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THE MEDIATING EFFECTS OF ARTIFICIAL INTELLIGENCE LITERACY ON THE ASSOCIATION BETWEEN COMPUTATIONAL THINKING SKILLS AND ORGANIZATIONAL AGILITY AMONG SECONDARY SCHOOL TEACHERS

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Abstract

These days' educational landscape forces teachers to adapt to changing demands and embrace innovations. In this study, Artificial Intelligence (AI) literacy was analyzed as how it mediates the association between Computational Thinking Skills (CTS) and Organizational Agility (OA) among secondary teachers. A quantitative causal mediation analysis design was utilized in this study. Standardized AI literacy test, CTS Test, and OA test instruments were utilized to gather pertinent data among 305 respondents. The test instruments were first subjected to confirmatory factor analysis for model fitness. Path and mediation analysis through structural equation modeling revealed that CTS significantly predicts AI literacy, AI Literacy significantly predicts OA, and CTS significantly predicts OA. It was found out that AI literacy partially mediates the relationship between CTS and OA among teachers. This recommends that schools should conduct a comprehensive training program to enhance teachers' CTS and AI proficiency for schools' sustained agility.

Keywords: *AI literacy, computational thinking skills, organizational agility, structural equation modeling, mediation analysis*

Introduction

In this era of industrial 4.0 revolution, industries and sectors are evolving rapidly, and education is no exception. Countries around the world are introducing countless changes, innovations, and advancements to meet global education demands, thus, schools must develop skills that make teachers adaptive to the ever-evolving educational setting (Kersher & McQuillan, 2016).

Meanwhile, the onslaught of the pandemic has also set unforeseen challenges, which made both students and teachers caught-off-guard disrupting the learning process and affecting teachers' ability to deliver teaching effectively. The unexpected nature of the pandemic caught everyone off guard, leading to unexpected deviations in pedagogical practices and school operations. Thus, schools had to quickly adapt and implement new measures to cope with the situation (Xing et al., 2018).

According to the Department of Education, 425 schools in the Philippines have permanently closed since 2020. These closures could have been prevented if schools had been agile enough to respond to the problem, allowing quality education to reach more Filipino

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learners.

Aside from the problems brought on by the pandemic, one of the most notable changes making waves internationally is the emergence of Artificial Intelligence (AI). According to Kim and Lee (2022), Filipino teachers find a hard time coping with artificial intelligence during its upsurge in 2022. Eslit (2023) further opined that although Filipino teachers find AI a rising problem in the field of education, yet they try their best to cope with this technological advancement. AI includes the expansion of computing systems skilled in executing tasks that require human capabilities, such as problem-solving, decision-making, and learning (Fahimirad & Kotamjani, 2018). In education, generative AI, exemplified by large language models like ChatGPT, Jenni, Bard, Quillbot, and Bing, among others has become prevalent, offering innovative solutions, and enhancing learning experiences. AI offers several educational benefits, such as aiding in the creation of academic papers, presentations, and images, among other services that can enhance teaching delivery and enable educators to create interactive learning experiences. As the integration of artificial intelligence in education becomes more widespread, educators must have sufficient AI literacy. AI literacy entails the skills and knowledge needed for comprehension, utilization, and assessment of AI technology (Zhai et al., 2021).

As these serious difficulties arise in the educational sector, there is this critical skill that all members of a school organization must develop: the capability to swiftly rejoin to challenges within organizational environment and adapt to changes that affect the organization (Walter, 2021). This is known as organizational agility. Organizational agility is gaining traction, particularly in the context of educational institutions, as it points out an organization's ability to effectively meet and solve challenges posed by the ever-growing demands and innovations in the education sector.

There is a dire need for educational institutions to foster organizational agility as this helps them to remain competitive in the ever-evolving society. It enables them to quickly adapt to changes in need of the stakeholders such as students, advancements in technological industries, and other indispensable requirements (Darvishmotevali, 2020). By nurturing a culture of agility within organizations, schools can improve their receptiveness, originality, and flexibility, ultimately cultivating their capacity in attaining their objectives, and achieve their visions.

In addition to being adaptable to various situations that can impact the education sector, teachers also need robust skills in problem-solving to meet the needs of the global arena. These skills are considered indispensable for educators in this era. Computational thinking, therefore, is a foundational skill that includes chunking down problems into more controllable portions and generating algorithms for possible solutions (Martínez et al., 2023). Recognized as a crucial skill for educators to cultivate, Martinez et al. (2023) further discussed that CT endorses problem-solving, creativity, and logical reasoning. This concept is gaining prominence in organizations, particularly in educational institutions, where it is essential to assess secondary teachers' computational thinking skills to plan and implement interventions that are critical in the ever-evolving educational landscape, where teachers play a pivotal role.

Several studies discussed how computational thinking skills relate to AI literacy, revealed in the study of Gadanidis (2017), Dohn et al. (2022), Yu & Chen (2018), and Shamir & Levin (2020). Meanwhile, several studies have also discoursed on the relationship between artificial intelligence literacy and organizational agility (Wamba, 2022; Shafiabady et al., 2023). Meanwhile, the relationship between CT and OA was studied by Cutumisu et al. (2022) and Li (2022). However, in the case of the Philippines' secondary teachers, the topic requires further exploration as there is a huge dearth of existing literature since these areas were barely studied.

This study analyzed the mediating effects of artificial intelligence literacy on the relationship between CT and OA among secondary school teachers. By developing a deeper understanding of AI literacy, educators can effectively integrate artificial intelligence into their

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teaching practices and empower students to become critical thinkers and problem-solvers who are ready to meet the demands of the future (Zhai et al., 2021). Therefore, AI literacy and computational thinking are crucial for educators to enhance secondary school teachers' organizational agility and help students in solving the predicaments of the digital age.

Literature Review

Computational Thinking Skills Increase Organizational Agility

As computational thinking skills become progressively indispensable in today's digital age, organizations face unprecedented levels of complexity and uncertainty, where they must develop organizational agility—the ability to adapt quickly to survive and thrive (Bender-Salazar, 2023). This agility requires a combination of strategic thinking, effective decision-making, and the ability to leverage technology for improved efficiency and innovation where computational thinking skills play a crucial role in enabling organizational agility (Calderon-Monge & Soriano, 2023).

Cutumisu et al. (2022) explored the computational thinking skills of preservice teachers and their relationship with attitudes and skills as dimensions of organizational agility. Path analysis revealed a significant result within the constructs. Specifically, it suggests that computational thinking abilities are determinants for pre-service teachers to acclimatize and rejoin efficiently to deviations and tasks within schools. This is congruent with the study of Presser et al. (2023), Li (2022), Alvarado et al. (2023), and Vieira & Hai (2023) that computational thinking helps organizations to achieve goals and direct to feasible results. Yeh & Chu (2017) and Amenyo & Kpo (2023) opined a broader implication suggesting that including CT into practices of organizations is essential for realizing lasting accomplishment and flexibility in various industries as digital revolution continues to reshape business landscapes.

Computational Thinking Skills Increase AI Literacy

CT skills and AI literacy are progressively important in education as technology becomes more integrated into the learning process. As teachers are expected to solve problems in navigating the school toward its vision and incorporate artificial intelligence tools and technologies into their classrooms, they must possess a solid understanding of AI literacy and computational thinking skills (Yu & Chen, 2018). Grover & Pea (2013) and Laupicher et al. (2022) opined that secondary school teachers are in dire need of harnessing Computational Thinking and AI literacy.

Various research has studied how computational thinking skills relate to AI literacy, such as the study by Celik (2023), which studied computational thinking as a determining factor of AI literacy. On the other hand, a study conducted by Dohn et al. (2022) revealed a positive significant relationship between these two constructs, suggesting that teachers with advanced CT skills tend to have stronger AI literacy. Further, the study of Abar et al., (2021) and Bae et al. (2022) affirmed the importance of harnessing computational thinking as it improves AI abilities of the members of the school organization. By acquiring computational thinking skills and AI literacy, teachers are better equipped to integrate these tools and technologies into their classrooms (Jacob & Warschauer, 2018).

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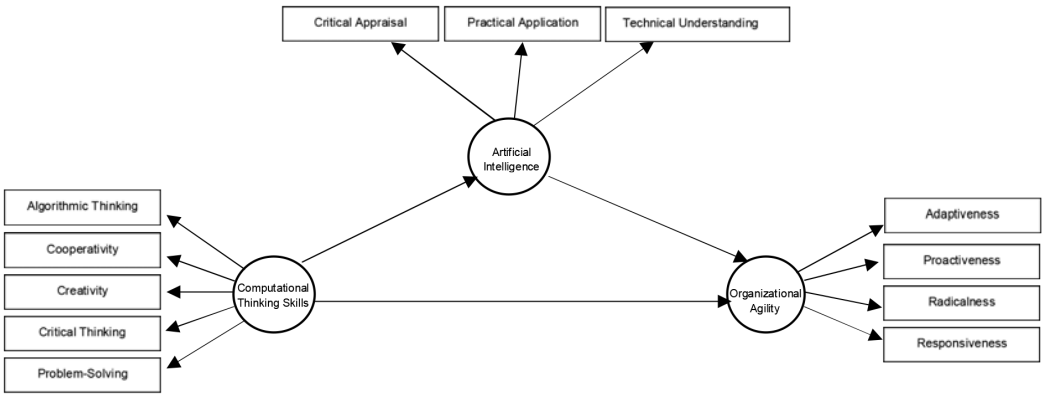
Artificial Intelligence Literacy Increases Organizational Agility

Artificial intelligence literacy and organizational agility are two important concepts in any organization. AI literacy as an important skill is increasingly recognized as a critical skill in modern organizations (Demirel & Türetken, 2017), which goes with the indispensability of organizational agility (Žitkienė & Deksnys, 2018). Given these two constructs, various investigations have revealed the relationship between AI literacy and organizational agility, as AI literacy enables organizations to leverage AI technologies to enhance their agility.

In Wamba's (2022) study, AI literacy and organizational agility among US organizations were examined. The results pointed out that AI literacy has a significant role in predicting organizational agility. Using simple linear regression analysis, artificial intelligence literacy was seen as a significant predictor of organizational agility. This implies that organizations with advanced AI literacy are more likely to exhibit better agility in adapting to changes and seizing opportunities presented by technological advancements. Therefore, investing in AI literacy training for employees could be a strategic move for organizations looking to enhance their agility and competitiveness in today's rapidly evolving digital landscape. Similarly, another study conducted by Felipe et al. (2020) suggests that organizations seeking agility could enhance their focus on technology, such as AI, and prioritize employee development programs that foster traits conducive to organizational agility.

In light of the quest for Australia to future-proof organizations, Shafiabady et al. (2023) found out that AI literacy predicts organizational agility through Logistic Regression (LR), which was found out to have 97.6% up to 99.2% prediction power. Moreover, Southworth et al. (2023) further explained that in this case, AI literacy is very relevant as it facilitates innovation within organizations, which is essential for maintaining agility, therefore establishing the relationship between both constructs.

Figure 1
The Hypothesized Model



H1: Computational thinking skills increase AI literacy of secondary school teachers.
H2: AI literacy increases organizational agility of secondary teachers.
H3: Computational Thinking skills increase organizational agility of secondary teachers.
H4: AI literacy partially mediates the association between CTS and OA among secondary teachers.

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Research Methodology

Research Design

This study used a quantitative causal mediation analysis design. This was utilized to determine the mediating effects of artificial intelligence on the association between CT skills and OA among secondary school teachers. This research method was profoundly used by various researchers such as Kang et al. (2023), Lee and Park (2023), and Miyamoto et al. (2019). This was conducted from January to April 2024 among secondary school teachers in the Division of Romblon, Philippines.

Participants and Procedures

Based on a population of 1,470 secondary teachers in the division of Romblon, Philippines, a total of 305 participants (Male=92, Female=213) was calculated using the Raosoft software sample size calculator. Secondary teachers who submitted their intent to participate in the survey were chosen through convenience sampling. This sampling method was also used in the study of Kumar et al. (2020) and Adekunle and Dakare (2020), who also took structural equation modeling as their statistical method.

Before the data gathering, the researchers sought approval of the School's Division Superintendent, School Principals, and informed consent of the respondents. A clearance from the ethics office of the university where the researchers are affiliated was also sought before the data gathering, ensuring that the ethical aspects of the study were carefully considered. In the data gathering, the researcher used both printed instruments (for nearby secondary schools) and Google forms (for far-flung secondary schools) distributed in all secondary schools throughout the Romblon Province, Philippines.

The summary of the demographic profile of respondents aggregated based on gender and position is presented in the succeeding table.

Table 1
Demographic Profile of Respondents in terms of Gender and Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Female	213	69.8	69.8	69.8
	Male	92	30.2	30.2	100
	Total	305	100.0	100	
Position	Head Teacher IV	1	.3	.3	.3
	Master Teacher 1	16	5.2	5.2	5.6
	Master Teacher 2	4	1.3	1.3	6.9
	Teacher 1	179	58.7	58.7	65.6
	Teacher 2	71	23.3	23.3	88.9
	Teacher 3	34	11.1	11.1	100
	Total	305	100	100	

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Instruments

This study used three standardized instruments namely: Artificial Intelligence Literacy Test, Computational Thinking Skills Test, and Organizational Agility Test. The instruments were minimally improved based on the context of the secondary schools' set-up in the Philippines.

Artificial Intelligence Literacy Test. This is a 39-item standardized AI literacy test adapted from Laupichler et al. (2023) with five scales (1-5) level of agreement. This test is divided into three factors namely: Technological Understanding (items 1-14); Critical Appraisal (items 15-24); and Practical Application (25-31). This item is answerable in an hour. The instrument was proven reliable and fit based on the EFA with the following indices: α = .89 [CI: .87, .91].

Computational Thinking Skills Test. This is a 29-item test adapted from Korkmaz et al. (2017). The test consists of five factors namely: Creativity (items 1-8); Algorithmic Thinking (9-14); Cooperativity (items 15-18); Critical Thinking (items 19-23); Problem-solving (items 24-29) with five scale (1-5) level of agreement. EFA results of the instruments revealed a fitness based on various indices with a high Cronbach's alpha value (α = .92), validating its reliability.

Organizational Agility Test. The organizational Agility Test was pioneered in Turkey to test an organization's agility. This was adapted from Gurbuz and Hatunoglu's (2022) developed organizational agility test, which is composed of four dimensions, namely: proactiveness, responsiveness, radicalness, and adaptiveness, which was answered in a scale of 1-5 level of agreement. In Turkey, 11 out of 12 indicators were confirmed. After testing for the confirmatory factor analysis, Cronbach's alpha coefficient was tested generating an ideal value (α = .80). In this investigation, the researcher used the 12 indicators to test if all are confirmed in the measurement model in the case of the Philippine setting.

Data Analysis

In the analysis of the data collected, Confirmatory Factor Analysis (CFA) was undertaken to test the measurement models of the three instruments using Jamovi software for fit indices. After testing for the measurement models of the three instruments, Structural Equation Modeling (SEM) was done using the Smart PLS v. 4 to test the mediation and path analysis.

Research Results

To test the association of different variables, the AI test, CTS Test, and OA test instruments were tested for model fitness. Since these instruments had already undergone exploratory factor analysis, confirmatory factor analysis was undertaken to test their fitness in the Philippines setting. Chi-square (χ^2), Average Variance Extracted (AVE), Cronbach's alpha (α), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardized Root Mean Square Residual (SRMSR), and Root Mean Square Error of Approximation (RMSEA) served as the indices that helped in determining the fitness of the instruments.

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Table 2
Model Fitness Test for Artificial Intelligence Test

Fit Index	Observed Value	Ideal Value	Fitness
χ^2 (*p* value)	3212 (< .001)	Lower is better (*p* = .05)	Not Fit
AVE	.665	≥ .50	Fit
α (Cronbach's Alpha)	.917	≥ .70	Fit
CFI	.90	≥ .90	Fit
TLI	.634	≥ .90	Not Fit
SRMR	.116	≤ .08	Not Fit
RMSEA	.151	≤ .06	Not Fit
RMSEA 90% *CI* (Lower)	.147	Close to RMSEA value	Fit
RMSEA 90% *CI* (Upper)	.156	Close to RMSEA value	Fit

Table 2 presents the model fitness test for the Artificial Intelligence Literacy Scale, showing mixed results. The Chi-Square (χ^2) value of 3212 (p = <.001) indicates a discrepancy but is sensitive to sample size. The RMSEA of 0.151 suggests a reasonable fit, although values below .08 are preferred. The CFI (.90) and TLI (.634) suggest room for improvement, with ideal values closer to 1. The SRMR of 0.116 indicates a lack of fit at the item level. However, the AVE of .665 and Cronbach's Alpha (α =.917) indicate moderate variance explained and high internal consistency. Despite some indices suggesting non-fitness, most parameters reveal that the AI literacy instrument fits well with the model.

Table 3
Model Fitness Test for Computational Thinking Skills Test

Fit Index	Observed Value	Ideal Value	Fitness
χ^2 (*p* value)	884 (< .001)	Lower is better (*p* = .05)	Not Fit
AVE	.719	≥ .50	Fit
α (Cronbach's Alpha)	.971	≥ .70	Fit
CFI	.904	≥ .90	Fit
TLI	.890	≥ .90	Fit
SRMR	.046	≤ .08	Fit
RMSEA	.112	≤ .06	Not Fit
RMSEA 90% CI (Lower)	.105	Close to *RMSEA* value	Fit
RMSEA 90% CI (Upper)	.120	Close to RMSEA value	Fit

Table 3 depicts the model fitness test for the Computational Thinking Skills test indicating a strong fit overall. Although the Chi-Square value (χ^2 = 884) suggests a poor fit due to its sensitivity to sample size, other indices show more positive results. The RMSEA (.112) suggests a reasonable fit, while the CFI (.904) and TLI (.890) both indicate a strong fit, with values closer to 1 being better. The SRMR (.046) is within the acceptable range, indicating a good fit at the item level. In terms of reliability and validity, the AVE (.719) exceeds the recommended threshold of .50, and the Cronbach's Alpha (α = .971) demonstrates a high level of internal consistency.

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Table 4
Model Fitness Test for Organizational Agility Scale

Fit Index	Observed Value	Ideal Value	Fitness
χ^2	242 (< .001)	Lower is better (p = .05)	Not Fit
AVE	.839	≥ .50	Fit
α (Cronbach's Alpha)	.957	≥ .70	Fit
CFI	.953	≥ .90	Fit
TLI	.935	≥ .90	Fit
SRMR	.046	≤ .08	Fit
RMSEA	.115	≤ .06	Not Fit
RMSEA 90% CI (Lower)	.101	Close to RMSEA value	Fit
RMSEA 90% CI (Upper)	.130	Close to RMSEA value	Fit

The model fitness test for the Organizational Agility Scale presented in Table 4 indicates a good overall fit. Although the Chi-Square value (χ^2 = 242) suggests a lack of fit due to sensitivity to sample size, other indices show positive results. The RMSEA (.115) suggests a reasonable fit, and the CFI (.953) and TLI (.935) indicate a strong fit. The SRMR (.046) is within an acceptable range. The AVE (.839) and Cronbach's alpha (a= .957) demonstrate high reliability and substantial variance explained. Despite some indices suggesting a lack of fit, the majority support that the Organizational Agility instrument fits well within the model.

Figure 2
SEM Showing Structural Association of Computational Thinking Skills, Artificial Intelligence Literacy, and Organizational Agility

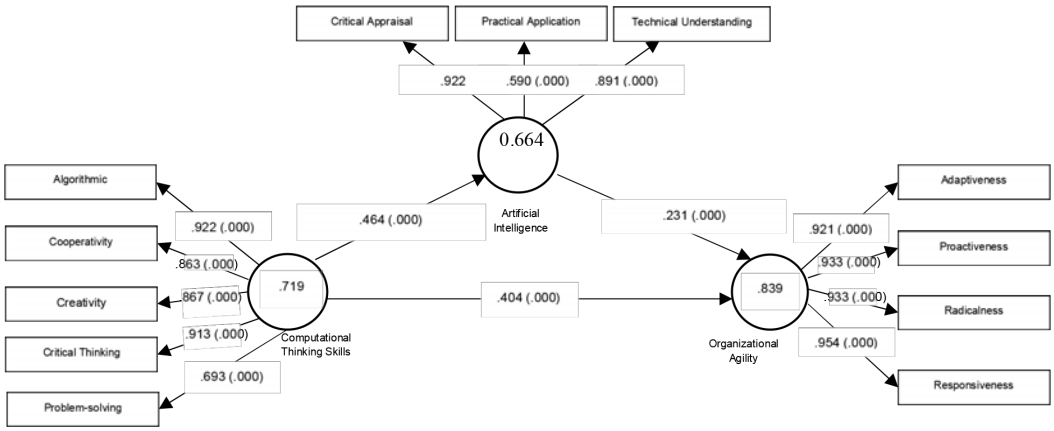

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Table 5
Mediation Estimates of the Direct and Indirect Effect in the SEM Model

				95% Confidence Interval				
Effect	Label	Estimate	*SE*	Lower	Upper	*z*	*p*	%Mediation
Indirect	axb	.051	.016	.020	.083	3.21	.001	14.7
Direct	c	.299	.045	.210	.388	6.61	< .001	85.3
Total	c+axb	.351	.045	.262	.439	7.79	< .001	100

Table 6
Path Estimates of the Variables in the SEM Model

				95% Confidence Interval			
Effect	Label	Estimate	SE	Lower	Upper	*z*	*p*
CT →AI Literacy	a	.464	.048	.137	.328	4.75	< .001
AI Literacy → OA	b	.231	.051	.122	.323	4.35	< .001
CT →OA	c	.404	.045	.211	.388	6.61	< .001
CT→AI→OA	axb	.109	.032	.044	.171	3.361	< .001

The mediation analysis revealed significant indirect and direct effects. The indirect effect (axb) was 0.051 (*SE* = 0.016, *p* = .001), showing that the mediator explains a significant portion of the independent and dependent variables' association. The direct effect (c) was 0.299 (*SE* = .045, *p* < .001), indicating a strong direct association, and the total effect (c+axb) was 0.351 (*SE* = .045, *p* < .001). There was 14.7% of the total effect, which was accounted for the indirect effect, while 85.3% for the direct effect. This suggests that while there is a significant direct association, a portion was mediated by the mediator variable, which is AI literacy.

The SEM analysis showed significant path estimates: from Computational Thinking (CT) to Artificial Intelligence Literacy (AI Literacy) (a) at .464 (*SE* = .048, *p* < .001), indicating a strong positive association; from AI Literacy to Organizational Agility (OA) (b) at 0.231 (*SE* = .0512, *p* < .001), indicating AI Literacy's significant influence on OA; and the direct path from CT to OA (c) at .404 (*SE* = .045, *p* < .001), indicating a strong direct association. The indirect path from CT to OA through AI Literacy (axb) at 0.109 (*SE* = .032, *p* < .001) suggests that the association between CT and OA was partially mediated by AI literacy. These results highlight the importance of both CT and AI Literacy in predicting OA, with AI Literacy serving a mediating role.

Discussion

Due to the dynamic and competitive nature of contemporary educational environments, there is a growing interest in leveraging artificial intelligence (AI) and computational thinking to enhance organizational agility. This study examines the intricate interplay between Computational Thinking Skills, AI Literacy, and Organizational Agility within the domain of education (Zhao & Lou, 2022). Given the transformative potential of AI in education, expounding these relationships is paramount for educational institutions seeking to cultivate adaptability and innovation, thereby equipping students with the requisite skills for success in an increasingly AI-centric society (Sperling et al., 2024).

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This study is significant for enhancing organizational agility and promoting the integration of artificial intelligence (AI) in educational settings. The positive relationships observed among Computational Thinking Skills, AI Literacy, and Organizational Agility align with existing literature and provide valuable insights for educational institutions.

Computational Thinking Skills emerged as a significant predictor of AI Literacy, accounting for approximately 21.5% of the variance in AI Literacy (R = .464, R^2 = .215, p < .001). This is consistent with the various studies suggesting that Computational Thinking Skills are essential for understanding and effectively applying AI concepts (Grover & Pea, 2018; Wing, 2006). This further supports the claims established in the study of Celik (2023), Dohn et al. (2022), Abar et al. (2021), and Abar et al. (2024). On the other hand, although Bae et al. (2022) have seen a nonsignificant result in their investigation, descriptive mean score results highlight a clear trend. This clearly implies that by fostering computational thinking skills among teachers, educational institutions can better equip them to comprehend and integrate AI into their pedagogical practices (Yadav et al., 2017).

Meanwhile, AI Literacy was also found to be a significant predictor of Organizational Agility, explaining approximately 17.1% of the variance in Organizational Agility (R = .414, R^2 = .171, p < .001). This aligns with the notion that AI Literacy enables organizations to adapt more efficiently to changing environments and focus their interest on emerging opportunities (Makridakis, 2017). These findings were further affirmed by Wamba (2022) and Lu and Ramamurthy (2017), Shafiabady et al. (2023), and Alshamsi et al. (2021). As AI technologies continue to transform various sectors, including education, organizations that prioritize AI Literacy among their workforce are better positioned to adapt and remain competitive (Wilson & Daugherty, 2018). In the case of educational institutions, the use of artificial intelligence has a great impact on revolutionizing educational experiences, as well as improving educational outcomes for students, thus maximizing schools' ability to cope with the demands of time and industry (Ng et al., 2021).

Moreover, the direct association between CT Skills and OA, accounting for approximately 25.6% of the variance in Organizational Agility (R = .506, R^2 = .256, p < .001), is consistent with previous research highlighting the role of computational thinking skills in fostering organizational agility (Benbya et al., 2020; Cheng et al., 2021). This further affirms the findings revealed in the study by Li (2022) and Cutumisu et al. (2022). By streamlining computational thinking skills, teachers can enhance their problem-solving abilities, creativity, and adaptability, which are essential for driving organizational agility and innovation. CT skills help organizations devise and perform strategies that replicate diverse scenarios and outcomes. These capabilities enable organizations to foresee challenges and discern chances for enhancement or revolution within the educational institution (Román-González et al., 2019).

The CFA results supported the construct validity of the Artificial Intelligence Literacy Scale, Computational Thinking Skills Scale, and Organizational Agility Scale, indicating that the measures utilized in the research were valid and reliable. These results are consistent with previous research on the development and validation of similar scales, such as in AI literacy (Laupichler et al. (2023), Computational thinking skills (Korkmaz et al., 2017) and Organizational agility (Gurbuz & Hatunoglu's 2022). It can be implied that the scales used in the study have been rigorously tested and are considered valid and reliable measures for assessing Artificial Intelligence Literacy, Computational Thinking Skills, and Organizational Agility. These findings' alignment with previous research on similar scales suggests a consistent understanding and measurement of these constructs across different studies, further enhancing the reliability of the results.

The SEM analysis revealed a partial mediation effect, where AI Literacy served as a partial mediator in the relationship between Computational Thinking and Organizational Agility. The indirect effect of Computational Thinking on Organizational Agility through AI

Literacy was estimated at .051 (*SE* = .0161, *p* = .001), explaining 14.7% of the total effect. This is consistent with the literature suggesting that CT Skills are foundational for developing AI Literacy, which in turn contributes to organizational agility (Cheng et al., 2021; Román-González et al., 2019). The implications of these findings are far-reaching for educational institutions. By fostering Computational Thinking Skills and AI Literacy among teachers, schools can enhance their organizational agility, enabling them to respond more effectively to rapidly changing educational landscapes, adopt innovative practices, and meet the developing desires of students and other stakeholders (Benbya et al., 2020; Makridakis, 2017).

Yadav et al. (2017) and Román-González et al. (2019) highlighted the idea that educational institutions should prioritize the integration of CT and AI concepts into professional development programs and teacher training curricula. Collaborative partnerships between educational institutions and industry experts or researchers in the area of AI and CT can facilitate the development of relevant and practical training programs. Furthermore, educational institutions should consider adopting organizational structures and cultures that promote agility, experimentation, and continuous learning. This may involve encouraging cross-functional collaboration, fostering a growth mindset, and embracing iterative processes for curriculum development and instructional design (Benbya et al., 2020; Wilson & Daugherty, 2018).

Conclusions and Recommendations

The study confirms the crucial role of Computational Thinking Skills as a significant predictor of AI Literacy and Organizational Agility, likewise with AI literacy as a significant predictor of Organizational Agility. This underscores the importance of fostering Computational Thinking Skills among educators to enhance their ability to understand and integrate AI concepts into teaching practices. Educational institutions should prioritize the advancement of Computational Thinking Skills and AI literacy among educators through targeted training programs and professional development opportunities. This will enable educators to better understand and integrate AI concepts into their pedagogical practices, as well as enhance their adaptability and problem-solving abilities.

Findings further underscore the interconnected nature of CT Skills, AI Literacy, and OA in secondary education, revealing AI literacy as a partial mediator. By investing in the development of these skills among educators, educational institutions can enhance their organizational agility, better prepare students for an AI-driven future, and remain competitive in the evolving educational landscape. Future investigations should put emphasis on longitudinal studies, which will investigate the long-term impact of these skills on organizational agility and educational outcomes, providing further insights into the sustainability and scalability of such initiatives. Also, future studies may also attempt to conduct this in a wider audience with more randomized samples. Investing in the advancement of CT Skills and AI Literacy among educators can lead to improved organizational agility in educational institutions. Future research should aim to conduct longitudinal studies to assess the lasting impact of these skills on organizational agility and educational outcomes, providing valuable insights into the sustainability and scalability of such initiatives.

Declaration of Interest

The authors declare no competing interest.

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