JMSP (Jurnal Manajemen dan Supervisi Pendidikan)
Volume 9 Nomor 1 Bulan November Tahun 2024

ISSN : 2541-4429 (Online)
: 2580-3417 (Print)
Available Online in http://journal2.um.ac.id/index.php/jmsp/

Education Transformation: The Impact of Digital Mindset on Chemistry Teacher Innovation

Ilmi Zakiah Amalia, Eliana Sari, Masduki Ahmad
Univeritas Negeri Jakarta
Jl. Rawamangun Muka, RT.11/RW.14, Pulo Gadung, Kota Jakarta Timur, Jakarta
Correspondence: ilmi_1111822001@mhs.unj.ac.id

Article received: July 2024, Revision: October 2024, Approval: November 2024

DOI: 10.17977/um025v9i12024p12

Abstract: This study aims to analyze the influence of a digital mindset on the innovative behavior of chemistry teachers. A digital mindset, which reflects teachers' readiness and ability to utilize digital technology, is a key factor in driving innovation in education. Innovation among chemistry teachers includes creativity in teaching methods, the use of technology in the classroom, and the application of teaching approaches relevant to 21st-century needs. The technique used is a quantitative survey. The sample of this study consists of 60 chemistry teachers. Data collection techniques use a Likert scale questionnaire with five response options: Always, Often, Sometimes, Rarely, and Never. Data analysis is performed using SEM with the help of the SmartPLS 3.0 program. The results of the study show a coefficient value of 0.862 with a p-value of 0.000 < 0.05 and a t-value of 32.794 > 1.96, indicating that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted, signifying a significant influence of digital mindset on teachers' innovative behavior. Teachers with a well-developed digital mindset are more likely to utilize digital tools, engage in ongoing professional development, and collaborate with their peers to share best practices. These behaviors lead to more effective and engaging teaching strategies, ultimately enhancing student understanding and motivation. Despite potential obstacles such as limited training and resources, fostering a digital mindset among chemistry teachers is crucial for advancing educational practices and improving the quality of learning experiences. Therefore, the digital mindset affects the innovative behavior of chemistry teachers. The implications of this study highlight the importance of training and strengthening the digital mindset among teachers to support educational transformation. Training programs focused on improving technological skills and understanding digital pedagogy should be prioritized to create innovative learning environments that adapt to evolving times.
Keywords: Digital Mindset, Innovative Behavior, Chemistry Teachers, Education Management

INTRODUCTION

In the rapidly developing 21st century, the field of education has undergone significant transformations that challenge educators worldwide. Emerging technologies, changing student demographics, and evolving learning needs have shaped a new educational landscape (Kemendikbudristek, 2022). One of the most influential challenges faced by educators today is harnessing the power of technology to enhance the learning experience (González-Pérez *et al*., 2022).

While technology provides ease in learning, it is not easy to integrate it effectively into the learning process. Teachers must be adept at using technology to engage and empower students while ensuring that students use technology appropriately. According to Law Number 14 of 2005 on Teachers and Lecturers, Article 10, paragraph (1), there are four competencies for teachers: pedagogical, personal, social, and professional competencies, which are acquired through professional education. Teacher competency is demonstrated through teacher performance, which is reflected in their behavior in teaching. One indicator of optimal teacher performance is innovative behavior. Innovative behavior is a process where individuals generate, create, develop, apply, promote, realize, and modify new ideas to improve organizational effectiveness and performance(Baskaran & Rajarathinam, 2018; Ramadhani *et al*., 2023). Innovative behavior is also defined as the enhancement of creativity by using an individual's problem-solving skills to develop and apply new ideas, strategies, products, and services (Choi *et al*., 2021). Innovative behavior has several factors. Some factors come from outside the individual: organizational values, management styles, job characteristics, and contextual influences. Additionally, internal factors include individual differences, motivation, organizational commitment, individual characteristics, and psychological capital (Ilmi & Gistituati, 2024; Oktaria *et al*., 2021). In education, teachers are crucial pillars in the educational organization, playing a role in ensuring the success and effectiveness of the education system. Therefore, teacher innovative behavior is essential to ensure that the education system remains relevant to current developments.

Indonesia is still relatively low in terms of innovation performance. According to the 2023 Global Innovation Index report published by the World Intellectual Property Organization (WIPO), Indonesia ranked 61st out of 132 countries with a total score of 30.3 (Dutta *et al*., 2023). The Global Innovation Index assessment indicators include human resources, institutions, technology, creative output, and the sophistication of markets and businesses. Indonesia managed to improve by 14 places in 2022, but its score across all indicators remains below the average for Southeast Asian, East Asian, and Oceanian countries. This data indicates the need to improve human resources in Indonesia, one of which is by enhancing teachers' innovative behavior.

Improving innovative behavior is important for all teachers, especially chemistry teachers, as chemistry has distinctive characteristics. Chemistry learning has meaningful characteristics when linked to three levels: macroscopic, submicroscopic, and symbolic (Luviani *et al*., 2021). Furthermore, meaningful chemistry learning can connect the content (material) to be delivered with the context (everyday phenomena) from the students' perspectives (Putica, 2022). Based on research conducted by Nurlaela (2019), chemistry remains a difficult subject for most secondary school students, who often fail to interpret chemical representations correctly. This is also due to the low innovative behavior of chemistry teacher.

Recent research by Lambriex-Schmitz *et al* (2020), proposes a new five-dimensional model that emphasizes the need for the stabilization or continuation phase as a critical stage for completing the innovative process. The dimensions of innovative behavior used in this study are from Lambriex-Schmitz et al (2020) which include opportunity exploration, idea creation, idea promotion, idea realization, and idea sustainability. The first dimension, opportunity exploration, involves addressing difficulties or considering alternative approaches (De Jong & Den Hartog, 2010). The second dimension, idea creation, relates to the teacher's belief in problem-solving and performance improvement, as teachers need to organize and classify their new ideas while overcoming job-related barriers. The third dimension, idea promotion, is where innovative ideas often conflict with prevailing perceptions within the organization. The fourth dimension, idea realization, indicates the teacher's perception of implementation into practice. The fifth dimension, idea sustainability, reflects the teacher's thoughts on integrating new ideas through the organization and spreading them on a larger scale. This stage is essential because it aims to adjust new concepts to contribute positively to society.

One of the efforts to improve innovative behavior in teachers is through a digital mindset. Digital mindset is based on the growth mindset approach and involves the transformational use of digital technology (Dweck, 2015; Yeager *et al*., 2022). The digital mindset plays a crucial role in today's technological transformation. It includes the use and transformational ability to enhance digital awareness. Understanding technology skills for learning is essential in 21st-century education, but it is not enough; teachers must also be motivated to use their skills to create new opportunities. A digital mindset will help both teachers and students address problems and challenges in education with practical, creative, innovative, and disruptive solutions (Krohn dan Jantos, 2022). 21st-century learning heavily relies on digital technology, so the education of the millennial generation is achieved through technological determinism. The education system is a teaching approach designed to adapt to learning styles and technological media, making it more familiar and aligned with the evolving culture (Zaluchu, 2020). Most education systems (especially government regulations, educators, and schools) strive to meet the demands of 21st-century learning by producing various digital education products (education digitalization). Therefore, what is needed is a digital mindset.

The dimensions of a digital mindset consist of abundance mindset, growth mindset, agile approach, comfort with ambiguity, explorer mind, collaborative approach, and embracing diversity (Chattopadhyay, 2017). Individuals with a digital mindset know how to use digital technology and understand the potential and benefits of using technology to enhance productivity, assist operations, and other aspects. Additionally, a digital mindset can create a culture of innovation and agility within an organization. By leveraging emerging technologies such as artificial intelligence, cloud computing, and the Internet of Things (IoT), the education sector can identify new opportunities, develop new products or services, and maintain a competitive edge in a rapidly changing market.

Integrating digital technology into teaching practices is becoming increasingly important in the fast-evolving educational landscape. This is particularly true for subjects like chemistry, where innovative teaching methods can significantly improve student understanding and engagement

(Sugiyo & Sunawan, 2024). However, the adoption of new technology in education is highly dependent on the mindset of educators themselves. Digital mindset refers to an individual's attitude and approach toward digital technology, which includes openness to new tools, adaptability, and willingness to integrate technology into their professional practices (Haley, 2023). A digital mindset can transform traditional teaching methods for chemistry teachers, allowing the use of simulations, interactive software, and virtual experiments to make complex concepts more accessible and engaging for students.

Despite the potential benefits, many educators still face challenges in adopting new technologies. These challenges may stem from a lack of self-confidence, inadequate training, or limited access to resources (De Rosa & Bogliolo, 2016). Therefore, fostering a digital mindset among chemistry teachers is crucial to overcoming these barriers and promoting innovative behavior. Innovative behavior in teaching involves the ability to create, adopt, and apply new ideas and methods to improve educational outcomes (Ningrum & Abdullah, 2021). For chemistry teachers, this could mean developing new teaching materials, experimenting with digital tools, or collaborating with peers to share best practices. Teachers who adopt a digital mindset are more likely to engage in innovative behavior that leads to more dynamic and effective teaching strategies.

Research indicates a positive correlation between a strong digital mindset and innovative teacher behavior (Gkontelos *et al*., 2022). Teachers who are open to exploring and integrating digital technology are more prepared to develop new teaching methodologies that can enhance the learning experience (Haley, 2023). Therefore, understanding and promoting digital mindset among chemistry teachers is essential to advancing educational practices and improving student learning outcomes in the digital era. Overall, the growing demands of modern education call for chemistry teachers to develop a digital mindset. By cultivating this mindset, educators can overcome existing challenges, adopt innovative teaching methods, and ultimately provide a more engaging and effective learning environment for their students.

METHOD

The method used in this study is a survey method with a quantitative approach. The survey method is a quantitative research method used to obtain data on characteristics and behaviors related to the relationship between variables from a sample (Sugiyono, 2014). This study has one independent variable, which is digital mindset (X), and one dependent variable, which is innovative behavior (Y). The subjects of this study are chemistry teachers. The sampling technique used in this research is saturated sampling, which is part of non-probability sampling. Saturated sampling involves taking samples from all members of the population. The sample in this study consists of 60 chemistry teachers from senior high schools in the Greater Jakarta area.

Data collection techniques used instruments in questionnaires developed based on conceptual definitions, operational definitions, and grids for each research variable. The data analysis technique used in this study was SEM (Structural Equation Modelling). The model employed in this research is causal modeling or relationship influence, also known as path analysis. To test the hypothesis proposed in this study, the model fit analysis technique used is Structural Equation Modelling (SEM), which operates using the SmartPLS 3.0 program.

RESULT AND DISCUSSION

RESULT

Descriptive Analysis of Respondent Characteristics

The descriptive characteristics of the respondents aim to describe the respondents based on gender, age, education level, years of service, and professional teacher education. The respondents in this study consisted of 60 teachers.

Table 1. Respondent Characteristics by Gender

Gender	Frequency	Percentage
Male	19	31,67%
Female	41	68,33%
Total	60	100,00%

Based on Table 1, it can be concluded that the majority of the respondents were female, with 41 respondents or 68.33% of the total respondents.

Table 2. Respondent Characteristics by Age

Age Range	Frequency	Percentage
20 − 29 years	46	76,67%
30 − 39 years	4	6,67%
40 − 49 years	3	5,00%
50 − 60 years	7	11,67%
Total	60	100,00%

Based on Table 2, it can be concluded that the majority of the respondents were aged 20–29 years, with 46 respondents or 76.67% of the total respondents.

Table 3. Respondent Characteristics by Education Level

Education Level	Frequency	Percentage
S1	49	81,67%
S2	11	18,33%
Total	60	100,00%

Based on Table 3, it can be concluded that the majority of respondents held a Bachelor's degree (S1), with 49 respondents or 81.67% of the total respondents**.**

Table 4. Respondent Characteristics by Teacher Certification

Teacher Certification	Frequency	Percentage
Not Certified	42	70%
Certified	18	30%
Total	60	100 %

Based on Table 4, it can be concluded that the majority of the respondents had not completed the Teacher Professional Education (PPG), with 42 respondents or 70% of the total respondents.

Validity Test

The validity test conducted was convergent validity, by examining the loading factor of each indicator. A criterion is considered valid if the loading factor value is > 0.7.

Table 5. Validity of Digital Mindset Variable (X)

Indicator	Loading Factor	Description	Indicator	Loading Factor	Description
AM1	0,898	Valid	CA1	0,794	Valid
AM2	0,862	Valid	CA2	0,806	Valid
AM3	0,725	Valid	CA3	0,870	Valid
AM4	0,878	Valid	CA4	0,893	Valid
AM5	0,754	Valid	CA5	0,758	Valid
AM6	0,909	Valid	CA6	0,741	Valid
AM7	0,920	Valid	CA7	0,737	Valid
AM8	0,920	Valid	CA8	0,796	Valid
AM9	0,877	Valid	EM1	0,885	Valid
AM10	0,796	Valid	EM2	0,903	Valid
GM1	0,782	Valid	EM3	0,824	Valid
GM2	0,805	Valid	COA1	0,847	Valid
GM3	0,926	Valid	COA2	0,886	Valid
GM4	0,909	Valid	COA3	0,843	Valid
AA1	0,847	Valid	COA4	0,846	Valid
AA2	0,854	Valid	COA5	0,844	Valid
AA3	0,900	Valid	ED1	0,867	Valid
AA4	0,792	Valid	ED2	0,877	Valid
AA5	0,858	Valid	ED3	0,749	Valid
AA6	0,864	Valid	ED4	0,797	Valid

Table 5 shows that all items or indicators in the digital mindset variable are valid as their loading factor values are greater than 0.7.

Table 6. Validity of Innovative Behavior Variable (Y)

Indicator	Loading Factor	Description	Indicator	Loading Factor	Description
OE1	0,829	Valid	IR1	0,779	Valid
OE2	0,837	Valid	IR2	0,823	Valid
OE3	0,869	Valid	IR3	0,823	Valid
OE4	0,824	Valid	IR4	0,819	Valid
OE5	0,815	Valid	IR5	0,790	Valid
IG1	0,876	Valid	IR6	0,881	Valid
IG2	0,831	Valid	IR7	0,797	Valid
IG3	0,895	Valid	IR8	0,736	Valid
IG4	0,852	Valid	ISE1	0,718	Valid
IG5	0,932	Valid	ISE2	0,747	Valid
IG6	0,815	Valid	ISE3	0,792	Valid
IG7	0,825	Valid	ISE4	0,786	Valid
IG8	0,842	Valid	ISE5	0,774	Valid
IP1	0,777	Valid	ISI1	0,758	Valid
IP2	0,832	Valid	ISI2	0,872	Valid
IP3	0,854	Valid	ISI3	0,747	Valid
IP4	0,824	Valid	ISI4	0,729	Valid
IP5	0,826	Valid	ISI5	0,729	Valid
			ISI6	0,842	Valid
			ISI7	0,813	Valid

Based on Table 6, all items or indicators in the innovative behavior variable are valid because their loading factor values are greater than 0.7.

Reliability Test

The reliability tests used were Cronbach's alpha and composite reliability tests, where a dimension or variable is considered reliable if Cronbach's alpha and composite reliability values are greater than 0.6.

Table 7. Reliability of Variables

Indicator/Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Abundance Mindset	0,959	0,966	0,965	0,734
Agile Approach	0,925	0,928	0,941	0,728
Collaborative Approach	0,907	0,907	0,930	0,728
Comfort with Ambiguity	0,920	0,924	0,935	0,642
Digital Mindset	0,982	0,983	0,983	0,588
Embracing Diversity	0,841	0,843	0,894	0,679
Explorer Mind	0,842	0,852	0,904	0,760
Growth Mindset	0,879	0,900	0,917	0,736
Idea Generation	0,949	0,950	0,958	0,739

Indicator/Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Idea Promotion	0,880	0,880	0,913	0,677
Idea Realization	0,923	0,928	0,937	0,651
Idea Sustainability	0,940	0,941	0,948	0,604
Opportunity Exploration	0,891	0,892	0,920	0,697
Innovative Behavior	0,977	0,978	0,978	0,544

Table 7 shows that all dimensions and variables for digital mindset and innovative behavior are reliable as their Cronbach's alpha and composite reliability values are greater than 0.6.

Inner Model Analysis

The inner model is a structural model used to predict the causal relationship between latent variables or variables that cannot be measured directly. The inner model can be evaluated by examining the Q2 value, which assesses its predictive relevance.

Table 8. Construct Cross-Validated Redundancy

	SSO	SSE	Q^2 (=1-SSE/SSO)
X_Digital Mindset	2400,000	2400,000	
Y_ Innovative Behavior	2280,000	1414,546	0,380

Table 9. Construct Cross-Validated Communality

	SSO	SSE	Q^2 (=1-SSE/SSO)
X_Digital Mindset	2400,000	1060,026	0,558
Y_ Innovative Behavior	2280,000	1122,309	0,508

Tables 8 and 9 show that the Q2 values are greater than zero. According to Ghozali (2014), the Q2 value can be used to measure how well the model and parameter estimates generate the observed values. A Q2 value greater than 0 indicates that the model is considered good, while a Q2 value less than 0 indicates that the model does not have predictive relevance. In this research model, the latent constructs have a Q2 value greater than 0, indicating that the model's predictions are considered relevant.

Hypothesis Testing

The hypothesis testing used is direct effect analysis to test the direct effect of the independent variable on the dependent variable. If the path coefficient value is positive, then the independent variable has a direct effect on the dependent variable, meaning that as the independent variable increases, the dependent variable also increases.

Table 10. Statistical T-Test Results

Variable	Coefficient	SE	T result	P result
Digital Mindset	0,862	0,026	32,794	0,000

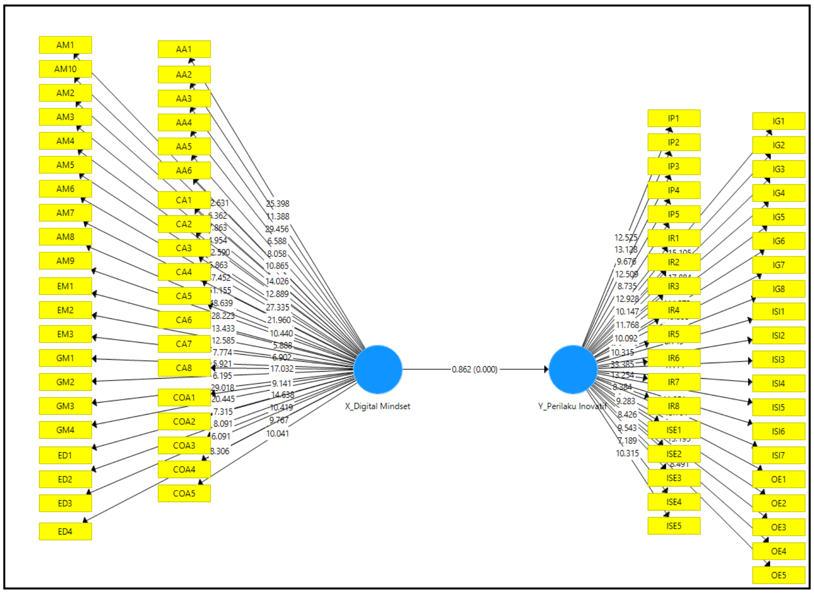

Figure 1. SEM PLS Model

H0: No significant effect of digital mindset on the innovative behavior of teachers.

Ha: There is a significant effect of digital mindset on the innovative behavior of teachers.

Testing criteria: Reject H0 and accept Ha if p-value < 0.05 or t-value > 1.96.

Based on Table 10, the coefficient value is 0.862 with a p-value of 0.000 < 0.05 and a t-value of 32.794 > 1.96, which means we reject H0 and accept Ha, concluding that digital mindset has a significant effect on the innovative behavior of teachers.

DISCUSSION

The discussion of the research findings attempts to link the results with relevant theories regarding digital mindset and innovative behavior. The hypothesis testing in this study shows that digital mindset has a positive direct effect on the innovative behavior of chemistry teachers. This is supported by research conducted by (Cementina, 2019), which found that teachers with a digital mindset not only know how to use digital technology but also understand the potential and benefits of using that technology to enhance productivity, support operations, and other aspects of classroom learning. Moreover, digital mindset influences creativity and innovative thinking in teachers (Krohn dan Jantos, 2022). By thinking outside the box, teachers can create better, faster, and more efficient solutions.

The relationship between digital mindset and innovative behavior in teachers has become an increasingly important focus in educational research. Digital mindset refers to an individual's perspective and attitude toward digital technology, including openness to new technology, adaptability, and the willingness to use technology in the learning process (Hasanah *et al*., 2023). Conversely, innovative behavior refers to the ability and willingness to create, adopt, and implement new ideas in teaching contexts to improve the effectiveness and efficiency of learning (Trapitsin *et al*., 2018).

Teachers with a strong digital mindset tend to adopt new technologies more quickly in the learning process, making more effective use of digital tools and platforms such as educational videos, online simulations, and interactive software. This mindset influences teachers' innovative behavior in several ways. First, the ability to adapt to technology makes teachers more proactive in exploring and applying new technologies in the classroom, which can lead to innovative teaching methods. Second, digital mindset encourages teacher engagement in collaboration and continuous learning through online communities, allowing teachers to share best practices and update their knowledge about the latest educational technologies. Third, teachers with this mindset are more motivated to innovate because they see technology as an opportunity to create more engaging, creative, and relevant learning experiences for students (Dasmo, 2022). This makes them significant agents of change in modern education.

This study shows a positive relationship between digital mindset and innovative behavior among teachers. Teachers with a digital mindset tend to utilize enhanced teaching tools such as virtual labs, educational software, and online resources, making learning more interactive and applicable. This not only increases teaching effectiveness but also provides a more practical learning experience for students (Widodo & Gustari, 2020). Additionally, the use of innovative technology contributes to increased student engagement and interest, especially in subjects like chemistry, thereby creating a more engaging and conducive learning environment (Li *et al*., 2015). Teachers with a digital mindset are also more actively involved in professional development focusing on technology integration, allowing them to continuously update their skills and knowledge to improve teaching quality (Bardach *et al*., 2024; He & Zhu, 2017). Thus, digital mindset plays an important role in driving innovation and sustainable development in education.

The findings of this study are reinforced by research conducted by Zainal & Matore (2019), which shows a positive correlation between digital mindset and innovative behavior in teachers. For instance, a study using survey methods and data analysis with Structural Equation Modeling (SEM) found that teachers with a high digital mindset tend to exhibit better innovative behavior in their teaching. The research findings often show significant coefficient values, indicating that an increase in digital mindset is related to an increase in innovative behavior.

To enhance digital mindset and encourage innovative behavior among chemistry teachers, several targeted strategies are needed. First, comprehensive training programs should be provided regularly, including in-depth training on the use of digital tools and resources in teaching so that teachers feel confident in applying technology in the classroom (Zhao *et al*., 2021). Second, institutional support is crucial, particularly in ensuring that schools provide adequate technological infrastructure, such as internet access, hardware, and educational software, and allow teachers the freedom to experiment and integrate new technologies without the fear of failure. Third, creating a culture of collaboration among peers so that teachers can share experiences, discuss challenges, and successes in the application of digital tools is vital (Ismiantari & Mulyana, 2021). Therefore, through these strategies, chemistry teachers can become more motivated to develop innovative teaching approaches that are relevant to the needs of students in the digital era.

Teachers who successfully integrate digital mindset with innovative behavior tend to see improved student outcomes (Forsythe & Rafoth, 2022). By utilizing interactive and visual tools, teachers help students understand complex chemistry concepts more easily and quickly, making abstract material more concrete and accessible. Additionally, interactive and modern teaching approaches increase student motivation and engagement, creating a more dynamic and enjoyable learning atmosphere (Komalasari *et al*., 2023). The use of technology also provides long-term benefits by preparing students for the future, where digital literacy will be a crucial skill in both academic and professional worlds (Astuti & Setiawan, 2023). Therefore, this integration not only improves learning outcomes but also equips students with relevant competencies to face the challenges of the times.

Analyzing the relationship between digital mindset and innovative behavior among chemistry teachers shows that building a digital mindset is crucial for the adoption of innovative teaching practices. Overcoming barriers through targeted training, institutional support, and a collaborative culture can lead to significant improvements in teaching effectiveness and student learning outcomes. As technology continues to evolve and reshape the educational landscape, empowering teachers with a digital mindset will be key to enhancing the quality and effectiveness of education.

CONCLUSION AND SUGGESTION

CONCLUSION

Based on the research conducted, the study results, hypothesis testing, and the discussion presented, the following conclusions can be drawn: There is a significant influence of digital mindset on the innovative behavior of chemistry teachers. This is evidenced by the hypothesis testing results showing a p-value of $0.000 < 0.05$ and a t-value of $32.794 > 1.96$, indicating the rejection of H0 and acceptance of Ha, which demonstrates a significant effect of digital mindset on the innovative behavior of teachers. Teachers with a strong digital mindset are more likely to adopt and integrate new technologies into their teaching practices, promoting innovative methods that enhance the learning experience. This includes the use of digital tools and platforms, participation in online learning communities, and continuous professional development. The study reveals a positive correlation between a high digital mindset and increased innovative behavior, suggesting that initiatives to cultivate a digital mindset among chemistry teachers can result in more effective and engaging educational practices.

SUGGESTION

This study can also evaluate the factors that hinder and support the adoption of technology in chemistry teaching, such as technological infrastructure, training, or school culture. Furthermore, further research could be conducted to examine how the transformation of teachers' digital mindsets affects long-term student learning outcomes, particularly in understanding complex chemistry concepts. This research can also provide practical recommendations to enhance teachers' innovation and digital skills by developing technology-based training models specifically designed for chemistry teachers. This study is important not only for identifying opportunities for educational transformation but also for preparing students to face an increasingly technology-driven workforce in the future.

REFERENCES

Astuti, K. L., & Setiawan, A. I. (2023). Fostering teacher's digital competencies and innovative work behavior in facing Merdeka Belajar policy: Digital informal learning as a mediator. *International Journal of Educational Research & Social Sciences*, *4*(2), 288–295.

Bardach, L., Bostwick, K. C. P., Fütterer, T., Kopatz, M., Hobbi, D. M., Klassen, R. M., & Pietschnig, J. (2024). A Meta-Analysis on Teachers' Growth Mindset. *Educational Psychology Review*, *36*(3), 84.

Baskaran, K., & Rajarathinam, M. (2018). Innovative Teaching Practices In Educational Institutions. *International Journal of Educational Sciences*, *20*(1–3), 72–76.

Cementina, S. (2019). Language Teachers' Digital Mindsets: Links between Everyday Use and Professional Use of Technology. *TESL Canada Journal*, *36*(3), 31–54.

Chattopadhyay, S. (2017). *Digital mindset: What is it all About*. https://www.peoplematters.in/article/employee-engagement/tips-re-engage-your-workforce-and-getting-back-growth-mode-12976

Choi, W.-S., Kang, S.-W., & Choi, S. B. (2021). Innovative Behavior in the Workplace: An Empirical Study of Moderated Mediation Model of Self-Efficacy, Perceived Organizational Support, and Leader-Member Exchange. *Behavioral Sciences (Basel, Switzerland)*, *11*(12). https://doi.org/10.3390/bs11120182

Dasmo. (2022). *Perilaku Inovatif Sebagai Pusat Pengembangan Profesional Guru Pada Era Digital*. Media Nusa Creative (MNC Publishing).

De Jong, J., & Den Hartog, D. (2010). Measuring Innovative Work Behaviour. *Creativity and Innovation Management*, *19*(1), 23–36.

De Rosa, R., & Bogliolo, A. (2016). Changing Mindset in School teachers. The Strange Case of the Italian national Plan for Digital School and the h-Mooc on Coding. *Edulearn16 Proceedings*, 4191–4199.

Dutta, S., Lanvin, B., Rivera León, L., & Wunsch-Vincent, S. (2023). *Global Innovation Index 2023: Innovation in the face of uncertainty*. WIPO.

Dweck, C. (2015). Carol Dweck Revisits the Growth Mindset. *Education Week*, *35*(5), 20–24.

Forsythe, J., & Rafoth, J. (2022). Being Digital: Why Addressing Culture and Creating a Digital Mindset are Critical to Successful Transformation. *INSIGHT*, *25*(1), 25–28.

Ghozali, I. (2014). SEM Metode Alternatif dengan Menggunakan Partial Least Squares (PLS). *Semarang: Badan Penerbit Universitas Diponegoro*.

Gkontelos, A., Vaiopoulou, J., & Stamovlasis, D. (2022). Teachers' innovative work behavior scale:

psychometric properties of the Greek version and measurement invariance across genders. *Social Sciences*, *11*(7), 306.

González-Pérez, Icela, L., Ramírez-Montoya, & Soledad, M. (2022). Components Of Education 4.0 In 21st Century Skills Frameworks: Systematic Review. *Sustainability*, *14*(3), 1493.

Haley, M. R. (2023). *How Do Digital Comfort and Digital Mindset Affect Teachers' Willingness to Integrate Technology into Their Classrooms?* The University of North Carolina at Greensboro.

Hasanah, E., Al Ghazy, M. I., Suyatno, S., Maryani, I., & Yusoff, M. Z. M. (2023). Unlocking Classroom Potential: Exploring the Mediating Role of Teacher Mindset on Embracing Differentiated Instruction. *International Journal of Learning, Teaching and Educational Research*, *22*(10), 433–452.

He, T., & Zhu, C. (2017). Digital informal learning among Chinese university students: the effects of digital competence and personal factors. *International Journal of Educational Technology in Higher Education*, *14*, 1–19.

Ilmi, F., & Gistituati, N. (2024). PERILAKU INOVATIF GURU DALAM PEMBELAJARAN DI SMK NEGERI KOTA PADANG. *Journal of Practice Learning and Educational Development*, *4*(1), 7–11.

Ismiantari, F. D., & Mulyana, O. P. (2021). Perbedaan perilaku kerja inovatif pada guru ditinjau dari karakteristik sekolah. *Jurnal Penelitian Psikologi*, *8*(6), 1–12.

Kemendikbudristek. (2022). *Pembelajaran Abad 21 - Cerdas Berkarakter*. https://cerdasberkarakter.kemdikbud.go.id/sahabatkarakter/kegiatan/93212a18-7b1e-4f4e-9919-51129308a785.pdf

Komalasari, D., Febriantina, S., & Adha, M. A. (2023). Perilaku Kerja Inovatif Guru SMK Negeri Di Jakarta Pusat. *Seroja: Jurnal Pendidikan*, *2*(3), 182–194.

Krohn, M., & Jantos, A. (2022). *Digital Mindset as the Most Important Prerequisite for Learning and Teaching in the Future*. *2*(2), 1–5. https://api.semanticscholar.org/CorpusID:255300447

Lambriex-Schmitz, P., Van der Klink, M. R., Beausaert, S., Bijker, M., & Segers, M. (2020). Towards Successful Innovations In Education: Development and Validation Of A Multi-Dimensional Innovative Work Behaviour Instrument. *Vocations and Learning*, *13*, 313–340.

Lambriex-Schmitz, P., Van der Klink, M. R., Beausaert, S., Bijker, M., & Segers, M. (2020). When innovation in education works: stimulating teachers' innovative work behaviour. *International Journal of Training and Development*, *24*(2), 118–134.

Li, L., Worch, E., Zhou, Y., & Aguiton, R. (2015). How and why digital generation teachers use technology in the classroom: An explanatory sequential mixed methods study. *International Journal for the Scholarship of Teaching and Learning*, *9*(2), 9.

Luviani, S. D., Mulyani, S., & Widhiyanti, T. (2021). A review of three levels of chemical representation until 2020. *Journal of Physics: Conference Series*, *1806*(1), 12206.

Ningrum, W. R., & Abdullah, S. M. (2021). Tinjauan literatur: Perilaku inovatif pada guru. *Mempersiapkan Generasi Digital Yang Berwatak Sociopreneur: Kreatif, Inisiatif, Dan Peduli Di Era Society 5.0*.

Nurlaela, E. U. (2019). "Chemistry Stortell" Inovasi Literasi Pembelajaran Kimia. *Prosiding SNPS (Seminar Nasional Pendidikan Sains)*, 143–151.

Oktaria, A., Sari, A. P., & Praningrum, P. (2021). Creative self-efficacy memediasi pengaruh kepribadian proaktif terhadap perilaku kerja inovatif guru. *Jurnal Inspirasi Bisnis Dan Manajemen*, *5*(1), 13–26.

Putica, K. (2022). Development of conceptual understanding of physical and chemical changes at the macroscopic, submicroscopic and symbolic level: A cross-age study. *Croatian Journal of Education*, *24*(1), 161–188.

Ramadhani, L., Hasmayni, B., & Khairuddin, K. (2023). Hubungan Antara Komitmen Organisasi Dengan Perilaku Inovatif Pada Guru. *Jurnal Social Library*, *3*(1), 30–36.

Sugiyo, S., & Sunawan, S. (2024). The Effect of Readiness for Change and Digital Mindset on School Counselors' Intention to use Technology through Digital Competence. *Jurnal Bimbingan Konseling*, 104–112.

Sugiyono. (2014). *Metode Penelitian Pendidikan Pendakatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Trapitsin, S., Granichin, O., Granichina, O., & Zharova, M. (2018). Innovative behavior of teachers: Definition and analysis. *European Proceedings of Social and Behavioural Sciences*, *51*.

Widodo, W., & Gustari, I. (2020). Teachers' innovative behavior in Indonesian school: The role of knowledge management, creativity, and OCB. *Universal Journal of Educational Research*, *8*(10), 4784–4791.

Yeager, D. S., Carroll, J. M., Buontempo, J., Cimpian, A., Woody, S., Crosnoe, R., Muller, C., Murray, J., Mhatre, P., & Kersting, N. (2022). Teacher mindsets help explain where a growth-mindset intervention does and doesn't work. *Psychological Science, 33*(1), 18–32.

Zainal, M. A., & Matore, M. E. E. M. (2019). Factors influencing teachers' innovative behaviour: A systematic review. *Creative Education*, *10*(12), 2869.

Zaluchu, S. (2020). The Digital Mindset as An Approach to Education For the Millenial Generation. *Proceedings of the 1st International Conference of Global Education and Society Science, ICOGESS 2019, 14 March, Medan, North Sumatera, Indonesia*. https://eudl.eu/pdf/10.4108/eai.14-3-2019.2292036

Zhao, Y., Llorente, A. M. P., & Gómez, M. C. S. (2021). Digital competence in higher education research: A systematic literature review. *Computers & Education*, *168*, 104212.