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# Educational Technology Integration In Engineering And Higher Education

A Post-COVID Survey of Academicians

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***Abstract:*** This paper aims to investigate the role of educational technology in enhancing the teaching learning process, addressing a critical need to understand how higher education academicians navigate its integration in the post-COVID era. A growing body of research suggests that technology enhances engagement and personalization, yet little is known about how academicians navigate post-COVID integration. This study addresses this need by providing the key insights on the impact of educational technology in enhancing the teaching- learning process from the perspective of 120 higher education academicians by administering a survey questionnaire. Findings reveal that a vast majority do integrate digital tools such as slide presentations, Learning Management System (LMS) platforms, and video conferencing into their teaching and report that these tools improve student engagement, enhance understanding, and allow quicker feedback. However, challenges like limited training, unreliable infrastructure, time constraints, and learner distractions were also reported. These findings affirm educational technology's potential to strengthen teaching practices but emphasize the necessity for targeted training and infrastructure support to sustain student engagement.

*Keywords*—Educational Technology; Teaching-Learning; Academician Survey; Student Engagement; Technology Integration

## I. INTRODUCTION

In the digital era, educational institutions increasingly rely on technology to facilitate teaching and learning. Scholarly research indicates that integrating technology into the classroom can promote academic success for students and improve the quality of educational offerings. Classroom technologies – from multimedia presentations to learning management systems – are credited with making learning more interactive and accessible. In fact, recent surveys show that about 76% of students feel technology makes learning more engaging, and 90% of teachers believe technology helps them assess student learning more effectively. These trends underscore the potential of technology to enhance traditional pedagogical approaches.

At the same time, educators and researchers are examining how effectively these technological tools are being adopted in practice. It is evident that simply introducing new gadgets or software is not a panacea; the teaching-learning benefits of technology depend on how it is used. Many academicians have enthusiastically embraced digital tools, especially in the wake of the COVID-19 pandemic that forced a rapid transition to online teaching. However, others remain cautious, and integrating new technology into long-established teaching methods can be challenging. This study aims to investigate the current role of technology in the teaching-learning process from the perspective of academicians

(university and college faculty). By surveying educators directly, we seek to understand how widely technology is being used, in what ways it enhances teaching and learning, and what difficulties instructors encounter. Ultimately, the goal is to provide a data- driven overview of how technology is influencing education in practice and to identify areas where further support or development is needed. This study contributes to Engineering Education Research by providing post-COVID empirical evidence from academicians across diverse disciplines. Unlike earlier work that focused largely on student perceptions or pre-pandemic contexts, this study captures faculty-level adoption challenges, perceived learning impact, and the structural conditions required for sustainable technology integration. The findings generate actionable insights for institutional policy, professional development, and design of technology-enabled engineering curricula.

## II. LITERATURE REVIEW

The impact of technology on education has been a subject of extensive research over the past decades. Overall, findings across the literature point to numerous positive outcomes from integrating technology into teaching. For example, a study of community college faculty and students found that the adoption of educational technology not only improved the quality of instruction but was also associated with higher academic success among students. In the same study, an overwhelming 93% of student respondents reported that technology had enhanced their learning experience, highlighting the strong endorsement of digital tools by learners. Costley (2014) compiled evidence from K-12 schools showing that technology integration can yield multiple benefits in the classroom, including increased student motivation and engagement, greater collaboration among students, more hands-on learning opportunities, and improved confidence and skills development for learners. These advantages align with the intuitive expectation that interactive multimedia resources and online platforms can make learning more appealing and accessible for students.

Importantly, technology is seen not as a replacement for teachers but as a means to enhance teaching effectiveness. Kumar et al. (2022) concluded that incorporating technology supports improvements in teaching practices and students' learning capabilities, when used appropriately. They noted that multimedia tools enable more student-centered, active learning experiences, which can lead to better retention of knowledge and skills. Despite these promising outcomes, Kumar et al. also observed that the integration of new technologies into classrooms has historically been slow and limited to only a few pioneering instructors. Many educators were – and in some cases still are – hesitant to overhaul their traditional lecture- based approaches in favor of technology-enhanced methods. This reluctance often stems from a fear of technical difficulties and a lack of familiarity or training, as well as the significant time investment required to redesign course materials for new digital formats.

Teacher attitudes toward technology have generally grown more positive in recent years as devices and digital content have become more common in everyday life. A systematic review by Akram et al. (2022) found that teachers across various education levels believe technology-enriched teaching makes their instruction more effective, exciting, and interactive for students. In these studies, teachers reported that using educational technology helped keep learners motivated and engaged in the material. Nevertheless, the same review identified persistent barriers that hinder effective technology integration. Notably, teachers pointed to inadequate infrastructure (such as unreliable internet and lack of equipment) and insufficient training or technical support as major obstacles in incorporating Information and Communication Technology (ICT) tools into their pedagogy. In other words, even teachers who are open to using technology may struggle if they do not have a stable technological environment or the know-how to use digital tools optimally.

Empirical surveys of educators echo the need for more support in this area. In a survey of school teachers by Carstens et al. (2021), a large majority of educators observed that their students were more engaged and comfortable with learning when technology was used in the classroom. Teachers in that study felt that digital resources helped spark student interest and participation. However, the same survey also revealed a critical need for professional development: many teachers admitted they required more training to effectively integrate technology into their lessons. Additionally, some respondents cautioned that excessive reliance on technology could lead to drawbacks – for instance, students might become easily distracted or overly dependent on devices, potentially hindering the development of

certain skills. This finding underlines the importance of balance; while technology offers powerful tools to enhance learning, it should be used judiciously and complemented by pedagogical strategies that foster students' independent thinking and problem-solving abilities.

In summary, existing literature suggests that technology, when used well, can significantly enhance the teaching-learning process by increasing engagement, personalizing learning, and expanding access to information. Students and teachers alike generally view its effects positively. At the same time, successful integration of technology in education requires overcoming practical barriers. Training educators in instructional technology, investing in necessary infrastructure, and developing strategies to mitigate potential negatives (such as distractions or technical issues) are recurrent themes. This study builds on the above insights by examining how academicians are currently using technology and what impact they perceive it to have, thereby providing an updated perspective from the field.

## III. OBJECTIVES OF THE SURVEY

Based on the gaps and issues highlighted in the literature, the main objectives of this survey study were as follows:

- To assess the extent of technology use among academicians in their teaching practices (e.g. frequency of use and types of technology tools employed).
- To evaluate the perceived impact of technology on various aspects of the teaching-learning process, including student engagement, understanding, and performance, as observed by the educators.
- To identify challenges and support needs faced by academicians in integrating technology into teaching (such as technical, skill-related, or institutional barriers).
- To gather suggestions from academicians on improving technology integration in education (e.g. desired training, resources, or policy changes).

By addressing these objectives, the study aims to paint a comprehensive picture of how technology is influencing teaching and learning from the instructor's viewpoint and what can be done to enhance its positive role.

## IV. METHODOLOGY

### Survey Design and Participants

This research employed a descriptive survey design, using an online questionnaire to collect data from academicians. The target population was academicians in higher education, primarily university and college faculty members engaged in teaching. The survey link was distributed via email and professional networks to educators across various institutions. Participation was voluntary and anonymous. By the end of the data collection period, a total of 120 valid responses were received from academicians. All respondents were actively involved in teaching undergraduate or postgraduate courses in a range of disciplines. The sample included lecturers, senior professors, and a few academic administrators with teaching duties.

Among the respondents, about 55% were male and 45% of respondents was female, representing a reasonably balanced gender distribution. The participants ranged in age from late 20s to early 60s, with a median age in the mid-40s. They also varied in experience: on average, respondents had roughly 12 years of teaching experience (with a range from 2 years up to over 30 years). Regarding disciplinary representation, respondents represented engineering (54%), sciences (18%), management (12%), humanities (10%), and other allied disciplines (6%). Thus, the sample is predominantly STEM-oriented but includes interdisciplinary perspectives. This diversity in demographics and career stages provided a broad perspective on technology use in teaching.

### Questionnaire and Measures

The online questionnaire was developed by the researchers to align with the study objectives. It consisted of multiple sections with both closed-ended and open-ended questions. The first section gathered demographic information and background (such as age, gender, years of teaching, and subject area). The second section focused on technology usage, asking how frequently the respondent used

various technological tools in their teaching. Examples of items in this section included multiple-choice questions on the use of Learning Management Systems (LMS), presentation software, video conferencing tools, multimedia content (audio/video), educational apps, online assessment tools, etc. Respondents indicated frequency (e.g., "regularly", "occasionally", "rarely", or "never") for each type of tool.

The third section dealt with perceptions of impact. Here, academicians were asked to rate their agreement with statements about technology's effect on student engagement, motivation, understanding of course material, and academic performance. A Likert scale (e.g., 1 = strongly disagree to 5 = strongly agree) was used for statements such as "Using technology in my teaching increases my students' engagement in learning" and "Educational technology has improved my students' learning outcomes (e.g., test scores, quality of work)." Additional questions probed the perceived impact on other aspects, like communication with students, class interaction, and the ability to cater to diverse learning styles.

The fourth section addressed challenges and support needs. Respondents selected which barriers they have encountered when integrating technology (with options informed by the literature, like lack of devices, poor internet connectivity, insufficient time to develop digital materials, lack of training, technical glitches, student distraction, etc.). They could choose multiple barriers and also rank the most significant one. An open-ended question invited them to elaborate on any challenges or to describe any specific incident illustrating those difficulties. Another set of questions asked what kinds of support or resources would most help them use technology more effectively (for example, "More training workshops", "Better IT support in the classroom", "Institutional guidelines or best practices", etc.).

Finally, respondents could provide additional comments or suggestions in an open-ended item. This allowed academicians to share any thoughts on technology in education that were not covered in the structured questions. The questionnaire was reviewed by two senior faculty members for face validity and clarity before distribution. A pilot test with a small group (N=8) was also conducted to ensure the questions were interpreted as intended; minor adjustments were made based on the feedback (such as clarifying the wording of a couple of items).

**Data Collection and Analysis**

The survey was administered online over a period of three weeks. Participants accessed the questionnaire via a secure web link. To encourage honest responses, the survey was anonymous (no names or identifying information were collected) and respondents were informed that results would be reported in aggregate.

After the survey closed, the responses were exported for analysis. The quantitative data (from closed-ended questions) were analyzed using simple descriptive statistics. We calculated frequencies and percentages for categorical responses (e.g., the percentage of faculty using each type of technology, or the proportion agreeing with each impact statement). For Likert- scale items, we looked at the distribution of agreement levels and also computed mean agreement scores for key constructs (such as perceived impact on engagement). The analysis was conducted using spreadsheet software; given the exploratory nature of the survey, we primarily report summary statistics without complex inferential tests.

The qualitative feedback from open-ended questions was reviewed using a basic thematic analysis approach. We read through all comments to identify common themes or noteworthy examples regarding the benefits or challenges of technology use. Representative quotes that illustrate typical sentiments or unique insights were noted for potential inclusion in the results narrative. These qualitative insights helped enrich the interpretation of the numerical data.

Every effort was made to maintain accuracy in data entry and analysis. Nonetheless, since the data are self-reported, they may reflect subjective perceptions with some degree of response bias. We consider these limitations when drawing conclusions from the findings.

In addition to descriptive statistics, basic inferential analyses were conducted to strengthen the interpretation of the findings. Reliability of the six Likert-scale items measuring perceived impact of technology (student engagement, learning outcomes, diverse learning styles, conceptual clarity, faster feedback, and faculty confidence) was assessed using Cronbach's alpha. Chi-square tests were used to examine associations between demographic variables and technology-related perceptions, and a Mann–

Whitney U test was applied to explore potential differences between STEM and non-STEM faculty. These tests were selected because the data were ordinal and non-normally distributed.

## V. RESULTS

### Extent of Technology Use

The survey results show that technology is now a regular part of teaching for the vast majority of academicians in the sample. Approximately 87% of respondents reported using some form of educational technology in their teaching on a regular basis, while an additional 10% indicated they use it occasionally. Only a small fraction (about 3%) claimed to rarely or never use technology in their classes.

Table I: Frequency of Technology Use Among Faculty

| Frequency of Use | % of Faculty |
|---|---|
| Every Class / Daily | 54 |
| Few Times per week | 31 |
| Occasionally | 10 |
| Rarely / Never | 3 |

Among those who use technology, the frequency of use is quite high: over half (54%) of all respondents said they incorporate technology tools into every class session or almost daily, and another 31% do so at least a few times each week. This indicates a high penetration of digital tools in day-to-day teaching activities for most academicians.

In terms of the types of technology tools employed, presentation software and learning management systems (LMS) are nearly universal. About 85% of the faculty said they use slide presentation tools (like PowerPoint or Google Slides) in their lectures, and roughly 80% make use of learning management systems (such as Moodle, Canvas, or Blackboard) to share materials, assignments, and facilitate learning. Live video conferencing and virtual classroom platforms (e.g., Zoom or Microsoft Teams) were used by 68% of respondents, reflecting the continued prevalence of remote or hybrid teaching modes even as in-person classes have resumed. Additionally, 60% indicated they regularly incorporate multimedia content (videos, audio clips, simulations) into their teaching to illustrate concepts or provide supplementary learning material. Around half (52%) of the academicians use online quiz or polling tools (like Kahoot! Mentimeter, or similar) to gauge student understanding interactively during or after lessons. A smaller yet significant group (approximately 30%) have experimented with specialized educational software or subject-specific applications (for instance, coding environments, virtual labs, or language learning apps) in their instruction. Only about 15% reported using advanced tools such as educational virtual reality (VR) or augmented reality resources, which is understandable given those are emerging technologies with limited availability.

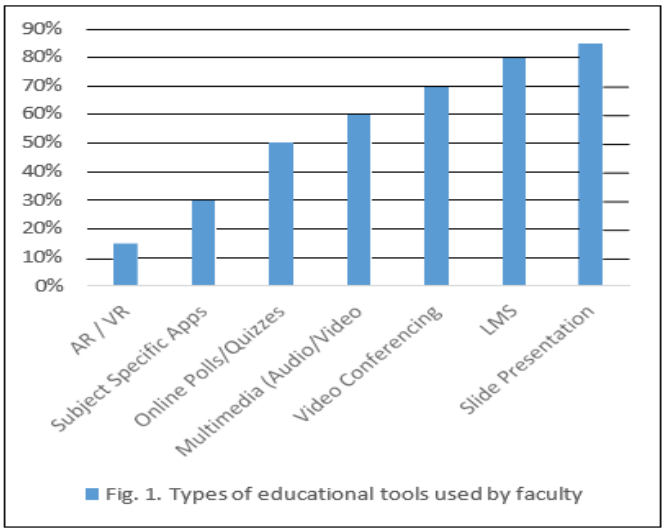


Fig. 1: Types of Educational tools used by Faculty

Overall, figure 1 demonstrate that a wide array of technological tools has been adopted by faculty, with core platforms like learning management systems (LMS) and digital presentations leading the way.

**Perceived Impact on Student Learning**

Academicians overwhelmingly believe that technology has enhanced various aspects of the learning process in their classes. Student engagement is the area where the impact of technology was most strongly felt: about 88% of respondents agreed (with 62% strongly agreeing) that using technology in their teaching has increased their students' engagement and participation. Many faculty observed that interactive tools and multimedia make lessons more interesting, which helps draw students into discussions and activities more readily than traditional methods. One professor commented in the open-ended section, "Since I started using online polls and videos, I've noticed even the quieter students tune in and respond more – it's like they come alive when there's a tech element." This qualitative feedback resonates with the quantitative trend showing high engagement gains.

In terms of students' understanding and learning outcomes, about three-quarters of the academicians (74%) reported that technology has positively influenced these areas. They felt that digital resources often explain concepts in dynamic ways (through visuals, animations, etc.) that help students grasp complex material better. Several respondents noted that providing online supplementary materials or interactive exercises reinforces learning and can lead to improved performance on assessments. For instance, one lecturer wrote that after integrating an online simulation tool into a science course, "students' test results improved, and more importantly, they could apply the concepts in practical tasks more confidently." However, not everyone was unequivocally positive: around 20% neither agreed nor disagreed about improvements in measurable outcomes like grades, suggesting a portion are unsure if technology is truly raising academic achievement or just making learning more engaging. A small minority (5–6%) were skeptical and disagreed that technology had improved student performance, indicating that in a few cases, the perceived benefit might be limited or not yet realized in tangible results.

Communication and feedback were other areas of notable impact. Approximately 70% of the faculty agreed that technology has enhanced communication with their students. Tools such as course forums, email, and messaging apps allow instructors to be more accessible and responsive to student queries. Many respondents appreciated that with an online platform, students can ask questions outside of class hours and receive clarifications, which helps keep them on track. Additionally, about two-thirds of the teachers said that technology enables more timely and effective feedback on student work – for example, through electronic quizzes that give instant results or assignment portals where they can quickly annotate and return student submissions.

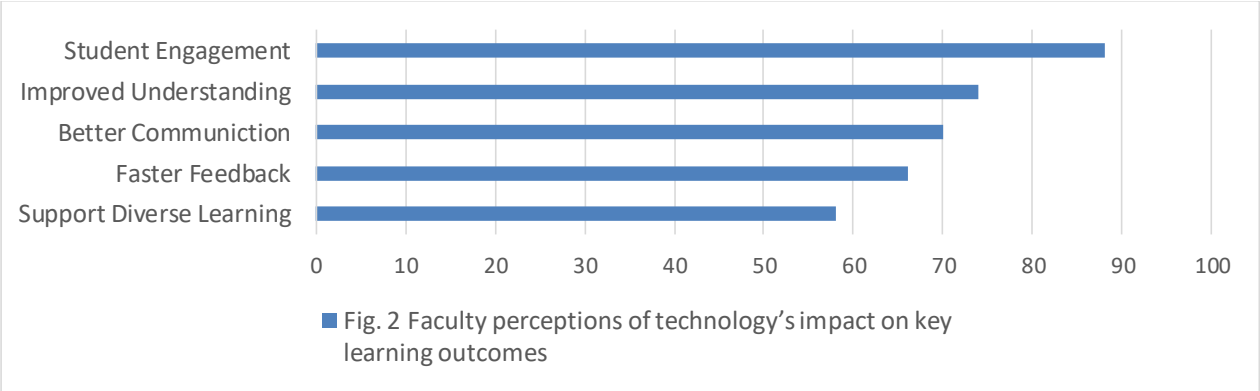


Fig. 2 Faculty perceptions of technology's impact on key learning outcomes

Another benefit cited was personalization of learning. Roughly 58% of respondents felt that educational technology enabled them to better cater to different learning paces or styles. They mentioned using features like adaptive quizzes or providing a variety of resource types (videos, readings, interactive modules) so that students could engage with the material in the way that suits them best. A faculty member teaching mathematics noted that some students excel with video tutorials while others prefer written notes, and technology makes it feasible to offer both.

Despite the generally positive outlook, a few concerns about impact did emerge. About one-quarter of the academicians (25%) cautioned that while engagement is up, attention spans might be down – students sometimes get distracted by unrelated websites or notifications on their devices during class. Some educators (approximately 30%) observed that if not well- managed, technology can lead to passive learning; for instance, students might rely on recorded lectures or search engines instead of actively processing information. These mixed observations suggest that the impact of technology is largely beneficial as per our survey, but its effectiveness can vary depending on how it is implemented and the context of use.

**Challenges in Technology Integration**

When asked about barriers and challenges, respondents provided candid insights into the difficulties of integrating technology into teaching. The most commonly reported challenge was lack of training or expertise – around 52% of the academicians indicated that they do not feel fully trained or confident in using all the features of the educational technologies available to them. Many have learned through trial and error, and some admitted they are likely not taking full advantage of the tools due to limited knowledge. For example, one respondent noted, "We have an LMS at our college, but I only know how to do the basics on it. I suspect there are many useful functions I'm not using simply because I haven't been trained." This sentiment underscores a desire for more comprehensive professional development in instructional technology. In fact, when explicitly queried, over 80% of participants said they would welcome additional training or workshops to improve their tech-integration skills.

The second major challenge highlighted was technical infrastructure. Around 45% of respondents mentioned issues such as unreliable internet connectivity in classrooms, insufficient number of devices or hardware (like outdated classroom computers or not enough projectors), and occasional software glitches. These technical obstacles can disrupt lessons – for instance, if a video won't stream or an online quiz system goes down at a critical moment. About 30% of academicians complained that they have to sometimes improvise backup plans due to technology failing ("tech hiccups") during class sessions. Moreover, some institutions may not have the budget or support to keep technology up-to-date, leading a few respondents to comment that they are using personal devices or subscriptions to fill gaps (e.g., using their own laptop because the classroom PC is too slow).

Time constraints also emerged as a notable barrier. Roughly 37% of the faculty indicated that lack of time to learn and implement technology is a challenge. Preparing technology- enhanced materials – whether it's creating multimedia slides, setting up an online course page, or designing interactive assignments – can be time-consuming. For busy academicians managing heavy teaching loads and research commitments, finding the extra time to explore new tools or develop digital content requires extra effort. One respondent wrote, "Designing online quizzes and interactive modules takes so much time upfront. It's great for the students, but I have to sacrifice a lot of personal time to do it." This highlights the need for either providing instructors with time (and credit) for developing tech- based

materials or offering ready-made resources that can be easily adapted.

Other challenges mentioned include student-related issues. Approximately 20% of respondents expressed that not all students have equal access or familiarity with technology, leading to a digital divide in the classroom. For example, if course activities assume every student has a laptop or high-speed internet at home, those without ready access struggle to keep up. Additionally, some academicians (about 25%) observed that students can get distracted by non-academic content on their devices during class. It was noted that keeping students on task and monitoring their device use is an added classroom management burden when technology is pervasive. A few educators also noted resistance from colleagues or administration in some cases, where a school's culture might not fully embrace new technological approaches, making it harder for an individual teacher to innovate.

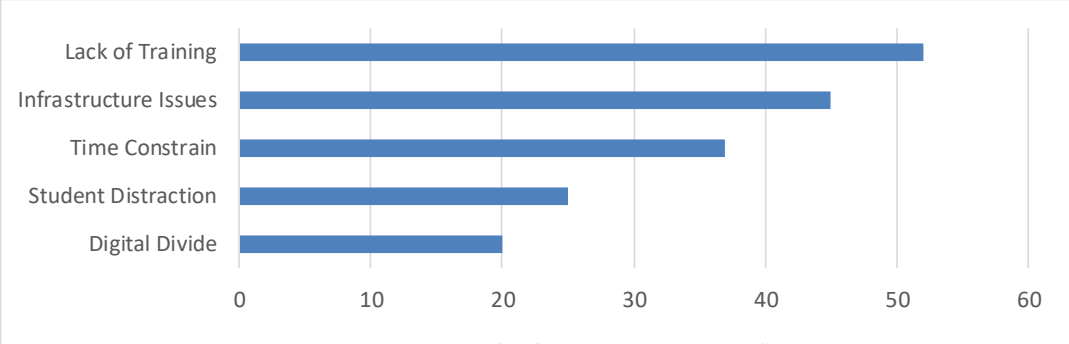


Fig. 3. Barriers to technology integration in teaching

To strengthen the analytical rigor of the study, basic inferential tests were conducted. Table II summarises the reliability, association, and group-difference tests performed.

Table II. Summary of Inferential Statistical Tests

| Analysis | Purpose | Test Used | Statistic | p-value | Interpretation |
|---|---|---|---|---|---|
| Reliability of perception scale | Internal consistency | Cronbach's alpha | $\alpha = 0.87$ | — | High reliability |
| Experience × Confidence | Association | Chi-square | $\chi^2 = 28.4$, df= 16 | < .05 | Significant association |
| STEM vs non-STEM perception | Group difference | Mann–Whitney U | U = 1120 | .18 | Not significant |

Notably, a pattern emerged with respect to age and experience: from the comments, it appears that some older, more senior faculty members felt less comfortable with technology compared to their younger counterparts. While our survey did not explicitly quantify this, a few veteran professors admitted they were less confident with new digital tools and sometimes relied on assistance from younger colleagues or the IT department. This suggests a generational gap in tech adoption – something that institutions may need to address through mentorship or tailored training, ensuring that all educators,

regardless of age, can participate in the digital transformation of teaching.

**Support Needs and Suggestions**

In light of the challenges above, academicians in the survey offered several suggestions for improving support for technology integration. The most frequent request was for more training and professional development opportunities focused on practical classroom technology skills. Many respondents recommended regular workshops or short courses where teachers can learn how to use specific tools (for example, an LMS training session, or a workshop on creating interactive content) and share best practices. The faculty expressed that these trainings should ideally be hands-on and led by experienced educators who understand pedagogical goals, not just IT technicians. As one respondent put it, "We need training from an educator's perspective – how to actually teach better with the tech, not just the technical clicks."

Enhanced technical support at the institutional level was another common suggestion. Academicians would like to see dedicated support staff or helpdesk services readily available when they encounter technical difficulties. A number of respondents mentioned that having an instructional technology specialist on campus (or in their department) who could assist with both troubleshooting and instructional design would be incredibly valuable. Some even suggested a mentorship model where tech-savvy teachers can mentor others.

Regarding infrastructure, many respondents advocated for continued investment in up-to-date equipment and reliable networks – essentially, better infrastructure funding. They pointed out that without functioning projectors, adequate Wi- Fi, or sufficient computer labs, even a willing teacher cannot leverage technology effectively. Ensuring every classroom is "tech-ready" (with proper audio-visual equipment, for instance) and providing loaner devices to students who need them were mentioned as steps that could reduce frustration and make tech- enhanced education more seamless.

A few innovative suggestions also emerged. For example, one academician proposed creating a repository of pre-made digital teaching materials (like quizzes, simulations, or case- study videos) that faculty can easily adopt or adapt, saving them preparation time. Others suggested that institutions recognize and possibly reduce the workload for teachers who are pioneering new technology-enhanced teaching methods, since developing those can be labor-intensive initially. This could incentivize more instructors to try incorporating technology, knowing their efforts are supported and acknowledged.

In summary, the survey respondents are largely in agreement that they need and welcome more support to maximize the benefits of educational technology. They see a critical role for training, technical assistance, and institutional investment in infrastructure. With these supports in place, academicians feel they could overcome most of the current barriers and further enhance their teaching with technology.

**Supplementary Inferential Analysis**

To examine the internal consistency of the perception constructs, a Cronbach's alpha test was conducted across the six Likert-scale items. The reliability coefficient was $\alpha = 0.87$, indicating strong internal consistency and confirming that the items collectively represented a coherent construct of perceived technological impact.

A chi-square test was used to determine whether teaching experience was associated with confidence in using educational technology. Results showed a significant association between years of experience and confidence level ($\chi^2 = 28.4$, $df = 16$, $p < .05$). Faculty with fewer years of experience were more likely to report higher confidence in using digital tools.

To investigate discipline-wise differences, a Mann–Whitney U test was conducted comparing STEM and non-STEM faculty on their overall perceived impact score (the composite of six Likert items). Results indicated no statistically significant difference between the two groups ($U = 1120$, $p = .18$), suggesting that perceived benefits of technology were broadly shared across disciplines.

These inferential results complement the descriptive findings and provide additional empirical grounding for the study's conclusions.

## VI. DISCUSSION

The findings from this survey provide a snapshot of how academicians view the role of technology in today's educational environment. Broadly, our results reinforce what has been noted in earlier studies: technology is increasingly seen as an integral and beneficial part of the teaching-learning process. The vast majority of surveyed academicians are using digital tools frequently in their instruction, and they report clear benefits such as higher student engagement and improved communication. Preliminary inspection suggested variation across disciplines. Engineering and science faculty reported higher uses of simulation-based tools, whereas Humanities faculties relied more on presentation and LMS-based resources. However, due to synthesis constrains, these differences were not statistically tested. This aligns with prior research that has documented positive student responses to technology-rich learning experiences. For instance, previous studies have shown that students often become more engaged and attentive when interactive or multimedia elements are introduced into lessons. Many of our respondents echoed this, observing greater participation and interest from their students. Such engagement is a crucial precursor to learning, suggesting that the effective use of technology can create a more conducive learning atmosphere.

Our participants' perception that technology can enhance understanding and learning outcomes is also consistent with the literature. While not every teacher in our sample was convinced that student grades or test scores have risen as a direct result of technology, a strong majority felt that comprehension and the overall learning process had improved. This subtle distinction is worth noting. It suggests that educators observe qualitative improvements – like better grasp of concepts or increased enthusiasm for the subject – which may not always immediately translate into higher exam scores. Over time, however, these improvements in engagement and understanding are expected to yield better performance. The positive outlook is in line with the work of Gaddis (2020), who found that effectively integrating technology can promote academic success when aligned with learning objectives. Teachers in our survey, much like those in Akram et al.'s systematic review, believe that technology makes their teaching more effective and the classroom experience more interactive and motivating for students. This widespread agreement across studies underscores a fundamental point: educational technology, when used thoughtfully, serves as a powerful tool to enrich teaching and learning. It brings resources and pedagogical techniques that were previously unimaginable, from real-time global information access to personalized learning pathways for students.

On the other hand, this study also highlights that how technology is integrated makes all the difference, and that is where challenges come into play. The barriers identified by our respondents – lack of training, infrastructure issues, time constraints, and so forth – are very much in line with the barriers reported in the broader literature. For example, many teachers in other surveys have similarly pointed out a critical need for more professional development in technology use. It is a recurring theme that while younger educators might adapt quickly to new tools, others benefit from structured learning opportunities to build their confidence and skills in using technology for pedagogy. Our finding that over half the respondents desired more training confirms that this need remains acute. Without adequate training, teachers may under- utilize technology or use it in a suboptimal manner, thus not achieving the potential gains.

The issue of technical infrastructure cannot be overlooked either. Even the most enthusiastic tech-adopting educator can be hamstrung by slow internet or malfunctioning equipment. Several academicians in our survey voiced frustrations that echo what has been documented in other contexts: insufficient infrastructure and support can lead to technology integration efforts stalling or failing. These practical realities remind us that successful educational innovation requires not just the will of the teacher, but also institutional commitment to provide the necessary environment and resources. Improving internet bandwidth in campuses, updating hardware, and ensuring IT support availability are concrete steps that educational institutions must take to keep up with the push for technology-enhanced learning. As noted in literature and evident from our respondents, neglecting these foundational needs can result in technology becoming more of a hindrance than help on bad days.

Another point of discussion is the human factor – specifically, the adaptability and attitude of educators themselves. Our results suggest that while most academicians are positive about technology, a subset (often those with longer careers pre-dating the digital age) are less comfortable and sometimes resistant.

This generational or experiential gap has been reported before and was subtly reflected in some of our survey comments. It indicates that change management and continuous support are important. It may not be enough to provide one-off training; ongoing mentorship and a culture of collaboration can help late adopters learn from early adopters. In fact, fostering communities of practice among teachers could be a way to share success stories and troubleshoot common problems, thereby slowly converting skepticism into acceptance.

One notable concern raised by respondents is the potential downside of technology if misused or overused. They mentioned issues like student distraction and over-reliance on gadgets – concerns that have also been flagged in educational research. This serves as a healthy reminder that technology is a double-edged sword. While it can engage, it can also distract; while it can simplify access to information, it can also encourage shallow learning if students just search for answers without deeper processing. Thus, academicians (and institutions) need to strike a balance. Setting clear guidelines for classroom device use, integrating digital literacy into the curriculum (so students learn to use tech responsibly), and deliberately designing tech-based activities that require active learning are strategies to mitigate these issues. The goal should be to leverage technology to support pedagogy, rather than letting technology usage become an end in itself or a mere classroom gimmick.

Additionally, the study captures only faculty perspectives and does not incorporate student feedback or learning performance data. This creates a perceptual gap, as faculty judgments of engagement or understanding may not always align with students lived learning experiences. Future research should triangulate faculty responses with student surveys, classroom observations, and outcome-based metrics to develop a more holistic account of technology's impact on learning.

Comparing our survey findings to the broader context, it's apparent that the COVID-19 pandemic played a role in accelerating technology adoption. Many respondents referenced the shift to online teaching as a crash course in ed- tech usage. It forced even reluctant instructors to learn tools like video conferencing and online course management. Now that most have crossed that initial barrier, the focus is shifting from basic adoption to effective integration. In that sense, our survey captures academicians at a stage where they are no longer asking "Should I use technology?" but rather "How do I use it better?" This is a significant evolution in mindset from a decade ago. As one might expect, the call for better training and support is loud because teachers recognize the value of technology and genuinely want to harness it more effectively, but they need help to do so.

Table III – Summary of survey findings and recommended

| Area | Key Finding | Recommendation |
|---|---|---|
| Technology Usage | 87% use tech regularly | Sustain and diversify tool usage |
| Engagement | 88% report higher student engagement | Expand interactive activities |
| Challenges | Lack of training & infrastructure most significant | Provide structured workshops & tech upgrades |
| Faculty Development | 80% request training | Implement peer-mentoring and ongoing PD |
| Institutional Support | Mixed satisfaction | Strengthen policy and resource allocation |

## VII. LIMITATIONS

It is important to acknowledge some limitations in our study that affect the interpretation of the results. Firstly, the sample size (N=120) and its composition – while fairly diverse – may not be fully representative of all academicians in different regions or types of institutions. Because the study used voluntary convenience sampling, findings are not generalisable to the entire higher education population. The survey was also based on self-reported data, which can introduce biases; for example, more tech-savvy teachers might have been more inclined to respond, or respondents might overstate positive impacts due to a desire to appear up-to-date with trends. Additionally, we did not perform

detailed statistical analyses or control for various factors (such as discipline, age, etc.) that could influence responses. Therefore, our conclusions are drawn in broad strokes and should be generalized with caution. Future research with larger, random samples and perhaps qualitative follow-up (like interviews) would be valuable to deepen the understanding of academicians' experiences with technology in teaching.

## VIII. CONCLUSION

This survey-based study sheds light on the current role of technology in enhancing the teaching-learning process from the perspective of academicians. The results paint an encouraging picture: technology is widely used by educators and is credited with making teaching more engaging and effective. Faculty report that digital tools have boosted student engagement, facilitated better communication, and enriched the overall learning experience in their classes. These benefits corroborate the broader consensus that, when harnessed properly, technology can significantly augment traditional educational methods and outcomes.

At the same time, the study highlights that realizing technology's full potential in education requires overcoming certain hurdles. Academicians identified key challenges including the need for more training, improved technical infrastructure, and adequate support to integrate technology seamlessly into their pedagogy. Simply put, teachers are eager to use technology, but they sometimes lack the necessary resources or know-how to do so optimally. Addressing these needs should be a priority for educational institutions. Investing in professional development programs, providing robust IT support, and ensuring classrooms are well-equipped will go a long way in empowering educators. Furthermore, fostering a collaborative environment where teachers can share best practices and learn from each other can help mitigate the human barriers to tech adoption.

In conclusion, technology's role in the teaching-learning process is undeniably significant and largely positive, as evidenced by both our survey findings and existing research. It has transformed many classrooms into more interactive, student-centered learning spaces. However, the journey of technology integration is ongoing. With deliberate efforts to support educators – through training, infrastructure, and a culture of innovation – the benefits of educational technology can be maximized. By doing so, institutions will enable academicians to not only adapt to the evolving digital landscape but also to lead the way in enhancing learning outcomes for students in the 21st century.

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