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The Influence of Madrasa Head Leadership, Madrasa Climate, and Science Literacy on Teacher Creativity in Madrasah Aliyah in Samarinda City

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Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh kepemimpinan kepala madrasah, iklim madrasah dan literasi sains terhadap kreativitas guru di Madrasah aliyah Kota Samarinda. Peran kreativitas guru dalam proses pembelajaran merupakan kunci utama keberhasilan yang dipengaruhi oleh berbagai aspek, termasuk dukungan kepemimpinan kepala madrasah, iklim madrasah, dan literasi sains yang baik. Penelitian ini menggunakan pendekatan kuantitatif dengan desain survei, di mana data dikumpulkan melalui kuesioner yang disebarkan kepada guru di Madrasah Aliyah Kota Samarinda. Variabel yang diteliti meliputi kepemimpinan yang dilakukan oleh kepala madrasah, keadaan iklim madrasah, serta literasi sains dalam pembelajaran terhadap kreativitas guru. Hasil penelitian menunjukkan bahwa kepemimpinan kepala madrasah memiliki pengaruh positif yang signifikan terhadap kreativitas guru, mendukung untuk mengeksplorasi ide-ide baru dan mengembangkan kreativitas bagi guru. Selain itu, iklim madrasah dapat menjadikan guru yang lebih kreatif dalam proses pembelajaran. Literasi sains dapat mendukung kreativitas guru dalam merancang dan menyampaikan materi pembelajaran dengan menggunakan pengetahuan ilmiah. Penelitian ini menyimpulkan bahwa ketiga faktor tersebut saling berinteraksi dan berperan penting dalam kreativitas guru di Madrasah Aliyah Kota Samarinda. Oleh karena itu, dukungan kepemimpinan kepala madrasah, keadaan iklim madrasah, serta pengembangan literasi sains yang positif perlu menjadi fokus utama dalam upaya meningkatkan kualitas kreativitas guru pada pendidikan di tingkat Madrasah Aliyah.

Kata Kunci: Kepemimpinan Kepala Madrasah, Iklim Madrasah, Literasi Sains, Kreativitas Guru, Madrasah Aliyah, Kota Samarinda

Abstract

This research aims to analyze the influence of madrasa head leadership, madrasa climate and scientific literacy on teacher creativity in Madrasah aliyah Samarinda City. The role of teacher creativity in the learning process is the main key to success which is influenced by various aspects, including leadership support from the madrasa head, madrasa climate and good scientific literacy. This research uses a quantitative approach with a survey design, where data is collected through questionnaires distributed to teachers at Madrasah Aliyah Samarinda City. The variables studied include leadership carried out by the madrasa head, the state of the madrasa climate, and scientific literacy in learning on teacher creativity. The results of the research show that the leadership of the madrasa head has a significant positive influence on teacher creativity, supporting the exploration of new ideas and developing creativity for teachers. Apart from that, the madrasa climate can make teachers more creative in the learning process. Scientific literacy can support teacher creativity in designing and delivering learning materials using scientific knowledge. This research concludes that these three factors interact with each other and play an important role in teacher creativity at Madrasah Aliyah Samarinda City. Therefore, support from the leadership of the madrasa head, the state of the madrasa climate, and the development of positive scientific literacy need to be the main focus in efforts to improve the quality of teacher creativity in education at the Madrasah Aliyah level.

***Keywords**: Madrasah Principal Leadership, Madrasah Climate, Scientific Literacy, Teacher Creativity, Madrasah Aliyah, Samarinda City*.

Introduction

The world today has experienced rapid development in science and technology, directly influencing various aspects of life, including education. Education is now geared towards preparing students for success in the 21st century. It's important to note that learning involves directly seeking mastery of knowledge in the form of facts and concepts that exist in everyday life. Research by Sovayunanto (2022) found that out of 610 students, 408 were categorized as average, 111 were identified as having learning loss, and the remaining 91 students tended not to experience learning difficulties. There is a possibility that students in the average category could be at risk of experiencing learning loss, thus requiring teacher creativity to address this issue.

To recover from educational learning loss, teachers play a crucial role in mobilizing their competencies and creativity to encourage students to improve their academic performance. Additionally, short-term educational remediation focuses on improving literacy and numeracy skills, as well as assessments to gauge student abilities. Therefore, teachers need to be creative in conducting classroom-based diagnostic assessments to identify learning achievements and needs (Arifa, 2019). There are still quite a variety of complex problems often encountered in 21st-century education that require serious attention, such as the quality of teaching and issues related to educators (Isma et al., 2023). Moreover, the 21st century requires the development of six types of skills: critical thinking, creativity, communication, literacy, cross-cultural understanding, and career skills (Eriyanti et al., 2022). Thus, there is a need to enhance teacher creativity to address these issues.

One of the government's supports for education is the launch of the Merdeka Belajar (Freedom to Learn) Program. This program is implemented so that students can optimize their talents and contribute their best to the nation. There are three indicators of the success of the Merdeka Belajar program initiated by the ministry, namely, equitable student participation in Indonesian education, effective learning, and no student left behind. Of course, effective learning must be supported by teachers who have high creativity. Creativity is the use of new ideas in working, solving problems, and taking innovative actions. According to Leong & Said, (2023), creative teachers are able to develop science, technology, and art to help their students. It can also be interpreted as a teacher who is never satisfied with what they convey to students. Creative teachers will be able to discover the intelligence of each student. They also become productive because what they find becomes an interesting subject of study. Creative teachers will be liked by students because of various teaching methods that do not make students bored quickly, and more challenging for students to follow the lessons given through something diverse (Rahmadhani et al., 2024).

The success or failure of a madrasah in creating an environment that supports teacher creativity is influenced by several factors, including school leadership, school climate, and science literacy. In madrasahs, leaders support teachers in implementing innovative teaching practices to ensure learning for all students (Bellibaş et al., 2024). The role of school leadership in supporting teacher creativity is by providing moral support and the necessary facilities for pedagogical exploration. As the leader of their subordinates, the school principal is the key to driving the development and progress of the madrasah, which is obliged to manage various components to achieve educational and learning goals (Purawanto, 2019). Where inspiring and supportive school leadership can contribute to increasing teacher creativity (Jabbar & Hussein, 2020). Strong and supportive school leadership can create a school environment for exploring new ideas and developing creativity for teachers. Teacher creativity will grow and be created from the existence of supportive leadership and a conducive work environment (Jazuli et al., 2023). In this case, the school principal's leadership supports and guides in increasing teacher creativity so that the desired goals can be achieved. The presence of school leadership can support the creation of a positive school climate in providing a strong foundation for teachers to develop their creative ideas. A positive, inclusive, and collaborative school climate can create a conducive atmosphere for the development of teacher creativity. Research shows that schools with a positive climate tend to

have teachers who are more creative in the teaching process.

As science and technology continue to advance rapidly and globalization becomes increasingly intense, there is a growing need for teachers to be creative in managing their classrooms to achieve optimal learning outcomes (Tumuheise et al., 2023). The role of teacher creativity in the learning process is the key to success. This is because teachers are the ones who will prepare, implement, and evaluate the learning process. Therefore, teacher creativity is highly demanded in conducting learning for students today. Teacher creativity in the learning process can be developed through skills in improving literacy (Alqorni et al., 2023). Thus, there is a need for teachers who have science literacy skills so that they can be more creative in designing and delivering teaching materials using scientific knowledge. Science literacy is often viewed as specific to science subjects, but in this case, it is considered important to enhance teachers' creativity in exploring and designing more creative learning outside of science subjects in madrasas.

In the context of madrasas, the above explanation provides a new perspective, as previous research has focused more on general schools or other educational institutions. This provides a specific insight into the unique needs and challenges in the madrasa environment, where the leadership of the madrasa head, the madrasa climate, and science literacy are interesting factors to be studied in more depth in relation to teacher creativity. Therefore, the researcher is very interested in conducting research entitled "The Influence of Madrasa Head Leadership, Madrasa Climate, and Science Literacy on Teacher Creativity in Madrasah Aliyah in Samarinda City." The results of this study are expected to contribute to the development of more effective madrasa management strategies related to the factors that influence teacher creativity.

Method

This research is based on a quantitative approach. Quantitative research emphasizes statistical data (Sudjana, 2005). According to Sugiyono (2016:102), quantitative research can be defined as a research method based on positivist philosophy, used to study a specific population or sample. Sampling techniques are generally done randomly, data collection uses research instruments, and data analysis is quantitative/statistical with the aim of testing the stated hypothesis. The purpose of collecting quantitative data in this research is to prove, strengthen, deepen, broaden, weaken, and refute previously obtained quantitative data. The research subjects consist of teachers at Madrasah Aliyah in Samarinda City, with research objects focusing on the leadership of school principals, school climate, and science literacy towards teacher creativity. The research location was determined at Madrasah Aliyah in Samarinda City, while the research period was conducted for one month, from September to October 2024. This research is divided into two stages, namely questionnaires and documentation. Furthermore, the population in this study is all teachers at Madrasah Aliyah in Samarinda City, totaling 291 people. The sample is a part of the number and characteristics possessed by the population, amounting to 184 people. In the preparation of instruments or data collection tools, the variables that are the main reference for researchers in compiling questionnaires consist of questionnaires about the leadership of school principals, school climate, and science literacy towards teacher creativity at accredited A and B Madrasah Aliyah. The methods used in data analysis are correlation analysis and regression analysis.

The data collection process involves several techniques, including questionnaires and documentary studies. The data obtained in this study was obtained by distributing questionnaires, namely the researcher directly involved in obtaining data from the relevant parties directly or also called primary data. Documentary studies were used to obtain information from documents or records related to the research. Data analysis in this study involves three main stages, namely data condensation, data presentation, and conclusion drawing. Data condensation involves grouping and simplifying the collected data, while data presentation involves the expression of analysis results in an easily understandable form. The final stage, drawing conclusions, is carried out to describe the findings and implications of the research (Sugiyono, 2016).

Results

Table 1. *Results of Multiple Regression*

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	61.744	5.194		11.887	0.000
	School Principal Leadership (X_1)	1.187	0.258	1.321	4.605	0.000
	School Climate (X_2)	0.269	0.060	0.338	4.499	0.000
	Science Literacy (X_3)	1.747	0.261	1.870	6.682	0.000
a. Dependent Variable: Y						

Source: SPSS Data Processing Results 29, 2024

Based on Table 1, it can be determined to answer the multiple regression test with the following steps: 1) The constant is 61,744, which means that if the variables of madrasa head leadership, madrasa climate, and scientific literacy are equal to zero, then the teacher creativity variable is only equal to 61,744. 2) The regression coefficient value for Madrasah Head Leadership (X_1) is 1.187, which is positive, which means that the better the leadership of the Madrasah head, the more teacher creativity will increase. 3) The Madrasah Climate regression coefficient value (X_2) of 0.269 is positive, which means that the better the Madrasah climate, the more teacher creativity will increase. 4) The Scientific Literacy coefficient (X_3) value of 1,747 is positive, which means that the better the scientific literacy, the more teacher creativity will increase.

Table 2. *Results of Partial Test (t-test)*

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	61.744	5.194		11.887	0.000
	School Principal Leadership (X_1)	1.187	0.258	1.321	4.605	0.000
	School Climate (X_2)	0.269	0.060	0.338	4.499	0.000
	Science Literacy (X_3)	1.747	0.261	1.870	6.682	0.000
a. Dependent Variable: Y						

Source: SPSS Data Processing Results 29, 2024

Based on Table 2, the influence of the school principal's leadership, the hypothesis test shows that variable X_1 has a calculated t-value of 4.605 and a tabulated t-value of 1.973. This indicates that the calculated t-value is greater than the tabulated t-value (4.605 > 1.973) with a significance level of 0.000. Since the significance level is less than the required significance level of 0.05 (0.000 < 0.05), the null hypothesis (H0) is rejected. This means that the alternative hypothesis (Ha), which states, "There is a significant influence between the school principal's leadership and teacher creativity in Madrasah Aliyah in Samarinda City," is accepted. The positive value indicates that as the school principal's leadership improves, the

creativity of teachers in Madrasah Aliyah in Samarinda City will also improve.

For school climate, the hypothesis test shows that variable X_2 has a calculated t-value of 4.499 and a tabulated t-value of 1.973. This indicates that the calculated t-value is greater than the tabulated t-value (4.499 > 1.973) with a significance level of 0.000. Since the significance level is less than the required significance level of 0.05 (0.000 < 0.05), the null hypothesis (H0) is rejected. This means that the alternative hypothesis (Ha), which states, "There is a significant influence between school climate and teacher creativity in Madrasah Aliyah in Samarinda City," is accepted. The positive value indicates that as the school climate improves, the creativity of teachers in Madrasah Aliyah in Samarinda City will also improve.

Science literacy, based on the hypothesis test, shows that variable X_2 has a calculated t-value of 6.682 and a tabulated t-value of 1.973. This shows that the calculated t-value is greater than the tabulated t-value (6.682 > 1.973) with a significance level of 0.000, which means the significance level is less than the required significance level of 0.05 (0.000 < 0.05). Therefore, the null hypothesis (H0) is rejected, meaning the alternative hypothesis (Ha), which states, "There is a significant influence of science literacy on the creativity of Madrasah Aliyah teachers in Samarinda City," is accepted. The positive value indicates that as science literacy improves, the creativity of Madrasah Aliyah teachers in Samarinda City will also improve.

Table 3. *Results of F Test (Simultaneous)*

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	996.012	3	332.004	22.776	.000[b]
	Residual	2623.901	180	14.577		
	Total	3619.913	183			
a. Dependent Variable: Y						
b. Predictors: (Constant), X_1, X_2, X_3						

Source: SPSS Data Processing Results 29, 2024

Based on Table 3, the calculated F-value is greater than the tabulated F-value (22.776 > 2.655). This is further supported by the significance probability of 0.000, which is less than 0.05. Therefore, the null hypothesis (H0) is rejected, meaning the alternative hypothesis, which states "There is a significant influence of school principal leadership, school climate, and science literacy on the creativity of Madrasah Aliyah teachers in Samarinda City," is accepted. It can be concluded that the influence of School Principal Leadership (X_1), School Climate (X_2), and Science Literacy (X_3) has a simultaneous (joint) effect on teacher creativity (Y).

Table 4. *Results of Determination Test (R2)*

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.525[a]	.275	.263	3.818
a. Predictors: (Constant), X_3, X_1, X_2				

Source: SPSS Data Processing Results 29, 2024

Based on Table 4 of the SPSS 29 model summary, it can be determined that the relationship of the influence of school principal leadership, school climate, and science literacy simultaneously on teacher creativity, as calculated using the multiple correlation coefficient R-squared, is 0.525. This indicates a positive influence. Thus, the R-squared value obtained is 0.275, meaning that the variables of school principal leadership, school climate, and science literacy simultaneously contribute 27.5% of the influence on teacher creativity. The remaining 72.5% is influenced by other factors.

Discussion

The impact of school principal leadership on teacher creativity

The analysis of the research results indicates that, partially, the variable of school

principal leadership (X_1) has a positive and significant influence on the variable of teacher creativity (Y). This means that the higher the level of school principal leadership, the higher the teacher's creativity.

The hypothesis test confirms that school principal leadership has a positive and significant influence on teacher creativity. This is supported by the t-test results, where the calculated t-value is greater than the tabulated t-value (4.605 > 1.973) with a significance probability of 0.000 (< 0.05). The positive and significant value indicates that school principal leadership (X_1) has a positive influence on increasing teacher creativity. The statistical data analysis shows that school principal leadership has a positive and significant influence on creativity. Therefore, hypothesis H1 is accepted.

Based on the research results, it can be concluded that there is a significant influence of school principal leadership on the creativity of Madrasah Aliyah teachers in Samarinda City. The positive value means that the better the school principal's leadership, the higher the creativity of Madrasah Aliyah teachers in Samarinda City. Strong leadership from the school principal will provide a strong impetus for teachers to have better abilities, which will result in maximum creativity. Conversely, weak leadership from the school principal will reduce the abilities of teachers, resulting in less than maximum creativity. Leadership is one of the important factors that influence the performance of subordinates, so the success of the leadership process is the behavior of the leader or the leadership style (Mulawarman & Srihandari, 2021).

The leadership of Madrasah Aliyah principals in Samarinda City is currently good. This indicates that the leadership of school principals has an influence on increasing teacher creativity in teaching. The leadership of school principals in this study includes five dimensions: 1) decision-making, 2) communication, 3) personality, 4) understanding of the vision and mission, and 5) knowledge. Thus, the leadership of school principals has a greater influence on teacher creativity.

Based on the analysis results, it was found that of the five dimensions, the dimension with the greatest contribution is the personality dimension at 0.767, and the lowest is the understanding of the vision and mission dimension with a contribution of 0.576. It can be concluded that the understanding of the vision and mission dimension has the least influence on the leadership of Madrasah Aliyah principals in Samarinda City.

The influence of school climate on teacher creativity

Analysis of the research results shows that, partially, the variable of School Climate (X_2) has a positive and significant influence on the variable of Teacher Creativity (Y). This means that the higher the level of school climate influence, the higher the teacher's creativity.

The hypothesis test proves that school climate has a positive and significant influence on the creativity of Madrasah Aliyah teachers in Samarinda City. This is supported by the t-test results, where the calculated t-value is greater than the tabulated t-value (4.499 > 1.973) with a significance probability of 0.000 (< 0.05). This positive and significant figure means that a good school climate (X_2) will increase the creativity of Madrasah Aliyah teachers in Samarinda City. Statistical data processing results show that school climate has a positive and significant influence on teacher creativity. Therefore, hypothesis H2 is accepted.

Based on the research results, it can be concluded that there is a significant influence of school climate on the creativity of Madrasah Aliyah teachers in Samarinda City. This positive correlation means that a better school climate will lead to higher teacher creativity. School climate is the atmosphere that influences the performance of each individual, fosters a sense of appreciation, and creates relationships among all organizations within it. A good school climate is the result of a friendly workplace where people can feel safe, well-compensated, accepted, honest, and transparent in their dealings, confident in their abilities, praised and admired, have opportunities for their voices to be heard, and have a sense of belonging (Hildayati, 2024).

The school climate in Samarinda City, as measured in this study, is already good and includes the following dimensions: 1) interpersonal relationships, 2) understanding characteristics and taking part in activities, 3) maintaining school habits and being simple, 4) caring for others and being open, and 5) providing support. This indicates that the school climate has a significant influence on teacher creativity.

Based on the analysis, it was found that, of the five dimensions, the dimension with the greatest contribution was "caring for others and

being open" at 0.732, while the lowest was "maintaining school habits and being simple" at 0.647. This suggests that maintaining school habits and being simple has the least impact on school climate for teachers in Madrasah Aliyah in Samarinda City.

The impact of science literacy on teachers' creativity

The research findings demonstrate that, on an individual basis, the variable of science literacy (X_3) has a positive and significant influence on the variable of teacher creativity (Y). In other words, as the level of science literacy increases, the creativity of teachers in Madrasah Aliyah in Samarinda City also increases. The hypothesis test confirms that science literacy has a positive and significant impact on teacher creativity in Madrasah Aliyah in Samarinda City. This is evidenced by the t-test results, where the calculated t-value is greater than the tabulated t-value (8.179 > 1.973) with a significance probability of 0.000 (< 0.05). This positive and significant value indicates that an increase in science literacy (X_3) will lead to an increase in teacher creativity in Madrasah Aliyah in Samarinda City. The statistical data analysis shows that science literacy has a positive and significant influence on teacher creativity. Therefore, hypothesis H3 is accepted.

Based on the research results, it can be concluded that there is a significant influence of science literacy on teacher creativity in Madrasah Aliyah in Samarinda City. This positive correlation means that as science literacy increases, teacher creativity also improves. Science literacy is the ability of an individual to solve problems and consists of aspects such as context, knowledge, competence, and attitude, leading to a high level of sensitivity to oneself and the environment (Dasic et al., 2024).

The science literacy of teachers in Madrasah Aliyah in Samarinda City is already considered good in this study. This is reflected in the following dimensions: 1) possessing knowledge of science, 2) applying it appropriately, 3) solving problems correctly, 4) applying technology, and 5) adapting to the environment. Thus, science literacy has a significant influence on teacher creativity.

Based on the analysis, it was found that among the five dimensions, the dimension with the greatest contribution is "applying appropriately" at 0.744, while the lowest is "applying technology" with a contribution of 0.476. It can be concluded that the dimension of "applying technology" has the least influence on the science literacy of teachers in Madrasah Aliyah in Samarinda City.

The influence of school principal leadership, school climate, and science literacy on teacher creativity

Based on the research results regarding the variables of school principal leadership, school climate, and science literacy towards teacher creativity, it can be described as follows:

The results of the multiple regression analysis show that the relationship model between school principal leadership, school climate, and science literacy towards teacher creativity can be expressed by the equation: $Y = 61{,}744 + 1{,}187X_1 + 0{,}269X_2 + 1{,}747X_3$. The regression coefficient for the variable of school principal leadership (X_1) is $1{,}187$. This means that if X_1 increases by 1%, then Y will decrease by $1{,}187$. Similarly, the regression coefficient for the variable of school climate (X_2) is [insert value]. If X_2 increases by 1%, then Y will decrease by $0{,}269$. Furthermore, the regression coefficient for the variable of science literacy (X_3) is $1{,}747$. If X_3 increases by 1%, then Y will increase by $1{,}747$.

The partial t-test results indicate that variable X_1 (school principal leadership) has a significant influence on variable Y (teacher creativity). The significance level of 0.000 is less than 0.05, which means that this relationship is statistically significant. The significance level of variable X_2 in relation to Y is 0.000 (0.000 < 0.05), indicating that the school climate (X_2) has a significant impact on teacher creativity (Y). Similarly, the significance level of variable X_3 in relation to Y is also 0.000 (0.000 < 0.05), meaning that science literacy (X_3) has a significant influence on teacher performance (Y). The partial t-test, based on the calculated t-value for X_1 in relation to Y, was found to be 4.605 while the tabulated t-value is 1.973. Since the calculated t-value is greater than the tabulated t-value (4.605 > 1.973), this indicates that school principal leadership has a significant partial effect on teacher creativity. The calculated t-value for variable X_2 (school climate) in relation to Y (teacher creativity) is 4.449, while the critical t-value is 1.973. Since the calculated t-value is greater than the critical t-value (4.449 > 1.973), we can conclude that school climate has a significant partial influence on teacher creativity. Additionally, the calculated t-value for variable X_3 (science literacy) in relation to Y is 8.179, with a

critical t-value of 1.973. As the calculated t-value is significantly larger than the critical t-value (8.179 > 1.973), it can be determined that science literacy also has a significant partial influence on teacher creativity. The calculated t-value for variable X_3 (science literacy) is 8.179, which is significantly greater than the critical t-value of 1.973. This indicates that science literacy has a significant partial effect on teacher creativity.

To find out whether this hypothesis is accepted or rejected, it can be seen from the results of the ANOVA test, the Fcount value is 22.776 and the Ftable value for alpha is 5% (0.05) and df1 = 3; df2 = 184 obtained 2.655. The results of the F-test, with an F-value of 22.776 and a p-value of 0.000, provide strong evidence to reject the null hypothesis. This statistical significance indicates that variables X_1, X_2, and X_3, when considered together, have a substantial and positive impact on variable Y. The combined influence of school principal leadership (X_1), school climate (X_2), and science literacy (X_3) on teacher creativity (Y) is represented by an R-squared value of 27.5%, indicating that these three variables together account for 27.5% of the variation in teacher creativity. The remaining 72.5% of the variation can be attributed to other factors.

Based on the research findings, it is evident that there is a significant positive correlation between school principal leadership, school climate, and science literacy, and the creativity of teachers in Madrasah Aliyah in Samarinda. This implies that as the quality of school principal leadership, school climate, and science literacy improves, so too does the creativity of the teachers.

Effective school principal leadership can stimulate creative thinking within a team by fostering a positive atmosphere. This can enhance self-confidence and encourage diverse perspectives, ultimately contributing to increased creativity within an organization. Furthermore, support from leaders in creating a positive mood can influence the creative performance of subordinates (Permatasari et al., 2023). When school principal leadership is strong, inspiring, and supportive, it can contribute to increased teacher creativity (Jabbar & Hussein, 2020). A strong and supportive school principal can create a school environment that encourages the exploration of new ideas and fosters creativity among teachers.

The presence of effective school leadership can foster a positive school climate, providing a strong foundation for teachers to cultivate their creative ideas. A positive, inclusive, and collaborative school environment can create a conducive atmosphere for the development of teachers' creativity. A positive school climate is characterized by a friendly workplace where individuals feel safe, valued, accepted, and experience honesty, transparency, self-confidence, recognition, a sense of belonging, and opportunities to be heard (Hildayati, 2024). The better the school climate, the more effectively teachers can enhance their creativity.

Science literacy is essential for enhancing teachers' creativity in exploring and designing more creative learning experiences beyond science subjects. Science literacy, as a form of ability to apply scientific knowledge in identifying, making decisions, and drawing conclusions related to interactions with science, the environment, technology, and society (Nurjanah et al., 2017), can be developed by fostering a strong foundation in science literacy. This empowers educators to provide accurate and up-to-date knowledge to their students, thereby helping them enhance their understanding and creativity in science (Asiyah et al., 2024).

Based on the findings, a positive school principal leadership, a conducive school climate, and strong science literacy are essential for fostering teacher creativity in Madrasah Aliyah. Teachers play a pivotal role in determining the quality of education. The success of education largely depends on teachers' readiness to equip themselves with strong creative abilities to produce high-achieving students. There is a need for all teachers to genuinely strive for creativity to achieve optimal outcomes and performance. With strong science literacy, coupled with effective school principal leadership and a positive school climate, it is expected that teacher creativity will be significantly enhanced.

The research findings indicate that School Principal Leadership, School Climate, and Science Literacy have a combined positive influence on Teacher Creativity. The results of the t-test, as shown in Table 4.13, support this claim. The significance level of 0.000 is less than the alpha level of 0.05, leading us to accept the alternative hypothesis. Furthermore, the F-test results in Table 4.14 show that the calculated F-value (22.776) is significantly greater than the critical F-value (2.655). This confirms that the null hypothesis is rejected. Therefore, we can conclude that School Principal Leadership (X_1), School

Climate (X_2), and Science Literacy (X_3) collectively have a significant impact on Teacher Creativity (Y). In other words, these three variables together influence the creativity of teachers.

Conclusion

Based on the data analysis, description, hypothesis testing, and discussion, the following conclusions can be drawn: 1) There is a highly significant positive direct influence of school principal leadership on teacher creativity. With a calculated t-value of 4.605, which is greater than the critical t-value of 1.973, and a significance level of 0.000 (less than 0.05), it can be concluded that effective school principal leadership positively impacts teacher creativity. 2) There is a highly significant positive direct influence of school climate on teacher creativity. With a calculated t-value of 4.499, which is greater than the critical t-value of 1.973, and a significance level of 0.000 (less than 0.05), it can be concluded that a positive school climate positively impacts teacher creativity. 3) There is a highly significant positive direct influence of science literacy on teacher creativity. With a calculated t-value of 8.179, which is greater than the critical t-value of 1.973, and a significance level of 0.000 (less than 0.05), it can be concluded that science literacy positively impacts teacher creativity. 4) There is a highly significant positive simultaneous influence of school principal leadership, school climate, and science literacy on teacher creativity. With an F-calculated value of 22.776, which is greater than the F-critical value of 2.655, and a significance level of 0.000 (less than 0.05), it can be concluded that, taken together, these three variables have a positive impact on teacher creativity. Effective school principal leadership, a positive school climate, and a strong foundation in science literacy can collectively enhance teacher creativity. Strengthening the school climate is predicted to increase science literacy. A school with effective leadership that supports teachers' creative abilities, a positive school climate that encourages creativity and development, and a strong focus on science literacy can significantly enhance teachers' creative capacity.

References

Alqorni, R. A., Suhardi, E., & Retnowati, R. (2023). Increasing Teacher Creativity Through Strengthening Achievement Motivation And Information Literacy. *Jurnal Pendidikan*, *12*(April), 542–550.

Arifa, F. N. (2019). Peran Guru Dalam Pemulihan Pendidika Pasca Pandemi Dan Tantangan. *Jurnal Pendidikan*, *Vol. XII*(19), 13–18.

Asiyah, Febrini, D., Topano, A., Mustamin, A. A., & Hakim, M. A. R. (2024). Measuring the Impact of Islamic Values-Based Scientific Literacy on Scientific Competency of Madrasah Teachers. *International Journal of Learning, Teaching and Educational Research*, *23*(4), 476–496. https://doi.org/10.26803/ijlter.23.4.25

Bellibaş, M. Ş., Ryskulueva, F., Levin, J., & Pietsch, M. (2024). A safe space and leadership matter for innovation: Exploring the role of psychological safety in the relationship between transformational leadership and innovation radicalness in Kyrgyz classrooms. *Educational Management Administration and Leadership*, *1*(2), 1–23. https://doi.org/10.1177/17411432241264696.

Dasic, D., Kostadinovic, M. I., Vlajković, M., & Pavlović, M. (2024). Digital Literacy in the Service of Science and Scientific Knowledge. *International Journal of Cognitive Research in Science, Engineering and Education*, *12*(1), 219–227. https://doi.org/10.23947/2334-8496-2024-12-1-219-227.

Eriyanti, R. W., Cholily, Y. M., & Masduki, M. (2022). Meningkatkan Kreativitas Guru dalam Inovasi Pembelajaran Berbasis HOTS untuk Mengembangkan Berpikir Ktitis dan Kreatif Siswa. *To Maega : Jurnal Pengabdian Masyarakat*, *5*(3), 416. https://doi.org/10.35914/tomaega.v5i3.1176.

Hildayati. (2024). The Influence of Principal Instructional Leadership, School Climate, and Work Motivation on Teacher Professionalism in Public High Schools throughout Barito Kuala Regency. *EduLine: Journal of Education and Learning Innovation*, *4*(1), 53–67. https://doi.org/10.35877/454ri.eduline2377

Isma, A., Isma, A., Isma, A., & Isma, A. (2023). Peta Permasalahan Pendidikan Abad 21 di Indonesia. *Jurnal Pendidikan Terapan*, *01*(September), 11–28. https://doi.org/10.61255/jupiter.v1i3.153.

Jabbar & Hussein. (2020). *The role of leadership in strategic management*. *5*(August). https://doi.org/https://doi.org/10.5281/zenodo.583890 Abstract.

Jazuli, N., Sudarmiatin, S., & Wardana, W. (2023). International Education Trend issues. *International Education Trend Issues*, *1*(2), 58–65.

Leong, S. Y., & Said, H. (2023). Recruitment Challenges for International Schools in Malaysia. *Journal of Social Science (EJOSS*, *9*(1), 74–84. https://doi.org/https://doi.org/10.37134/ejoss.vol9.1.7.2023.

Mulawarman, W. G., & Srihandari, A. P. (2021). Manajemen Kepemimpinan Kepala Sekolah Perempuan: Analisis Model CIPP. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *7*(1), 1. https://doi.org/10.37905/aksara.7.1.1-14.2021.

Nurjanah dkk. (2017). Literasi Sains Dalam Pembelajaran Berbasis Masalah. *Jurnal Pena Ilmiah*, *2*(1), 581–590.

Permatasari, F., Lestari, N. A., Christie, C. D. Y., & Suhaimi, I. (2023). Kepemimpinan Transformasional Kepala Sekolah Dalam Meningkatkan Mutu Kinerja Guru: Studi Meta Analisis. *Indonesian Journal of Humanities and Social Sciences*, *4*(3).

Purawanto. (2019). *Kepemimpinan Pendidikan*. Yogyakarta: Interlude.

Rahmadhani, D., Yuliani, R. D., Arruan, A., & Mulawarman, W. G. (2024). *Peran Kepemimpinan Kepala Sekolah Terhadap Kompetensi Pedagogik Guru Penjasorkes : Studi Kasus Sekolah Menengah Pertama Di The Leadership Role Of The School Principal On The Pedagogical Competence Of*. *February*, 1–7.

Sovayunanto, R. (2022). Learning Loss Dan Faktor-Faktor Penyebab Di Sekolah Menengah Pertama (SMP). *Jurnal Mahasiswa BK An-Nur : Berbeda, Bermakna, Mulia*, *8*(1), 12. https://doi.org/10.31602/jmbkan.v8i1.6001.

Sudjana. (2005). *Metoda Statistika*. Bandung: PT. Tarsito.

Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: PT Alfabet.

Tumuheise, A., Ssempala, F., Rwends, F. T., & Nachuha, S. (2023). Factors affecting implementation of competence based curriculum in selected Secondary Schools of Kabale Municipality-Kabale District. *International Journal of Educational Policy Research and Review*, *10*(2), 94–105. https://doi.org/https://doi.org/10.15739/IJEPRR.23.008.