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Humanizing AI Education: The MERGE Framework for Supporting Teachers in AI-Enhanced Classrooms

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Abstract: *This paper explores the evolving role of teachers in AI-enhanced classrooms, particularly within the context of South Korea's upcoming AI Digital Textbook (AIDT) initiative. As AI technology becomes increasingly integrated into educational systems worldwide, this paper argues that teachers remain indispensable, playing critical roles that AI cannot replicate. The MERGE framework—Monitor, Encourage, Reward, Guide, and Evaluate—is proposed as a model to support teachers in effectively merging traditional educational practices with modern AI technologies. Developed initially in South Korea, the MERGE framework is adaptable to various global educational contexts, ensuring that educators worldwide can harness AI to enhance teaching rather than replace vital human elements. By fostering a co-learning environment where both teachers and students can thrive, this paper underscores the potential for AI to elevate education systems globally, emphasizing the importance of human-centered approaches in the age of AI.*

Keywords: Artificial Intelligence (AI); AI-Driven Language Education; AI-Enhanced Classrooms, Human-Centered Approaches; Humanizing AI Education; Teacher's Role

1. Introduction

The increasing integration of artificial intelligence (AI) into educational systems has raised concerns about the potential obsolescence of teachers, with some suggesting that AI could replace human educators. However, this perspective fails to acknowledge the critical and evolving role that teachers continue to play in AI-enhanced education. Rather than being endangered, teachers are integral to the successful integration of AI, serving as guides, mentors, and co-learners with their students.

In particular, with the implementation of AI Digital Textbook in English, mathematics, and computer science for 3rd and 4th graders in elementary school, 1st graders in middle school, and 1st graders in high school starting in 2025, teachers of South Korea may experience heightened anxiety about the AI Digital Textbook initiative. While some teachers are adapting well to this wave of change, others, who have been teaching with traditional paper textbooks for a long time, are even considering early retirement due to the "villain" AI [1].

It is essential to provide students with authentic learning experiences that effectively prepare them for the challenges of the 21st century. These experiences should equip students with the necessary skills to become leaders and innovators, capable of producing ideas, products, and solutions that contribute positively to society. As John Dewey articulated in 1916, "If we teach today's students as we taught yesterday's, we rob them of tomorrow" [2]. This paper proposes a framework to integrate traditional educational practices with modern AI technologies through the MERGE model, emphasizing the collaborative role of teachers and AI in shaping the future of education.

2. Literature Review

2.1 The Context: Korea's AIDT Initiative and Teacher Challenges

Starting in 2025, South Korea will implement the AIDT (AI Digital Textbook) initiative, integrating AI into classrooms nationwide [3-5]. While this initiative positions South Korea at the forefront of educational innovation, it has also led to significant concerns among educators. The roles of teachers within this AI-enhanced classrooms are not yet fully defined, leading to uncertainty and anxiety. Additionally, the long-term impacts of AI on students' academic and cognitive development remain largely unknown, creating further apprehension [1].

The AIDT initiative also necessitates radical changes in schools, affecting homework practices, classroom structures, and overall educational strategies. These changes represent a fundamental shift in the educational landscape, requiring educators to adapt quickly to new teaching methods, tools, and expectations. The resulting anxiety among teachers is understandable, as they must navigate these changes while ensuring that their students' needs are met.

Despite these challenges, with the right understanding and perspective, teachers are not endangered by AI. Instead, they have the opportunity to collaborate with AI technologies to enhance the learning experience for students. This paper focuses on the evolving role and perceptions of teachers in this new AI-driven educational landscape, examining how the MERGE framework, first developed in South Korea, can support teachers during this transitional period and be adapted to various educational contexts globally. The framework emphasizes the importance of putting human needs first and using AI as a tool to enrich the educational experience.

2.2 The Context: The European Framework for the Digital Competence of Educators

The demand for teachers' digital competencies and changes in policies are not limited to South Korea. The UK and European countries are also actively preparing for AI-integrated education. In the case of the UK, the focus is on reducing teachers' workload through AI and alleviating the burden of nationwide school evaluations called Ofsted [1]. In Europe, digital competency for educators is defined as one of the transversal competencies under UNESCO's framework [6]. It consists of a total of six competencies and 22 sub-competencies, illustrated as follows.

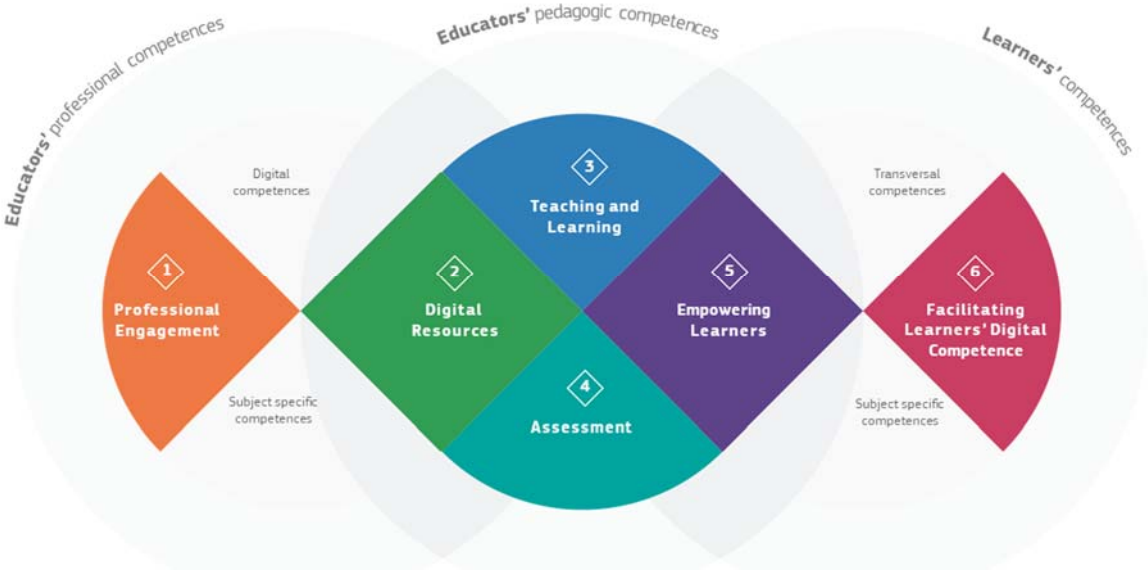

Figure 1. DigCompEdu framework

The teaching professions face changing demands, which require a brand-new, broader and more sophisticated set of competences than before. The ubiquity of digital devices and applications requires teachers to develop their digital competence. The European Framework for the Digital Competence of Educators (DigCompEdu) is a scientifically sound framework describing what it means for educators to be digitally competent. It provides a general reference frame to support the development of educator-specific digital competences in Europe [7].

3. Methodology

The researchers conducted a study on the use of AI in public education, focusing on South Korea. This study primarily involved classroom observation and discussions with teachers. The researchers visited elementary, middle, and high schools in April and May of 2024 to observe AI-integrated lessons conducted by teachers [1], [3]. On August 9 of the same year, the two researchers held a workshop in Daejeon, inviting the teachers who implemented AI education in their respective regions. These teachers were from Seoul, K Province, D Metropolitan City, and G Metropolitan City. Insights from classroom observations and group discussions on AI-enhanced teaching contributed to the development of the MERGE framework.

4. Findings

To effectively evaluate and enhance the integration of AI technologies in the classroom, this study developed the MERGE Matrix for AI-Adaptive Teachers. This matrix can serve as both a self-assessment tool and a collaborative evaluation framework, allowing teachers to gauge their proficiency in merging traditional teaching practices with AI-driven methodologies. The MERGE framework emphasizes the need for teachers to "Monitor, Encourage, Reward, Guide, and Evaluate" their use of AI tools in education.

4.1 The Importance of the MERGE Model

The MERGE model is especially crucial at a time when many teachers feel unprepared for the demands of AI-era education. Even in countries like South Korea, where teacher training is robust and well-prepared, the introduction of AI into the classroom can create significant burdens and anxiety for educators. This phenomenon, known as AI classroom anxiety, tends to be higher among teachers compared to younger, AI-native students who are more comfortable with technology [3], [8].

Moreover, the AIDT initiative introduces radical changes not only for teachers but also for schools, homework practices, and overall classroom structures. These changes mark a significant transformation in the educational environment, compelling educators to swiftly and efficiently adjust to new teaching approaches, tools, and expectations. It's natural that teachers experience anxiety and concern as they navigate these shifts while still prioritizing their students' needs. Nevertheless, with the right mindset and approach, AI does not pose a threat to teachers. Rather, it presents an opportunity for educators to work alongside AI technologies, using them to enrich the learning experiences of their students. Additionally, teachers can benefit from AI's support in managing administrative tasks, allowing them to focus more on personalized instruction and student development [1].

The MERGE framework, first developed in South Korea, provides a structured approach to help teachers navigate this new landscape. Its adaptability makes it useful in other contexts as well, allowing it to be tailored to different educational systems around the world. By focusing on areas such as monitoring, encouragement, reward systems, guidance, and continuous evaluation, the MERGE model helps teachers build confidence in their ability to use AI effectively, ensuring that they remain central to the educational process even as technology continues to evolve. This collaboration between teachers and AI not only supports the academic and cognitive development of students but also enhances the well-being and professional growth of teachers, leading to a flourishing educational environment. The key is not about doing or not doing AI; it's about putting humans first and using AI as a tool to enrich and elevate the learning experience.

4.2. The MERGE Framework

Based on the importance of the MERGE Model, this study has developed the following MERGE framework.

Figure 2. The MERGE Framework

The specific content of each element included in the MERGE framework is as follows:

(1) M - Monitor, Validate, and Spot Problems: In AI-enhanced classrooms, teachers must merge their expertise with AI tools to monitor student progress effectively. This involves validating AI-generated feedback and identifying and addressing any problems that arise. Technology alone cannot recognize the nuances of student difficulties or the contextual challenges they may face. Teachers, leveraging their understanding of students and the educational context, ensure that learning outcomes are aligned with educational goals and that any issues are promptly resolved. Positive interventions, a concept supported by Positive Psychology, emphasize the proactive identification and resolution of challenges, thereby fostering a flourishing learning environment [9].

(2) E - Encourage and Support Social-Emotional Growth: Teachers must merge their role as educators with that of emotional supporters, particularly in an AI-driven environment where interactions can sometimes feel impersonal. By combining AI's analytical capabilities with the teacher's ability to foster positive emotions, a supportive atmosphere can be created where students feel safe, understood, and confident. Positive Psychology indicates that fostering emotions such as joy, interest, and pride significantly enhances learning outcomes [10]. This social-emotional growth is essential for preparing students to harness technology in ways that contribute to meaningful, empathetic innovation. Moreover, the well-being of teachers themselves has never mattered more. Ensuring that educators are supported emotionally and professionally is critical to their ability to effectively manage the challenges of AI integration and foster a positive learning environment.

(3) R - Reward and Facilitate Collaboration: In the collaborative space of an AI-enhanced classroom, teachers must merge traditional methods of recognition with AI-driven insights to reward students effectively. At the same time, they should facilitate a learning environment where students can work together, make decisions collectively, and share their experiences. The PERMA model from Positive Psychology highlights relationships as a key component of well-being and flourishing [11]. By merging AI’s potential for personalized feedback with the human element of collaborative learning, teachers help students build the relationships and teamwork skills necessary for innovation. This collaborative approach also extends to co-learning, where teachers and students engage in a mutual exchange of knowledge and skills, breaking down traditional hierarchies and fostering a shared sense of purpose in the learning process.

(4) G - Guide and Co-Learn with Students Using EdTech: Teachers and students must merge their learning journeys, with educators guiding the use of EdTech while also exploring new technologies alongside their students. This approach aligns with the Growth Mindset theory, which posits that both teachers and students can continuously develop their abilities through effort and learning [12]. By embracing a co-learning model, teachers break down traditional hierarchical barriers and foster a culture of shared learning and exploration. This shift from "teaching" to "co-learning" is essential for the future of education, where the goal is to merge human insight with AI capabilities to foster critical thinking and creative problem-solving. Co-learning not only empowers students but also supports teachers in staying current with rapidly evolving technologies, ensuring that both parties benefit from the learning process.

(5) E - Evaluate and Evolve: In the constantly changing landscape of education, teachers and AI must merge their strengths in continuous assessment and adaptation. Teachers should regularly evaluate both students' progress and the effectiveness of AI tools, reflecting on how these technologies impact the learning environment. The principle of Self-Determination Theory (SDT) from Positive Psychology emphasizes the importance of autonomy, competence, and relatedness in motivating both students and teachers to pursue continual improvement [13]. By merging their traditional roles with AI’s adaptive learning capabilities, teachers can ensure that they are preparing students to be the innovators and leaders of tomorrow. This process of evaluation and evolution is crucial not only for students' academic success but also for maintaining teachers' well-being, as it allows for a reflective practice that acknowledges and addresses the challenges of the AI era.

4.3 MERGE Matrix for AI-Adaptive Teachers: Reflection and Assessment Questions

A matrix was developed in this study to effectively measure the MERGE framework. Teachers can self-assess whether they are fulfilling their role in AI-assisted classes by assigning themselves a score between 1 and 5 for the questions included in this matrix. The specific content is as follows.

Table 1. MERGE Matrix for AI-Adaptive Teachers

MERGE Component	Criteria for Evaluation	Sample Reflection Questions	Score (1-5)	Comments/Areas for Improvement
M - Monitor	- Regularly check student progress. - Ensure AI tools are functioning correctly. - Adjust learning paths based on AI data.	- How frequently do I review student progress using AI tools? - How do I ensure the accuracy and functionality of AI tools in my classroom? - In what ways have I adjusted learning paths based on insights from AI data?	__ / 5	Example: "Need to set more frequent checkpoints for progress."
E - Encourage	- Provide social-emotional support. - Motivate students consistently. - Foster a positive and inclusive classroom environment.	- How do I use AI tools to identify and support students' social-emotional needs? - What strategies do I use to keep students motivated, and how does AI help? - How do I create an inclusive classroom environment with the help of AI?	__ / 5	Example: "Incorporate more peer-to-peer encouragement activities."
R - Reward	- Recognize and reward student efforts. - Implement a system for acknowledging achievements. - Use AI data to tailor rewards.	- How do I use AI to identify and reward student achievements? - What system is in place to acknowledge student efforts, and how is it enhanced by AI? - How do I personalize rewards for students based on AI-generated data?	__ / 5	Example: "Develop a more personalized reward system using AI analytics."
G - Guide	- Offer clear guidance in using AI tools. - Ensure students understand how to interact with EdTech effectively. - Provide ongoing support for AI-related learning activities.	- How do I instruct students in effectively using AI tools in the classroom? - What methods do I use to ensure students fully understand how to interact with EdTech? - How do I provide continuous support for students as they engage with AI-related learning activities?	__ / 5	Example: "Organize a workshop on advanced AI tool usage for students."
E - Evaluate	- Continuously assess student progress. - Evaluate the effectiveness of AI tools. - Adapt teaching strategies based on AI-generated insights.	- How regularly do I assess student progress and how is AI used in this process? - How do I evaluate the effectiveness of AI tools in achieving learning outcomes? - In what ways have I adapted my teaching strategies based on AI insights?	__ / 5	Example: "Need to incorporate more feedback loops for AI tool assessment."

4.4 Expanded Questions for Teacher Self-Assessment and Reflection

In addition to the questions presented in Table 1, the MERGE Matrix for AI-Adaptive Teachers, the following additional questions can be considered. By asking themselves these questions and checking the scores for each item, teachers can proactively prevent potential side effects that may arise from the introduction of AI in school classes and effectively perform their role in AI-assisted classrooms. This matrix can also serve as an important reference for developing teacher competencies through the AIDT-based teacher training programs being widely implemented in Korea [1], [3].

(1) M - Monitor:
Regularly check student progress:
How often do I review student progress reports generated by AI?
Do I cross-reference AI data with my own observations of student performance?
Ensure AI tools are functioning correctly:
What steps do I take to ensure that AI tools are working as intended?
How do I troubleshoot or report issues with AI tools when they arise?
Adjust learning paths based on AI data:
How do I use AI-generated data to personalize learning paths for students?
Can I provide examples of how AI has influenced my adjustments to lesson plans?

(2) E - Encourage:
Provide social-emotional support:
How do I integrate AI tools to identify students who may need additional emotional support?
How do I follow up with students who have been flagged by AI as needing social-emotional support?
Motivate students consistently:
What motivational strategies do I use, and how are they supported or enhanced by AI?
How do I track changes in student motivation using AI tools?
Foster a positive and inclusive classroom environment:
How does AI help me identify and address inclusion issues in my classroom?
What measures do I take to ensure all students feel included, and how is this monitored through AI?

(3) R - Reward:
Recognize and reward student efforts:
How do I use AI to track and recognize student accomplishments?
How frequently do I update students on their progress using AI data?
Implement a system for acknowledging achievements:
What systems are in place to celebrate student achievements, and how do they incorporate AI?
How do students respond to the AI-driven reward system in my classroom?
Use AI data to tailor rewards:
How personalized are the rewards I offer to students, based on AI data?
Can I identify any improvements in student engagement as a result of AI-tailored rewards?

(4) G - Guide:
Offer clear guidance in using AI tools:
How do I instruct students on the proper use of AI tools in learning?
What resources do I provide to help students become proficient in using AI tools?
Ensure students understand how to interact with EdTech effectively:
What training do I offer to ensure students understand how to use educational technology effectively?
How do I assess whether students are effectively interacting with the AI tools?
Provide ongoing support for AI-related learning activities:
How do I continuously support students in their use of AI during learning activities?
How do I address challenges that students face when using AI tools?

(5) E - Evaluate:

Continuously assess student progress:

How do I incorporate AI-generated insights into my regular assessments of student progress?

How do I ensure that AI assessments align with my overall educational goals?

Evaluate the effectiveness of AI tools:

What criteria do I use to evaluate the effectiveness of AI tools in my classroom?

How do I gather feedback from students regarding their experiences with AI tools?

Adapt teaching strategies based on AI-generated insights:

How do I adjust my teaching strategies in response to data provided by AI tools?

Can I cite examples where AI insights led to a significant change in my instructional approach?

4.5 Scoring Guide

1-2 Points: Needs Improvement – This area requires significant attention and enhancement.

3 Points: Adequate – Meeting the basic requirements, but there's room for improvement.

4 Points: Good – Demonstrating solid practice with occasional opportunities for growth.

5 Points: Excellent – Exemplary practice, effectively merging AI and traditional teaching methods.

Total Score: ____ / 25

4.6 Interpretation

20-25 Points: Highly Effective AI-Adaptive Teacher – You are successfully integrating AI into your classroom and fostering an environment conducive to both traditional and AI-enhanced learning.

15-19 Points: Competent AI-Adaptive Teacher – You are doing well but may benefit from targeted improvements in specific areas.

10-14 Points: Developing AI-Adaptive Teacher – There are multiple areas that require enhancement to fully integrate AI and traditional teaching methods.

Below 10 Points: Beginner AI-Adaptive Teacher – Consider focusing on professional development and training to improve your skills in merging AI with classroom instruction.

5. Conclusions

Teachers can use this matrix regularly to self-assess their proficiency in merging AI with traditional teaching practices. Additionally, this matrix can serve as a collaborative tool, where teachers work with peers and administrators to identify strengths and areas for improvement. By consistently applying the MERGE Matrix, educators can ensure they are creating a balanced and supportive learning environment that leverages AI technology while maintaining the essential human elements of teaching.

The MERGE Matrix is not only a reflective tool but also a guide for professional development. Teachers scoring in the "Needs Improvement" or "Developing" categories can identify specific areas for growth and seek targeted training or mentorship opportunities. For those in the "Highly Effective" or "Competent" categories, the matrix encourages continuous improvement and adaptation, ensuring that the integration of AI remains dynamic and responsive to the evolving educational landscape.

While frameworks like MERGE offer a structured approach to integrating AI into the classroom, it is crucial to consider the psychological well-being of teachers. The introduction of AI can create significant stress, particularly among educators who may feel unprepared or overwhelmed by the rapid pace of technological change. High levels of anxiety or negative feelings among teachers can not only hinder the effective use of AI tools but can also impact their overall teaching performance and well-being.

In such cases, it is important not to push teachers to adopt AI if their psychological readiness is not aligned with these new demands. Schools and administrators must adopt a cautious approach, ensuring that teachers are provided with adequate support and professional development opportunities to build their confidence and competence in using AI. Additionally, offering spaces for teachers to voice their concerns and receive psychological support can help alleviate anxiety and foster a more positive attitude towards AI integration.

The MERGE framework—Monitor, Encourage, Reward, Guide, and Evaluate—represents a comprehensive approach to redefining the teacher's role in AI-enhanced classrooms. This model emphasizes the need to merge traditional educational practices with modern AI technologies, creating a harmonious

collaboration where both human and artificial intelligence work together to provide the best possible outcomes for students. Grounded in the principles of Positive Psychology, this framework underscores the importance of teachers as co-learners and mentors who foster creativity, collaboration, critical thinking, and empathy. As we prepare students to lead in the 21st Century, it is essential that we embrace this evolving role, ensuring that technology serves as a tool to enhance education rather than replace the vital human elements that drive innovation and positive change. The key is not about doing or not doing AI; it's about putting humans first and using AI as a tool to enrich and elevate the learning experience. With the right perspective, teachers and students alike can flourish in the AI-enhanced educational environment.

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