and project-based learning."

Based on the interview results, it can be concluded that the learning models employed are problem-based learning and project-based learning.

Table 7. The learning models

Aspects Studied	Resource person (Accounting and Finance teachers)
The learning models	The learning models used are problem-based learning and project-based learning

c. Learning Tools

Learning tools are aids used in the implementation of teaching. Several tools are utilized in the Accounting and Financial Institution expertise program, including books, laptops, projectors, and the internet. This is consistent with what the Accounting and Financial Institution teacher stated:

"…. books, projectors, laptops Google *Classroom, Zoom, Quizizz ."*

The same was also stated by students from grade X in the Accounting and Financial Institution program:

"…. the tools used are usually books, laptops, and projectors. For laptops, in grade X it's used in the even semester; currently, if there's a presentation, we bring our laptops, Zoom and Quizizz."

Students from grade XI in the Accounting and Financial Institution program also mentioned:

"…. the tools used are usually books, laptops, and projectors, and Quizizz."

Additionally, based on observations, the implementation of learning is also IT-based with the use of Google Classroom, Zoom, and Quizizz as well as learning using laptops, books, and projectors.

Table 8. Learning tools

Aspects Studied	Resource person (Accounting and Finance teachers)	Resource person (Students from grade X in the Accounting and Financial Institution program)	Resource person (Students from grade XI in the Accounting and Financial Institution program)
Learning tools	*Books, projectors, laptops* Google	*The tools used are usually books, laptops, and projectors. For laptops, in*	*The tools used are usually books, laptops,*

ISSN (Online): 2961-9602

	Classroom, Zoom, Quizizz	*grade X it's used in the even semester; currently, if there's a presentation, we bring our laptops, Zoom and Quizizz*	*and projectors, and Quizizz*

d. Assessment

The types of assessment or evaluation used in the Accounting and Financial Institution program at the end of the learning period include diagnostic assessment. This is in accordance with what was expressed by the Accounting and Financial Institution teacher, who said:

"…Yes, evaluations are conducted, but not all students can do them, and evaluations are also carried out verbally. If they can answer, they will be given a score. Diagnostic assessments usually involve tasks such as objective questions and essays. Formative assessments can include daily quizzes, presentations, and discussions, while summative assessments are usually in the form of objective questions administered at the end of the semester."

This was also confirmed by a Grade X student in the Accounting and Financial Institution program, who said:

"…If the learning is not finished, tasks are usually given in the form of objective questions and essays, as well as presentations. There are also daily quizzes and semester exams, usually conducted at the end of the semester."

Similarly, a Grade XI student in the Accounting and Financial Institution program mentioned:

"…At school, tasks are done directly because with the Merdeka curriculum, there is no homework. If tasks are not completed, they might become homework, but this is rare. The tasks given include objective questions and essays, as well as daily quizzes and semester exams, usually conducted at the end of the semester."

Based on the interviews above, it can be concluded that the forms of evaluation or tasks, usually in the form of objective questions, essays, or oral assessments, are done directly at school and are referred to as diagnostic assessments. Formative assessments usually involve daily quizzes and may also include presentations, while summative assessments are final semester exams.

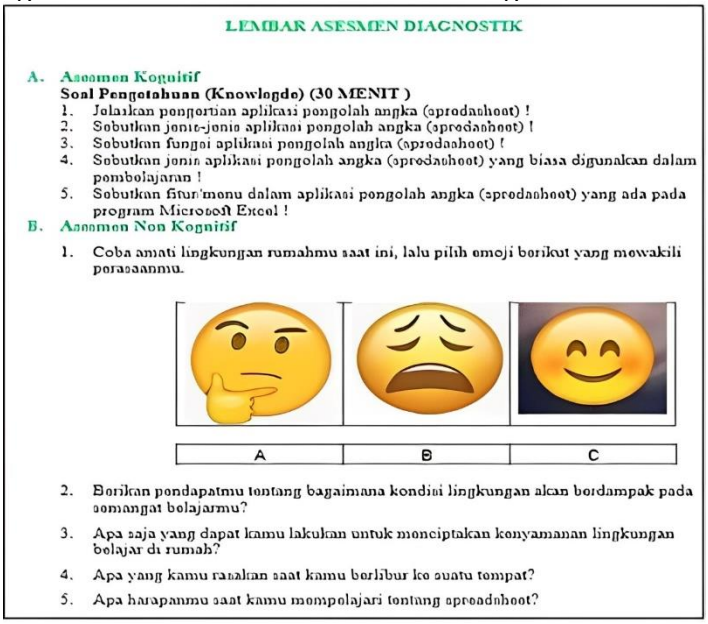
Table 9. Asessment

Aspects Studied	Resource person (Accounting and Finance teachers)	Resource person (Students from grade X in the Accounting and Financial Institution program)	Resource person (Students from grade XI in the Accounting and Financial Institution program)
Asessment	Yes, evaluations are conducted, but not all students can do them, and evaluations are also carried out verbally. If they can answer, they will be given a score. Diagnostic assessments usually involve tasks such as objective questions and	If the learning is not finished, tasks are usually given in the form of objective questions and essays, as well as presentations. There are also daily quizzes and	At school, tasks are done directly because with the Merdeka curriculum, there is no homework. If tasks are not completed, they might become homework, but

ISSN (Online): 2961-9602

	essays. Formative assessments can include daily quizzes, presentations, and discussions, while summative assessments are usually in the form of objective questions administered at the end of the semester	semester exams, usually conducted at the end of the semester	this is rare. The tasks given include objective questions and essays, as well as daily quizzes and semester exams, usually conducted at the end of the semester

The following are the documented results of the diagnostic assessments:



LEMBAR ASESMEN DIAGNOSTIK

A. Asesmen Kognitif

Soal Pengetahuan (Knowlegde) (30 MENIT)

1. Jelaskan pengertian aplikasi pengolah angka (spreadsheet) !
2. Sebutkan jenis-jenis aplikasi pengolah angka (spreadsheet) !
3. Sebutkan fungsi aplikasi pengolah angka (spreadsheet) !
4. Sebutkan jenis aplikasi pengolah angka (spreadsheet) yang biasa digunakan dalam pembelajaran !
5. Sebutkan fitur/menu dalam aplikasi pengolah angka (spreadsheet) yang ada pada program Microsoft Excel !

B. Asesmen Non Kognitif

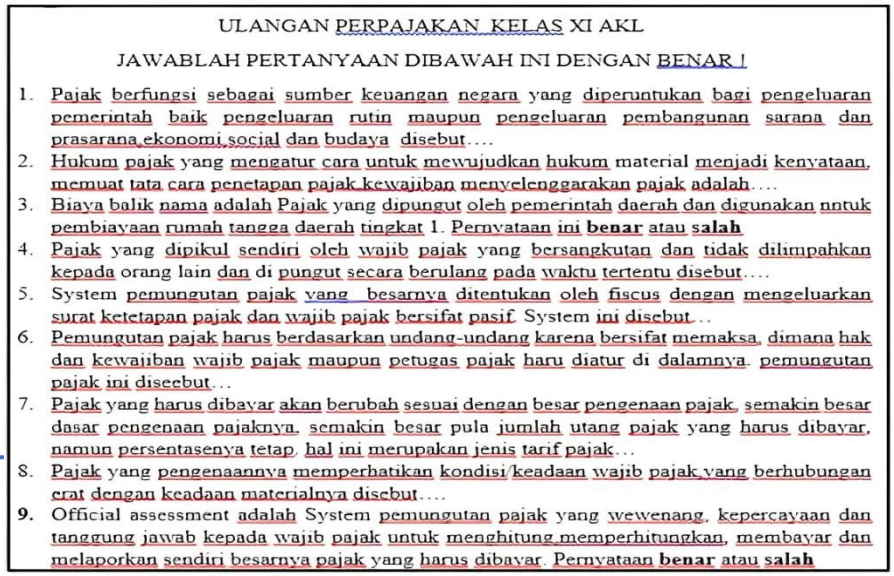
1. Coba amati lingkungan rumahmu saat ini, lalu pilih emoji berikut yang mewakili perasaanmu.

A B C

2. Berikan pendapatmu tentang bagaimana kondisi lingkungan akan berdampak pada semangat belajarmu?
3. Apa saja yang dapat kamu lakukan untuk menciptakan kenyamanan lingkungan belajar di rumah?
4. Apa yang kamu rasakan saat kamu berlibur ke suatu tempat?
5. Apa harapanmu saat kamu mempelajari tentang spreadsheet?

Figure 4. The documented results of the diagnostic assessment

The second type of assessment is called formative assessment. Formative assessment aims to gauge students' abilities during the learning process. Examples of formative assessment include discussions and daily quizzes.
The following are examples of documented formative assessments:



ULANGAN PERPAJAKAN KELAS XI AKL

JAWABLAH PERTANYAAN DIBAWAH INI DENGAN BENAR !

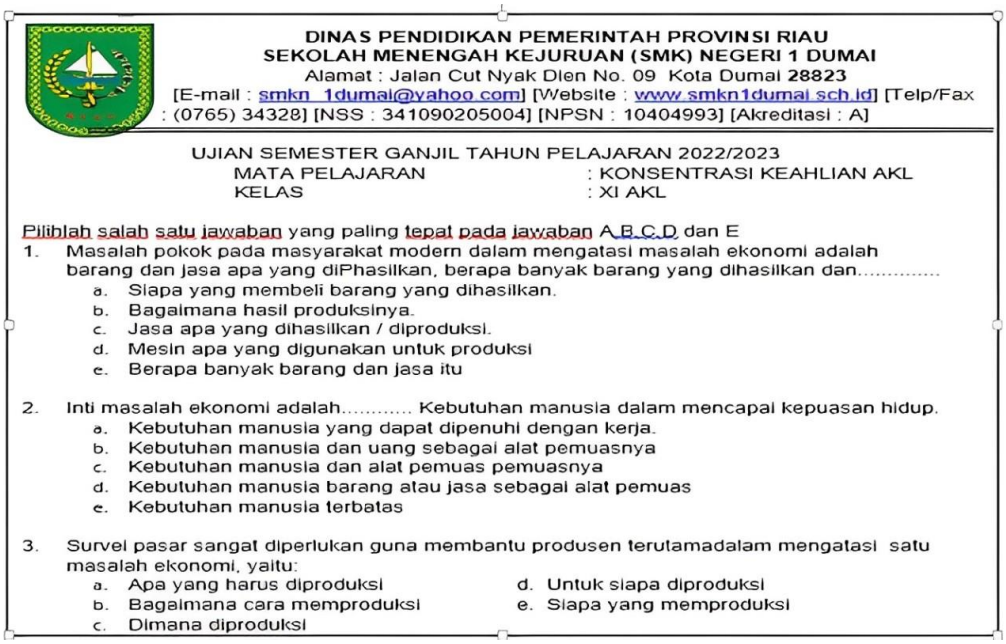
1. Pajak berfungsi sebagai sumber keuangan negara yang diperuntukan bagi pengeluaran pemerintah baik pengeluaran rutin maupun pengeluaran pembangunan sarana dan prasarana,ekonomi,social dan budaya disebut....
2. Hukum pajak yang mengatur cara untuk mewujudkan hukum material menjadi kenyataan, memuat tata cara penetapan pajak,kewajiban menyelenggarakan pajak adalah....
3. Biaya balik nama adalah Pajak yang dipungut oleh pemerintah daerah dan digunakan untuk pembiayaan rumah tangga daerah tingkat 1. Pernyataan ini **benar** atau **salah**
4. Pajak yang dipikul sendiri oleh wajib pajak yang bersangkutan dan tidak dilimpahkan kepada orang lain dan di pungut secara berulang pada waktu tertentu disebut....
5. System pemungutan pajak yang besarnya ditentukan oleh fiscus dengan mengeluarkan surat ketetapan pajak dan wajib pajak bersifat pasif. System ini disebut..
6. Pemungutan pajak harus berdasarkan undang-undang karena bersifat memaksa, dimana hak dan kewajiban wajib pajak maupun petugas pajak haru diatur di dalamnya. pemungutan pajak ini diseebut...
7. Pajak yang harus dibayar akan berubah sesuai dengan besar pengenaan pajak, semakin besar dasar pengenaan pajaknya, semakin besar pula jumlah utang pajak yang harus dibayar, namun persentasenya tetap, hal ini merupakan jenis tarif pajak...
8. Pajak yang pengenaannya memperhatikan kondisi/keadaan wajib pajak,yang berhubungan erat dengan keadaan materialnya disebut....
9. Official assessment adalah System pemungutan pajak yang wewenang, kepercayaan dan tanggung jawab kepada wajib pajak untuk menghitung memperhitungkan, membayar dan melaporkan sendiri besarnya pajak yang harus dibayar. Pernyataan **benar** atau **salah**

ISSN (Online): 2961-9602

Figure 5. The documented results of the Formative Assessments

The final type of evaluation is summative assessment. Summative assessment aims to measure students' abilities to ensure the alignment of learning objectives and determine promotion or graduation.

The following are examples of summative assessments:



DINAS PENDIDIKAN PEMERINTAH PROVINSI RIAU
SEKOLAH MENENGAH KEJURUAN (SMK) NEGERI 1 DUMAI
Alamat : Jalan Cut Nyak Dien No. 09 Kota Dumai 28823
[E-mail : smkn_1dumai@yahoo.com] [Website : www.smkn1dumai.sch.id] [Telp/Fax : (0765) 34328] [NSS : 341090205004] [NPSN : 10404993] [Akreditasi : A]

UJIAN SEMESTER GANJIL TAHUN PELAJARAN 2022/2023
MATA PELAJARAN : KONSENTRASI KEAHLIAN AKL
KELAS : XI AKL

Pilihlah salah satu jawaban yang paling tepat pada jawaban A,B,C,D dan E

1. Masalah pokok pada masyarakat modern dalam mengatasi masalah ekonomi adalah barang dan jasa apa yang diPhasilkan, berapa banyak barang yang dihasilkan dan.....
   a. Siapa yang membeli barang yang dihasilkan.
   b. Bagaimana hasil produksinya.
   c. Jasa apa yang dihasilkan / diproduksi.
   d. Mesin apa yang digunakan untuk produksi
   e. Berapa banyak barang dan jasa itu

2. Inti masalah ekonomi adalah..... Kebutuhan manusia dalam mencapai kepuasan hidup.
   a. Kebutuhan manusia yang dapat dipenuhi dengan kerja.
   b. Kebutuhan manusia dan uang sebagai alat pemuasnya
   c. Kebutuhan manusia dan alat pemuas pemuasnya
   d. Kebutuhan manusia barang atau jasa sebagai alat pemuas
   e. Kebutuhan manusia terbatas

3. Survei pasar sangat diperlukan guna membantu produsen terutamadalam mengatasi satu masalah ekonomi, yaitu:
   a. Apa yang harus diproduksi
   b. Bagaimana cara memproduksi
   c. Dimana diproduksi
   d. Untuk siapa diproduksi
   e. Siapa yang memproduksi

Figure 6. The documented results of the Summative Assessments

The interview results are supported by observations conducted by the researcher as well as evidence in Figures 4, 5, and 6, which confirm that the evaluation or assessment in the Merdeka curriculum indeed uses diagnostic assessment, formative assessment, and summative assessment.

e. Graduation Competency Standards

Students must also meet the graduation competency standards. This is in line with what the Vice Principal of SMK Negeri 1 Kota Dumai stated:

ISSN (Online): 2961-9602

"...For practical exams, there is the Professional Certification Institution (LSP) exam. Before taking the LSP, students must pass the practical work experience (PKL) from the institution. Once they pass the LSP, they will receive a certificate with the Garuda emblem."

This was also confirmed by the Vice Principal for Curriculum, who said:

"...Every student must complete the Professional Certification Institution (LSP) P1 and P3 and take the competency skill test (UKK) with industry partners, such as the marketing department at Alfamart, which is conducted in the XII grade after completing the internship."

Similarly, the Head of the Accounting and Financial Institution Expertise Program mentioned:

"...Actually, for the Accounting and Financial Institution department, it follows the curriculum, which involves taking the LSP at the end of the XII grade semester."

This was also affirmed by the Accounting and Financial Institution teacher, who said:

"...The graduation competency standards measure the students' abilities. For SKL, the LSP is usually conducted in the XII grade at the end of the semester."

Based on the interview results above, the graduate competency standards that have been prepared by SMK Negeri 1 Dumai are the professional certification institution (LSP) and the skills competency test (UKK).

Table 10. Graduation Competency Standards

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City)	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)	Resource person (Accounting and Financial Institution teacher)
Graduation Competency Standards	For practical exams, there is the Professional Certification Institution (LSP) exam. Before taking the LSP, students must pass the practical work experience (PKL) from the institution. Once they pass the LSP, they will receive a certificate with the Garuda emblem	Every student must complete the Professional Certification Institution (LSP) P1 and P3 and take the competency skill test (UKK) with industry partners, such as the marketing department at Alfamart, which is conducted in the XII grade after completing the internship	Actually, for the Accounting and Financial Institution department, it follows the curriculum, which involves taking the LSP at the end of the XII grade semester	The graduation competency standards measure the students' abilities. For SKL, the LSP is usually conducted in the XII grade at the end of the semester

3. Barriers in Implementing the Merdeka Curriculum at the Center of Excellence Vocational High School Accounting and Financial Institution Program

ISSN (Online): 2961-9602

In the implementation of the Center of Excellence Vocational High School, there are certainly challenges. The obstacles in curriculum implementation, as expressed by the vice principal, are as follows:

"...In reality, there are no significant obstacles, but the facilities and infrastructure are not yet fully sufficient, and we will later develop a curriculum in line with industry needs."

This was also stated by the Vice Principal for Curriculum, who mentioned:

"...There are no actual obstacles, but the facilities and infrastructure are still insufficient."

The Head of the Accounting and Financial Institution Expertise Program also noted:

"...As for the teachers, there are no issues following the SMK PK guidelines, but there is a lack of comprehensive information about the Merdeka curriculum and insufficient facilities and infrastructure."

Similarly, the Accounting and Financial Institution teacher mentioned:

"...There are issues with facilities and infrastructure and a lack of comprehensive information, leading to misunderstandings about the Merdeka curriculum."

Based on these interview results, it can be concluded that the obstacles in implementing the Merdeka curriculum at the Center of Excellence Vocational High School are due to insufficient facilities and infrastructure and a lack of understanding of the Merdeka curriculum.

Table 11. Barriers in Implementing the Merdeka Curiculum at the center of Excellence Vocational High School Accounting and Financial Institutional Program

Aspects Studied	Resource person (principal of State Vocational High School 1 Dumai City)	Resource person (vice principal for curriculum)	Resource person (head of Accounting and Finance study program)
Barriers in Implementing the Merdeka Curiculum at the center of Excellence Vocational High School Accounting and Financial Institutional Program	In reality, there are no significant obstacles, but the facilities and infrastructure are not yet fully sufficient, and we will later develop a curriculum in line with industry needs	As for the teachers, there are no issues following the SMK PK guidelines, but there is a lack of comprehensive information about the Merdeka curriculum and insufficient facilities and infrastructure	There are issues with facilities and infrastructure and a lack of comprehensive information, leading to misunderstandings about the Merdeka curriculum

DISCUSSION

Based on the research conducted, it can be observed State Vocational School 1 Dumai City has implemented the Merdeka Curriculum, particularly in the Center of Excellence Vocational High School program. The implementation of the Merdeka Curriculum at State Vocational School 1 Dumai City has been in place from grade X to grade XII, with grade XII only being implemented this year. The Center of Excellence Vocational High School program at State Vocational School 1 Dumai City has been in effect for 3 years to date.

1. Readiness of the Merdeka Curriculum at the Center of Excellence Vocational High School in the Accounting and Financial Institution Program

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Readiness is a fundamental issue; without proper preparation to implement a curriculum according to official guidelines, the learning objectives and methods may not be achieved optimally (Irfan et al., 2022). The readiness for implementing the Merdeka Curriculum is divided into 3 aspects: 1) Readiness in lesson planning, 2) Readiness in the learning process, and 3) Readiness in the evaluation process (Apriatni et al., 2023). Based on interviews conducted by the researcher, it can be concluded that the readiness for implementing the Merdeka Curriculum includes facilities and infrastructure, curriculum implementation mentoring activities, and workshops or training to enhance teachers, educational staff, and learning tools.

In education, facilities and infrastructure are always crucial. Based on observations and interviews with sources, facilities and infrastructure are present but still insufficient overall. There are mentoring activities in place for the Center of Excellence Vocational High School program, conducted by institutions such as Kampar State Polytechnic and Padang State University. These mentoring activities can improve both soft and hard skills among students, aligning with the demands of the workforce and developing students' characters in line with Pancasila principles (Aditya & Kencanawaty, 2024).

Additionally, teachers must also undergo training or workshops. At State Vocational School 1 Dumai City, teachers participate in workshops for teachers, students, and educational staff, as well as the Merdeka Learning Platform (PMM). This aligns with research by Priantini, Suarni, & Adnyana (2022), which indicates that the Merdeka Learning Platform (PMM) helps teachers easily access inspiration, references, literature, and understanding of the Merdeka Curriculum.

The teaching materials used in the Accounting and Financial Institution Expertise Program include modules, learning outcomes, and learning objectives. This corresponds with the research by Sari & Gumiandari (2022), which notes that the Merdeka Curriculum can be implemented according to procedures and formats provided by curriculum heads, such as Learning Objectives (ATP), Learning Goals (TP), and teaching modules. Additionally, the head of the Accounting and Financial Institution Expertise Program must create a School Operational Curriculum (KOSP). Learning Objectives (ATP) serve as the basis for learning, and teaching modules are the main learning resources to achieve learning goals, while the School Operational Curriculum (KOSP) supports teaching implementation. Therefore, to build the School Operational Curriculum (KOSP), there needs to be Learning Objectives (ATP), a Series of Learning Activities, Assessments, Development of Teaching Materials, and the Pancasila Student Profile to develop the School Operational Curriculum (KOSP) (Sasmitha et al., 2023).

2. Implementation of the Merdeka Curriculum in the Center of Excellence Vocational High School Accounting and Financial Institution Program

The implementation of the Merdeka Curriculum at at State Vocational School 1 Dumai Cithas been in place for 3 years to date. The curriculum has been applied from grade X to grade XII, with grade XII only being implemented this year. For the Merdeka Curriculum implementation at SMK Negeri 1 Kota Dumai, teachers are required to prepare teaching media, learning tools, and teaching materials. The teaching tools used by the Accounting and Financial Institution teachers include projectors, laptops, and textbooks.

One primary choice to facilitate the implementation of the educational program is the use of information technology (Sumantri & Alfiah, 2022). In the Merdeka Curriculum, learning must be digital and IT-based. Based on observations and interviews, the learning process is already digital and IT-based, including subjects such as Informatics, the use of Google Classroom, Zoom, Quizizz, and learning tools like projectors and laptops. Additionally, the teaching models frequently used are Problem-Based Learning and Project-Based Learning.

ISSN (Online): 2961-9602

Based on observations and interviews, the Problem-Based Learning method involves discussions. First, the teacher explains the basic accounting concepts related to the accounting processes of service companies. Then, students must understand the overview of these basic accounting concepts. Students are divided into groups with their desk partners to discuss these concepts, with the teacher acting as a facilitator during the discussion. After the discussion, students present their findings, and other students/groups provide responses and arguments on the presentation. The teacher provides reinforcement for any answers that require clarification or correction. Group discussions create a more enjoyable learning atmosphere and make the material easier to understand through problem-solving, thereby increasing student interest, motivation, and participation (Umar et al., 2022).

The Project-Based Learning method involves assigning a test to prepare financial reports. The teacher provides worksheets including general journal tables, ledgers, and balance sheets. This test measures students' abilities to prepare financial reports. The Project-Based Learning approach not only helps students understand and apply difficult concepts but also aids in developing critical thinking skills, interpersonal skills, and teamwork abilities (Nurlaila, 2020).

The Merdeka Curriculum includes graduation competency standards (SKL). These standards consist of content standards, process standards, and assessment standards. At SMK Negeri 1 Dumai, the graduation competency standards include conducting Professional Certification Institute (LSP) assessments and Competency Skills Exams (UKK), as well as other assessments. The UKK includes both hypothetical professional tests and practical exams. Students who pass the UKK will receive a certificate issued by the LSP (Istiyana et al., 2023). The LSP and UKK exams are conducted in the second semester of grade XII. Assessments are divided into three types: 1) diagnostic assessment, 2) formative assessment, and 3) summative assessment. Diagnostic assessment involves straightforward evaluation of the curriculum (Herwina, 2021). Formative assessment evaluates the learning process, while summative assessment includes written tests and final exams (UAS) or mid-term exams (UTS) (Sasmitha et al., 2023).

3. Barriers in Implementing the Merdeka Curriculum at the Center of Excellence Vocational High School Accounting and Financial Institution Program

The barriers to implementing the Merdeka Curriculum at the Center of Excellence Vocational High School, specifically in the Accounting and Financial Institution program, include insufficient projectors, which need to be shared, and inadequate computer laboratories that are not sufficient for use by an entire class. This aligns with the research by Putri & Syahril (2022), which suggests that the availability of facilities and infrastructure in schools can significantly contribute to the success of an educational program. A similar issue was identified in Mulyono (2024), where factors hindering the implementation of the Merdeka Curriculum at State Senio High School 2 Slawi included: 1) Limited teacher knowledge of the Merdeka Curriculum, 2) Lack of training and guidance, 3) Limited budget, and 4) High time pressure.

To address these barriers, solutions include allocating operational funds and enhancing teacher competencies in implementing the Merdeka Curriculum. According to Mulyana, Ramdani & Nur'ainiyah (2023), solutions for implementing the Merdeka Curriculum are: 1) Attending internal and external workshops, 2) Expanding knowledge of teaching methods, requiring teachers to be more creative in their teaching, 3) Sharing knowledge with fellow educators, which helps in exchanging knowledge and improving performance in curriculum implementation, and 4) Changing the mindset

CONCLUSION

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Based on the results and discussion of this research, the following conclusions can be drawn: (1) The readiness for implementing the Merdeka Curriculum at the Center of Excellence Vocational High School includes facilities and infrastructure, teacher and educational staff preparation, and training/workshops to enhance teachers and educational staff as well as learning tools. at State Vocational School 1 Dumai City has implemented the Merdeka Curriculum because the school has adopted the Center of Excellence model. This implementation has been carried out from grades X to XII, with grade XII just starting this year. The implementation of the curriculum includes teacher training or workshops, learning activities, and teaching materials. (2) The implementation of the Merdeka Curriculum at at State Vocational School 1 Dumai City has been digital and IT-based in its learning processes, including subjects such as Informatics in grade X, and the use of Google Classroom, Zoom, Quizizz, as well as learning tools like laptops, computers, and projectors. The learning models used are Problem Based Learning and Project Based Learning. The graduation competency standards applied by at State Vocational School 1 Dumai City include conducting Professional Certification Institute (LSP) and Competency Skills Exams (UKK). The evaluation or assessment methods used include diagnostic assessment, formative assessment, and summative assessment. (3) The obstacles in implementing the Center of Excellence Vocational High School curriculum at at State Vocational School 1 Dumai City include: 1) Changes in industry competency standards requiring curriculum development and adequate facilities and infrastructure, and 2) Incomplete information and lack of understanding of the Merdeka Curriculum. In the Accounting and Financial Institution Expertise Program, projectors are used interchangeably, and the computer laboratory is insufficient for use by one class.

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