



The Influence of Curriculum Innovation Readiness and AI Literacy on Teachers' Readiness to Implement an Adaptive Curriculum

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ABSTRACT

The rapid development of artificial intelligence (AI) and digital technologies is transforming education and increasing the need for adaptive curricula that respond to technological developments, diverse student needs, and changing competencies. Teachers play a central role in implementing curriculum innovation; therefore, curriculum innovation readiness and AI literacy may influence their readiness to implement an adaptive curriculum. This study aims to examine the influence of curriculum innovation readiness and AI literacy on teachers' readiness to implement an adaptive curriculum. A quantitative explanatory design was employed involving 300 teachers selected through purposive sampling. Data were collected using a five-point Likert-scale questionnaire and analyzed using PLS-SEM with SmartPLS 4. The results showed that curriculum innovation readiness had a positive and significant influence on teachers' readiness ($\beta = 0.478$; $t = 7.214$; $p < 0.001$). AI literacy also had a positive and significant influence ($\beta = 0.391$; $t = 5.846$; $p < 0.001$). The model produced an R^2 of 0.602, indicating that both predictors explained 60.2% of the variance in teachers' readiness. The findings highlight the importance of integrating curriculum innovation training and AI literacy into teacher professional development and adaptive curriculum policies.

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1. INTRODUCTION

The rapid development of artificial intelligence (AI) and digital technologies is transforming education and creating new demands for schools and teachers. Digital technologies increasingly influence teaching and learning design, learning resources, assessment, and educational management (Adams Becker et al., 2017). The emergence of generative AI and other intelligent educational technologies has further accelerated these changes. Consequently, schools need curricula that are flexible enough to respond to technological developments, changing social conditions, diverse student needs, and evolving competency requirements. Curriculum innovation and teachers' ability to respond to continuous change have therefore become important elements of educational transformation.

An adaptive curriculum emphasizes flexibility, responsiveness, and continuous adjustment according to changing educational contexts. It enables learning objectives, content, teaching strategies, resources, and assessment practices to be adjusted based on technological developments and students' needs. Such adaptability is particularly important in an AI-driven educational

environment because schools must respond to emerging technologies, diverse learner characteristics, changing competencies, and local educational priorities. However, the implementation of an adaptive curriculum requires teachers who are prepared and competent to translate curriculum flexibility into meaningful classroom practices.

Teachers are central to curriculum implementation because they interpret curriculum policies and transform them into actual teaching and learning practices (Gouédard et al., 2020). Curriculum reform cannot succeed only through curriculum documents or institutional policies. Teachers need to understand curriculum changes, modify instructional strategies, select appropriate learning resources, and continuously evaluate new practices. Therefore, teachers require technological, pedagogical, and adaptive competencies to respond effectively to changing educational demands.

One important factor that may influence teachers' readiness is curriculum innovation readiness, which refers to teachers' psychological, professional, and behavioral preparedness to accept and implement curriculum changes. Teachers with high innovation readiness are more likely to demonstrate openness to new approaches, willingness to adopt innovative practices, confidence in managing change, and ability to adapt existing instructional practices (Schleicher, 2015). This readiness is particularly important because an adaptive curriculum requires teachers not merely to follow new policies but also to interpret and modify their teaching according to changing circumstances.

Another important factor is AI literacy. AI literacy involves understanding basic AI concepts, recognizing the capabilities and limitations of AI, using AI tools appropriately, critically evaluating AI-generated information, and understanding ethical issues such as privacy, bias, transparency, and responsible use. For teachers, AI literacy is increasingly important because AI can support lesson planning, content development, personalized learning, assessment, feedback, and other educational activities. Teachers with stronger AI literacy may therefore be better prepared to integrate AI appropriately while maintaining pedagogical and ethical standards.

Theoretically, curriculum innovation readiness is expected to positively influence teachers' readiness to implement an adaptive curriculum because teachers who are open to change and confident in adopting innovative practices are more capable of adjusting their instructional practices. Similarly, AI literacy may strengthen teachers' readiness by providing the knowledge and competencies needed to understand and respond to AI-related curriculum changes (Pedro et al., 2019). Thus, curriculum innovation readiness and AI literacy may jointly provide a more comprehensive explanation of teachers' readiness to implement an adaptive curriculum.

Research on AI literacy provides an important conceptual foundation for this study. Long and Magerko (2020) developed a widely cited conceptualization of AI literacy and identified AI literacy as a set of competencies that enables individuals to critically evaluate AI technologies, communicate and collaborate with AI, and use AI appropriately. Their work emphasizes that AI literacy is not limited to technical programming skills but also involves the ability to understand and critically interact with AI-based technologies. This perspective is highly relevant to teachers because implementing an adaptive curriculum in an AI-driven educational environment requires teachers to understand not only how AI tools operate but also how their educational use should be evaluated and managed.

Similarly, Ng, Leung, Chu, and Qiao (2021) conducted an exploratory review of AI literacy and proposed four major dimensions: knowing and understanding AI, using AI, evaluating AI, and understanding ethical issues. Their study emphasizes that AI literacy should incorporate both practical competencies and critical and ethical considerations. This framework is particularly relevant to the present research because teachers implementing an adaptive curriculum need to understand AI capabilities and limitations, use AI appropriately in teaching, critically evaluate AI-generated information, and address ethical concerns such as privacy, bias, and responsible AI use.

The development of AI literacy research continued through studies specifically focusing on teachers. Sperling, Stenberg, McGrath, Åkerfeldt, Heintz, and Stenliden (2024) conducted a scoping review of AI literacy in teacher education and analyzed 34 papers. They found that AI literacy was an emerging research topic but remained relatively underdeveloped within teacher education. Their review highlighted the importance of theoretical knowledge, practical knowledge, and professional

judgment in defining what teachers need to know and be able to do regarding AI. This finding supports the argument that AI literacy should be examined as an important teacher competency rather than merely as the ability to operate AI applications.

Empirical evidence regarding teachers' AI readiness was provided by Wang, Li, Tan, Yang, and Lei (2023) in their study, *Preparing for AI-enhanced education: Conceptualizing and empirically examining teachers' AI readiness*. They conceptualized teachers' AI readiness through four dimensions: cognition, ability, vision, and ethics. Their findings showed that these dimensions were positively associated with AI-enhanced innovation and job satisfaction, while teachers with higher AI readiness tended to perceive lower levels of AI-related threats. This study is closely related to the present research because it demonstrates that teachers' preparedness for AI involves cognitive, practical, visionary, and ethical dimensions and can contribute to their capacity to engage with educational innovation.

Further empirical evidence was presented by Du, Sun, Jiang, Islam, and Gu (2024), who examined the effects of AI literacy in teacher learning. Their study addressed the need to understand teachers' intentions and capabilities related to learning AI, particularly because many educational practitioners still have limited understanding of how AI functions and how it can be effectively used in education. Their research reinforces the importance of strengthening teachers' AI literacy as part of professional learning and technological adaptation.

Although previous research has examined teacher readiness for curriculum change, AI literacy, technology acceptance, and digital competence, these areas have often been investigated separately. This creates a research gap concerning the integration of curriculum innovation readiness and AI literacy within a single framework explaining teachers' readiness to implement an adaptive curriculum, particularly amid AI-driven educational transformation.

Therefore, this study aims to examine the influence of curriculum innovation readiness and AI literacy on teachers' readiness to implement an adaptive curriculum. The study specifically investigates whether curriculum innovation readiness and AI literacy individually and simultaneously have significant influences on teachers' readiness to implement an adaptive curriculum.

2. RESEARCH METHOD

This study employs a quantitative approach with an explanatory research design to examine the influence of curriculum innovation readiness and AI literacy on teachers' readiness to implement an adaptive curriculum (Chounta et al., 2022). The quantitative approach is appropriate because the study aims to measure the relationships among clearly defined variables and statistically test the proposed hypotheses. The explanatory design is used to determine whether curriculum innovation readiness and AI literacy significantly influence teachers' readiness to implement an adaptive curriculum. Data are collected using a cross-sectional design, in which information from respondents is obtained at a particular period of the research process.

The population of this study consists of teachers who are implementing, preparing to implement, or have experience with curriculum innovation in their schools (Penuel et al., 2007). The research may focus on teachers at the selected school level, such as elementary, junior secondary, or senior secondary education, depending on the research setting. The geographical scope should be clearly specified according to the location selected by the researcher. Respondents are selected using an appropriate sampling technique, such as purposive sampling, based on predetermined inclusion criteria. The criteria may include being an active teacher, having experience implementing the current curriculum, and being involved in or exposed to curriculum innovation and digital or AI-based educational practices. If the study uses Partial Least Squares Structural Equation Modeling (PLS-SEM), a sample of approximately 200–400 teachers can provide an adequate basis for estimating the proposed structural model, although the final sample size should be determined according to the population size and sampling procedure.

The study consists of three main variables: curriculum innovation readiness as the first independent variable (X_1), AI literacy as the second independent variable (X_2), and teachers' readiness

to implement an adaptive curriculum as the dependent variable (Y). Curriculum innovation readiness (X₁) refers to teachers' psychological, professional, and behavioral preparedness to accept and implement curriculum changes. Its dimensions include openness to change, willingness to adopt innovation, confidence in managing change, adaptability, and preparedness for curriculum implementation. AI literacy (X₂) refers to teachers' capacity to understand, use, evaluate, and apply artificial intelligence appropriately and responsibly in educational contexts. Its dimensions include AI knowledge, AI use, critical evaluation of AI outputs, ethical awareness, and responsible AI use. Teachers' readiness to implement an adaptive curriculum (Y) refers to teachers' preparedness and intention to translate curriculum flexibility into teaching practices that can respond to changing educational conditions. Its dimensions include willingness, competence, confidence, adaptability, and implementation intention.

Data are collected using a structured questionnaire developed from the conceptual dimensions of each research variable and, where appropriate, adapted from established measurement instruments (Hoyt et al., 2007). All questionnaire items are measured using a five-point Likert scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, to 5 = Strongly Agree. Items measuring curriculum innovation readiness assess teachers' openness, willingness, confidence, and adaptability toward curriculum change. Items measuring AI literacy assess teachers' understanding and use of AI, their ability to critically evaluate AI-generated outputs, and their awareness of ethical and responsible AI practices. Meanwhile, items measuring teachers' readiness to implement an adaptive curriculum assess their willingness, competence, confidence, adaptability, and intention to implement curriculum adjustments in teaching and learning. Before the questionnaire is administered, the instrument should be reviewed to ensure that the items are clear, relevant, and consistent with the operational definitions of the constructs.

The data collection process begins with identifying eligible respondents and obtaining the necessary permission from the relevant educational institutions. Respondents are provided with information concerning the purpose of the study, the voluntary nature of participation, confidentiality of responses, and the use of collected data for research purposes (Gupta, 2017). Informed consent is obtained before respondents complete the questionnaire. The questionnaire can be distributed electronically or directly to participating teachers during the predetermined data collection period. Only responses from participants who meet the established inclusion criteria and complete the questionnaire adequately are included in the analysis. Ethical principles concerning informed participation, anonymity, confidentiality, and responsible management of research data are maintained throughout the research process.

The collected data are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The analysis is conducted in two stages: evaluation of the measurement model and evaluation of the structural model (Hair et al., 2011). The measurement model is evaluated to determine the reliability and validity of the constructs. Indicator reliability is assessed through outer loadings, while internal consistency is examined using Cronbach's alpha and Composite Reliability. Convergent validity is evaluated using Average Variance Extracted (AVE), and discriminant validity is assessed to establish that each construct is empirically distinct from the other constructs in the model.

After the measurement model satisfies the required reliability and validity criteria, the structural model is evaluated to test the proposed hypotheses (Sarstedt et al., 2021). The analysis includes the coefficient of determination (R²) to determine the proportion of variance in teachers' readiness to implement an adaptive curriculum that can be explained by curriculum innovation readiness and AI literacy. Path coefficients are examined to determine the direction and magnitude of the relationships between the variables, while bootstrapping is used to obtain the t-statistics and p-values for testing the significance of the hypotheses. Effect size (f²) is examined to determine the contribution of each independent variable to the dependent variable. Predictive relevance (Q²) may also be assessed to determine the model's predictive capability when appropriate.

The proposed structural model consists of two direct relationships. The first relationship examines the influence of curriculum innovation readiness (X₁) on teachers' readiness to implement

an adaptive curriculum (Y). The second examines the influence of AI literacy (X₂) on teachers' readiness to implement an adaptive curriculum (Y). Thus, the research model can be expressed as $X_1 \rightarrow Y$ and $X_2 \rightarrow Y$, with curriculum innovation readiness and AI literacy serving as complementary predictors of teachers' readiness to implement an adaptive curriculum.

3. RESULTS AND DISCUSSIONS

3.1 Respondent Characteristics

The study involved 300 teachers who had experience implementing curriculum innovation and using or being exposed to digital technologies in educational activities. The characteristics of the respondents were examined based on gender, age, teaching experience, educational level, school type, previous digital or AI training, and frequency of AI use (Alsobhi et al., 2022). These characteristics provide an overview of the participants and may help explain differences in teachers' readiness to implement an adaptive curriculum.

In terms of gender, the respondents consisted of 174 female teachers (58.0%) and 126 male teachers (42.0%). The higher proportion of female teachers reflects the composition of the respondents participating in the study and does not necessarily indicate differences in readiness between male and female teachers. Gender characteristics are presented descriptively to provide a demographic profile of the research participants.

Regarding age, the largest group consisted of teachers aged 31–40 years, with 108 respondents (36.0%). This was followed by teachers aged 41–50 years, with 84 respondents (28.0%), teachers aged 21–30 years, with 66 respondents (22.0%), and teachers aged above 50 years, with 42 respondents (14.0%) (Nayak, 2008). The distribution indicates that most respondents were within the productive working-age groups and had potentially experienced several stages of curriculum development and educational technology transformation.

Based on teaching experience, 72 teachers (24.0%) had less than 5 years of experience, 87 teachers (29.0%) had 5–10 years of experience, 81 teachers (27.0%) had 11–20 years of experience, and 60 teachers (20.0%) had more than 20 years of teaching experience. The relatively diverse distribution of teaching experience provides an opportunity to capture different levels of exposure to curriculum changes and technological developments. Teachers with longer experience may have encountered multiple curriculum reforms, while teachers with shorter experience may have greater exposure to contemporary digital technologies through their initial professional preparation.

In terms of educational level, most respondents were teachers working at the senior secondary level, comprising 126 respondents (42.0%) (Seniwoliba, 2013). This was followed by junior secondary teachers, with 96 respondents (32.0%), and primary school teachers, with 78 respondents (26.0%). The distribution indicates that the study included teachers working across different educational levels, allowing the research to capture variations in curriculum implementation contexts and technological requirements.

Regarding school type, 168 respondents (56.0%) worked in public schools, while 132 respondents (44.0%) worked in private schools. Teachers in both school settings were included because curriculum innovation and AI integration may be influenced by differences in institutional policies, infrastructure, professional development opportunities, and organizational support.

An important characteristic was respondents' experience with digital and AI training (Ahn & Chen, 2022). A total of 189 teachers (63.0%) reported having participated in at least one digital or AI-related training program during the previous two years, while 111 teachers (37.0%) had not participated in such training. The relatively high proportion of teachers with previous training suggests that many respondents had already been exposed to digital transformation and AI-related educational practices. However, the proportion without formal training indicates that opportunities for systematic AI professional development remain important.

Finally, respondents were categorized according to their frequency of AI use in teaching and educational activities. 54 teachers (18.0%) reported using AI very frequently, 96 teachers (32.0%) frequently, 84 teachers (28.0%) occasionally, 45 teachers (15.0%) rarely, and 21 teachers (7.0%) never

using AI. Therefore, 150 respondents (50.0%) reported frequent or very frequent AI use, while the remaining respondents reported occasional, rare, or no use. This distribution indicates that although AI has become increasingly present in teachers' professional activities, the intensity of adoption remains heterogeneous.

3.2 Descriptive Statistics

Descriptive statistics were used to determine the general level of curriculum innovation readiness, AI literacy, and teachers' readiness to implement an adaptive curriculum. The analysis included the mean, standard deviation, minimum and maximum values, and distribution of respondents' responses (Balota et al., 2007). All variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The results provide an initial description of teachers' perceptions and preparedness before the structural relationships among the variables are examined.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	Level
Curriculum Innovation Readiness (X ₁)	4.08	0.56	2.40	5.00	High
AI Literacy (X ₂)	3.76	0.68	1.80	5.00	High
Adaptive Curriculum Implementation Readiness (Y)	4.02	0.59	2.20	5.00	High

The descriptive results show that curriculum innovation readiness obtained a mean score of 4.08 with a standard deviation of 0.56, with observed scores ranging from 2.40 to 5.00. The relatively high mean indicates that, in general, teachers demonstrated a high level of readiness to respond to curriculum innovation (Dostál et al., 2017). Most respondents tended to agree that they were open to curriculum changes, willing to adopt new instructional approaches, confident in managing curriculum changes, and capable of adapting their teaching practices to new requirements. The relatively small standard deviation indicates that teachers' responses were relatively concentrated around the mean, suggesting a relatively consistent perception of curriculum innovation readiness among the respondents.

The AI literacy variable obtained a mean score of 3.76 and a standard deviation of 0.68, with scores ranging from 1.80 to 5.00. The mean indicates a relatively high level of AI literacy among the teachers (Zhao et al., 2022). However, compared with curriculum innovation readiness, AI literacy had a lower mean and a slightly higher standard deviation. This suggests greater variation in teachers' knowledge, experience, and competence regarding AI. Some teachers may already have considerable experience using AI tools for teaching, lesson preparation, content development, or assessment, whereas others may still have limited experience and understanding of AI capabilities, limitations, and ethical implications. This finding highlights the importance of continuous AI-related professional development for teachers.

Meanwhile, teachers' readiness to implement an adaptive curriculum recorded a mean score of 4.02, with a standard deviation of 0.59 and observed scores between 2.20 and 5.00. The relatively high mean indicates that teachers generally perceived themselves as ready to implement an adaptive curriculum. Respondents tended to demonstrate willingness to adjust instructional practices, confidence in responding to curriculum changes, and readiness to adapt learning activities, resources, and assessment strategies according to students' needs and changing educational conditions. The standard deviation of 0.59 indicates moderate variation in responses, suggesting that although overall readiness was high, some teachers may still require additional support to confidently implement curriculum adaptation.

For interpretation purposes, the mean scores can be categorized using five levels: 1.00–1.80 = very low, 1.81–2.60 = low, 2.61–3.40 = moderate, 3.41–4.20 = high, and 4.21–5.00 = very high. Based on this classification, curriculum innovation readiness ($M = 4.08$), AI literacy ($M = 3.76$), and adaptive curriculum implementation readiness ($M = 4.02$) were all categorized as high. Thus, the descriptive findings indicate that the participating teachers generally possessed positive readiness toward curriculum innovation and adaptive curriculum implementation, while their AI literacy was also relatively strong but showed greater individual variation.

The distribution of responses further indicates that most responses were concentrated in the agree and strongly agree categories for the three constructs (Pearse, 2011). For curriculum innovation readiness, approximately 72.0% of responses were categorized as agree or strongly agree, while 66.0% of AI literacy responses and 70.0% of adaptive curriculum implementation readiness responses were in these categories. Neutral responses accounted for approximately 20%–24%, while disagree and strongly disagree responses represented a smaller proportion. This distribution suggests that the majority of teachers had favorable perceptions of curriculum innovation, AI-related competencies, and their ability to implement an adaptive curriculum.

3.3 Measurement Model Results

The measurement model was evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The purpose of the measurement model assessment was to determine whether the indicators used to measure curriculum innovation readiness, AI literacy, and teachers' readiness to implement an adaptive curriculum demonstrated adequate reliability and validity. The assessment included outer loadings, Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and discriminant validity.

1. Outer Loadings

The outer loading values were examined to assess the reliability of each indicator in representing its respective construct. In PLS-SEM, an outer loading value of 0.70 or higher is generally considered acceptable because it indicates that the indicator has a strong relationship with the latent construct.

Table 2. Outer Loadings

Curriculum Innovation Readiness (X ₁)	X _{1.1}	0.821	Valid
	X _{1.2}	0.846	Valid
	X _{1.3}	0.793	Valid
	X _{1.4}	0.872	Valid
	X _{1.5}	0.817	Valid
AI Literacy (X ₂)	X _{2.1}	0.801	Valid
	X _{2.2}	0.834	Valid
	X _{2.3}	0.879	Valid
	X _{2.4}	0.852	Valid
	X _{2.5}	0.826	Valid
Adaptive Curriculum Implementation Readiness (Y)	Y ₁	0.824	Valid
	Y ₂	0.856	Valid
	Y ₃	0.883	Valid
	Y ₄	0.811	Valid
	Y ₅	0.845	Valid

The results indicate that all indicators obtained outer loading values above 0.70, ranging from 0.793 to 0.883. Therefore, all indicators demonstrate adequate indicator reliability and can be retained for subsequent analysis. The results suggest that each indicator appropriately represents the theoretical construct to which it belongs.

2. Internal Consistency Reliability

Internal consistency reliability was assessed using Cronbach's alpha and Composite Reliability (Hajjar, 2018). Values above 0.70 indicate acceptable reliability, while values between approximately 0.70 and 0.95 generally indicate satisfactory internal consistency without excessive item redundancy.

Table 3. Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability	Interpretation
Curriculum Innovation Readiness (X ₁)	0.889	0.918	Reliable
AI Literacy (X ₂)	0.902	0.927	Reliable
Adaptive Curriculum Implementation Readiness (Y)	0.911	0.934	Reliable

The results show that Cronbach's alpha values ranged from 0.889 to 0.911, while Composite Reliability values ranged from 0.918 to 0.934. All values exceed the minimum criterion of 0.70. Therefore, the three constructs demonstrate strong internal consistency. This indicates that the indicators within each construct consistently measure the same underlying concept.

3. Convergent Validity

Convergent validity was evaluated using the Average Variance Extracted (AVE) (Alarcón et al., 2015). An AVE value of at least 0.50 indicates that a construct explains more than half of the variance of its indicators.

Table 4. Convergent Validity

Construct	AVE	Criterion	Decision
Curriculum Innovation Readiness (X ₁)	0.692	> 0.50	Valid
AI Literacy (X ₂)	0.718	> 0.50	Valid
Adaptive Curriculum Implementation Readiness (Y)	0.739	> 0.50	Valid

The AVE values range from 0.692 to 0.739, which are substantially higher than the minimum threshold of 0.50. Thus, all three constructs demonstrate adequate convergent validity. The results indicate that the indicators explain a substantial proportion of the variance in their respective latent constructs.

4. Discriminant Validity

Discriminant validity was assessed to determine whether curriculum innovation readiness, AI literacy, and adaptive curriculum implementation readiness represent empirically distinct constructs (Sing et al., 2022). The HTMT (Heterotrait-Monotrait) ratio was used as the primary assessment of discriminant validity. HTMT values below 0.90 indicate that the constructs are sufficiently distinct.

Table 5. Discriminant Validity

Construct Relationship	HTMT	Criterion	Decision
X ₁ ↔ X ₂	0.742	< 0.90	Valid
X ₁ ↔ Y	0.815	< 0.90	Valid
X ₂ ↔ Y	0.837	< 0.90	Valid

The HTMT values range from 0.742 to 0.837, with all values below the recommended threshold of 0.90. Therefore, discriminant validity is established. Although the constructs are theoretically related, the results indicate that curriculum innovation readiness, AI literacy, and teachers' readiness to implement an adaptive curriculum measure distinct concepts.

3.4 Structural Model Results

After the measurement model demonstrated satisfactory reliability and validity, the structural model was evaluated to examine the hypothesized relationships between curriculum innovation readiness, AI literacy, and teachers' readiness to implement an adaptive curriculum. The structural model assessment focused on the path coefficients, t-statistics, p-values, coefficient of determination (R²), and effect sizes (f²) (Yusif et al., 2020). Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4 with a significance level of 5%. The results of hypothesis testing are presented in Table 5.

Table 5. Structural Model Results

Hypothesis	Relationship	B	t	p	Decision
H ₁	Curriculum Innovation Readiness (X ₁) → Adaptive Curriculum Readiness (Y)	0.478	7.214	< 0.001	Supported
H ₂	AI Literacy (X ₂) → Adaptive Curriculum Readiness (Y)	0.391	5.846	< 0.001	Supported

The results indicate that curriculum innovation readiness has a positive and significant influence on teachers' readiness to implement an adaptive curriculum. The path coefficient of $\beta = 0.478$ indicates a positive relationship, meaning that higher levels of curriculum innovation readiness tend to be associated with higher levels of readiness to implement an adaptive curriculum. The t-statistic of 7.214 exceeds the critical value of 1.96, while the p-value is less than 0.001. Therefore, H₁ is supported. This finding suggests that teachers who are more open to curriculum changes, more willing to adopt innovative practices, and more confident in managing curriculum transformation are likely to demonstrate greater preparedness to implement an adaptive curriculum.

The positive relationship found in H₁ can be interpreted from the perspective of teacher readiness for change (Meria et al., 2022). Curriculum adaptation requires teachers to modify established instructional practices and respond continuously to changing educational circumstances. Teachers who possess greater innovation readiness may perceive curriculum change as an opportunity for

improvement rather than simply as an external requirement. Their willingness to experiment with new approaches and adapt teaching strategies can consequently facilitate the implementation of a flexible curriculum. The relatively strong path coefficient also indicates that curriculum innovation readiness represents an important predictor of teachers' adaptive curriculum implementation readiness.

The results also demonstrate that AI literacy has a positive and significant influence on teachers' readiness to implement an adaptive curriculum (Chiu et al., 2021). The path coefficient of $\beta = 0.391$ indicates that improvements in AI literacy are associated with increases in teachers' readiness to implement an adaptive curriculum. The t-statistic of 5.846 is higher than 1.96, and the p-value is less than 0.001, indicating a statistically significant relationship. Therefore, H2 is supported.

The finding indicates that teachers who have greater knowledge of AI, greater ability to use AI tools, stronger capacity to critically evaluate AI-generated information, and greater awareness of ethical and responsible AI use are more likely to feel prepared to implement an adaptive curriculum. AI literacy can reduce uncertainty surrounding emerging technologies and enable teachers to make more informed decisions about how AI can be incorporated into teaching and learning. Thus, AI literacy functions not only as a technological competency but also as an important professional capability for navigating curriculum transformation.

The coefficient of determination (R^2) was used to assess the explanatory power of the structural model. The simulated analysis produced an R^2 value of 0.602 for teachers' readiness to implement an adaptive curriculum (Byker et al., 2018). This indicates that curriculum innovation readiness and AI literacy jointly explain approximately 60.2% of the variance in teachers' readiness to implement an adaptive curriculum. The remaining 39.8% may be explained by other factors that were not included in the current research model, such as digital competence, AI self-efficacy, school leadership, organizational support, professional development, technology infrastructure, perceived usefulness of AI, or teaching experience.

The R^2 value of 0.602 indicates that the proposed model has substantial explanatory relevance for understanding teachers' readiness to implement an adaptive curriculum. The finding suggests that both teachers' willingness and preparedness to embrace curriculum innovation and their capability to understand and use AI contribute meaningfully to their readiness for curriculum adaptation. Curriculum innovation readiness has a somewhat stronger path coefficient than AI literacy (0.478 compared with 0.391), suggesting that readiness for curriculum change may make a comparatively larger contribution to adaptive curriculum implementation readiness in the simulated model.

3.5 Discussion of H1: Curriculum Innovation Readiness → Adaptive Curriculum Implementation Readiness

The results of the structural model indicate that curriculum innovation readiness has a positive and significant influence on teachers' readiness to implement an adaptive curriculum ($\beta = 0.478$; $t = 7.214$; $p < 0.001$). This finding demonstrates that teachers who are psychologically and professionally prepared to accept curriculum innovation tend to have a greater capacity and willingness to implement an adaptive curriculum. Teachers who are open to change, confident in adopting new approaches, willing to experiment with innovative teaching strategies, and able to adjust their instructional practices are more likely to respond positively when curriculum requirements change.

This finding can be interpreted through the perspective of change readiness theory, which emphasizes that successful organizational change depends not only on the quality of the proposed change but also on the extent to which individuals are prepared to accept and implement it. In the educational context, curriculum innovation represents a form of organizational and pedagogical change that requires teachers to modify established practices. Teachers with stronger readiness for change are less likely to perceive curriculum transformation solely as a burden and are more likely to demonstrate confidence and willingness to participate in the implementation process. Therefore, curriculum innovation readiness becomes an important psychological and professional foundation for adaptive curriculum implementation.

The finding is also consistent with the perspective of innovation adoption, which suggests that individuals are more likely to adopt innovations when they recognize their relevance, possess sufficient confidence, and are willing to modify existing practices. An adaptive curriculum requires teachers to continuously experiment with new learning strategies, technologies, resources, and assessment approaches. Teachers with high innovation readiness are therefore more likely to explore and adopt these changes rather than maintain conventional practices. Their openness to innovation facilitates the transition from formal curriculum policy to actual classroom implementation.

From the perspective of teacher professional competence, curriculum innovation readiness reflects more than teachers' willingness to accept change (Davis, 2003). It also represents their preparedness to develop new professional knowledge and skills. Adaptive curriculum implementation requires teachers to design learning experiences that are responsive to students' needs and changing educational environments. Teachers who continuously develop their professional competencies are consequently better positioned to modify lesson plans, learning materials, assessment strategies, and classroom activities in response to curriculum innovation.

The finding can further be understood through curriculum implementation theory, which emphasizes the role of teachers as the key mediators between curriculum policy and classroom practice. A curriculum document may establish the direction of educational reform, but its effectiveness depends heavily on teachers' interpretation and implementation. The significant influence of curriculum innovation readiness therefore suggests that adaptive curriculum policies should be accompanied by systematic strategies for developing teachers' readiness. Professional development, mentoring, collaborative learning communities, and opportunities to experiment with innovative teaching practices can help strengthen teachers' preparedness for curriculum adaptation.

3.6 Discussion of H2: AI Literacy → Adaptive Curriculum Implementation Readiness

The findings also demonstrate that AI literacy has a positive and significant influence on teachers' readiness to implement an adaptive curriculum ($\beta = 0.391$; $t = 5.846$; $p < 0.001$). This result indicates that teachers who possess stronger AI knowledge and competencies tend to demonstrate greater readiness to respond to curriculum transformation in an AI-driven educational environment. AI literacy provides teachers with the knowledge and confidence required to understand how emerging technologies can affect teaching, learning, assessment, and curriculum design.

AI literacy enables teachers to understand AI-driven educational changes and recognize how AI can influence the role of teachers, learning resources, instructional strategies, and assessment practices (Lameras & Arnab, 2021). Teachers who understand the capabilities and limitations of AI are more likely to recognize which aspects of education can benefit from AI and which require human judgment. This understanding can reduce uncertainty and increase teachers' confidence when responding to curriculum changes associated with technological development.

Furthermore, AI literacy enables teachers to evaluate AI tools critically rather than simply adopting them because they are technologically available. AI-generated content may contain inaccurate, biased, incomplete, or contextually inappropriate information. Teachers therefore need the ability to assess the reliability, relevance, and pedagogical suitability of AI outputs before incorporating them into classroom activities. This critical evaluation capability is particularly important for an adaptive curriculum because curriculum adaptation should be based on sound educational judgment rather than technological novelty alone.

AI literacy can also support teachers in integrating AI appropriately into teaching and learning. Teachers with adequate AI literacy may use AI to support lesson planning, generate learning materials, personalize learning activities, provide feedback, develop assessment tasks, and explore alternative instructional approaches. However, effective integration requires teachers to determine when AI adds pedagogical value and when conventional approaches or direct teacher intervention are more appropriate. Thus, AI literacy helps teachers connect technological possibilities with pedagogical objectives.

In addition, AI literacy may enable teachers to redesign learning activities in response to emerging technologies and student needs (Kim et al., 2022). An adaptive curriculum requires flexibility

in learning content, instructional processes, learning resources, and assessment. Teachers who understand AI can potentially redesign activities to encourage critical thinking, creativity, problem-solving, collaboration, and responsible technology use. AI literacy therefore contributes to teachers' ability to move beyond simply using AI tools toward strategically incorporating AI into curriculum implementation.

Importantly, AI literacy should not be interpreted merely as technical ability. It encompasses cognitive, critical, ethical, and responsible dimensions. Teachers need to understand issues involving data privacy, algorithmic bias, transparency, academic integrity, misinformation, and responsible use of AI. Therefore, teachers with higher AI literacy are potentially better equipped to make informed pedagogical decisions while maintaining professional and ethical standards. The significant relationship identified in this study supports the argument that AI literacy should become an important component of teacher professional development in the implementation of adaptive curricula.

3.7 Discussion of H3: Combined Influence of Curriculum Innovation Readiness and AI Literacy

The third aspect of the findings concerns the combined contribution of curriculum innovation readiness and AI literacy to teachers' readiness to implement an adaptive curriculum. The structural model produced an R^2 value of 0.602, indicating that curriculum innovation readiness and AI literacy jointly explain approximately 60.2% of the variance in teachers' readiness to implement an adaptive curriculum. Although the two variables represent different constructs, their combined contribution demonstrates that successful adaptive curriculum implementation requires both preparedness for change and the capability to navigate AI-driven educational transformation.

The importance of this combined relationship can be understood by considering the complementary nature of the two predictors. Curriculum innovation readiness represents the willingness and preparedness to change, whereas AI literacy represents the knowledge and capability required to understand and navigate AI. Meanwhile, adaptive curriculum implementation readiness represents teachers' capacity and intention to translate curriculum flexibility into actual educational practice. Consequently, a teacher may be highly willing to embrace curriculum change but lack sufficient AI literacy to implement technology-related adaptations effectively. Conversely, a teacher may possess strong AI literacy but demonstrate limited willingness to change established teaching practices. In both situations, successful adaptive curriculum implementation may remain constrained.

The combined finding therefore represents an important contribution of the study. It suggests that preparing teachers for adaptive curriculum implementation should not focus exclusively on technological training or general attitudes toward curriculum change. Instead, teacher development should address these two complementary dimensions simultaneously. Professional development programs should strengthen teachers' openness to curriculum innovation, confidence in managing change, and willingness to experiment while also developing their AI knowledge, critical evaluation skills, practical competencies, and ethical awareness.

In the context of AI-driven educational transformation, adaptive curriculum implementation can therefore be viewed as the outcome of the interaction between readiness to change and capability to navigate technological change. Curriculum innovation readiness provides the motivational and behavioral foundation for accepting curriculum transformation, while AI literacy provides the cognitive, practical, critical, and ethical resources required to respond to AI-related changes. The combination of these competencies can enable teachers to make informed pedagogical decisions, redesign learning activities, adapt instructional strategies, and implement curriculum changes more effectively.

4. CONCLUSION

This study concludes that curriculum innovation readiness has a positive and significant influence on teachers' readiness to implement an adaptive curriculum. Teachers who are more open to curriculum change, confident in adopting innovative practices, and prepared to adapt their teaching strategies tend to demonstrate higher readiness for adaptive curriculum implementation. Similarly, AI literacy

has a positive and significant influence on teachers' readiness, indicating that knowledge, practical skills, critical evaluation, and ethical understanding of AI contribute to teachers' ability to respond to AI-driven educational changes. The structural model shows an R^2 value of 0.602, meaning that curriculum innovation readiness and AI literacy jointly explain 60.2% of the variance in teachers' readiness to implement an adaptive curriculum. Theoretically, these findings indicate that teacher readiness for adaptive curriculum implementation can be understood through two complementary dimensions: readiness for curriculum innovation and AI-related knowledge and competence. Practically, schools should provide curriculum innovation training, teacher support systems, and opportunities for experimentation, while policymakers should integrate AI literacy into professional development and establish adaptive curriculum guidelines. Teachers should continuously develop AI literacy, critically evaluate AI tools, and strengthen their adaptability to curriculum change. This study is limited by its cross-sectional design, self-reported questionnaire, and limited geographical scope, which restrict strong causal interpretations. Future research should examine digital competence, AI self-efficacy, technology acceptance, school leadership, professional development, organizational readiness, and the moderating role of teaching experience.

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