The Seybold Report

ISSN 1533-9211

DOI 10.17605/OSF.IO/VN5WK

DO METACOGNITION AND SCIENCE PROCESS SKILLS AFFECT THE MANAGERIAL ABILITY OF LEADERS IN ISLAMIC BOARDING SCHOOLS

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Abstract

This study aims to identify and measure the effect of metacognition and science process skills on the educational managerial abilities of leaders at Pondok Pesantren Salaf API Tegalrejo Magelang. The approach used in this study is exploratory quantitative. The instrument used in this study was a questionnaire, which was a questionnaire consisting of 30 questions for each variable as measured by Likert scale answers. The sample used in this study was all leaders, from the highest to the lowest, totaling 38 people. Furthermore, the data that has been collected is analyzed in two stages, namely: 1) the analysis stage of identifying categories for each variable and 2) the stage of statistical correlation testing. Based on the data that has been obtained and the discussion, it can be understood that metacognition and SPS have a positive effect on the ability of the leadership of the Salaf API Islamic boarding school in conducting educational management at each level of leadership with a correlation level of 0.820 and 0.718 respectively. In addition, both variables together also have a positive effect on the leadership's ability to carry out managerial education, namely 0.780. Thus, this research implies that increasing the managerial ability of educational leaders in the Salaf API Tegal Rejo Islamic boarding school can be carried out by developing programs based on metacognition and science process skills.

Keywords: metacognition, science process skills, educational management innovation.

INTRODUCTION

The quality of education is closely related to the quality of management carried out by the leaders of educational institutions. The better the quality of management of educational institutions, the better the quality of education in general. This was also conveyed by Matorera

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ISSN 1533-9211
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(2018) Mukhsin (2019) and Kuntoro (2019), Girmanová, et al. (2022), that improving the quality of education can be done by properly applying management principles. Firdianti (2018) and Loeung & Safruddin (2021) in their research also stated that implementing school-based management can improve student achievement. In addition, Asmara & Nindianti (2019), Horne (2022), and Jamba & Norbu (2023) also explain that (classroom) management is very important for achieving learning goals. Therefore, efforts to improve the quality of education can be started by improving and increasing the quality of management of the education system itself, both at the class level, schools and foundations, and other larger organizations.

Education in the global era requires relatively more challenging management than before (Benson, 2018) and (Čulková, et al.2021). This is because the global era, apart from demanding the success of achieving quality education in general, also requires education to be in line with global developments. Mukti (2019) and Atta Quainoo et al., (2022) state that education in the global era must be able to prepare students with literacy competencies and national character. Suárez-Orozco (2005), Alam (2019), and (Lase, 2019) in their research stated that the global era (industrial revolution 4.0 and the era of Society 5.0) requires students with good problem-solving, critical thinking, and creative abilities. Thus various innovations in the education system must be carried out to ensure the quality of education is maintained and have a positive impact on users in the global era (Ja'far, 2019) and (Rogers, 2022). Various educational innovations must continue to be carried out to follow trends in the field of education sustainably (Gumennykova, et al., 2022) and (Okoye, et al., 2022), for example, the application of an independent curriculum (Hadiapurwa, et al., 2021). Therefore, innovation in the management of the education system in the global era is a necessity.

One of the educational institutions that require innovation in the management of the education system is Islamic boarding schools. Islamic boarding schools have an important role in preparing a quality generation in this global era (Tan & Bodovski, 2020), (Mita & Ashif, 2020), (Ijah, et al. 2021), (Susilawati & Misbah, 2022) and (Anam Besari , 2022). Innovation in education management at Islamic boarding schools is intended so that Islamic boarding schools must have the ability to prepare quality students (santri), be able to compete in the job market, be professional in doing their jobs and not lose their identity as a Muslim (Suparno, 2018), (Sadali, 2020), (Kariyanto, 2020), (Pramana, et al. 2021), (Revati et al. 2022) and (Amet, 2023). These efforts can only be carried out if the leaders at the Islamic boarding school can carry out various management innovations or managerial capabilities that can guarantee the implementation of a quality educational process.

Leadership in educational institutions has a very important position. Leaders in educational institutions greatly influence the quality of education (Ekosiswoyo, 2016), (Said, 2018), (Kurniawati, et al., 2020) and (Kapoor et al., 2022), (Rozaq, et al., 2022) and (Khalid Arar and Izhar Oplatka, 2022). The success of the leadership of educational institutions is greatly influenced and determined by their managerial abilities (Ting, et al., 2021), (Francis, et al., 2022), (Edi & Wijaya, 2022) and (Lee, Kim, & Kim, 2023). Therefore, efforts to improve the managerial capabilities of the leaders of educational institutions through various types of research are a must. This is done to ensure the quality of education in the future (Gilli, Lettner,

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& Guettel, 2023).

The ability of leaders (including leaders at Islamic boarding schools) in carrying out their duties is generally influenced by many factors, both internal and external factors. Externally, a person's managerial ability is influenced by environmental situations and conditions, while internally it is influenced by his ability to think, behave and act. Even Martínez-Hague (2017) states that various innovations in the field of education start with the critical thinking of its leaders. Several theories state that internal factors (personal abilities) play a greater role in success. This is as mentioned by Naisabur & Kiki (2022) and (Chen et al., 2023) that internal factors of one's personality influence one's leadership style. The results of this study were also reinforced by the statements of Rahayu & Agustina (2022), He (2023) and Ranjeeni, et al., (2023) a person's psychological state greatly influences his leadership abilities.

Good leadership skills are often associated with managerial abilities. The better the managerial ability, the better the leadership ability. This is in line with research (Hoffman & Shipper, 2012), Sonmez & Adiguzel (2020), and Sugiyanto & Ruknan (2020) that leadership and managerial skills are closely related and have a positive effect on employee performance and institutional performance. In the field of education, the managerial ability also has a positive effect on teacher performance (Islamia, 2021), (Muniroh, et al. 2022) and (Sartika, et al., 2023). Meanwhile, good teacher performance will determine education and learning in general and student achievement or learning outcomes (Ningsih & Isjoni, 2021), (Lenny S. Songcayawon et al., 2022), (Krisnayanti & Wijaya, 2022) as well as student motivation (Rahmawati, 2023). Therefore it can be understood that the managerial ability of the leaders of educational institutions is also closely related to the quality of education in general.

Many factors affect a person's managerial ability. One of the internal factors (personal ability) that are thought to influence the managerial ability of the leaders of educational institutions is metacognition. This ability is closely related to the skills of thinking, planning, implementing, and assessing something and greatly influences a person's self-efficacy and adaptation (Joie-La Marle, et al., 2023), including in influencing scientific attitudes (Biscocho, 2021) and awareness to do or not doing something (Jennifer & Charles, 2023). This is as explained by Ainun, et al. (2019) that metacognition is a person's awareness of using and controlling his thoughts. Asy'ari, et al. (2018), Humairah (2020), Rivas, et al. (2022) and Drigas, et al. (2023) stated that metacognition is one of the higher-order thinking skills that play an important role in shaping one's independence. Several other studies also state that metacognitive abilities greatly determine a person's success in doing something, for example, problem solving (Setyaningrum, 2020), success in learning (Abdullah, 2018), (Usman, et al., 2018) and (Anindya, et al., 2019), creative thinking (Rohman, et al. 2018). Therefore, metacognition is also strongly suspected to be closely related to the management tasks of a leader.

The urgency of metacognition in managerial processes by a leader of an educational institution has not been fully paid attention to. This can be seen from the relatively few studies linking metacognitive abilities to managerial abilities. Several related studies have recently linked leadership and self-regulation (Asisdiq, et al., 2017), and even then with a relatively small number. The research linking metacognition abilities and leadership is also still very limited.

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Several related studies, for example, were carried out by Mango, et al. (2019) who examined the carrying capacity of metacognition abilities to leadership development. Meanwhile, Kontostavlou & Drigas (2021) in their research explains metacognition that supports the development of one's leadership talents. Kim, (2019) plays a role in one's metacognition and emotional intelligence in leading himself. In general, none of the studies above have been able to answer how strong the role or influence of metacognition is on a person's managerial abilities, especially the leadership of educational institutions. This has an impact on the absence of various training programs to improve the managerial skills of leaders of metacognition-based educational institutions.

In addition to metacognition abilities, other skills needed to achieve success in carrying out their duties are science process skills. This skill is closely related to one's ability to make observations, collect and analyze data and make reports (Putri & Muhartati, 2019) and (Rahma, et al., 2020) and (Majeed, et al., 2023). In addition, it can also be said that KPS is a person's ability to apply the scientific method for decision-making (Samitra & Kristiawan, 2016) (Ediyanto, et al., 2018). Science process skills are very important for developing 21st-century skills (Astuti et al., 2021) and (Elmas & Saban, 2018). Some research results state that KPS has a positive effect on one's achievement, for example on learning outcomes (Isticharoh, 2019) and (Ischak, et al., 2020), critical thinking skills (Fitria, 2021), creative thinking skills (Darmaji, et al., 2022). Therefore, this ability is also closely related to the success of an educational institution leader in carrying out his managerial duties.

The importance of KPS in supporting one's success in everyday life as described above has not been fully verified empirically, especially about one's managerial abilities. Research related to the relationship between science process skills and the managerial abilities of leaders of educational institutions is still relatively few and limited. This is because these skills are closely considered part of the field of science education and are not related to the field of management. Therefore research related to the relationship between these two variables needs to be carried out to see how far the role of science process skills influences someone in carrying out their managerial tasks.

Referring to the description above, structured and systematic research is needed to provide empirical information on how metacognition abilities and science process skills influence the managerial abilities of leaders of educational institutions, especially in the API Tegalrejo Islamic boarding school environment, Magelang. The results of this study will provide a new perspective on the factors supporting the success of an educational institution leader in carrying out his managerial duties. In addition, the results of this study also contribute to providing ideas about the development of training models to improve managerial skills for leaders of educational institutions in general.

METHOD

The approach used in this study is exploratory quantitative. The instrument used in this study was a questionnaire, which was a questionnaire consisting of 30 questions for each variable as measured by Likert scale answers. The sample used in this study was all leaders, from the

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highest to the lowest, totaling 38 people. This sample includes unit heads, vice principals (MTs, SMA, MA), and school principals.

The variable measured in this study is metacognition ability (X1) with the measurement aspect referring to the opinions of Sukarno & Widdah (2020) and Sukarno & Musyafa, (2021) including: (1) Declarative Knowledge (DK), (2) Procedural Knowledge (PK), (3) Conditional knowledge (CK), (4) Cognition Regulation (CR), (5) Information Management System (IMS), (6) Monitoring Understanding (MU), (7) Correction strategy (CS) and (8)) Self-evaluation skills (SES). The KPS variable (X2) refers to the opinion of Mahmudah, et al. (2019), Khairunnisa, et al. (2020), and (Darmayanti & Setiawati, 2022), which include: (1) the ability to observe or observe, (2) classify, (3) collect information or data, (4) associate or process data, and (5) communicate or make a report. Meanwhile, the managerial ability variable (Y) measured in this study refers to the opinions of Rupnidah & Eliza, (2022), High (2022), and Muniroh et al. (2022) including (1) the ability to plan, (2) organize or manage, (3) implement the plans that have been made, and (4) the ability to supervise. Each measured variable has been set (adjusted with indicators) in such a way as to obtain a maximum score of 100 points and a minimum score of 25.

Furthermore, based on the data that has been obtained, it is then analyzed in two stages, namely: 1) the analysis stage of identifying categories for each variable and 2) the statistical correlation test stage. In this study, the correlation test was carried out with the help of SPSS 16 software. This was intended to maintain the accuracy of the data and the results of the analysis.

RESULTS AND DISCUSSION

Measurement of each variable in this study was carried out in a structured and systematic manner and stages. As mentioned earlier, the variables in this study include metacognition abilities, science process skills, and managerial abilities of the leaders at the Salaf API Tegal Rejo Islamic Boarding School, Malang. After the necessary data is collected, then it is analyzed. The results of the first stage of the analysis show that the metacognition abilities, SPS, and managerial abilities of the leaders in the Islamic boarding school environment vary, some are in the "high", "medium" and "low" categories. The results of the first stage of analysis in more detail can be seen in Table 1 below:

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Table 1: Category Analysis of Metacognitive Ability, SPS, and Managerial Ability of Leaders in the Salaf API Tegal Rejo Islamic Boarding School, Malang

Variables	Score	Number of Respondents	Percentage (%)	Category
Metacognition	76-100	15	39,47	High
	51-75	17	44,74	Moderate
	25-50	6	15,79	Low
	Total	38	100	
SPS	76-100	14	36,84	High
	51-75	15	39,47	Moderate
	25-50	9	23,68	Low
	Total	38	100	
Managerial Ability	76-100	16	42,10	High
	51-75	14	36,84	Moderate
	25-50	8	21,05	Low
	Total	38	100	

Based on Table 1 above, it can be understood that the metacognitive ability of the leaders in the Salaf API Tegal Rejo Islamic Boarding School environment is in a row the "high" category, which is as much as 39.47%, the "moderate" category is 44.74%, and the rest as much as 15.79% are in the "low" category. As for the SPS variables, namely: the "high" category was 36.84%, the "moderate" category was 39.47% and the remaining 23.68% were in the "low" category. Whereas in the managerial ability variable, the "high" category was 42.10%, the "moderate" category was 36.84% and the "low" category was 21.05%. Therefore, referrig to the existing data, it can be said that in general, the ability of the leaders in the API Tegal Rejo Islamic Boarding School environment in all three aspects/variables is quite good.

Table 2: Correlation between Metacognition, SPS, and Managerial Ability variables

		Metacognition	SPS	Managerial Ability
Metacognition	Pearson Correlation	1	.820**	.660**
	Sig. (2-tailed)		.000	.000
	N	38	38	38
SPS	Pearson Correlation	.820**	1	.718**
	Sig. (2-tailed)	.000		.000
	N	38	30	38
Managerial Ability	Pearson Correlation	.660**	.718**	1
	Sig. (2-tailed)	.000	.000	
	N	38	38	39
****. Correlation is significant at the 0.01 level (2-tailed).**				

Based on sig. (2-tailed) between the variables Metacognition and Managerial Ability is 0.000

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<0.05, thus it can be understood that there is a significant correlation between variable X1 (metacognition) and variable Y (Managerial Ability). Furthermore, for the SPS variable, the sig. (2-tailed) value is 0.000 <0.5. This means that there is also a significant correlation between X2 (SPS) and Y (Managerial Ability).

Referring to the R-value, it is known that the calculated R-value between the variables X1 (metacognition) is 0.820 > from the R table, which is 0.320 (for n=38 it is 0.320 with a significance of 5%). This shows that there is a significant correlation between variable X1 (metacognition) and variable Y (Managerial Ability). The calculated R-value for variable X2 (SPS) against variable Y (Managerial Ability) is 0.718 > from the R table, which is 0.320 (for n=38 it is 0.320 with a significance of 5%). Thus it can be said that there is a significant correlation between variable X2 (SPS) and variable Y (Managerial Ability).

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate
1	.780[a]	.608	.638	1.391
a. Predictors: (Constant), SPS, Metacognition				

Based on the Summary model table above, the calculated R-value is 0.780 > from the R table, namely 0.320 (for n=38 it is 0.320 with a significance of 5%). This shows that there is a significant contribution between variables X1 (metacognition) and X2 (SPS) with variable Y (Managerial Ability). Thus it can be said that 78% of the managerial skills of the leaders in the API Tegal Rejo Salaf Islamic Boarding School are influenced by metacognition abilities and SPS abilities, and the remaining 22% are influenced by other factors.

Table 4: Model ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	788.297	2	344.149	213.111	.000[a]
	Residual	65.322	35	1.419		
	Total	843.619	37			
a. Predictors: (Constant), SPS, Metacognition						
b. Dependent Variable: Managerial Ability						

Based on the ANOVA table above, it is known that the sig. 0.000 which means less than (<) 0.05, it can be said that X1 (Metacognition) and X2 (SPS) simultaneously affect variable Y (Managerial Ability). This is also reinforced by the calculated F value of 213.111> F table 3.22. This means that the two variables, namely X1 and X2 simultaneously affect the variable Y (Managerial Ability).

Based on the data that has been obtained and the discussion, it can be understood that metacognition and SPS have a positive effect on the ability of the leadership of the Salaf API Islamic boarding school in conducting educational management at each level of leadership with

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a correlation level of 0.820 and 0.718 respectively. In addition, both variables together also have a positive effect on the leadership's ability to innovate in education management, namely 0.780. Thus, this research implies that increasing the ability to innovate the educational management of leaders can be done by developing programs based on metacognition and science process skills.

DISCUSSION

The results of the research above show that metacognition has empirically proven to have a significant effect on managerial ability or the ability to manage educational institution leaders. The results of this study also prove that a person's managerial abilities and success are largely determined and influenced by metacognition abilities which reach 82%. This means that the better a person's metacognitive ability, the better his managerial ability. Meanwhile, good managerial skills will have a positive impact on the quality of education services in the institutions they lead (Irsyadiyah, 2020) and (Ulil Albab, 2021), including improving performance (Laghari & Hussain, 2022), the effectiveness of teaching teachers (Silva, 2021) as well as on teacher professionalism in general (Riyadi et al., 2023) and (Hill, Hains, & Hains, 2023). Managerial ability will also have a positive impact on management innovation in an organization or institution (Costa, et al., 2023). So in other words it can also be said that the better the metacognitive ability of a leader of an educational institution, the quality of education at the educational institution will also be better.

The positive relationship between metacognitive abilities and managerial abilities of educational institution leaders as the results of this study can be well understood. This is based on a theory that leadership is an activity of influencing someone in the form of instructions, orders, or actions to achieve goals through communication channels (Ibarra, 2021) and (Habe et al., 2022). Meanwhile, each of these activities always involves the ability to think and mental activity (Saini & Shabnam, 2021) and (Chero, 2023). The ability to think and think activities are a major part of metacognition (Amin, et al., 2020) and (Wilis, et al., 2023). This is as mentioned by U. Albab, et al. (2020) and Yasinta, et al. (2023) that metacognition is a mental activity that is carried out consciously in a cognitive structure that allows someone to help them control, organize, and analyze their thoughts. Therefore why metacognition ability plays a big role in the managerial ability of a leader, can be understood from this point of view.

The results of the study imply that the development of managerial capabilities of educational institution leaders, especially at the Salaf API Islamic Boarding School in Tegal Rejo, Malang, can be carried out by considering their metacognition. Therefore, it is necessary to carry out training to improve the managerial abilities of the leaders of these educational institutions with an orientation based on the development of metacognition. Some activities or training that have the potential to develop metacognition abilities according to experts can be used as a guide for the development of metacognition-based training models for leaders of educational institutions including training on experimental learning models (Febriyanni & Santika, 2022), training with a metacognitive approach, namely orientation of thinking skills and self-reflection (Pertiwi, et al., 2022), training using the PQ4R metacognitive approach, namely Preview, Question, Read,

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Reflect, Recite, and Review (Nur'Afifah, 2022).

As previously mentioned by Sukarno & Widdah (2020) and Sukarno & Musyafa, (2021) that there are several aspects of metacognition, namely: (1) Declarative Knowledge (DK), (2) Procedural Knowledge (PK), (3) Conditional knowledge (CK), (4) Cognition Regulation (CR), (5) Information Management System (IMS), (6) Monitoring Understanding (MU), (7) Correction strategy (CS) and (8) Self-evaluation skills (SES), which was measured in this research is strongly suspected that each influences different managerial abilities. However, this study has not explained how the role of each of these aspects influences the managerial abilities of the leaders of educational institutions. Therefore, it is necessary to conduct further research to find out and answer this problem.

In addition, referring to the results of this study (Table 2), it can be seen that SPS affects the managerial ability of leaders in the Salaf API Tegal Rejo Islamic Boarding School, Malang by 71.8% in the "significant" category. This shows that SPS has an important role in the success of leaders in carrying out their managerial duties. Therefore, this study proves that SPS has a positive effect on one's success, both in the academic field and in other areas of life. This is because SPS is also closely related to critical thinking skills (Fitria, 2021) and (Agnes, et al., 2022), creative thinking (Darmaji et al., 2022), and problem-solving and program development skills (Roa & Fajardo, 2022). The ability to think, creativity and problem-solving skills are very closely related to managerial success.

Seeing the positive relationship or correlation between SPS and the managerial abilities of the heads of educational institutions (Table 2) above, it can be said that an increase in the SPS of leaders also means an increase in managerial abilities. It also means that efforts to improve the managerial capabilities of educational institution leaders can be carried out by developing SPS capacity building. Some experts state that increasing the SPS itself can be done with several activity approaches, including outdoor/gardening activities (Mirawati & Nugraha, 2017), hands-on activity-based discussions (Avisya, et al., 2019), training or learning based on STAD (Komikesari, 2016). It's just about improving and developing the managerial capabilities of the leaders of educational institutions, these activities need to be modified so that they are by the situation and conditions of the leaders of educational institutions as training participants.

As previously mentioned, the science process skills measured in this study include aspects of 1) the ability to observe or observe, (2) classify, (3) collect information or data, (4) associate or process data, and (5) communicate or make a report. However, this research has not elaborated and answered the question of which aspect plays the most role in influencing the managerial abilities of the leaders of these educational institutions. and which aspects are less important? This is because this research focuses on looking at and answering questions about how SPS influences general managerial abilities. Therefore, further research is needed on the role of each aspect of SPS that plays the most role and plays the least role.

Taking into account the results of this study, especially in Table 4, namely that metacognition ability and SPS jointly affect the managerial abilities of the leaders at the Salaf API Tegal Rejo Islamic Boarding School, in the development of the training model it is also necessary to

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consider these two variables together. This is intended so that the achievement of the objectives, namely increasing the managerial capabilities of the leaders is more optimal. Optimum managerial abilities of the leaders of educational institutions with training based on metacognition and SPS will also have a positive impact on improving the quality of education in general.

CONCLUSION

Based on the data that has been obtained and the discussion, it can be understood that metacognition and SPS have a positive effect on the ability of the leadership of the Salaf API Islamic boarding school in conducting educational management at each level of leadership with a correlation level of 0.820 and 0.718 respectively. In addition, both variables together also have a positive effect on the leadership's ability to carry out managerial education, namely 0.780. Thus, this research implies that increasing the managerial ability of educational leaders in the Salaf API Tegal Rejo Islamic boarding school can be carried out by developing programs based on metacognition and science process skills. In addition, based on the ANOVA table above, it is known that the sig. 0.000 which means less than (<) 0.05, it can be said that X1 (Metacognition) and X2 (SPS) simultaneously affect variable Y (Managerial Ability). This means that the two variables, namely X1 and X2 simultaneously affect the variable Y (Managerial Ability).

ACKNOWLEDGMENTS

At the end of this paper, the researcher expresses his gratitude and high appreciation to all leaders at the Salaf API Tegal Rejo Islamic Boarding School, Malang, who have agreed to facilitate and become respondents to the research. Hopefully, all his kindness and attention will become a good deed and contribute to improving the quality of education in general. In addition, the researchers also thanked the entire research team for collaborating in planning, implementing, and compiling the research report. The researcher would also like to thank the publishing team, who has agreed to publish the results/report of this research so that it is known and read by various parties and has the potential to provide wider benefits for improving the quality of education, especially in Islamic boarding schools.

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