

The Quality of Decision-Making for School Vocational Principals: An Information System and Decision Support System Technology

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Abstract: The principal sometimes makes decisions that cannot solve the problem because the principal does not adequately study the factors that influence and hinder the implementation of decisions before making a decision. The low quality of decisions is because of the lack of data availability or current information related to planning parameters. The unavailability of a decision support system as part of an education management information system that manages the data becomes information for school principals and is an obstacle to the quality of decision-making. The main objective of this research is proposing the decision-making model of school principals. This research is a quantitative study with a questionnaire as a research instrument. The research sample was the head of vocational schools in the Special Region of Yogyakarta and Central Java. The data analysis technique used was the analysis technique used by Structural Equation Modeling (SEM) using SmartPLS software. The results showed that the Decision Information System and the Decision Support System must support a practical decision-making quality. Both systems will have an impact on increasing alternative selection ability and analysis of problem-solving ability. Future research may develop an Android-based principal's decision support system.

Keywords: Decision Quality, Decision Making, School Principal, Information System, Decision Support System

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1. Introduction

In the contemporary digital landscape, vocational school principals encounter multifaceted challenges in managing the operations of educational institutions and preparing students for employment. Their decisions significantly impact educational quality, graduate relevance, and the overall success of the institution. The decision-making process in vocational schools often encounters numerous obstacles. Effective decision-making by a school principal relies on accurate information. Access to relevant data facilitates efficient problem-solving to address existing needs. A well-managed information system will provide enormous benefits. When decision-making by the principal is supported by management information systems, schools are better equipped to achieve their educational goals.

The core of the principal's leadership lies in their ability to make decisions regarding various issues within the school and to engage in program planning (Nurhidayati, 2015). According to some experts, decision-making activities conducted by the principal under specific conditions are crucial management functions (Robbins & Judge, 2013; Hoy & Miskel, 2013). Vocational schools manage a wide array of complex data, including information about students, teachers, curricula, and trends in the industry and job market. Effective management and analysis of this data are vital for informed decision-making. However, vocational school principals often face limitations in time and resources for collecting, processing, and analyzing the information necessary for sound decision-making. Decisions based solely on intuition or personal experience are prone to subjectivity and bias, which can compromise their effectiveness.

Vocational principals face a unique set of challenges that require them to make complex decisions impacting students, staff, and the community (Kahn & Bullis, 2021). Here are some common decision-making challenges: 1) Curriculum Development: Vocational principals must align programs with industry demands, incorporate new technologies, and secure funding for equipment and training. 2) Student Enrollment and Placement: Vocational principals are responsible for attracting students, assessing their skills and interests, and placing them in suitable programs and internships. 3) Resource Allocation: Vocational principals manage budgets, allocate staff effectively, and prioritize equipment purchases and maintenance. 4) Performance Measurement: Vocational principals track student

outcomes, evaluate program effectiveness, and meet accountability requirements. 5) Industry Partnerships: Vocational principals build and maintain relationships with businesses to secure internships and job placements while staying informed about evolving industry needs (Guzman, 2020).

The problem of decision-making faced by school principals is that they often overlook the decision-making capabilities of their staff. As a result, teachers are compelled to implement decisions that may be ineffective. The data and information utilized by school principals in their decision-making processes are frequently incomplete, leading to unresolved issues (Rose & Fleige, 2014). Decisions made may fail to address the underlying problems because principals do not adequately examine the factors that influence and impede the implementation of these decisions prior to making them. Furthermore, research indicates that causal thinking significantly impacts both rational and intuitive decision-making (Uluçınar & Aypay, 2016). For vocational school principals, access to accurate and relevant information is essential in the decision-making process (Ilham & Yuniarti, 2022).

Research conducted on several school principals shows two important critical variables in the effectiveness of school planning implementation: the principal's managerial performance and the use of school management information systems. This research aligns with the concept put forward by some experts that the effectiveness of implementing planning in schools is influenced by the school principal's leadership and the information data stored in the school management information system (Rosani et al., 2019).

How can Management Information Systems (MIS) and Decision Support Systems (DSS) help vocational principals make strategic decisions? Vocational principals used MIS for operational efficiency (Machado & Chung, 2015). Centralized data management: MIS can track student information, program data, financial records, and staff details in one place, improving data accuracy and accessibility. Automated reporting: MIS can generate reports on key performance indicators like student attendance, program completion rates, and budget variances, saving time and effort (Shah, 2014). Improved communication: MIS can facilitate communication between the school, students, parents, and industry partners through online portals, automated notifications, and data sharing platforms. Data-Driven Insights: DSS can analyze historical data (student demographics, program

costs, and industry trends) to inform decisions about curriculum development, resource allocation, and program evaluation (Forrester, 2019). Scenario planning: principals can use DSS to model the impact of different decisions (e.g., adding a new program, changing admission criteria) and choose the most effective course of action (Sterrett, & Richardson, 2019). What-if analysis: DSS allows for exploring the potential outcomes of various choices, helping principals make informed decisions in uncertain situations (Sterrett, & Richardson, 2019). By leveraging DSS and MIS, vocational principals can make more informed, data-driven decisions that improve the quality of education, enhance student outcomes, and strengthen ties with the community.

The research problem heavily implies that principals face challenges in effectively leveraging technology, including DSS and MIS, for optimal decision-making in education. How the specific ways principals utilize DSS and MIS in different decision-making scenarios? This research investigating these aspects could provide valuable insights into how to better support principals in leveraging technology for effective decision-making in education. So, the main objective of this research is proposing the decision-making model of school principals. This research aims to enhance understanding of the application of information technology in improving leadership effectiveness and decision-making within vocational school settings.

2. Literature Review and Hypothesis

Currently, various information systems and their associated benefits are frequently linked to similar challenging concepts and objectives. This diversity and dispersion have led to complexity and instability in the decision-making processes of organizational managers, as well as in the development plans for information technology. To address this complexity, information systems are categorized into two main classes: specific connections to operational fields and general connections to operational fields. Management Information Systems (MIS) and Decision Support Systems (DSS) play a crucial role in organizational structure and the decision-making processes of managers. Management Information Systems (MIS) provide critical information for organizational management, while Decision Support Systems (DSS) offer data, models, and analytical tools to aid in

decision-making for non-routine situations. Keshtegar and Vakili's (2018) research indicates a significant relationship between Management Information Systems (MIS), Decision Support Systems (DSS), and the decision-making processes of managers. Figure 1 illustrates the rational decision-making process as an intermediary variable in explaining this effect.



Figure 1. Research Model by Keshtegar & Vakili (Keshtegar & Vakili, 2018)

Information and decision support systems are crucial in supporting vocational decision-making for school vocational principals (Marzal, Bintana, & Utomo, 2021). These technologies can provide access to various accurate and up-to-date information, including labor market trends, career pathways, educational opportunities, and job requirements (Susilowati, Suyono, & Andewi, 2017). They can also assist in organizing and processing this information, presenting it in a format that is easy to understand and analyze (Awangga, Pane, & Tunnisa, 2019). By utilizing these technologies, vocational principals can gain valuable insights into students' skills, interests, and goals, track their progress, and counsel in decision-making. By using information and decision support systems, vocational principals can effectively gather, analyze, and utilize relevant data to make informed decisions (Vargas, Patel, & Patel, 2018). With the help of these technologies, vocational principals can better understand their students' needs and aspirations, tailor guidance and support accordingly, and provide opportunities for skill development and career planning.

While the terms Decision Information System (DIS) and Decision Support System (DSS) are sometimes used interchangeably, they have distinct characteristics primarily in their scope, functionality, and purpose (Xu, 2023). The DIS focuses on providing relevant and accurate information to support decision-making processes (Devaraju, 2016). It is more about delivering information rather than providing tools for analysis. DIS provides accurate, timely, and relevant information; supports routine decision-making by delivering essential data; and emphasizes data presentation and reporting over analytical capabilities. Examples

of DIS are management information systems (MIS), executive information systems (EIS), and reporting tools and dashboards. DSS is designed to support decision-making activities (Kim, & Eom, 2016). It helps decision-makers use data, models, and analytical tools to make informed decisions. DSS provides tools for data analysis, simulation, and forecasting; assists in solving semi-structured and unstructured problems; and offers various types of analysis, such as “what-if” analysis, sensitivity analysis, and scenario analysis (Xu, 2023). Examples DSS are Financial planning systems, Business intelligence tools, and Healthcare decision support systems.

Trimmer explains that in the context of schools, principals’ knowledge, perceptions about the goals and values of the governance mechanism of the regulatory framework, and the authority to make decisions will impact their decision-making (Trimmer & Trimmer, 2014). Principals take risks when they make decisions that are not based on established policies and can respond to the needs of schools and the community because they can be criticized if negative results arise. Based on the various. Problems that have been described, it is crucial to analyze a model that contains the factors that influence the quality of decision-making for school vocational principals. The conceptual model and research hypotheses regarding the factors that shape the decision quality a school vocational principal are presented in Figure 2.

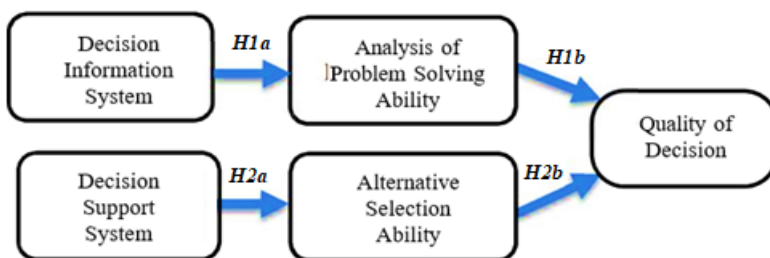


Figure 2. Research Conceptual Model

2-1. Decision Information System on Decision Quality

Decision information systems can significantly enhance problem-solving capabilities for both individuals and organizations (Ada & Ghaffarzadeh, 2015). Information systems (IS) and decision support systems (DSS) greatly improve the

quality and timeliness of decision-making by offering managers improved access to relevant data and expert systems (Ming et al., 2021). This, in turn, enhances their problem-solving capabilities by allowing for more informed decisions. The effectiveness of DSS in problem-solving is highly dependent on the user's level of expertise. Users with more experience using DSS exhibit more focused and efficient problem-solving strategies compared to those who are new to the system and may feel restricted or confused by its functionalities (Lee et al., 2008). The extent to which decision processes are defined and operationalized positively affects decision-making efficacy. Additionally, social interactions within the organization also play a crucial role in enhancing decision-making capabilities, suggesting that DSS should be designed to support both structured processes and collaborative efforts (Kanungo, 2009). Decision information systems enhance problem-solving abilities by improving decision quality and timeliness, supporting structured processes and social interactions, and providing user-friendly technological assistance. However, the effectiveness of these systems is influenced by user expertise and the organizational context in which they are implemented.

Key components of a Decision Information System assist in presenting data and analysis results in a comprehensible format (Desku, 2023). These systems often offer tools and models that allow users to explore various scenarios and potential outcomes. This exploration aids in assessing the potential impacts and risks associated with different solutions, resulting in more informed decision-making. Decision information systems can rapidly process vast amounts of data, enabling users to efficiently gather and analyze pertinent information. This speed and efficiency are essential for effective problem-solving. Integrating knowledge-based systems enhances decision quality. The impact on problem-solving ability demonstrates that combining human intellect with computer capabilities leads to higher-quality decisions (Luckyardi et al., 2023). By providing access to timely and relevant data, facilitating efficient analysis, supporting scenario exploration and risk assessment, and promoting collaboration among users, decision information systems significantly enhance problem-solving capabilities.

A study found that problem-solving skills and cognitive competency have a positive impact on decision-making, highlighting the mediating role of problem-solving skills in the relationship between cognitive competency and decision-

making (Tran et al., 2024). Research of Ming, Teng, & Jodaki (2021) also indicated that information quality significantly positively impacted decision-making quality, suggesting a potential positive influence of information systems on decision-making ability. Decision information systems have a positive influence on the analysis of problem-solving ability by enhancing cognitive competency, facilitating ease of decision-making, and improving decision-making quality (Nabot, 2023). Problem-solving ability is integral to high-quality decision-making. By fostering structured thinking, critical analysis, creativity, adaptability, and a commitment to continuous learning, individuals and organizations can enhance their decision-making processes and achieve better outcomes. Based on these inferences, the following hypothesis was developed:

H1a: The decision information system has a positive influence on the analysis of problem-solving ability

Problem-solving ability is a critical factor that directly impacts the quality of decision-making. Individuals with strong problem-solving skills are more likely to make informed and effective decisions. Proficient problem solvers tackle complex situations using a systematic and organized approach. They can decompose problems into smaller, manageable components, efficiently gather relevant information, and analyze it objectively. This systematic approach aids in identifying the underlying causes of issues and evaluating potential solutions with greater effectiveness. Training individuals in analytical thinking enhances the quality of decision-making. Strong problem-solving skills are often associated with advanced critical thinking abilities. This enables individuals to critically assess assumptions, identify biases, and evaluate different perspectives. Objective evaluation of information and consideration of alternative viewpoints enable decision-makers to minimize personal biases and enhance rational decision-making. Problem-solving skills are closely linked to executive functions, which include cognitive control and emotional regulation. These skills enhance cognitive flexibility, allowing individuals to process information in an adaptive and creative manner, which improves both the quality and speed of decision-making (Drigas & Karyotaki, 2019).

Problem-solving frequently entails the development of innovative solutions to intricate challenges. Individuals possessing robust problem-solving skills

often engage in unconventional thinking, explore alternative methodologies, and generate innovative solutions that may be disregarded by others. Generating new ideas can result in more effective and impactful decisions. Good judgment, an essential aspect of effective decision-making, is shaped by both cognitive ability and personality traits. Effective problem-solving skills enhance judgment by allowing individuals to analyze issues comprehensively and evaluate multiple solutions prior to decision-making (Hogan et al., 2008).

The problem-solving process typically entails trial and error, necessitating individuals to adjust their methods in response to feedback and new information. Effective problem-solvers exhibit comfort with ambiguity and uncertainty, demonstrating a willingness to adapt their strategies as necessary. The capacity for adaptability and the readiness to learn from experience enhance ongoing improvement in decision-making processes. Training in problem-solving can mitigate decision biases that frequently result in suboptimal decision quality. Forecasting instruction has been demonstrated to reduce biases, leading to improved quality and originality in problem solutions (Todd et al., 2019). Problem-solving skills serve as a mediator in the relationship between cognitive competency and decision-making. Cognitive competency, while not directly influencing decision-making, is enhanced by the integration of problem-solving skills, which improves decision quality through more effective utilization of cognitive abilities (Tran et al., 2024).

It allows them to gather relevant information, identify potential alternatives, and assess the potential outcomes of each choice. Furthermore, individuals with strong problem-solving abilities are better equipped to think critically and evaluate the risks and benefits associated with each decision (Sukarno & Musyafa, 2021). Additionally, technology can enhance decision-making processes by providing problem-solving models and assisting in data analysis (Alasmri & Basahel, 2022). It can help decision-makers make more informed judgments and evaluate the results of their decisions. Overall, problem-solving ability has a significant influence on the quality of decision-making. Educators must incorporate problem-solving skills into their teaching methods to enhance students' decision-making abilities. By developing strong problem-solving skills, individuals can improve their ability to make informed and effective decisions (Sari et al., 2023).

Thinking critically positively influences an individual's problem-solving skills and decision-making abilities (Sukarno & Musyafa, 2021). The research results concluded that learners who make their own decisions in problem-solving are more likely to achieve creative and innovative solutions (Ahaddin et al., 2020). Furthermore, studies have shown a significant relationship between critical thinking, problem-solving, metacognitive, and decision-making skills (Karim & Cheng, 2018). The findings from various sources indicate a significant relationship between problem-solving ability and the quality of decision-making.

It has been found that individuals with strong problem-solving abilities are more likely to make informed and effective decisions. They can analyze and evaluate different options, consider potential outcomes, and make decisions that are well-suited to the situation at hand. Furthermore, problem-solving skills are crucial in management and leadership, as making decisions is often a vital aspect of these roles (Anwar, 2021). Individuals can improve their decision-making skills by enhancing problem-solving abilities, resulting in informed and effective choices. Additionally, research has shown that individuals with strong problem-solving abilities are more likely to exhibit critical thinking skills (Muhammad & Sugiyanto, 2022). It, in turn, allows them to approach problems more analytically and logically, leading to better decision-making.

The research Tran et al. (2024) demonstrates that problem-solving skills have a direct positive impact on decision-making, highlighting the importance of these skills in enhancing decision quality. Factors such as motivation, perception, and teamwork skills have been found to positively influence problem-solving skills, emphasizing the multifaceted nature of problem-solving abilities (Bhadargade, Kaushik, & Joshi, 2020). Self-efficacy, hope, and resiliency, has been shown to significantly influence problem-solving abilities, providing avenues for improving decision quality through enhanced problem-solving skills (Zhao et al., 2019). Problem-solving ability enhances decision quality by improving cognitive control, metacognitive awareness, judgment, and reducing biases, thereby enabling more effective and efficient decision-making processes. Using these deductions, the subsequent hypothesis was formulated:

H1b: The analysis of problem-solving ability has a positive influence on decision quality

2-2. Decision Support System on Decision Quality

A decision support system improves the decision-maker's selection ability (Fitri et al., 2018). By providing interactive and flexible tools for decision-making, DSS enables decision-makers to process relevant data and solve unstructured problems more quickly and accurately (Saputro et al., 2022). Overall, a decision support system enhances decision-maker selection ability by combining intellectual resources with computer capabilities (Awangga et al., 2019).

The decision support system plays a crucial role in improving the selection ability of decision-makers by providing them with reliable information, data analysis tools, and modeling capabilities, enabling them to make more informed decisions and better evaluate the various alternatives available to them (Yesmaya et al., 2018; Cristian & Mansyur, 2021). It enables decision-makers to consider a broader range of options and make more informed choices based on accurate and reliable information. (Janti et al., 2020). The decision support system enhances the decision-makers selection ability by providing an extensive range of choices and assisting in evaluating those alternatives (Setiawan & Akbar, 2019).

Decision Support Systems enhance the ability to select alternatives by offering tools and features that improve the identification, evaluation, and selection processes among various options. Model-based decision support systems of high quality facilitate improved decision-making for decision-makers (Lilien et al., 2004). Decision Support Systems (DSS) enable decision-makers to evaluate a wider array of alternatives than manual assessment allows. DSS facilitates access to a broader range of data sources and analytical models, allowing users to investigate options that may not be readily visible (Buhisi & Abu Naser, 2009). Decision Support Systems facilitate the assessment, estimation, and comparison of alternatives, which is essential for informed decision-making. This entails the application of mathematical techniques to determine weights and conduct sensitivity analyses, thus enhancing the reliability of decision-making (Pankratova & Nedashkovskaya, 2017).

Decision Support Systems frequently integrate quantitative models and algorithms, facilitating a more objective and systematic assessment of alternatives. Through the application of weighted criteria and scoring systems, decision support systems (DSS) can evaluate and rank alternatives according to their perceived

value and congruence with organizational objectives. Multi-objective programming is employed in decision support systems for supplier selection, illustrating the objective evaluation of various criteria. Decision support systems enable decision-makers to concentrate on exploring further alternatives and allocating cognitive resources to the decision-making process (Tamanini et al., 2015).

Automating specific elements of the decision-making process, including data collection, analysis, and computation, can alleviate cognitive overload for decision-makers. This enables a concentration on advanced tasks, including the assessment of strategic implications and the consideration of qualitative factors. DSS features such as choice provision and competition may lead to increased risky behavior and overconfidence; however, they simultaneously improve user satisfaction regarding the decision-making process and its outcomes (Chen & Koufaris, 2015). Decision support systems facilitate the automatic incorporation of preferences, enabling decision-makers to concentrate on the selection of alternatives (Ritonga, 2018). Decision Support Systems serve as effective instruments for delivering insights and data-driven recommendations, thereby improving the precision of decision-making (Alzoubi et al., 2023).

Decision Support Systems can significantly enhance alternative selection ability; however, they possess inherent limitations. Certain characteristics of Decision Support Systems may introduce biases or result in overconfidence. It is essential to utilize Decision Support Systems (DSS) as instruments that enhance, rather than supplant, human judgment and critical thinking in decision-making processes. Decision support systems enhance alternative selection capabilities by automating preference integration and offering critical insights for decision-making processes. The subsequent hypothesis was formulated based on these inferences:

H2a: The decision support system has a positive influence on alternative selection ability

Decision quality refers to the effectiveness and soundness of a decision. The ability to effectively select among alternatives is a cornerstone of high-quality decision-making. When decision-makers possess strong alternative selection ability, they are more likely to make sound judgments that lead to favorable outcomes.

Alternative selection ability significantly impacts decision quality (Ahmed, 2022). When decision-makers can consider and evaluate multiple alternatives effectively, they are more likely to make informed and well-thought-out decisions. By carefully assessing different options and their corresponding criteria, decision-makers can better prioritize public values, principles, and metrics, leading to higher-quality decisions (Wu & Shang, 2020).

The availability of tools and resources, such as decision aids and online information sources, also plays a crucial role in decision quality (Hussein, Nassreddine, Younis, 2023). These tools have been shown to improve knowledge, clarify preferences, reduce uncertainty, and increase acceptability among consumers (Zelený, 2011). By ensuring that these tools are accessible and easy to understand, decisions can be more informed (Irwig et al., 2006). This comprehensive evaluation process, supported by decision aids and access to varied sources of information, can significantly enhance decision quality in healthcare and other fields.

Decision makers frequently do not identify all potential alternatives, acknowledging fewer than fifty percent of them. The neglected alternatives possess comparable quality to those recognized, highlighting a deficiency in the decision-making process (Siebert & Keeney, 2015). The capacity to generate and evaluate a diverse array of alternatives is crucial. Limiting options for decision-makers may result in the oversight of potentially superior solutions. The quality of decision-making is directly related to the quality of information and the evaluation methods employed, thereby reinforcing the connection between selection ability and decision confidence. The utilization of objectives as prompts can improve the capacity to produce alternatives. This method enhances both the quantity and quality of alternatives, independent of the decision maker's level of experience. Utilizing objectives in prompting can effectively replace experience, rendering it a useful instrument for immediate application (Siebert, 2016).

The prominence of alternatives affects a decision maker's attention, exhibiting positive salience effects (Siebert & Keeney, 2015). Altering the prominence of alternatives can result in choice reversals, which are significant for evaluating decision quality. The capacity of decision makers to generate alternatives for significant decisions can be improved by augmenting both the quantity and quality

of the alternatives produced (Siebert, 2016). This concept appears intuitive, suggesting that the capacity for alternative selection enhances decision-making quality. Research in decision-making emphasizes the significance of evaluating multiple options. Sigalou and Mann (2023) propose that decision-making rules, which take into account multiple factors, are essential for making effective choices. Basic decision aids, including sorting and elimination tools, can affect the quality of decisions made. Unrestricted sorting may reduce decision quality in situations of high choice conflict; however, integrating sorting with elimination tools can alleviate these adverse effects and enhance decision quality (Lurie & Wen, 2014). The composition of the choice set, particularly the inclusion of dominated options, can impact decision quality by influencing trust in the choice architect and modifying preferences (Bogard et al., 2024).

The ability to select alternatives is not just a phase in the decision-making process; it is a crucial factor influencing the quality of decisions. Developing and implementing effective methods for generating, evaluating, and selecting alternatives can enhance decision-making effectiveness and improve the probability of successful outcomes for individuals and organizations. From these deductions, the following hypothesis was developed:

H2b: The alternative selection ability has a positive influence on decision quality

3. Method

This study utilized a quantitative methodology. Quantitative research employs statistical methods and numerical data to analyze specific aspects of phenomena. Quantitative researchers seek to identify predictions and explanations that can be generalized to other contexts and populations, as noted by Thomas (2003). The research locations are the State Vocational Schools in the Special Province of Yogyakarta and Central Java Province. According to data from the Ministry of Education and Culture of the Republic of Indonesia, these two provinces have a significant number of vocational schools ranked among the top five. The research sample consisted of 60 principals and teachers selected using a purposive sampling technique. The data collection instrument used in this study was a questionnaire. The data comprises a private dataset. The questionnaire includes the following

items: the caliber of a vocational school principal's decision-making, alternative selection ability, problem-solving analysis, Decision Information System, and Decision Support System. Researchers recommend utilizing questionnaires from previous studies whenever possible. All questions were rated on a numerical scale using a five-point Likert scale. The Decision Information System and the Decision Support System questionnaires were adapted from the research conducted by Keshtegar and Vakili (2018)..

Donelan et al. (2016) developed and validated questionnaires to measure the quality of decision-making. The instrument used to assess alternative selection ability was derived from research conducted by Sinclair, Ashkanasy, and Chattopadhyay (2010). Additionally, the general decision-making style questionnaire from Spicer and Sadler-Smith (2005) is utilized to evaluate problem-solving analysis.

The data were analyzed using descriptive statistics, including the arithmetic mean and standard deviation. The research hypotheses were tested using a structural equation model (SEM) with SmartPLS software. SmartPLS is regarded as one of the most robust software packages for structural equation modeling with covariance matrices.

4. Results

4-1. Validity and Reliability Test

Convergent validity indicates the degree to which the measurement of an entire item encompasses a shared construct. Reliability is the degree to which a measurement error is minimized, and the results obtained remain consistent across all assessment events.

Table 1. Convergent Validity and Reliability Test

Number of Item	Analysis of Problem Solving Ability (APSA)	Alternative Selection Ability (ASA)	Decision Information System (DIS)	Decision Support System (DSS)	Quality of Decision (QD)
APSA.1	-	0.718	-	-	-
APSA.2	-	0.849	-	-	-
APSA.3	-	0.786	-	-	-

Number of Item	Analysis of Problem Solving Ability (APSA)	Alternative Selection Ability (ASA)	Decision Information System (DIS)	Decision Support System (DSS)	Quality of Decision (QD)
APSA.4	-	0.797	-	-	-
APSA.5	-	0.664	-	-	-
ASA.1	0.760	-	-	-	-
ASA.2	0.836	-	-	-	-
ASA.3	0.838	-	-	-	-
ASA.4	0.747	-	-	-	-
ASA.5	0.611	-	-	-	-
DIS.1	-	-	0.835	-	-
DIS.2	-	-	0.881	-	-
DIS.3	-	-	0.916	-	-
DIS.4	-	-	0.809	-	-
DSS.1	-	-	-	0.904	-
DSS.2	-	-	-	0.848	-
DSS.3	-	-	-	0.846	-
DSS.4	-	-	-	0.807	-
DSS.5	-	-	-	0.634	-
QD.1	-	-	-	-	0.782
QD.2	-	-	-	-	0.766
QD.3	-	-	-	-	0.739
QD.4	-	-	-	-	0.773
QD.5	-	-	-	-	0.679
QD.6	-	-	-	-	0.881
QD.7	-	-	-	-	0.835
QD.8	-	-	-	-	0.878
QD.9	-	-	-	-	0.870
QD.10	-	-	-	-	0.882

Number of Item	Analysis of Problem Solving Ability (APSA)	Alternative Selection Ability (ASA)	Decision Information System (DIS)	Decision Support System (DSS)	Quality of Decision (QD)
Cronbach Alpha	0.817	0.823	0.884	0.868	0.942
Composite Reliability	0.873	0.876	0.92	0.906	0.95

Table 1 shows that the convergent validity of items is valid. The factor loading for all of the items is higher than 0.50. The composite reliability of the five constructs is higher than 0.70. It shows that the consistency and instruments used are very high.

Analysis of Structural Equation Modeling

Numerous studies have extensively used Structural Equation Modeling (SEM) to model the relationships between latent and manifest variables. This study analyzes the SEM methodology utilized in decision-making research and introduces a school principal decision quality metric.

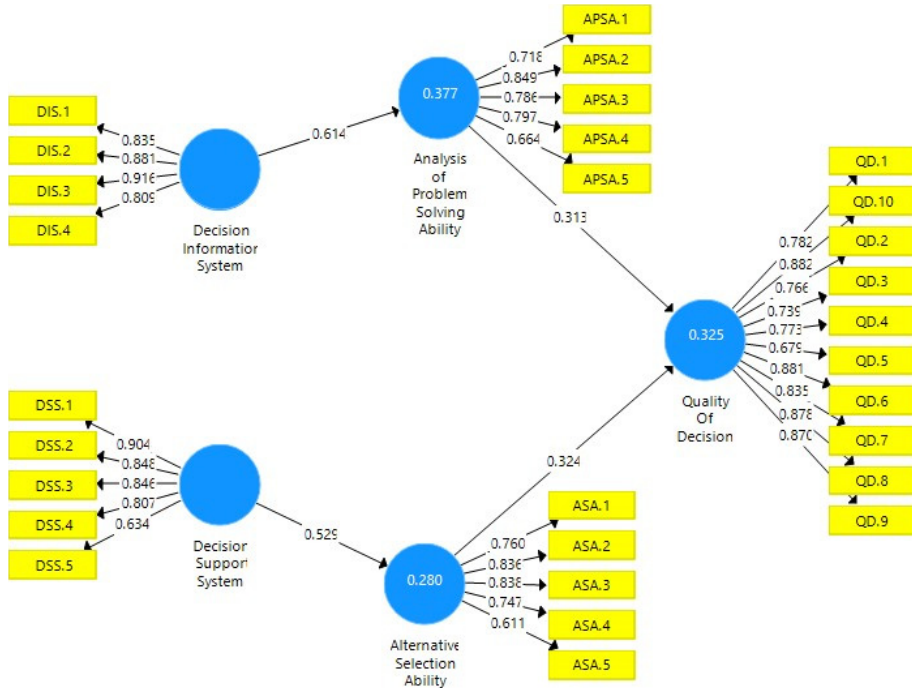


Figure 3. The Result of Structural Equation Modeling Analysis

Applying structural modeling identifies the hypothesized relationship (exogenous or endogenous) between research variables associated with the conceptual model.

Table 2. Direct and Indirect Effects on Quality of Decision

Equation	Direct Effect	P Value	Indirect Effect	P Value	R-Square
DIS -> APSA	0.614	0.000	0.192	0.026	0.280
DSS -> ASA	0.519	0.000	0.172	0.030	0.377
APSA -> QD	0.313	0.022			
ASA -> QD	0.324	0.017			
All -> QD					0.325

The H1a hypothesis: The decision information system has a positive influence on the analysis of problem-solving ability. This relation of the Decision Information System with the Analysis of problem-solving ability exhibits a perfect model fit to the given data (R-Square = 0.280). As presented in Table 2, the Decision

Information System significantly positively impacts Analysis of Problem Solving Ability ($b = 0.614$; $p\text{-value} < 0.001$). Therefore, the analysis of problem-solving ability is better with a Decision Information System.

The H1b hypothesis: The analysis of problem-solving ability positively influences decision quality. This relation presents an acceptable model fit to the given data ($R\text{-Square} = 0.377$). As seen in Table, Decision Support System significantly positively impacts Alternative Selection Ability ($b = 0.519$; $p\text{-value} < 0.001$). Therefore, the Decision Support System attempts significant control and improves the alternative selection ability of the school principal.

The H2a hypothesis: The decision support system positively influences alternative selection ability. This relation demonstrates an acceptable model fit for the data ($R\text{-Square} = 0.325$). Table 2 signifies that problem-solving ability and decision quality have a strong positive relation ($b = 0.313$; $p\text{-value} < 0.050$).

The H2b hypothesis: The alternative selection ability positively influences decision quality. This relation exhibits a good model fit to the data ($R\text{-Square}=0.325$). According to Table 2, Alternative Selection Ability ($b = 0.324$; $p\text{-value} < 0.050$) is directly related to the quality of a decision. Table 2 also indicates that Alternative Selection Ability has a significant positive impact on the quality of a decision, which is more likely to be higher. The exposure indicator and outcome tests in the way they impact the mediator. The indirect effect is significant, confirming that the interaction between Analysis of Problem Solving Ability acts as a mediator in the association between Decision Information System and decision quality ($b= 0.192$). The indirect effect of the Decision Support System and decision quality is significant ($b = 0.172$), an Alternative Selection Ability as a mediator variable.

5. Discussion

Numerous studies have extensively utilized Structural Equation Modeling (SEM) to examine the relationships between latent and manifest variables. This study analyzes the SEM methodology in decision-making research and introduces a metric for assessing the decision quality of school principals. The results of this model test complement the models developed by Keshtegar and Vakili (2018), specifically regarding the existence of a Decision Support System within the framework of decision-making quality. The quality decision model comprises

both a decision information system and a decision support system. The decision information system enhances the problem-solving capabilities of vocational principals. While the decision support system enhances the analysis of problem-solving abilities among vocational principals, the results of the analysis address the research question regarding the influence of decision information systems on problem-solving capabilities. This influence ultimately leads to an improvement in the quality of decisions made. Principals believe that the amount of information available to them influences the quality of their decisions. Furthermore, the extent to which subordinates are involved in the implementation of these decisions may enhance both the quality of the decisions and the level of their engagement (Negulescu & Doval, 2014).

Furthermore, they habitually consult their team members for input before making any decisions. While most decisions are driven by established protocols, certain choices are influenced by the surrounding environment.

Additionally, effective school governance improves the quality of decision-making by empowering faculty members, promoting the distribution of authority, and encouraging collaborative decision-making among principals (Supriadi et al., 2021).

One suggestion is that increased teacher participation in the decision-making process is essential (Ossai & Okokoyo, 2023). Additionally, administrators should ensure that the implementation phases comply with the guidelines established by the stakeholders involved in the decision-making process. Principals should allocate sufficient time for collaborative discussions that are goal-oriented and knowledge-driven. This approach will enable teachers to participate in decision-making processes, as relying solely on the principals' experience cannot guarantee effective administration and instructional task performance (Ayeni & Ojo, 2022). Utilizing principals' decision-making profiles during organizational change initiatives can facilitate the inclusion of critical variables and improve the quality of decisions (Summak & Kalman, 2020). To ensure quality performance, individuals must understand the circumstances in which decisions need to be made. They should be aware of and clarify situations that require either individual or collective decision-making, as well as comprehend the conditions under which these decisions should occur.

The results of the analysis in this study also answer the research question that decision support systems influence the alternative selection ability which will then improve the quality of decisions. DSSs are information systems that operate on computers and are specifically engineered to assist principals in selecting a solution from many potential options when confronted with a school problem. Thus, the effectiveness of complex decision-making is enhanced by using a DSS (Tripathi, 2011). By transforming data into actionable information, an information system enables and enhances decision-making across the entire organization, which is one of its primary benefits. However, the system remains a mere instrument and does not supplant the human element; decision-making authority remains with the principals.

Decision-making entails the evaluation and selection of alternative courses of action in order to accomplish specific objectives. Decision-making is executed methodically by transforming data into information via data collection. Decision-making and problem-solving share many similarities. When solving problems, one identifies and assesses potential solutions; similarly, when making decisions, one discovers and evaluates alternative courses of action. Therefore, the essence of the decision-making process lies in the meticulous recognition and assessment of available options. For each alternative, it is critical to forecast immediate and long-term consequences as part of the decision-making process. Systems thinking was evident in three aspects of effective decision-making: the augmentation of alternative options, the identification of potential repercussions of different alternatives, and the pursuit and evaluation of pertinent information (Shaked & Schechter, 2019).

The principal and school manager will always be involved in the planning process, both long-term and short-term planning. Managers are constantly faced with an atmosphere of scarcity that demands priority setting. Managers are faced with choices about what areas of activity they want to prioritize. The priority setting is intended so that the resources available in a limited manner are used optimally. Formulating wisdom is one of the most essential tasks of any leader. Policy formulation must be based on up-to-date, complete, and trustworthy information. The formulated plans are detailed in work programs based on a priority scale. To correctly determine the priority scale of the work program, information about

available resources, precise information about the source of funding, the program's location, the reporting system, the assessment system, and the feedback system to be used are needed. The principals are responsible for learning tasks and actively participate in decision-making (Ortega-Rodríguez, 2013).

The caliber of their decision-making processes primarily determines the effectiveness of organizations; therefore, meeting stakeholders' expectations should undoubtedly be the principal's objective when making decisions. The availability of accurate, fast, and relevant information supports the right decision. With this information, the vocational school principal gets a complex and specific picture of a decision to be formulated. Decisions will be efficient because data can be accessed quickly. In making this decision, a decision-making system is needed that can help the vocational school principal make decisions. The purpose of a Decision Support System (DSS) is to assist managerial decision-makers when confronted with semi-structured decision scenarios. The purpose of this system is to augment decision-maker's capabilities; it is not designed to supplant their discerning judgment. DSS is designed for making decisions that are entirely unsupportable by algorithms. DSS uses a flexible, interactive computer-based system that can be adapted and developed to support solutions to specific management problems. DSS uses data, provides an easy user interface, and can combine decision-makers' thinking. The principals' decision-making can improve the strategies and teachers' instructional task performance (Ayeni, 2018). The limitations of this study have not yet significantly tested whether the school has implemented a decision information system and a decision support system.

This study provides valuable insights into improving decision-making processes in vocational schools through the implementation of information systems and decision support systems (DSS). Nonetheless, like any study, several limitations must be acknowledged and addressed in future research. This study focused on vocational school principals, who may have unique needs and challenges compared to principals in other educational settings. Generalizing the findings to a broader educational context requires caution. This study may not have sufficiently considered the influence of external factors, such as government policies, economic conditions, or industry trends, on principal decision-making. The successful implementation of information systems and decision support systems

heavily depends on adequate training and support for users. This study may not have thoroughly examined all significant aspects; therefore, future research across diverse school types and educational levels is essential to understand the impact of information systems and decision support systems on decision-making in various contexts. Employing a mixed-methods approach that integrates both quantitative and qualitative research methods to achieve a comprehensive understanding of the relationship among information systems, decision support systems (DSS), and the quality of decision-making. Addressing these limitations and pursuing future research suggestions will deepen our understanding of technology's role in facilitating effective decision-making within educational contexts.

6. Conclusion

The primary conclusion of the research findings is that the quality of decision-making can be enhanced through the use of management information systems and decision support systems. This conclusion, derived from the analysis of a structural equation model, indicates that a quality decision-making model comprises both a decision information system and a decision support system. The presence of a decision information system enhances the ability of vocational school principals to analyze problems effectively. The decision support system enables vocational school principals to select alternatives more efficiently and accurately. Enhancing the ability to analyze problems and evaluate options will positively impact the quality of decision-making for these principals. Proficient use of management information systems requires a strong ability to discern, adapt, and conduct non-technical analysis. Vocational schools should adopt the strategy of developing information and communication systems through internet and intranet networks. This approach is an effective method for forecasting trends in scientific and technological advancement, as well as globalization. Further research could potentially lead to the development of an Android-based decision support system for principals.

7. Suggestions and Implication

Further research could focus on the development of an Android-based principal

decision support system. Principals should ensure access to accurate, real-time information to enhance timely, data-driven decision-making. Support principals in the analysis of complex data, the evaluation of alternatives, and the formulation of strategic and objective decisions. Make more comprehensive and contextually informed decisions by considering various perspectives and qualitative factors. Facilitate the effective utilization of information systems and decision support systems (DSS) by all stakeholders to enhance decision-making processes. Enhance transparency, accountability, and decision-making effectiveness in educational institutions; Ensure that the employed systems are relevant, effective, and optimally aligned with school objectives.

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References

- Ada, K., & Ghaffarzadeh, M. (2015). Decision making based on management information system and decision support system. *European Researcher*, 93(4), 260–269.
<https://doi.org/10.13187/er.2015.93.260>
- Ahaddin., M.A., Jatmiko.,B, & Supardi., Z.A.I (2020). The improvement of critical thinking skills of primary school students through guided inquiry learning models with integrated peer instructions. *Studies in Learning and Teaching*, 1(2), 104–111.
<https://doi.org/10.46627/silet.v1i2.39>
- Ahmed, H.O.K. (2022). Improving the quality of strategic decision-making process in universities through employing expert systems: A case study from a developing country. *International Journal of Advanced and Applied Sciences*, 9(2), 81–94.
<https://doi.org/10.21833/ijaas.2022.02.009>
- Alasmri, N., & Basahel, S. (2022). Linking artificial intelligence use to improved decision-making, individual and organizational outcomes. *International Business Research*, 15(10), 1.-15 <https://doi.org/10.5539/ibr.v15n10p1>

- Aldegis, A.M. (2018). Impact of Accounting Information Systems' Quality on the Relationship between Organizational Culture and Accounting Information in Jordanian Industrial Public Shareholding Companies. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 8(1), 70-80.
<https://doi.org/10.6007/ijarafms/v8-i1/3829>
- Alzoubi, S., Amayreh, K.T., Farea, M.M., & Bisht, N.(2023). A Review of Effectiveness and Efficiency Methodology of Decision Support System for Selecting Suppliers. *International Conference on Computer Science and Emerging Technologies, CSET*.
<https://doi.org/10.1109/CSET58993.2023.10346850>
- Anwar, M. (2021). Analysis of Problem-Solving Skills of Vocational Teacher Candidates in Terms of Several Variables. *Journal of Education Technology*, 5(1), 132-136.
<https://doi.org/10.23887/jet.v5i1.33624>
- Awangga, R. M., Pane, S. F., & Tunnisa, K. (2019). Collaboration FMADM And K-Means Clustering To Determine The Activity Proposal In Operational Management Activity. *EMITTER International Journal of Engineering Technology*, 7(1), 44–54.
<https://doi.org/10.24003/emitter.v7i1.317>
- Ayeni, A.J., & Ojo, R.T. (2022). Decision-making model and productivity in public secondary schools in ondo north senatorial district of ondo state, nigeria. *International Journal of Education, Teaching, and Social Sciences*, 2(1), 1–19.
<https://doi.org/10.47747/ijets.v2i1.596>
- Bhadargade, S.L., Kaushik, M., & Joshi, G. (2020). A study of factors influencing the problem-solving skills of engineering students. *Journal of Engineering Education Transformations*, 33(4), 8 – 19.
- Bogard, J. E., Reiff, J. S., Caruso, E. M., & Hershfield, H. E. (2024). Social inferences from choice context: Dominated options can engender distrust. *Organizational Behavior and Human Decision Processes*, 183. <https://doi.org/10.1016/j.obhdp.2024.104337>
- Buhisi, N. I., & Abu Naser, S. S. (2009). Dynamic Programming as a tool of decision supporting. *Journal of Applied Sciences Research*, 5(6), 671–676.
<https://www.scopus.com/inward/record.uri?eid=2-s2.0-69049112125&partnerID=40&md5=d10a77e785f640f79b4dfcb315c384b8>
- Chen, C.-W., & Koufaris, M. (2015). The impact of decision support system features on user overconfidence and risky behavior. *European Journal of Information Systems*. 24(6), 607 – 623. <https://doi.org/10.1057/ejis.2014.30>
- Cristian, N., & Mansyur, A. (2021). Employee Performance Assessment System of PT. Graha Prima Mentari Medan by Using Simple Additive Weighting. *ZERO: Jurnal Sains, Matematika dan Terapan*, 5(1), 39-52. <https://doi.org/10.30829/zero.v5i1.11125>

- Desku, F. (2023). The Role of Information Systems in the Decision-making Processes of the Enterprises in Kosovo. *Springer Proceedings in Business and Economics*.
https://doi.org/10.1007/978-3-031-42511-0_53
- Devaraju, P. (2016). The Role of MIS in Business Decision Supporting Applications and Features. *International Journal of Innovative Research in Engineering & Management (IJIREM)*, 3(6), 518-521. <https://doi.org/10.21276/ijirem.2016.3.6.11>
- Donelan, R., Walker, S., and Salek, S. (2016). The development and validation of a generic instrument, qodos, for assessing the quality of decision making. *Frontiers in Pharmacology, Frontiers Research Foundation*, 7, p. 180,
<https://dx.doi.org/10.3389/fphar.2016.00180>.
- Drigas, A., & Karyotaki, M. (2019). Executive functioning and problem solving: A bidirectional relation. *International Journal of Engineering Pedagogy*, 9(3).
<https://doi.org/10.3991/ijep.v9i3.10186>
- Fitri, A.A., Pradnyana, I. M.A., & Darmawiguna, I.G.M. (2018). Decision Support System for “Buleleng Cerdas” Program Social Fund Recipient Candidates with Analytical Hierarchy Process (AHP) and Simple Additive Weighting (SAW) Method. *Scientific Journal of Informatics*, 5(2), 213–223. <https://doi.org/10.15294/sji.v5i2.16457>
- Forrester, V.V. (2019). School Management Information Systems: Challenges to Educational Decision-Making in the Big Data ERA. *International Journal on Integrating Technology in Education (IJITE)*, 8(1), 1-11. <https://doi.org/10.5281/zenodo.2624163>
- Guzman, M.J.J.D. (2020). Academe-Industry Partnership: Basis for Enhanced Learning of BSBA Students in One State University. *Universal Journal of Educational Research*, 8(12), 6574-6584. <https://doi.org/10.13189/ujer.2020.081222>
- Hogan, R., Hogan, J., & Barrett, P. (2008). Good judgment: The intersection of intelligence and personality. In *Ergonomics and Psychology: Developments in Theory and Practice*.
<https://doi.org/10.1201/9781420067019-28>
- Hoy, W.K., & Miskel, C.G. (2013). *Educational administration: Theory, research, and practice*. New York: McGraw-Hill.
- Hussein, N.R., Nassreddine, G., & Younis., J. (2023). The Impact of Information Technology Integration on the Decision-Making Process. *Journal of Techniques*, 5(1), 144–155.
<https://doi.org/10.51173/jt.v5i1.1262>
- Ilham, M., & Yuniarti (2022). Implementation of management information systems to enhance educational quality (Case Study at SMP Negeri 11 Lhokseumawe). *IDARAH (Jurnal Pendidikan dan Kependidikan)*, 6(1), 15-26.
<https://doi.org/10.47766/idarah.v6i1.177>
- Irwig, L., McCaffery, K., Salkeld, G., & Bossuyt, P. (2006). Informed choice for screening: implications for evaluation. *BMJ*, 332(7550), 1148–1150.
<https://doi.org/10.1136/bmj.332.7550.1148>

- Janti, S., Adriansyah, M., & Taufik, G. (2020). Simple additive weighting for decision support selection of expedition services. *Sinkron*, 4(2), 115-122. <https://doi.org/10.33395/sinkron.v4i2.10520>
- Kahn, J D., & Bullis, M. (2021). A Look Inside the “Black Box”: An Integrative Review of the Cognitive Decision-Making Processes Used by School Principals. *Leadership and Policy in Schools*, 22(3), 565-584. <https://doi.org/10.1080/15700763.2021.1934704>
- Kanungo, S. (2009). The centrality of processes in IT-enabled decisions. *15th Americas Conference on Information Systems 2009, AMCIS 2009*, 10.
- Karim, F.A., & Tan, J. C. (2018). Readiness in Applying Higher Order Thinking Skills after Attending Courses. *Journal Of Techno Social*, 10(2), 35-41. <https://doi.org/10.30880/jts.2018.10.02.006>
- Keshtegar, A., & Vakili, N. (2018). Comparison of Management Information System (MIS) and Decision Support System (DSS) and its role in the decision-making process of managers of Economic Affairs and Finance of Zahedan. *International Review of Management and Marketing*, 8(1), 93–97.
- Kim, E B., & Eom, S B. (2016). Decision Support Systems Application Development Trends (2002–2012). *IGI Global*, 8(2), 1-13. <https://doi.org/10.4018/ijjiss.2016040101>
- Lee, Z., Wagner, C., & Shin, H. K. (2008). The effect of decision support system expertise on system use behavior and performance. *Information and Management*, 45(6). <https://doi.org/10.1016/j.im.2008.04.003>
- Lilien, G. L., Rangaswamy, A., Van Bruggen, G. H., & Starke, K. (2004). DSS effectiveness in marketing resource allocation decisions: Reality vs. perception. *Information Systems Research*, 15(3), 216–235. <https://doi.org/10.1287/isre.1040.0026>
- Luckyardi, S., Rahayu, A., Adiwibowo, L., & Hurriyati, R. (2023). Information technology in evolutionary strategic management: Decision support system in smart university. *Journal of Engineering Science and Technology*, 18(3).
- Lurie, N. H., & Wen, N. (2014). Simple Decision Aids and Consumer Decision Making. *Journal of Retailing*, 90(4), 511–523. <https://doi.org/10.1016/j.jretai.2014.08.004>
- Machado, L.J.C., & Chung, C. (2015). Integrating Technology: The Principals' Role and Effect. *Canadian Center of Science and Education*, 8(5). <https://doi.org/10.5539/ies.v8n5p43>
- Marzal, J., Bintana, R. R., & Utomo, P. E. P. (2021). User acceptance of data informed decision making portals: application of the utaut model and leadership styles. *Journal of Business Studies and Management Review*, 5(1), 102–107. <https://doi.org/10.22437/jbsmr.v5i1.17052>
- Ming, T., Teng, W., & Jodaki, S. (2021). A model to investigate the effect of information technology and information systems on the ease of managers' decision-making. *Kybernetes*, 50(1), 100–117. <https://doi.org/10.1108/K-10-2019-0712>

- Muhammad, M., & Sugiyanto, S. (2022). Training of Geogebra Software to Solve the Problems of Cube and Beam Space in SMP Muhammadiyah 1 Purwokerto. *Proceedings Series on Physical & Formal Sciences*, 3, 123–126.
<https://doi.org/10.30595/pspfs.v3i.463>
- Nabot, A. (2023). Investigating the Effect of Information Systems and Decision Quality on Organizational Performance in Business Firms. *The Eurasia Proceedings of Science Technology Engineering and Mathematics*, 23, 513–520.
<https://doi.org/10.55549/epstem.1374912>
- Negulescu, O., & Doval, E. (2014). The quality of decision making process related to organizations' effectiveness. *Procedia Economics and Finance*, 15, 858–863.
[https://doi.org/10.1016/s2212-5671\(14\)00548-6](https://doi.org/10.1016/s2212-5671(14)00548-6)
- Ortega-Rodríguez, P.J. (2013). School Autonomy in France According to TALIS 2013: The Importance of Educational Leadership, *The Turkish Online Journal of Educational Technology*, 8(1) 88–94.
- Ossai, A.G., & Okokoyo, I.E. (2023). Principals' decision-making strategies and teachers productivity in delta state secondary schools, Nigeria. *Russian Law Journal*, 11(3), 2524-2532. <https://doi.org/10.52783/rj.v11i3.2179>
- Pankratova, N. D., & Nedashkovskaya, N. I. (2017). A decision support system for evaluation of decision alternatives on basis of a network criteria model. *2017 IEEE 1st Ukraine Conference on Electrical and Computer Engineering, UKRCON 2017 - Proceedings*, 830–835. <https://doi.org/10.1109/UKRCON.2017.8100363>
- Richardson, J W., & Sterrett, W. (2018). District Technology Leadership Then and Now: A Comparative Study of District Technology Leadership From 2001 to 2014. *Educational Administration Quarterly*, 54(4), 589-616. <https://doi.org/10.1177/0013161x18769046>
- Ritonga, I.S. (2018). Decision support system software developer selection with analytical hierarchy process method. *Journal of Advanced Research in Dynamical and Control Systems*, 10(2), 1532 – 1536.
- Robbins, S.P., & Judge, T.A. (2013). *Organizational behavior 15th Edition*. New Jersey: Pearson Prentice Hall.
- Rosani, M., Karnati, N., & Sari, E. (2019). Information system and transparency free school program. *Proceedings of the First International Conference on Technology and Educational Science*, 1-6. <https://doi.org/10.4108/eai.21-11-2018.2282252>
- Rose, A.D., & Fleige, M. (2014). Making a choice ? Vocational training and decision- making for the undereducated and the unemployed in Germany and the United States . *Adult Educ. Res. Conf.*, 437–442.
- Saputro, N.D., Waliyansyah, R.R., & Novita, M. (2022). Implementation simple additive weighting method in determining feasibility sacrificial animals. *Jurnal Transformatika*, 20(1), 57-63. <https://doi.org/10.26623/transformatika.v20i1.4542>

- Sari, S. Y., Sari, M. N., Darvina, Y., & Afrizon, R. (2023). Validity of guided inquiry-based student worksheets in mechanical waves and thermodynamics. *Journal of Physics: Conference Series*, 2582(1), 012044. <https://doi.org/10.1088/1742-6596/2582/1/012044>
- Setiawan, A., & Akbar, J. N. (2019). Implementation Fuzzy C-Means on Decision Support System BPNT (Bantuan Pangan Non-Tunai) Ministry of Social Affairs Indonesia. *EMITTER International Journal of Engineering Technology*, 7(2), 559-569. <https://doi.org/10.24003/emitter.v7i2.444>
- Shah, M. (2014). Impact of Management Information Systems (MIS) on School Administration: What the Literature Says. *Procedia-Social and Behavioral Sciences*, 116(21), 2799-2804. <https://doi.org/10.1016/j.sbspro.2014.01.659>
- Shaked, H., & Schechter, C. (2019). Exploring systems thinking in school principals' decision-making. *International Journal of Leadership in Education*, 22(2), 1–24. DOI:10.1080/13603124.2018.1481533
- Siebert, J. (2016). Can novices create alternatives of the same quality as experts? *Decision Analysis*, 13(4), 278–291. <https://doi.org/10.1287/deca.2016.0339>
- Siebert, J., & Keeney, R. L. (2015). Creating more and better alternatives for decisions using objectives. *Operations Research*, 63(5), 1144–1158. <https://doi.org/10.1287/opre.2015.1411>
- Sinclair, M., Neal, M., Ashkanasy and Chattopadhyay, P (2010). Affective antecedents of intuitive decision making. *Journal of Management & Organization*, 16(3), 382-398. <https://doi.org/10.5172/jmo.16.3.382>
- Spicer, D.P., & Sadler-Smith, E. (2005). An examination of the general decision making style questionnaire in two UK samples. *Journal of Managerial Psychology*, 20(2), 137–149. doi:10.1108/02683940510579777
- Sterrett, W., & Richardson, J.W. (2019). The change-ready leadership of technology-savvy superintendents. *Journal of Educational Administration*, 57(3), 227-242. <https://doi.org/10.1108/jea-09-2018-0160>
- Sukarno, S., & Musyafa, A. (2021). AM Analysis of Metacognition Ability and Critical Thinking Skills of Students in Integrated Islamic Education Institutions. *Innovation: Journal for Religious Innovation Studies*, 21(1), 1–17. <https://doi.org/10.30631/innovatio.v21i1.124>
- Summak, M. S., & Kalman, M. (2020). A Q-Methodological Analysis of School Principals' Decision-Making Strategies during the Change Process at Schools. *Center for Educational Policy Studies Journal*, 10(2), 123–144. <https://doi.org/10.26529/cepsj.527>
- Supriadi, D., Usman, H., Jabar, A., & Widyastuti, I. (2021). Good school governance: An approach to principal's decision-making quality in Indonesian vocational school. *Research in Educational Administration and Leadership*, 6(4), 796–831. <https://doi.org/10.30828/real/2021.4.2>

- Susilowati, T., Suyono, S., & Andewi, W. (2017). Decision support system to determine scholarship recipients at sman 1 bangunrejo using saw method. *IJISCS (International Journal of Information System and Computer Science)*, 1(2), 29.
<https://doi.org/10.56327/ijiscs.v1i2.500>
- Tamanini, I., Pinheiro, P. R., Machado, T. C. S., & Albuquerque, A. B. (2015). Hybrid approaches of verbal decision analysis in the selection of project management approaches. *Procedia Computer Science*, 55, 1183–1192.
<https://doi.org/10.1016/j.procs.2015.07.093>
- Thomas R M. (2003). *Blending Qualitative & Quantitative Research Methods in Theses and Dissertations*. Corwin Press Inc.
- Todd, E. M., Higgs, C. A., & Mumford, M. D. (2019). Bias and Bias Remediation in Creative Problem-Solving: Managing Biases through Forecasting. *Creativity Research Journal*, 31(1). <https://doi.org/10.1080/10400419.2018.1532268>
- Tran T.D., Truong T.D., Pham T.V., Pham D.H. (2024). Cognitive Competency, Problem-Solving Skills and Decision-Making: A Case Study of Students' Extracurricular Activities in The Distribution Chains Sector. *Journal of Distribution Science*, 22(2), 71 – 82.
<https://doi.org/10.15722/jds.22.02.202402.71>
- Trimmer, B.K., & Trimmer, K. (2014). Decision-making by school principals and education researchers: The dilemma of reverse coding in structural equation modeling and its resolution in a study of risk-taking in decision-making for school principals. *Athens Journal of Education*, 1(1), 69–82. <https://doi.org/10.30958/aje.1-1-6>
- Tripathi, K.P. (2011). Decision making as a component of problem solving. *International Journal of Information Technology & Management Information System (IJITMIS)*, 1(1), 22-29.
- Uluçınar, U., & Aypay, A., (2016) A model of decision-making based on critical thinking. *Education and Science*, 41(185), 251-268. <http://dx.doi.org/10.15390/EB.2016.4639>
- Vargas, A., Patel, S., & Patel, D. (2018). Towards a Business Model Framework to Increase Collaboration in the Freight Industry. *Logistics*, 2(4), 22.
<https://doi.org/10.3390/logistics2040022>
- Wu, J., & Shang, S. (2020). Managing Uncertainty in AI-Enabled Decision Making and Achieving Sustainability. *Sustainability*, 12(21), 8758.
<https://doi.org/10.3390/su12218758>
- Xu, J. (2023). Advancement of Sustainable Development, Decision Support Systems, and Data Science Based on the Seventeenth ICMSEM Proceedings. *International Conference on Management Science and Engineering Management (ICMSEM)*, 409(2), 1-9. <https://doi.org/10.1051/e3sconf/202340900002>

Yesmaya, V., Ronald, A., & Hidajat, M. (2018). Property exhibition decision support system based on web application. *TELKOMNIKA (Telecommunication Computing Electronics and Control)*, 16(2), 766-770. <https://doi.org/10.12928/telkomnika.v16i2.7601>

Zhao, X., Shen, M., Zhang, X., Ye, H., (2019). Research on correlation between problem solving ability and positive mental capital of nursing undergraduates. *Chinese Journal of Practical Nursing*, 35(31), 2458–2464.

<https://doi.org/10.3760/cma.j.issn.1672-7088.2019.31.012>



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