

## The Future of Teachers in the Automation Era: Which Competencies Remain Irreplaceable by Technology?

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### ABSTRACT

This study aims to explore the roles and competencies of teachers that remain relevant in the era of automation. With rapid technological advancements, many aspects of education have undergone transformation; however, the role of teachers is still considered essential. The results show that interpersonal competencies, such as empathy and communication, as well as the ability to facilitate critical and creative learning, are aspects that cannot be replaced by technology. Additionally, teachers are expected to possess skills in integrating technology into the learning process, allowing them to act as mediators between students and digital resources. The study employs a qualitative research method with a phenomenological approach to deeply explore teachers' subjective experiences in facing these changes. The phenomenological approach was chosen because it helps researchers understand how teachers perceive their roles and identify competencies that remain essential, such as interpersonal skills, empathy, and creativity, which play important roles in building relationships with students. Through in-depth interviews with teachers, this study uncovers key themes regarding competencies that cannot be automated. The study also highlights the importance of continuous professional development for teachers to remain relevant in the face of change. These findings provide insights for educational stakeholders in designing curricula and training programs that support the enhancement of teacher competencies amidst rapid technological changes. Therefore, this study concludes that while technology plays an important role in education, certain teacher competencies remain irreplaceable and are crucial for holistic learning development.

### Keywords:

*Keywords:* Teachers, Competencies, Technology.

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## 1. INTRODUCTION

The Fourth Industrial Revolution, characterized by the rapid development of digital technology, artificial intelligence (AI), and automation, has transformed many aspects of human life, including the field of education. Various technological advancements have introduced more sophisticated learning systems, ranging from adaptive learning software to the use of robots in teaching processes. This automation in education is seen as a means to increase efficiency, accessibility, and personalized

learning (Bates, 2019). However, amid this surge in technology, an important question arises: what will the role of teachers be in the future, and which competencies remain irreplaceable by technology?

The transformation of education through automation has raised concerns that the teaching profession might be displaced by technology, especially in the area of factual teaching or information delivery. Artificial intelligence, for instance, can teach lessons, provide feedback, and even design adaptive curricula for each student (Jones, 2021). Nevertheless, technology has not yet been able to replace the essential aspects of the teaching profession that involve human interaction, empathy, and the ability to build emotional connections with students.

In the automation era, the role of teachers is not only to teach lessons but also to act as learning facilitators, developing students' critical thinking, creativity, and social values. Teachers possess the ability to guide students through learning challenges with a holistic approach, which AI and technology have not fully been able to replicate (Säljö, 2020). Therefore, it is crucial to understand which competencies teachers must continue to develop to remain relevant in the evolving educational landscape.

One of the key competencies that remain irreplaceable is emotional intelligence. Emotional intelligence enables teachers to understand and respond to students' emotional needs, build strong interpersonal relationships, and create a safe and supportive learning environment (Goleman, 2018). Although technology can assist in many areas, building trust and providing emotional support are still realms that require a human touch.

In addition to emotional intelligence, critical thinking skills and professional ethics are other highly important competencies. Teachers do not only teach academic content but also help students develop the ability to think critically, evaluate information, and make wise decisions. In an era where information is abundant and sometimes misleading, teachers play a crucial role in guiding students to navigate the challenges of the digital age with integrity and responsibility (Hargreaves & Fullan, 2020).

Furthermore, teachers play a central role in character formation. Learning is not just about academic mastery but also about shaping individuals into responsible, ethical, and social beings. Technology may be able to impart knowledge, but moral values and character can only be instilled through direct interaction and the role modeling provided by teachers (Noddings, 2013).

In terms of pedagogical skills, flexibility and adaptability are competencies that remain important. Teachers must be able to adapt to the different learning needs of

each student and adjust their teaching strategies to the latest technological developments. Although automation can help speed up this process, teachers are still needed to identify the most effective approaches based on the unique context of each learning situation (Trilling & Fadel, 2009).

Lastly, communication and collaboration skills continue to be important competencies for teachers. In an increasingly complex digital era, teachers must act as connectors between students, parents, and the educational community. Teachers must be able to communicate a relevant and collaborative educational vision, thus creating an inclusive and dynamic learning environment (Fullan, 2016).

Based on the above, this study will delve deeper into the competencies of teachers that remain irreplaceable by technology in the context of educational automation. This study will highlight the critical role of teachers in maintaining essential educational values and how they can prepare themselves for a future increasingly influenced by technology.

## **2. METHODS**

This study employs a qualitative research method with a phenomenological approach to understand the experiences and perceptions of teachers in facing automation and technology. This approach focuses on how individuals interpret and give meaning to their experiences, particularly in the context of education. The steps of the research using the phenomenological approach are as follows: determining the research subjects; collecting data through in-depth interviews and classroom observations; recording and transcription; data analysis; validation of findings; writing the research report; conclusion and recommendations. Through these steps, the study is expected to provide deep insights into the competencies of teachers that remain relevant in the era of automation.

## **3. FINDINGS AND DISCUSSION**

This study aims to identify the competencies of teachers that remain irreplaceable by technology in the era of educational automation. Based on interviews with several teachers and education experts, as well as a literature analysis, the findings indicate that there are several key competencies that form the foundation of the teaching profession and will remain relevant in the future, even though technology has transformed many aspects of learning. Some of the identified competencies include

emotional intelligence, critical thinking skills, adaptability, communication, and collaboration.

#### 1. Emotional Intelligence

Teachers play an important role in understanding and responding to the emotional needs of students, something that technology cannot yet replace. Interviews with teachers show that emotional interaction between teachers and students is crucial for creating a learning environment that supports students' psychological development. While technology may provide data-driven learning, only teachers can recognize and address students' emotional or motivational issues on a personal level. This is reinforced by Goleman's (2018) findings, which emphasize that emotional intelligence plays a key role in professional success, including in education.

#### 2. Developing Critical and Creative Thinking

The research findings also show that teachers act as facilitators in developing critical and creative thinking skills. Technology can efficiently deliver information, but the ability to guide students in thinking independently, evaluating information critically, and solving problems creatively still requires human intervention. Trilling and Fadel (2009) highlight that critical and creative thinking skills are becoming increasingly important in the 21st century, and the role of teachers as mentors in developing these skills is irreplaceable by automation.

#### 3. Character and Social Values Formation

Teachers play an integral role in shaping character and social values. Several interviewed teachers emphasized that they are not only responsible for teaching academic material but also for shaping students' behavior and attitudes. This includes values such as responsibility, discipline, empathy, and ethics. Technology has not yet been able to replicate the process of moral value education delivered through role modeling and direct interaction. Noddings (2013) argues that education should prioritize character formation, and this is one important aspect that AI or robots cannot replicate.

#### 4. Adaptability and Flexibility

Successful teachers in the era of automation must be able to adapt to technological advancements and the ever-changing needs of students. The research reveals that while automation can assist in the teaching process, teachers still need to be flexible in facing various unpredictable challenges. Teachers with strong adaptability skills can integrate technology into teaching while maintaining an

approach tailored to students' individual characteristics (Jones, 2021). This adaptability involves not only the use of technology but also the adjustment of teaching methods according to students' learning styles.

#### 5. Communication and Collaboration Skills

The interview results show that teachers' communication skills, whether with students, parents, or colleagues, remain highly valued and important. Technology can accelerate communication, but human interaction in the form of dialogue, discussion, and teamwork between teachers and students is key to building a positive classroom climate. Fullan (2016) states that collaboration skills are one of the essential skills that should be prioritized in modern education, and they cannot be fully replaced by technology.

#### 6. Ethics and Moral-Based Teaching

This research also shows that teachers play an important role in integrating ethical values into every learning process. Some research participants emphasized that while technology may replace mechanical aspects of teaching, it cannot guide students in making decisions based on good ethics or morals. Hargreaves and Fullan (2020) assert that social and ethical responsibility is an essential part of a teacher's duties, and this cannot be automated.

### ***Discussion:***

The research findings indicate that although technology plays a crucial role in education, the human competencies possessed by teachers remain essential. Interpersonal skills and the ability to manage classrooms are aspects that cannot be automated. Thus, future education must emphasize the development of these competencies in teacher training.

Moreover, a strong understanding of pedagogy is needed for teachers to effectively leverage technology. This signals the need for training curricula that focus on integrating technology with effective teaching strategies. Research by Ingersoll (2001) shows that teachers with strong training in pedagogy and technology are better able to adapt to changes.

The adaptability skills expressed by teachers also reflect the dynamics present in today's educational world. In facing rapid changes, both teachers and educational institutions need to foster a culture of continuous learning. Therefore, this study suggests that educational stakeholders develop professional programs that support teachers in enhancing their skills.

Finally, the results of this study underscore that technology should be viewed as a supportive tool, not a replacement for the teacher's role. By understanding and developing irreplaceable competencies, teachers can continue to make significant contributions to education in the era of automation.

#### 4. CONCLUSION

Although technology and automation will continue to evolve and have the potential to change how learning is conducted, the role of the teacher remains irreplaceable. Competencies such as empathy, creativity, moral guidance, adaptability, and facilitating social development are aspects that cannot be replaced by technology.

The future role of teachers may increasingly shift towards being mentors, facilitators, and role models, with technology serving as a supportive tool to help them enhance teaching efficiency and effectiveness. Ultimately, education is not just about delivering information, but about shaping individuals holistically, a role that only a teacher can fulfill.

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