© Volume 2, Issue 8, ***August*** 2026 | JATIR
ISSN: 3139-8464 (p)

Current and Future Trends in Technology Integration by College Faculty

[1]Sanjana S. Shenoy, [2]Dr. Shailashri V. T
[1]*Research Scholar, Institute of Management and Commerce, Srinivas University, India*
[2]*Research Professor, Institute of Management and Commerce, Srinivas University, India*

***Abstract*—The teaching profession, a noble profession, has evolved with changing times to reflect societal shifts and technological breakthroughs. From the traditional classroom which involved usage of blackboard, chalk and textbooks, where teaching was done using the "chalk and talk" method, to the emergence of smart classrooms and blended learning, each job component of a college teacher, including teaching, evaluation, research, learning and development and administrative duties have undergone tremendous change. The purpose of this paper is to study the current and future trends of ICT and AI-based technology usage in higher education, in context of each job role of a college faculty.**

Technology has widespread usage in teaching and learning and has brought about a paradigm shift in teaching practices. The advent of Artificial Intelligence (AI) technology has been rapid and is fast evolving. Technology tools have completely changed the ways in which lectures are delivered. With the availability of vast e-resources, learning is now easier. Tools such as ChatGPT and Gemini have made research work quicker. Usage of AI-driven technology is becoming widespread very rapidly, bringing with it a new set of opportunities and challenges.

***Index Terms*—Technology, Artificial Intelligence (AI), Teacher, Higher Education, Job components**

I. INTRODUCTION

In modern times, technology has pervaded all aspects of life. From the days of chalk and blackboard, the process of teaching and learning has kept on evolving with changing technology. The introduction of AI has brought about far-reaching changes in every aspect of teaching profession. Each component of a teacher's job can now be carried out by integrating technology, making learning interactive and informative.

1.1. The emergence of technology in education

Information and Communication Technology (ICT) is referred to as the diverse range of technological tools and resources used for information generation, dissemination, administration and communication. ICT consists of hardware, software and network infrastructure.

ICT tools have revolutionized the landscape of higher education, offering university faculty a dynamic range of resources to enhance teaching, research, and administration. The integration of ICT tools into academia facilitates innovative pedagogical approaches, enabling instructors to create more interactive and engaging learning environments. From smart classrooms which include digital whiteboards, projectors, power point presentations, USB, cables and laptops to Enterprise Resource Planning (ERP) software, which is used to track student attendance and performance and Blended Learning, which is a hybrid method of learning combining face-to-face and online mode, thereby providing flexibility of study time and location, these technologies empower educators to tailor their teaching methods, reach a broader audience, and manage their academic responsibilities more efficiently. Additionally, ICT plays a crucial role in fostering research and learning by providing access to webinars, online Faculty Development Programmes (FDPs), vast digital libraries, plagiarism check, grammar check and paraphrasing tools. As universities continue to evolve in a digital age, the adept use of ICT tools by faculty is essential for improving educational outcomes of students and for their own professional development in a technology-driven world.

II. OBJECTIVES

The paper aims, through a literature survey,
To study how each component of a college teacher's job has been integrated with technology.
To enumerate the current and futuristic technology tools that can be used for each component of a faculty.
To examine the benefits and challenges of technology usage by faculty.

III. METHODOLOGY

This is a conceptual paper and the data for the same is collected through secondary sources. For the purpose of Literature Review, Google Scholar was searched to collect journal articles using keywords such as "ICT in Education", "Challenges of technology usage" etc.
Data was also collected from other sources such as thesis and websites for the purpose of enumerating the various job roles of a faculty and the tools used to help perform them.

IV. REVIEW OF LITERATURE

a) Zafar, T. (2019). [1] examines role, challenges and impact of ICT on students, teachers and end-users. The study finds a positive impact of ICT usage on students' collective capabilities and skills.

b) Ratheeswari, K. (2018). [2] calls for a well-designed teacher training programme so that ICT tools can be effectively used for teaching.

c) Rani, M, et. al. (2023). [3] Through a survey of 60 teachers, the paper underlines a need for teacher training in using ICT tools.

d) Singh, V, Dubey, A, & Sonkar, C (2022). [4] Through a literature analysis, the study examined the changes introduced in education system such as blended learning, evaluative learning, learning through blogging etc.

e) Janaki, P. (2019). [5] Finds a positive influence on quality of education through ICT. Using a sample size of 17 teachers and 40 students, the paper recommends that ICT can be effective only when teachers are digitally literate and trained to use ICT.

f) Pandey, A. & Kamlesh S.R. (2023). [6] The paper provides an overview of various ICT tools used in education field and studies advantages and disadvantages of these tools and also examines the role of policy and infrastructure in effective integration of ICT in education.

g) Saha, T. (2023). [7] The paper discusses the role of ICT in education and the issues and challenges in the process. Suggests financial and technical support, policy formulation and teacher's training.

h) Jo Shan Fu (2013). [8] This review paper studies merits of integrating ICT in schools, barriers and challenges in implementation, teacher's attitudes, perception and confidence in using ICT.

i) Sharma, A. (2021). [9] Finds that school teachers use ICT in lesson planning, lesson delivery and assessments. The paper also highlights Government efforts to integrate ICT into the education system.

j) Singh, J., & Kumari, M (2022). [10] Studies the role of ICT in Indian education from 35 universities. Finds that teachers prefer using ICT tools in classrooms. Students also reported a positive impact of ICT.

k) Kumar, K. (2023). [11] Notes the increasing use and impact of ICT in the higher education system. Discusses the role played by in continuing education during the pandemic. The paper also calls for increased involvement of teachers in using ICT.

l) Ghavifekr, S., et. al. (2016). [12] In a study of 100 secondary school teachers in Meleka state Malaysia, found that challenges faced included problems with network connection, lack of training and lack of competency in using ICT.

m) Jena, R. K. (2015). [13] examined the stress levels among academicians resulting from use of ICT tools, by studying technostress among 216 academicians randomly selected from different

colleges across India. Observed that increased technostress reduces satisfaction, commitment and performance.

n) Scherer, R., Siddiq, F., & Teo, T. (2015). [14] The study conducted among 1653 Norwegian teachers, finds a positive correlation between self-efficacy and ICT tools but a negative relation to age.

o) Olulube, P. (2006). [15] Studied the impact, uses and challenges of integrating ICT in teachers' education program in Nigeria and showed dissatisfaction among the 180 respondents studied, with the pace of ICT integration.

p) Chigona, A., Chigona, W., & Davids, Z. (2014). [16] Investigates factors that motivate teachers to use ICTs in schools in disadvantaged areas of South Africa. Finds that satisfaction derived from using ICT, individual expectations and a sense of achievement experienced while using technology are some factors that motivate use of ICT tools.

q) Oye, N. D., Iahad, N. A., & Rabin, Z. A. (2011). [17] Using the TAM & UTAUT models, studied teachers' behavioural intention on acceptance and use of technology among 100 respondents from a University in Nigeria. Finds that performance expectancy is the most influential factor for use of ICT by the respondents. The study recommends mandatory training for teachers to use ICT.

r) Mikre, F. (2011). [18] The paper analyses the benefits and limitations of ICT in education. The paper studies the challenges and impact of ICT usage in the Ethiopian context. Concludes that despite the limitations, use of ICT improves the quality of education programmes and is useful to enhance student engagement and has a positive impact on student performance and achievement.

s) Lomos, C., Luyten, J. W., & Tieck, S. (2023). [19] Luxembourg has one the highest availability of technology related resources of teaching and learning, but a relatively lower use of technology in classrooms. Using a data of 420 teachers in Luxembourg, the study finds internal barriers such as skills, attitude and knowledge are responsible for low use. The study also finds personal characteristics of teachers such as vision, beliefs and perception of utility of ICT are predictors of ICT usage.

t) Fitria, T. N. (2021). [20] The paper discusses the various uses of AI in education, and notes that use of AI in routine tasks such as grading, recoding student attendance, generating admin reports, will be made easier. This will enable teachers to better perform their job duties. The paper notes that while AI is a powerful tool, it cannot replace teachers.

u) Crompton, H., & Burke, D. (2023). [21] This systematic review examines the use of AI in higher education from 2016 to 2022. Around 138 articles were studied. The purpose of using AI was identified as assessment/evaluation and managing student learning.

V. FINDINGS, RESULT AND DISCUSSIO

Table 1: Job Components of a college faculty and scope for technology usage

Job Component of a college faculty	ICT Tools used		Current and future trends of AI-driven technology
Classroom teaching		Hardware Tools	
• Creation of lesson plan • Preparation of PPT/Slides • Delivering Lectures • Preparation and sharing of Study Material • Field Trips	• Smart Classroom • Blended Learning • YouTube • MS office (PowerPoint, word) • Websites & Search engine (eg. Google) • Google Classroom • Videoconferencing Platforms (Zoom, Google meet etc.) • Learning Management System (LMS)	• Projector • Wi-Fi • Laptop • USB • Smart Board • Cable	• AI-driven Presentation tools (eg. Canva/ Prezi) • Virtual field trips using Virtual reality (VR) • Curriculum design using Machine Learning (ML) and Generative AI. • Augmented Reality (AR) • Gamification
Administrative duties		Hardware Tools	
• Attendance • Internal marks • Student committee work • Class teacher duties • Mentoring students • Administrative Positions (eg. Dean) • Parent-teacher communication • Staff meetings	• Enterprise Resource Planning (ERP) • E-mail	• WIFI • Laptop	• AI-based attendance system through facial recognition. • Support through automated administrative tasks (helps to reduce teacher workload)
Evaluation		Hardware Tools	
• Question Paper setting • Valuation or	• Online Quiz (Internal Assessment through ERP or Google Forms)	• Computer lab • Internet	• Plagiarism check software (eg. Turnitin)

grading • Internal Assessment • Invigilation • Preparing exercises/activities.	• MS Office (Word, Excel)	connection (LAN)	• AI-based proctored examination • Grading tools (eg. Gradescope) • Assessments through generative AI [22] & Natural language processing (NLP) powered tools • Auto descriptive answer Evaluation [23].
Research		Hardware Tools	
• Publications • Conference Presentations • Funded Projects • Guiding students for projects/ Ph.D.	• Article Databases/Search engine (Google Scholar/CrossRef/Research Gate etc.) • Reference Management Software (eg. Mendeley, Zotero etc.) • Repository (Shodhganga/INFLIBNET) • Statistical Analysis Software (eg. SPSS, R etc.)	• Laptop • Wi-Fi	• AI Chatbots (eg. ChatGPT) • Paraphrasing Tool (eg. Quillbot) • Grammar Check software (eg. Grammarly) • Plagiarism check software (eg. Turnitin)
Learning and Professional Development		Hardware Tools	
• Updating knowledge	• Digital Library (Databases, e-books, e-journals, repositories) • MOOCs (eg. Coursera, SWAYAM, Udemy, LinkedIn Learning etc.) • E-learning (Online FDPs, Webinars)	• Wi-Fi • Laptop • Library with desktop and internet connection	• AI generated personalized course recommendations (eg. Coursera) [24] Customized learning modules

5.1. Current and Future trends of Artificial Intelligence (AI) and other technology in Education

AI is revolutionizing teaching in higher education by streamlining tasks and enhancing pedagogical methods. Currently, AI is being used by faculty members to automate grading, manage

administrative duties, enable faster research work and provide analytics on student performance to tailor instruction. Tools like virtual teaching assistants and AI-driven content creation platforms help educators focus on core teaching activities. AI tools are assisting faculty members with creating educational content, such as lesson plans, presentations, and interactive modules. Virtual Reality (VR) technologies, powered by AI, can create immersive and engaging learning experiences, through virtual field trips.

In the future, AI is expected to enable more dynamic and personalized learning environments, support faculty in research by analyzing large datasets, and foster collaboration through intelligent virtual platforms. AI can automate tasks like grading and providing feedback, freeing up teachers' time for more focused interactions with students. AI can help to analyse student performance data, providing immediate feedback and insights to students, their parents and teachers. AI will also likely revolutionize invigilation through AI-based proctored examinations, leading to more efficient and effective online assessments, thereby reducing the need for physical invigilation.

Additionally, AI will play a key role in professional development by offering customized learning modules based on individual teaching styles and needs.

Some types and uses of this AI technology is described in detail below:

a) AI Chatbots

An AI chatbot is a computer program that uses artificial intelligence to simulate conversations with human users, often used in higher education to automate tasks, provide instant support, and offer personalized learning experiences.

ChatGPT is one the most popular AI-powered chatbots used in education. Teachers can use ChatGPT to generate answers to open-ended questions [25], thereby helping them to prepare instruction material for their classes. It also makes tasks such as writing research papers quicker and easier.

b) Paraphrasing Tools

A paraphrasing tool is software that rewrites or rephrases text while preserving the original meaning, offering alternative phrasing for words, phrases, sentences, or even paragraphs. In higher education, teachers can use these tools for research, to improve writing, understand complex texts, and avoid plagiarism.

c) AI-driven presentation tools

An AI-driven presentation tool uses artificial intelligence to assist in creating, designing, and delivering presentations, offering features like content generation, layout suggestions, and multimedia integration. It helps teachers make more visually appealing presentation slides, thereby acting as a valuable tool in making classroom teaching more interesting.

d) Virtual Reality (VR)

VR uses technology to simulate environments and objects, making users feel like they are present in that virtual world. VR creates immersive, interactive, 3D simulated environments, and college

teachers can use it to enhance learning by offering hands-on simulations, virtual field trips, thereby providing students access to otherwise inaccessible experiences.

e) Grammar Check Software

AI based Grammar check software analyses text for errors in grammar, spelling, punctuation, and style, and college teachers can use it to save time on grading, provide students with feedback on their assignments, and also helps faculty in research writing.

f) Plagiarism check software

Plagiarism check software, like Turnitin, helps higher education teachers identify instances of plagiarism by comparing student work against a vast database of published materials and the internet, generating similarity reports to highlight potential issues. It can be used to evaluate student papers, assignments and projects.

Newer AI-driven plagiarism detection tools help to check for AI-generated texts and helps in controlling use of AI assistance [26].

g) Grading tools

AI-based grading tools use artificial intelligence to automate and streamline the grading process in higher education, offering teachers time-saving solutions and providing students with faster feedback. These tools analyse student work, provide feedback, and can even assist with creating assessments. AI algorithms can automatically grade multiple-choice questions, fill-in-the-blank questions, and even some short-answer questions, saving teachers significant time. Some tools allow teachers to input rubrics, and the AI can then grade based on those criteria, ensuring consistency and fairness.

5.2. Constraints or Challenges of Technology usage in Education

A few challenges posed by technology integration in education include

- Digital divide in terms of access to internet and other IT infrastructure as well as access to digital libraries between institutions in rural and urban areas or between elite and non-elite educational institutions or between those who know to use and do not know.
- Drop in thinking skills or creativity due to rise in AI Chatbots
- Rise in plagiarism caused by use of paraphrasing tools.
- Stress of adapting to changing technology i.e., technostress.
- Data privacy concerns.
- Cost of access and maintenance.
- Lack of awareness about technology tools/ Lack of training
- Addiction to devices or gadgets.
- Need for continuous learning to use emerging technology tools.
- Tiredness/health problems caused by use of devices.
- Overload of information.

VI. SCOPE FOR FURTHER RESEARCH

There is need for a primary data-based study to analyse the extent of technology usage and further detailing what factors facilitate early adoption and optimum utilization of these technologies by higher education teachers.

VII. CONCLUSION

Integration of technology into teaching and learning has revolutionized the education system. Furthermore, technology is rapidly evolving and newer AI tools are set to bring about more rapid changes. The use of technology has the power to make teaching and learning a more fulfilling experience. However, technology poses certain challenges like information overload, use of technology by students for leisure activities and lack of creativity. It is essential that only the positive aspects of technology have to be used.

REFERENCES

[1] Zafar, T. (2019). Role of information communication technology (ICT) in education and its relative impact. International Journal of Engineering Research & Technology (IJERT), 7(04), 1-10.

[2] Ratheeswari, K. (2018). Information communication technology in education. Journal of Applied and Advanced research, 3(1), 45-47.

[3] Rani, M, et. al. (2023). Role of Information Communication Technology in Education: An Overview., qualitativeresearchjournal.com, https://qualitativeresearchjournal.com/index.php/view/article/view/58

[4] Singh, V, Dubey, A, & Sonkar, C (2022). Role of Information and Communication Technologies (ICT) in Education Sector in India. International Journal of Creative research Thoughts.

[5] Janaki, P. (2019). A Study on "The Impact of ICT on Educational Performance, International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN:2349-5162, Vol.6, Issue 1, page no.72-77, January-2019, Retrieved from :http://www.jetir.org/papers/JETIRT006012.pdf

[6] Pandey, A. & Kamlesh S.R. (2023). Transformative Role of ICT Tools in Education, International Journal of Creative Research Thoughts (IJCRT), 11(8), pp.c930-c935, Available at :http://www.ijcrt.org/papers/IJCRT2308316.pdf

[7] Saha, T. (2023). The role of ICT in Education: : Challenges and issues , International Journal of Emerging Technologies and Innovative Research (www.jetir.org).10(2), page no.f794-f801, Available at :http://www.jetir.org/papers/JETIR2302586.pdf

[8] Jo Shan Fu (2013). ICT in Education: A Critical Literature Review and Its Implications. International Journal of Education and Development using Information and Communication Technology, (IJEDICT). 9(1), pp. 112-125.

[9] Sharma, A. (2021). Impact of ICT on teaching practices in India (No. 46). ICT India Working Paper.

[10] Singh, J., & Kumari, M (2022). Role of ICT in Indian Education System and How does it Impact the Student's Learning?. Unnati. 10(2).

[11] Kumar, K. (2023). Impact of ICT on the Indian Education System in India. International Journal for Multidisciplinary Research. (Conference Proceedings)

[12] Ghavifekr, S., et. al. (2016). Teaching and Learning with ICT Tools: Issues and Challenges from Teachers' Perceptions. Malaysian Online journal of educational technology, 4(2), 38-57.

[13] Jena, R. K. (2015). Technostress in ICT enabled collaborative learning environment: An empirical study among Indian academician. Computers in Human Behavior, 51, 1116-1123.

[14] Scherer, R., Siddiq, F., & Teo, T. (2015). Becoming more specific: Measuring and modeling teachers' perceived usefulness of ICT in the context of teaching and learning. Computers & Education, 88, 202-214.

[15] Olulube, P. (2006). Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2(3), pp. 70-85.

[16] Chigona, A., Chigona, W., & Davids, Z. (2014). Educators' motivation on integration of ICTs into pedagogy: case of disadvantaged areas. South African Journal of Education, 34(3).

[17] Oye, N. D., Iahad, N. A., & Rabin, Z. A. (2011). A model of ICT acceptance and use for teachers in higher education institutions. International Journal of Computer Science & Communication Networks, 1(1), 22-40.

[18] Mikre, F. (2011). The roles of information communication technologies in education: Review article with emphasis to the computer and internet. Ethiopian journal of education and sciences, 6(2), 109-126.

[19] Lomos, C., Luyten, J. W., & Tieck, S. (2023). Implementing ICT in classroom practice: what else matters besides the ICT infrastructure. Large-Scale Assessments in Education, 11(1), 1.

[20] Fitria, T. N. (2021). Artificial intelligence (AI) in education: Using AI tools for teaching and learning process. In Prosiding Seminar Nasional & Call for Paper STIE AAS (pp. 134-147).

[21] Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. International journal of educational technology in higher education, 20(1), 22.

[22] Preparing for the Future: How AI will Transform Education in 2025

[23] Preparing for the Future: How AI will Transform Education in 2023 [Podcast]

[24] How Is AI in Education Transforming Digital Learning?

[25] Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: systematic literature review. International Journal of Educational Technology in Higher Education, 20(1), 56.

[26] Ibrahim, K. (2023). Using AI-based detectors to control AI-assisted plagiarism in ESL writing:"The Terminator Versus the Machines". Language Testing in Asia, 13(1), 46.

[27] http://hdl.handle.net/10603/126594

[28] https://shodhganga.inflibnet.ac.in/handle/10603/281141

[29] The Future of AI in Education: Personalized Learning and Beyond < Tech Takes - HP.com India