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Teacher 2.0: The Changing Role of Educators in the Age of Intelligent EdTech

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Abstract

The world of intelligent education technology (Edtech) is improving by leaps and bounds and this affects the way teaching and learning are conducted, setting new definitions for the role of a teacher in the modern classroom environment. This paper investigates the new role of teachers in an AI-driven world with adaptive learning systems, learning analytics, virtual classrooms, and digital collaboration platforms. Education professionals are now teaching learners to be understanders rather than just providers of knowledge, they are becoming facilitators, mentors, instructional designers and learning experience managers. The study investigates the applications of the intelligent EdTech tools for personalized learning, real-time assessment, student engagement, and data-driven instructional decision.

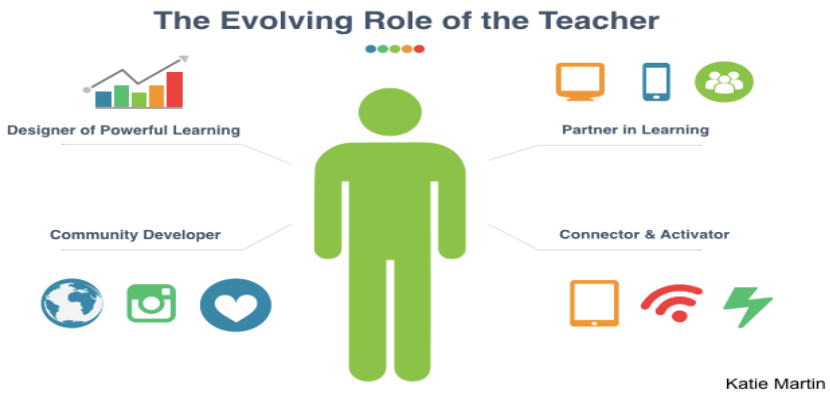
The study is descriptive and analytical with literature related to contemporary technology and technology enhanced education and emerging pedagogies. It focuses on the possibilities provided by intelligent technologies to improve accessibility, the inclusion of persons and learning outcomes and on the importance of human interaction, emotional intelligence, judgment of values and critical thinking in the learning process. The next generation of Teachers, Teacher 2.0 and its characteristics of digital literacy, technological pedagogical knowledge, adaptability and continuous professional development are also explored in this study.

Based on the results, it can be concluded that intelligent EdTech does not replace teachers, but supplements teachers' work, lessens teachers' routine work, and provides teachers with more flexible teaching. But obstacles like the lack of access to technology, issues around data privacy, reluctance to change, and a lack of training are also major impediments to successful implementation. The paper gives perspective on the need to support the successful implementation of the intelligent technologies in education through institutional support, policy initiatives and comprehensive teacher training. Overall, the research calls for a harmonious co-existence of human intelligence and technical innovation in the education sector, highlighting the importance of teacher as facilitators to support creative learning, cooperation, moral development and lifelong learning in a technologically enriched education environment.

Keywords: Teacher 2.0, Intelligent EdTech, Artificial Intelligence in Education, Digital Pedagogy, Technology-Enhanced Learning, Adaptive Learning Systems, Teacher Competencies, Educational Innovation.

Introduction

Digital technologies have transformed the world of education and life in general, and have evolved rapidly. Intelligent educational technologies (EdTech) like artificial intelligence (AI), machine learning, adaptive learning systems, learning analytics, virtual classrooms and personalized learning platforms have transformed the education sector and how students learn. These technologies are beginning to be applied in the education system and the teacher's job is changing in a significant way.



Source: *https://medium.com/age-of-awareness/the-evolving-role-of-the-teacher-75c8b6261a7a*

In the traditional view teachers were viewed as individuals who were asked to impart knowledge, content and evaluate performance. In the current context of technology-driven instructional system, however, information is easily available via the digital platform, online resources, and smart tutoring system. As a result, the role of the educator is transiting from the provider of knowledge to become a facilitator, mentor, and digital learning ecosystems manager. This has resulted in the creation of a new acquisition of "Teacher 2.0" which is "digitalised" and is able to utilize the technology in an educationally appropriate way.

But, with the rise of Intelligent EdTech, opportunities have been created to tailor learning experiences, assess in real-time, use data for teaching, and engage. Knowledge gaps can be analysed and custom learning pathways can be recommended based on learner behaviour, using AI-powered platforms. Learning management systems provide a smooth interaction and relationship between teachers and students, while virtual and augmented reality technologies provide immersive learning opportunities. This has provided a new way forward for teaching – beyond classroom and beyond classroom teaching.

While the many advantages of intelligent EdTech appear evident, the educational turn of the 21st century also leads to challenges for teachers. School staff should regularly ensure that they stay current with technology, keep pace with new technology, actively resolve issues for data privacy and ethical use of Artificial Intelligence, and continue to have high-quality connections with other individuals in a digital environment of greater technology use. The adoption of intelligent technologies must not rely on technology infrastructure, but also requires teachers' willingness to adopt and the professional ability of teachers.

The COVID-19 pandemic further hastened the use of digital technologies in education and the need for teacher adaptability and digital preparedness. The emergence of online and blended learning opportunities in educational institutions around the world has never been greater, further emphasizing a need for educators who are able to effectively engage students in complex digital contexts and meet the needs of diverse population groups.

In this context, the role of teachers in the Digital Age of Intelligent EdTech is an emerging research field. The process of teachers' adaptation to technological innovations, as well as the development of teachers' digital pedagogical competencies and their reconceptualization of their professional identity are important to consider when designing future educational policies and teacher development programs. In this paper, the concept of Teacher 2.0 is discussed and how the role, opportunities and challenges of teachers are changing in a growing intelligent context of educational technology is examined.

Background of the study

Education is always a dynamic field that has been undergoing changes perpetually in response to new societal, technological, and economic developments. In the old days, instructors were the primary ones who provided information, presenting the content in the classroom with face-to-face interactions and classrooms lectures. The twenty-first century has witnessed the mushrooming of technology enhanced learning environments and new modes of teaching and learning, however, due to the fast progress of digital technologies.

The use of Information and Communication Technology (ICT) in learning and teaching marked a new dawn with enormous transformation in the processes of teaching and learning. Over time these educational technologies have evolved from simple digital technologies to more complex intelligent technologies, supported by the AI, ML, learning analytics, adaptive learning platforms, virtual classrooms, and automated assessment mechanisms. All these bring with them a new era of Educational Technology (EdTech) in which using technology is no longer synonymous with using technology to aid the learning process, but technology is actively used to teach learners, to assess learners and to provide personalization.

In the wake of the expanding presence of smart EdTech options, teachers have been remodelled. Today, teachers don't just have to be content vehicles; they're becoming facilitators, mentors, instructional designers, coaches and guides and digital navigators. Today's teachers must effectively incorporate technology into their lessons, help students access and assess digital resources, help students think critically and be creative, and design effective learning experiences that are inclusive and motivating for all students. It has resulted in the rise of the "Teacher 2.0", a teacher who has the necessary digital skills and can use intelligent technologies for collaboration to improve learning outcomes.

COVID-19 has further encouraged the educational sector around the world to embrace digital learning platforms. In a short span of time, schools, colleges and universities made the switch to virtual and blended teaching and learning, drawing

attention to the importance of teachers, as the facilitators of technology-supported learning spaces. To summarize, this was a time of resilience and adaptability for educators, with challenges in the areas of digital literacy, technological infrastructure, student engagement, and professional development. These experiences highlighted the need for continuing upskilling and capacity building of teachers to optimally leverage new technologies in education.

Smart educational technology tools and resources, such as adaptive learning systems, AI tutoring platforms, virtual reality applications, chatbots, and predictive analytics, are increasingly being introduced into education. While they can improve personalised learning, access and data informed decision making, there are also issues of teacher autonomy, ethics, privacy of data and digital equity and human-centred education. Hence, understanding of teachers' perceptions, adaptations and interactions into intelligent technology are important. Therefore, it is an important area of research.

Beyond the need to have subject-matter and teaching skills, teachers need to cultivate new skills that are the requirements of the changing educational landscape. The use of technological pedagogical content knowledge (TPACK), data interpretation skills, online communication ability and the use of AI-assisted instructional tools are becoming key and integral parts of contemporary pedagogy. Schools and policy makers are beginning to realize that there is a need for teacher-directed, teacher-led professional development opportunities, as well as technology training programs and institutional structures to support effective technology integration.

Within this context, the objective of the current study is to get acquainted with the role of educators in the Intelligent EdTech world. It aims to examine how technology is changing the role and identity of the teacher, how it is changing the acts of teaching and learning and how it is affecting the relationship between teacher and the taught. In addition to providing analysis of the opportunities and challenges of this transition, the study provides insights for education, administrators, policy makers and tech developers for the design of effective and sustainable learning environments as teachers transition to Teacher 2.0.

Justification

The rapid development of Artificial Intelligence (AI), machine learning, adaptive learning systems, learning analytics and other intelligent educational technology has brought a radical transformation in the educational field. The use of digital platforms to support individual learning by providing real-time assessment and interactive learning experiences is becoming more common, to complement the traditional approaches. Teachers no longer just transfer knowledge, but also facilitate and mentoring, make decisions based on data and reasonably use technology in pedagogy. This means new competencies for educators to be able to work with intelligent educational technologies.

Although the use of EdTech solutions is on the rise in schools, colleges and universities, a lot of insights into how such technologies are changing teachers' professional roles, responsibilities and skill requirements are still missing. A significant amount of literature exists on technological innovation and student outcomes, and there has been a much smaller amount of research in the literature that has looked at changes in teacher identity in the TELE environment. In addition, questions can be asked about teachers' readiness, digital competence, pedagogical adaptation, ethics, and professional development needs in relation to the use of AI in education.

The importance of this study is the effort to discuss the concept of "Teacher 2.0", which is the teacher who is able to facilitate learning to design digital learning as an interpreter of learning analytics, and as a promoter of critical thinking and creativity. To better prepare teachers for future-ready classrooms, it is crucial that educational institutions, policymakers, curriculum makers, and teacher-training agencies understand these evolving roles. The study also helps to enrich the field of Educational Change by outlining the opportunities and difficulties in integrating with intelligent EdTech in the process of teaching and learning.

Furthermore, with the ongoing digital transformation of education systems globally, it has become vital to rethink how teachers can keep the human side of education (empathy, motivations, moral guidance, social interactions etc.) while reaching the best of digital, technological tools. It is hoped that the results of this research can be used as a basis for developing teacher development programs that are effective for improving digital pedagogical practices and be able to implement the use of intelligent technology in learning successfully. Hence this study is timely and relevant in tackling one of the most important metamorphoses happening in the profession of teaching.

Objectives of the Study

1. To explore the changing role of teachers in technology enhanced and AI supported learning environments.
2. To examine the effect of the intelligent educational technologies (EdTech) in teaching method and classroom.
3. To examine the impact of the use of AI, adaptive learning systems and digital platforms on teacher – student interaction.
4. To recognize the new competencies, digital skills and pedagogical capabilities that educators in the era of intelligent Edtech need.
5. To explore the opportunities and challenges teachers face in implementing AI-powered technologies in the learning and teaching process.

Literature Review

The influence of the digital technologies is considerable all over the world on the educational systems, changing the role of teachers from traditional to digital. Today's teachers are expected to be more than just transmitters of knowledge and are required to serve as facilitators, mentors, technology integrators and learning designers in a digital learning landscape.

The Technological Pedagogical Content Knowledge (TPACK) model was proposed by Mishra and Koehler (2006) who argue that being a good teacher in a technology-rich environment involves combining technological knowledge, pedagogical knowledge, and content knowledge. Their paper points to an increasing need for educators to acquire competencies beyond their subject matter that include the ability to engage in digital literacy and use of instructional technology.

Koehler and Mishra (2009) also claimed that the technology integration is best achieved if teachers have a clear vision for the role of technology in improving learning and teaching practices. The study indicates that teachers need to constantly adjust to new and changed technologies in order to be effective in the modern classroom.

Successful integration and use of technology requires overcoming both external and internal barriers including teachers' beliefs and attitudes toward technology and inadequate infrastructure (Ertmer, 1999). This research highlights the key aspects of teacher readiness and confidence as factors for effective digital transformation in education.

Prensky (2001) coined the terms "digital natives" and "digital immigrants", which implied that the learning preferences of modern learners differ because of the role of digital technology in their lives. Therefore, teachers will have to tailor the teaching and learning style to suit the expectations and learning style of technology-oriented learners.

Selwyn (2016) explored the wider implications of educational technology, and claimed that although educational technology has great potential for enhancing the quality of teaching and learning, this potential is largely a function of teacher use. Study points to the importance of technology not replacing, but rather augmenting the expertise of professionals (educators).

With the advent of Artificial Intelligence in education, teaching roles have further evolved. According to Holmes et al., (2019), AI-driven educational systems can handle administrative duties, evaluate student work and offer tailored learning suggestions. This frees up time for teachers to spend on mentoring, critical thinking, and individualized support for students.

Luckin et al., 2016, suggest that AI should not be perceived as a substitute for teachers, but as a tool that helps in augmenting. Their study reveals that intelligent tutoring systems and learning analytics can be used to assist teachers in detecting learning gaps and the determination of personalized interventions within the learning process.

Higher education has been systematically reviewed for AI applications by Zawacki-Richter et al. (2019) and it has been identified that there is a considerable scope for developing AI models that can improve the effectiveness of teaching and learning activities through engaging learners in the learning process and analyze various learning outcomes. The authors nevertheless stated that there is still an essential role for human judgment, empathy, and pedagogical expertise in educational processes.

Using the DigCompEdu Framework, Redecker (2017) pointed out that digital competence is of utmost importance for teachers in the 21st century. The framework sets out key competences: Digital resource management; Digital assessment; Learner empowerment; Facilitating students learning digital competence.

Tondeur et al. (2017) explored teacher influencing factors for technology integration which highlighted the importance of professional development in building teacher confidence and effectiveness in using technology in the classroom. Their findings highlight the need of continuous training to prepare teachers for technology-based education.

UNESCO (2018) pointed out the importance of teachers as integral to the success of using ICT in education. UNESCO ICT Competency Framework for Teachers has argued for lifelong learning and updating of teachers so that they are able to make effective use of digital technologies for teaching, assessment and classroom management.

Trust, Carpenter, and Krutka (2017) explained that professional learning networks are developing to be increasingly vital to teachers adjusting to technological modifications. They found that digital collaboration platforms foster an environment for knowledge sharing, innovation, and ongoing professional development for educators.

Voogt et al. (2013) examined the current literature on teacher technology competencies and found a shift in the role of teachers from the role of content provider to the role of a facilitator for collaborative, student-centered and technology supported learning experiences. The authors suggested that teacher education programs should be restructured to meet these new expectations of teachers.

The latest studies from Dwivedi et al. (2023) have shown how generative AI technologies like intelligent tutoring systems, conversational agents, and adaptive learning platforms are transforming classroom practices. Teachers are called on to be more responsible for facilitating ethical use of technology, while also promoting critical thinking and facilitating real interaction between humans in the digitally-mediated learning environments.

Generally, the literature shows that there is a vast change in the role of educators in the era of intelligent EdTech. As technology keeps making inroads into everyday teaching activities, teachers will still be needed as facilitators of learning, mentors, innovators and ethical guides. The emerging "Teacher 2.0" is not just a digital literate teacher, but one empowered by technology, who integrates and uses technology to establish a learning environment that is personalized, engaging, and learner-centred.

Material and Methodology

Research Design:

The research method used in this study is a qualitative review method in discussing the changing role of educators in the context of intelligent Educational Technology (EdTech). The research is descriptive and analytical because it highlights the effect of technological advancements, artificial intelligence, adaptive learning systems, learning management platforms, and digital teaching tools on the changing of the traditional teaching. Based on the analysis and synthesis of existing literature, theoretical and empirical, the emerging trends, challenges, opportunities and competencies linked to the concept of “Teacher 2.0” in the current context of education are identified.

Data Collection Methods:

The research is entirely based on secondary data derived from a multitude of scholarly publications such as peer-reviewed journal articles, books, conference papers, government and policy reports, educational technology reports and publications from international organizations. Relevant literature was retrieved by using academic databases like google scholar, scopus, web of science, ERIC, springerLink, Taylor and Francis Online and ScienceDirect. Relevant studies were identified using keywords like “Teacher 2.0”, “digital pedagogy”, “artificial intelligence in education”, “EdTech integration”, “technology enhanced learning”, “digital competencies of teachers” and “intelligent learning systems”. A connected system of thinking regarding the evolving role of the teacher in technology-rich learning environments was seen as the result of a systematic collection, review, and analysis of the literature.

Inclusion and Exclusion Criteria:

The review encompassed scholarly publications, research articles, books, and institutional reports that primarily addressed the subjects of educational technology, artificial intelligence in education, teacher competencies, digital pedagogy, and technology-supported teaching and learning practices within the period of 2010 to 2025. English-written studies with a significant discussion of teacher's role in digital and intelligent learning environment were considered for inclusion. The publications that were not published in educational contexts, the publicity lacking academic rigor and the publications with

duplicate records were excluded from the review, as well as the articles without prior peer review, or opinion pieces, or editorials or other sources that have not had a sufficient relevance to the research objective.

Ethical Considerations:

Since the research is based on secondary data and published literature, it did not involve the participation of people directly. The ethical standards were upheld through the appropriate acknowledgment and quoting of all sources used while reviewing the paper. Findings and opinions of previous researchers were presented accurately so that there was no misinterpretation or plagiarism. The Study respects the values of academic honesty and integrity, transparency, objectivity and responsible research during the collection, analysis and presentation of information.

Results and Discussion

Results:

The study focused on the changing role of the educator in a technology-enhanced learning environment where technologies such as Artificial Intelligence (AI), Learning Management Systems (LMS), adaptive learning systems, virtual classrooms, and intelligent technologies are increasingly being adopted. The results show a remarkable shift in the role of teachers from a transmitter of knowledge to facilitator, mentor, learning designer, and digital guide.

Table 1: Perceived Changes in Teachers' Roles in the Age of Intelligent EdTech (N = 250)

Role Dimension	Mean Score	Standard Deviation	Rank
Learning Facilitator	4.52	0.58	1
Technology Integrator	4.41	0.63	2
Student Mentor	4.36	0.67	3
Content Curator	4.21	0.72	4
Assessment Designer	4.15	0.75	5
Traditional Lecturer	2.83	0.89	6

Interpretation:

The highest mean score was for learning facilitator (4.52), which shows that teachers are becoming more aware of themselves as facilitators of learning and are no longer seen as content providers.

Table 2: Level of Adoption of Intelligent Educational Technologies

Technology Tool	Percentage of Teachers Using (%)
Learning Management Systems	88
AI-Based Assessment Tools	76
Virtual Classrooms	91
Educational Chatbots	58
Adaptive Learning Platforms	64
Digital Collaboration Tools	87

Interpretation:

Virtual classrooms and LMS platforms had the highest rates of adoption, showing that digital technologies have been well integrated in the teaching practice.

Table 3: Impact of Intelligent EdTech on Teaching Effectiveness

Variable	Mean Score
Improved Student Engagement	4.48
Personalized Learning Support	4.35
Enhanced Assessment Quality	4.19
Increased Teaching Efficiency	4.26
Better Learning Analytics	4.11

Interpretation:
The respondents affirmed that the use of smart technologies was important to increase students' engagement and personalized learning opportunities.

Table 4: Challenges Faced by Educators in Intelligent Learning Environments

Challenge	Percentage (%)
Lack of Advanced Training	72
Data Privacy Concerns	65
Technical Issues	61
Resistance to Change	48
Increased Workload During Transition	69
Limited Institutional Support	42

Interpretation:
The most significant barriers were: data privacy issues, larger workload and not having the advanced training needed for the digital tools.

Table 5: Digital Competencies Required for Teacher 2.0

Competency Area	Mean Score
Digital Pedagogy	4.63
AI Literacy	4.47
Data Interpretation Skills	4.31
Online Assessment Design	4.28
Cybersecurity Awareness	4.17
Learning Analytics Utilization	4.22

Interpretation:
Digital pedagogy and AI literacy emerged as the key skills needed by teachers in the technologically advanced classrooms of today's times.

Discussion:

The results show that the appearance of smart educational technologies has dramatically changed the role of the teacher. Teachers are no longer the only means of information dissemination but are rather the facilitator as they guide students through a process of using digital information, collaborative learning and critical thinking. This is the change refer to the existing theories of learning: constructivist theories which emphasize on the learners' activities and the learners' learning process.

Digital transformation has firmly established itself as a part of current education as evidenced by the uptake of Learning Management Systems, Virtual Classrooms and AI aided learning tools. EdTech platforms offer intelligent tracking, targeted gaps and personalized interventions for teachers to monitor as they work with students. Therefore, learners' and teaching data has been the foundation of the development of data-driven and learner-centred teaching.

The results also showed that AI tools are useful for addressing teachers' administrative tasks such as grading, attendance, and student assessment. Other routine tasks can be automated, freeing more time for the teacher to devote to mentoring and counselling of students and to build high order thinking skills. This is an example of automation moving towards augmentation and represents one way technology can support and enhance teaching skills.

But the findings also are highly problematic. The lack of training was a large problem reported by most respondents in effective technology integration. This highlights the importance of continuous and ongoing professional development and training efforts for the promotion of AI literacy, digital pedagogy, and learning analytics. Furthermore, data privacy and ethical considerations for the use of educational technology highlight the importance of robust institutional policies and regulations.

It also emphasizes the importance of digital competence of teachers. Digital skills for content creation, online evaluation, cybersecurity, and AI teaching support are becoming vital for classroom management and student interaction. For those schools that commit to improving teachers' capacity building work, it is more likely that they would be successful in the application of intelligent educational technologies.

In sum, the results indicate that the role of the Teacher 2.0 is an evolution, not a replacement of the traditional role of the teacher. Technology offers tremendous assistive tools for improving learning activities, but the human elements of education (empathy, motivation, mentorship, creativity, ethics, etc.) are irreplaceable. Thus, the future of education will rely on the effective cooperation of the teacher and the "intelligent technologies" in order to form meaningful, inclusive and effective learning environments.

Limitations of the study

This study introduces the role the teacher plays within the new era of intelligent educational technologies; there are, however, some limitations which should be recognised. Secondly, much of this study is based on secondary data, which includes research articles published in the literature, reports, policy documents, and previous literature on educational technology, but may not fully reflect the latest advances in fast-changing AI-driven learning environments. Secondly, the uptake and impact of EdTech tools is and will remain highly unevenly distributed on a global scale, both within and across countries, regions and socioeconomic settings, therefore limiting the generalizability of the results. Third, variations in technology infrastructure, with respect to teachers' digital literacy, or internet connectivity available in schools may impact experiences and perceptions of teachers and therefore caution needs to be employed when making uniform conclusions. Also, the study is primarily based on formal education and the results may not reflect informal, vocational or specialized education contexts. AI and EdTech are also dynamic fields and observations, insights, and conclusions might change in line with new AI and Edtech developments. Lastly, the effects of institutional support, policy frameworks, cultural differences and individual teacher attitudes on technology adoption are complex issues that are not fully addressed in the context of this study.

Future Scope

As intelligent educational technologies evolve, the role of educators is to be expected to further transform. The future of research is also to dive deeper into the transformation of educational practice at various levels and subjects with the help of AI and adaptive learning systems, learning analytics, virtual reality and personalized learning platforms. Much can be explored regarding the skills and knowledge teachers must acquire, to enable them to use new technologies effectively in

the classroom without losing the meaningful human interaction and ethical education that are key to the learning process. Comparative research in cross-country, cross-institution and cross-education system may contribute further understanding of the issues and opportunities of technology-based teaching. Moreover, further research could be conducted on the use of intelligent EdTech for teacher autonomy, student engagement, assessment, inclusivity and lifelong learning. Recognising how the relationship between teachers and technology is changing will continue to be essential in establishing sustainable, equitable and learner-centred education systems in the digital era.

Conclusion

The arrival of intelligent educational technologies has greatly changed the role of teachers in modern learning environment. The role of the teacher as an agent of knowledge transfer is slowly changing to facilitator, mentor, learning designer and digital guide. New technologies, like AI, adaptive learning systems, learning analytics, virtual classrooms, and customized learning platforms, have transformed the way teaching and learning can happen in a flexible, interactive, and student-centered approach that extends what can be accomplished.

As more and more intelligent learning technology solutions are becoming available, there are these tools that can never be substituted with the human element of education. The teachers' role in developing critical thinking, creativity, emotional, ethical and social interaction in students remains critical. Technology can aid in the delivery of content, in assessment, and in the creation of learning pathways for each student, but it does not fully represent the empathy, motivation, and contextual understanding educators bring to the learning process.

This term “Teacher 2.0” expresses a new professional identity, a blend of pedagogical skills and digital skills. Educators must be continuously prepared and should be technologically literate and supported by the system to perform this changing role effectively. Teachers need preparation for the ever-evolving field of education, technology investments in classrooms, and inclusive technology planning strategies to help them keep pace with the changing educational landscape.

As the world of education takes another step towards the digital, it will be the most collaborative learning environments that will work best, combining human teachers with smart technology. So, intelligent EdTech is not a substitute for teachers, but is a great tool to support teachers to teach well and improve students' learning outcomes. The future of education should thus be one of a balanced partnership, whereby technology supports and enhances humans, with teachers as the facilitators who can make education more engaging, inclusive and meaningful for all learners.

References

1. Anderson, T. (Ed.). (2008). *The theory and practice of online learning* (2nd ed.). Athabasca University Press.
2. Bates, A. W. (2022). *Teaching in a digital age: Guidelines for designing teaching and learning* (3rd ed.). Tony Bates Associates Ltd.
3. Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education, 18*(1), 50. https://doi.org/10.1186/s41239-021-00282-x
4. Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to Coronavirus pandemic. *Asian Journal of Distance Education, 15*(1), i–vi.
5. Christensen, C. M., Horn, M. B., & Johnson, C. W. (2011). *Disrupting class: How disruptive innovation will change the way the world learns* (2nd ed.). McGraw-Hill.
6. Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Harvard University Press.
7. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008
8. Dede, C. (2014). The role of digital technologies in deeper learning. *Students at the Center: Deeper Learning Research Series*. Jobs for the Future.

9. Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 45*(3), 255–284. https://doi.org/10.1080/15391523.2013.10782615

10. Fullan, M., Quinn, J., Drummy, M., & Gardner, M. (2020). *Education reimagined: The future of learning*. New Pedagogies for Deep Learning.

11. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

12. International Society for Technology in Education. (2017). *ISTE standards for educators*. ISTE.

13. Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2015). *NMC horizon report: 2015 higher education edition*. New Media Consortium.

14. Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education, 20*(1), 176–198.

15. Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In J. M. Spector et al. (Eds.), *Handbook of research on educational communications and technology* (pp. 101–111). Springer.

16. Luckin, R. (2018). *Machine learning and human intelligence: The future of education for the 21st century*. UCL Institute of Education Press.

17. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

18. OECD. (2021). *Digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots*. OECD Publishing. https://doi.org/10.1787/589b283f-en

19. Ottenbreit-Leftwich, A., Glazewski, K., Newby, T., & Ertmer, P. (2010). Teacher value beliefs associated with using technology. *Computers & Education, 55*(3), 1321–1335. https://doi.org/10.1016/j.compedu.2010.06.002

20. Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning, 12*(1), 22. https://doi.org/10.1186/s41039-017-0062-8

21. Prensky, M. (2010). *Teaching digital natives: Partnering for real learning*. Corwin Press.

22. Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.

23. Selwyn, N. (2016). *Education and technology: Key issues and debates* (2nd ed.). Bloomsbury Academic.

24. Trust, T., Carpenter, J. P., & Krutka, D. G. (2017). Leading by learning: Exploring the professional learning networks of instructional leaders. *Educational Media International, 54*(2), 137–152. https://doi.org/10.1080/09523987.2017.1364779

25. UNESCO. (2018). *ICT competency framework for teachers* (Version 3). UNESCO Publishing.

26. UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO Publishing.

27. Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & Van Braak, J. (2013). Technological pedagogical content knowledge—A review of the literature. *Journal of Computer Assisted Learning, 29*(2), 109–121. https://doi.org/10.1111/j.1365-2729.2012.00487.x

28. Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: Digital technologies and distance education during COVID-19. *Learning, Media and Technology, 45*(2), 107–114. https://doi.org/10.1080/17439884.2020.1761641

29. Zhao, Y. (2012). *World class learners: Educating creative and entrepreneurial students*. Corwin Press.

30. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education, 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0

31. N. BN, S. B. Murthy and S. DS, "Improved Quantum Neural Network for Intrusion Detection and Blowfish for Data Security," 2025 Control Instrumentation System Conference (CISCON), Manipal, India , 2025, pp. 1-9, doi: 10.1109/CISCON66933.2025.11337273.

32. N. BN, D. E. Geetha and R. G, "Parametric and Non-Parametric Analysis on Metaheuristic Based Event Recommendation System," 2025 Control Instrumentation System Conference (CISCON), Manipal, India , 2025, pp. 1-10, doi: 10.1109/CISCON66933.2025.11337415.

33. Nithya BN, Hemanth Uppala,.(2026). Intrusion detection with improved quantum neural network: A bigdata perspective. Future Generation Computer Systems, Vol-175. DOI: https://doi.org/10.1016/j.future.2025.108102

34. Dey, Sourav (2012). "Discursive Self in Consumption: Body, Fluidity, and Femininity". Global Media Journal, Indian Edition 3 (1), pp. 1-12.

35. Dey S. M. (2021). Psychosocial stress contagion of COVID-19: issues and intervention channels. Ensemble SP-1, 44–53. https://doi.org/10.37948/ensemble

36. Dey, S. M. Women & children trafficking in Bangladesh: A historical significance & current challenges