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INTEGRATION OF TECHNOLOGY IN TEACHING LEARNING ACTIVITY AT HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

The integration of technology into teaching and learning has become a pivotal aspect of higher education, fundamentally transforming traditional pedagogical methods. This article explores how digital tools and platforms are being utilized by higher education institutions (HEIs) to enhance instructional delivery, promote student engagement, and improve learning outcomes. It examines key technologies such as learning management systems, virtual learning environments, artificial intelligence, and collaborative online tools, highlighting their role in facilitating flexible, accessible, and learner-centered education. The article also addresses the challenges associated with technology adoption, including infrastructure limitations, digital literacy gaps, and resistance to change among educators. Furthermore, it discusses best practices and emerging trends that are shaping the future of technology-enhanced learning. By analyzing both the opportunities and obstacles, this study provides a comprehensive overview of the current landscape and future directions for integrating technology into teaching and learning practices in higher education.

Purpose of the study: To examine the digital tools utilised by university and college teachers. The present study the identify problem faced by teachers with regard to ICT integration in the teaching learning process and to find out whether significant difference exists between the attitude of college teachers in different streams towards virtual classroom.

Research Methodology: The present study administered the primary data with well-structured questionnaire with sample size of 34 from different higher education institutions. This present study used simple statistical methods such as graphical representation with interpretations.

Findings: The study found that multimedia content plays a crucial supplementary role. Data also reveals a need for improved consistency in survey design, as a duplicated entry for "soft copy material" slightly skews the data. points to the necessity of more interactive and collaborative tools in online environments. Time management while still relevant, appears to be a less dominant concern.

Keywords: Technology-enhanced learning, Higher education, Digital tools, Student engagement, Pedagogical transformation.

INTRODUCTION

In the 21st century, technology has become an integral component of nearly every aspect of human life, and education is no exception. Higher education institutions (HEIs) around the world are increasingly adopting digital tools and platforms to enhance the quality, accessibility, and effectiveness of teaching and learning. The integration of technology into

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academic environments is not merely about digitizing traditional methods, but rather about transforming pedagogical approaches to foster more engaging, interactive, and personalized learning experiences. From learning management systems and online collaboration tools to artificial intelligence and virtual simulations, technology is reshaping how educators teach and how students learn. As the demand for flexible, learner-centred education continues to grow, especially in the post-pandemic era, understanding the role and impact of technology in higher education has become more critical than ever. This article explores the significance, methods, benefits, challenges, and future directions of integrating technology into teaching and learning processes within higher education institutions.

REVIEW OF LITERATURE

Ayaz Ahmad Khan & Subhash (2024)[1] in this research paper titled **"Factors affecting on-line teaching teachers' perspective"** in this paper study on the role of online teaching methodology which Played during the COVID -19 pandemic. The author also addressing the educational needs, the importance of NEP2020, and the importance of online teaching. Basically, the researcher believed that offline teaching is less productive than online teaching. The objectives of the studies are to examine the digital tools utilised by university teachers, to investigate the various perspectives affecting online teaching, and to reveal the relationship between key variables and online teaching. for the purpose, the descriptive survey method has been employed in the study to achieve the objectives. The Findings of the study was that nearly 28.8% of respondent's users laptops conduct on line teaching, 28.8% of respondent's use Wi-Fi as Internet collectively, for video conferences 54.1% users Google meet, and 55% of the respondents use What's-app to convey the messages. finally, the paper shall try to conclude that there are several factors contributing significantly affecting on line teaching, such as educational institution, geographical background, technological infrastructure, and the social economic background of the students.

Shalini and BB Kharbirymbi (2024)[2] in this research paper titled **"ICT integration in teaching-learning process for sustainable education: A Study"** The research explains the integration of technology into education can evaluate the learning environment, Foster active collaboration nurture creativity and pave the way for the provision of quality education to all. The objectives of the studies are to study the application of ICT in the teaching- learning process for sustainable school education, and to study the problem faced by teachers with regard to ICT integration in the teaching learning process. Descriptive survey study method was used in the paper. The Findings the study was maximum 73.7%of government school teachers were using to prepare and provide online work to students, maximum of 85% of government aided school teachers were using the Internet to search study materials and also 82.5% of private school teachers were using the Internet to search study materials. Finally, it is clear that teachers used a variety of ICTs in the teaching and learning process. Teachers are sharing assignments and messages using social media platforms like WhatsApp and various online classroom management system like Google classroom and meet.

Mehraj Ahmad Bhat and Shabnumali (2004)[3] in this research article titled **"Attitude of college teachers towards virtual classroom during COVID-19 pandemic"** here the author says online learning also comes as an interesting and interactive additional resource as compared to the normal classroom undoubtedly, the spread of COVID-19 created huge challenges for the world's educational system. The virtual teaching the teachers used different social networking and educational applications/platforms like zoom, Google meet, Facebook, YouTube, Skype, etc. the objectives of the studies to study the attitude of male and female college teachers towards virtual classrooms during the video-19 pandemic, and to find-out whether a significant difference exists between the attitude of college teachers in different

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streams towards virtual classrooms during the COVID-19 PANDEMIC. The descriptive survey method was used. The paper used the statically tool such as Correlation method. The Findings of the study was overall attitudes of male teachers is53.81%and 53.84% of female teachers towards virtual classrooms during the COVID-19 pandemic. Implications of study was teachers and students can both enhance their knowledge and skills by using the virtual classroom. Finally, the paper shall try to conclude the perusal of results revealed that teachers of both genders showed average attitudes towards online teaching and learning however in certain items, both genders showed highly positive attitudes towards virtual classroom during the COVID-19 pandemic.

Kesh Rana, Karna Rana (2020)[4] in this research paper titled**," ICT integration in teaching-learning activities in higher education: A case study of Nepal's teacher education"** here the researcher has conducted a study was the use of modern technologies is rapidly increasing in people's life. Particularly in urban areas, interest has been a fundamental need of people. The UGC formulates policies plans and programmes to promote and enhance the quality and development of higher education. The study of the objectives of teacher education is to produced trained teachers to teach at primary and secondary schools, education planners, trainers and policy makers. ICT can be resource for learning for both teachers and students and it provides them with opportunities for sharing their experiences and for updating themselves elves with the latest informative materials and theoretical improvements in education. A qualitative interpretive design has been used in the study. The Findings are related to organization strategy for the implementation of ICT policy, teachers' perspective of ICT use and students, perceived potential of ICT for own learning and teaching practices. Students and teachers can establish immediate communication through technologies. Finally, the paper shall conclude that the majority of old generation teachers in the faculty of education, who have limited ICT knowledge and skills, needed advanced professional development training to effectively use the new technology and to transform traditional teacher education to the modern system of teacher preparation.

Sunnyseth, Sugandha Sharma, Devishlowe, Bhavana Galhotr (2024)[5] in this research paper titled, **"Technological integration in higher education: insights from Indian context"** here the researcher tries to explain that the paper the landscape of higher education in being reshaped by rapid advancement in technology. The integration of ICT in education can break-time and distance barriers facilitate collaboration and knowledge sharing, and improve the quality of learning. The objectives of studies Technological integration in higher education: insights from the Indian context. The government taking initiative such as SWAYAM, NDL, DIKSHA, PM-evidya, FOSSEE.a qualitative approach has been used in the study. Findings suggest positive perception of technology's impact on the teaching learning environment among students and faculty. Based on the findings, several recommendations are proposed to optimize the integration of technology in HEIs. the study concludes addressing challenges such as digital equity and faculty readiness crucial to realising the full potential of these technologies in education.

Jijo Varghese & Anand Kumar Arya (2024)[5] in this research paper title **"Exploring 21st century digital literacy skills among the prospective teachers for holistic learning"** here the researcher has tried to explain the present and future difficulties of delivering quality education for all, it is essential to optimize and expand existing digital platforms and ongoing ICT based educational initiatives. The objective of the study are to understand the status of 21st century digital literacy perception level of prospective teachers, to analyse if there exist any significant difference in the mean scores of digital literacy skills among prospective teachers based on their gender, locality, educational qualification and specialized subject and

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also to understand the views and opinion of prospective teachers about current teacher education programme in preparing them with digital literacy skills. The descriptive survey method was used in the study. The findings of the study were that 13.1% of prospective teachers have a low level of digital literacy skills, 71.6% have average and 15.2% have high level of digital literacy skill. A researcher used statistical tools such as T-Test, One-Way ANOVA. The suggestion is continues training programme , workshops and awareness programmes arranged for prospective teachers on digital literacy to understand and update digital competency among them , finally the study of the paper tries to conclude that the prospective teachers have a average level of digital literacy skills, hover-ever it was observed in the questionnaire that they do have an average level of opinion about the curriculum transaction mode for enhancing digital competency among the prospective teachers.

Dr. Rudresh B.S (2022)[6] in this research paper titled **"Integration new technology into teaching and learning-A study"** here the researcher says digital learning technologies used effectively in the classroom may boost student engagement, assist teachers in creating better lesson plans, and promote individualised instruction. The use of technology to improve student learning is referred to as technology integration in education. The objectives of the study are to understand the integration new technology into teaching and learning in modern era. the paper completely based on secondary data sources. How to integrate technology in the classrooms such as power-point and games, internet homework assignments, online grading system, classroom-tablets. the advantages of technology in education are increased collaboration and communication, opportunities for personalized learning, curiosity sparked by interesting material, increased effectiveness and productivity of teachers, become a leader in enriching classroom through technology. finally, the paper concludes that technology integration into the curriculum is only possible when it is employed as a tool to improve learning, ideally in the subject matter. the use of technology in the classroom should be integrated into its operations and be equally available to all students.

Sunita Saikia, Mohammad Asif, and Yeasmin Sulthana (2024)[7] in this research paper titled **"Investigating socially mediated educational communication through WhatsApp and telegram; perception and preference of students and teachers"** here the researcher has conducted a study social networking applications facilitate the creation of virtual communities for sharing common interest or exploring new ones. The aim of study is the researcher believed that discovering teachers and students' perceptions about the use of WhatsApp and telegram as educational tools will help to make versed decisions for improving the educational potential and effectiveness. A descriptive quantitative research method has been used in the study. The findings of the study the preference of the teachers towards the use of whatsapp56%,26% of teachers prefer both WhatsApp and telegram and 18%of teachers prefer using telegram. finally, the paper shall conclude that we attempted to examine students and teachers' perceptions and preference regarding the use of WhatsApp and telegram as educational tolls.

Research Gap

After detailed review of literature regarding the technology integration in teaching, found that there are several articles focused on the present topic but there is lack study in the Mandya region colleges. This study can be evidence for the present topic.

Objectives of the study

1. To examine the digital tools utilised by university and college teachers.

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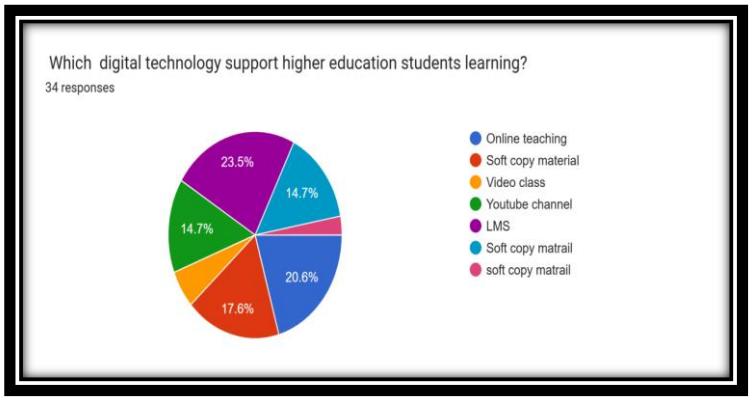
2. To study the problem faced by teachers with regard to ICT integration in the teaching learning process.
3. To find out whether significant difference exists between the attitude of college teachers in different streams towards virtual classroom.

Research Methodology: -

The present study administered the primary data with well-structured questionnaire with sample size of 34 from different higher education institutions. This present study used simple statistical methods such as graphical representation with interpretations.

Data Analysis and Interpretation.

Graph showing which digital technology support higher education students learning?

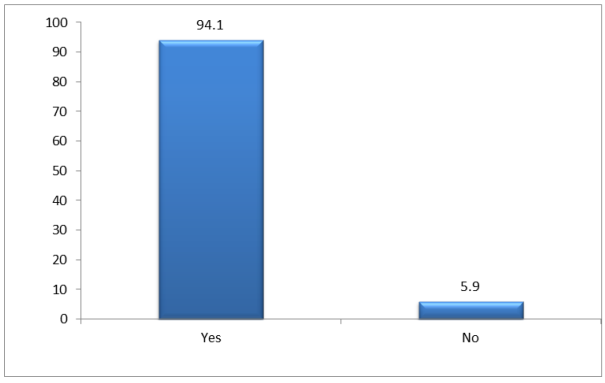


(**Sources**: Compiled by Author using Primary data)

Interpretation:-

The Graph showing the findings which indicate that **Learning Management Systems (LMS)** are the most effective digital technology supporting higher education learning, chosen by **23.5%** of respondents. This is followed closely by **Online Teaching (20.6%)** and **Soft Copy Materials (17.6%)**, highlighting the importance of structured platforms and accessible learning resources. The significant use of **Video Classes** and **YouTube Channels (each 14.7%)** suggests that multimedia content plays a crucial supplementary role. Data also reveals a need for improved consistency in survey design, as a duplicated entry for "soft copy material" slightly skews the data.

Graph showing Do you apply technology tools as a learning strategy to improve your learning process



(**Sources:** Compiled by Author using Primary data)

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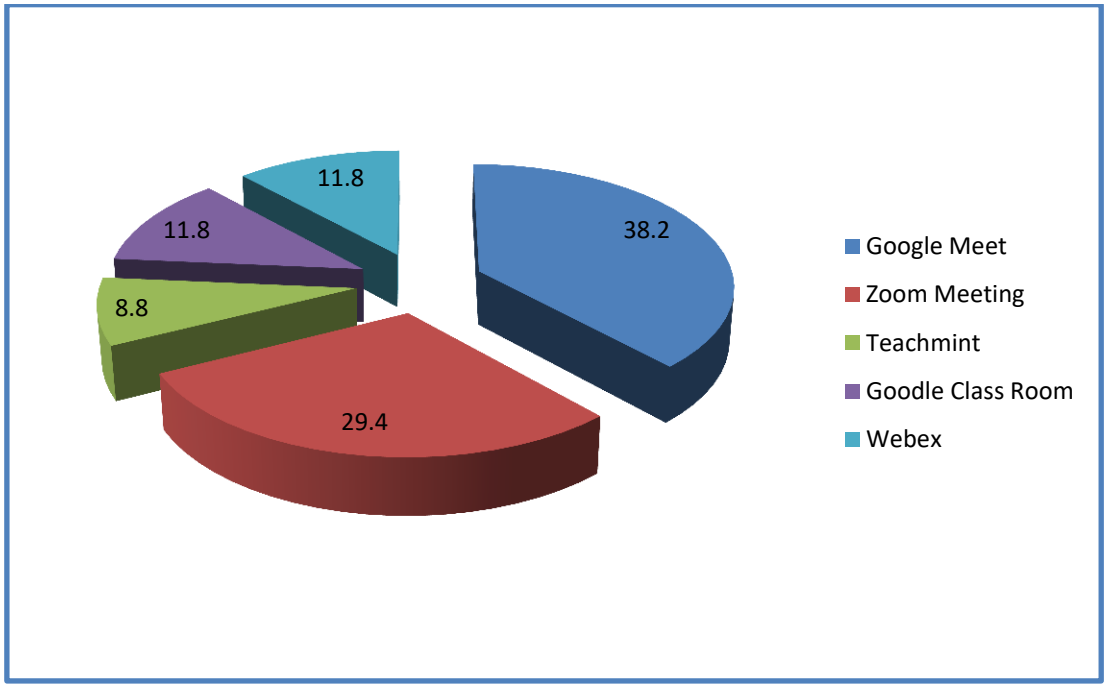
Interpretation:-

The graph illustrates the respondents' use of technology tools as a learning strategy to enhance their learning process. The findings reveal that a vast majority, **94.1%**, of the participants affirmed that they apply technological tools in their learning activities, while only **5.9%** reported that they do not. This clearly indicates that most learners have embraced technology as an integral component of their educational experience. The high percentage of technology users reflects a growing awareness of the benefits of digital tools in promoting interactive, flexible, and efficient learning. Conversely, the small proportion of non-users may be attributed to factors such as limited access to technological resources, lack of digital literacy, or preference for traditional learning methods. Overall, the data underscores the increasing role of technology in shaping modern educational practices and highlights the need for continuous support and training to maximize its pedagogical potential.

Graph showing What are the educational platform and technological tools that you frequently used?



(**Sources**: Compiled by Author using Primary data)

Interpretation:-

The data highlights a clear preference for **Google Meet (38.2%)** and **Zoom (29.4%)** as primary platforms for online teaching in higher education. These tools appear to be favoured due to their accessibility, institutional integration, and ease of use. While platforms like **Google Classroom** and **Webex** have a moderate presence (**11.8%** each), more niche platforms such as **Teachmint (8.8%)** are yet to gain widespread traction, potentially due to lower institutional endorsement or visibility among students and faculty.

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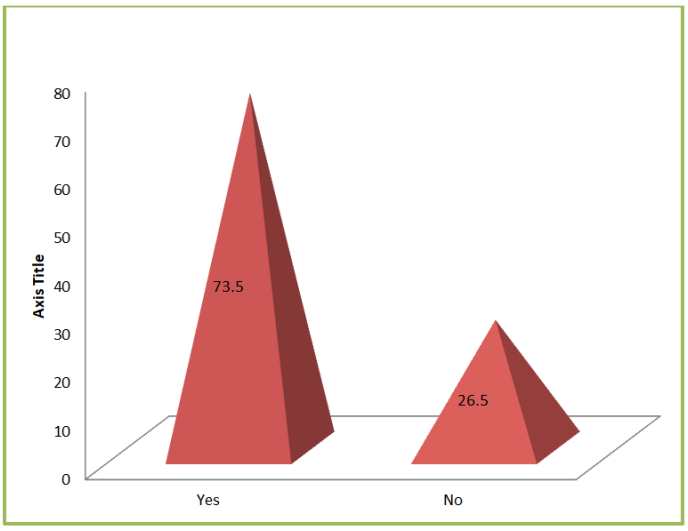
Graph showing Do you create video lessons through presentation slides?

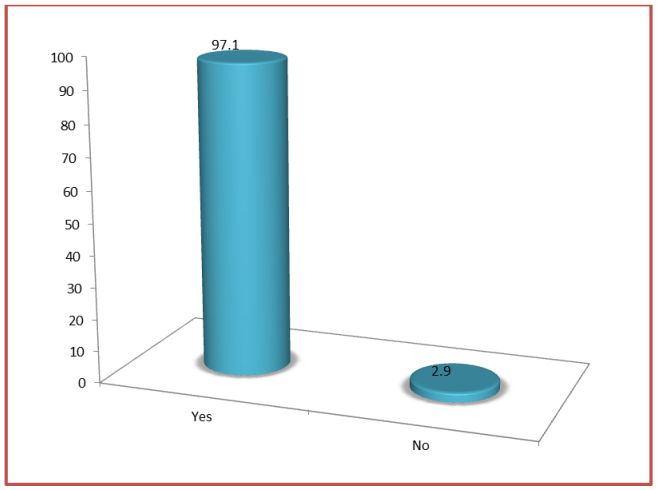


(**Sources**: Compiled by Author using Primary data)

Interpretation:-

Graph showing, which addresses the question "Do you create video lessons through presentation slides?", the data indicates a **strong preference** for this method among the respondents. A substantial majority, **73.5%**, answered **"Yes,"** confirming that they create video lessons using presentation slides. Conversely, only **26.5%** of the respondents answered **"No,"** suggesting that creating video lessons via presentation slides is the predominant practice for the surveyed group. This high percentage strongly suggests that presentation slides are a **popular and established tool** for educators or content creators to produce video-based learning materials.

Graph showing Do you search notes in online platform?



(**Sources**: Compiled by Author using Primary data)

Interpretation:-

Graph titled "Do you search notes in online platform?", reveals a near-unanimous reliance on online platforms for academic note-searching among the surveyed population. A dominating majority of 97.1% of respondents indicated "Yes," they do search for notes on online

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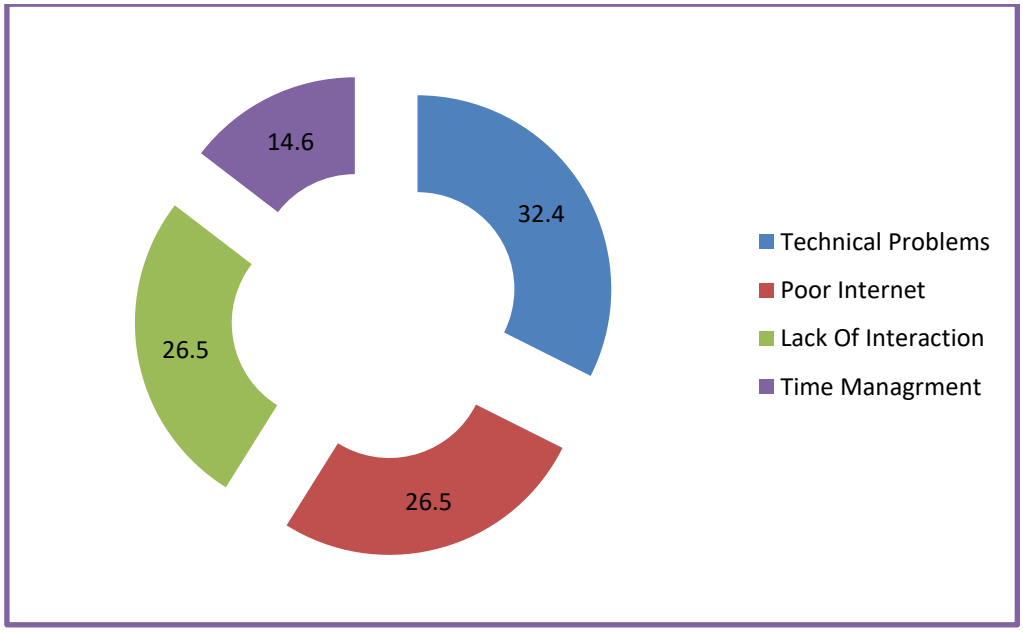
platforms. Conversely, only a negligible 2.9% of respondents reported "No." This stark difference highlights that utilizing online resources for finding educational notes is the overwhelming, standard, and preferred practice for nearly all individuals in this sample, underscoring the critical role of digital accessibility in modern academic research and study habits.

Graph showing What are the most common problems you face in online classes?

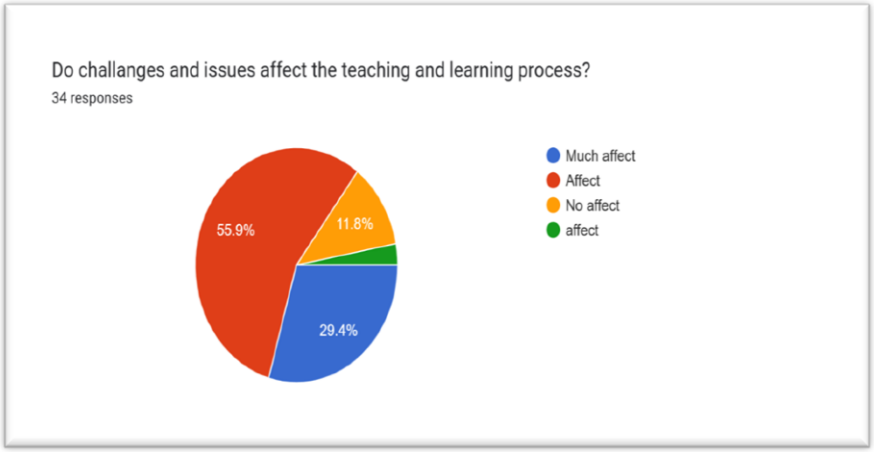


(**Sources**: Compiled by Author using Primary data)

Interpretation:-

Graph showing the data suggests that the most significant challenges encountered are related to **technical problems (32.4%)** and **connectivity issues (26.5%)**, highlighting the need for better technical support and reliable internet infrastructure. Furthermore, **lack of interaction (26.5%)** points to the necessity of more interactive and collaborative tools in online environments. **Time management (14.6%)**, while still relevant, appears to be a less dominant concern.

Graph showing Do challenges and Issues affect the teaching and Learning Process?



(**Sources**: Compiled by Author using Primary data)

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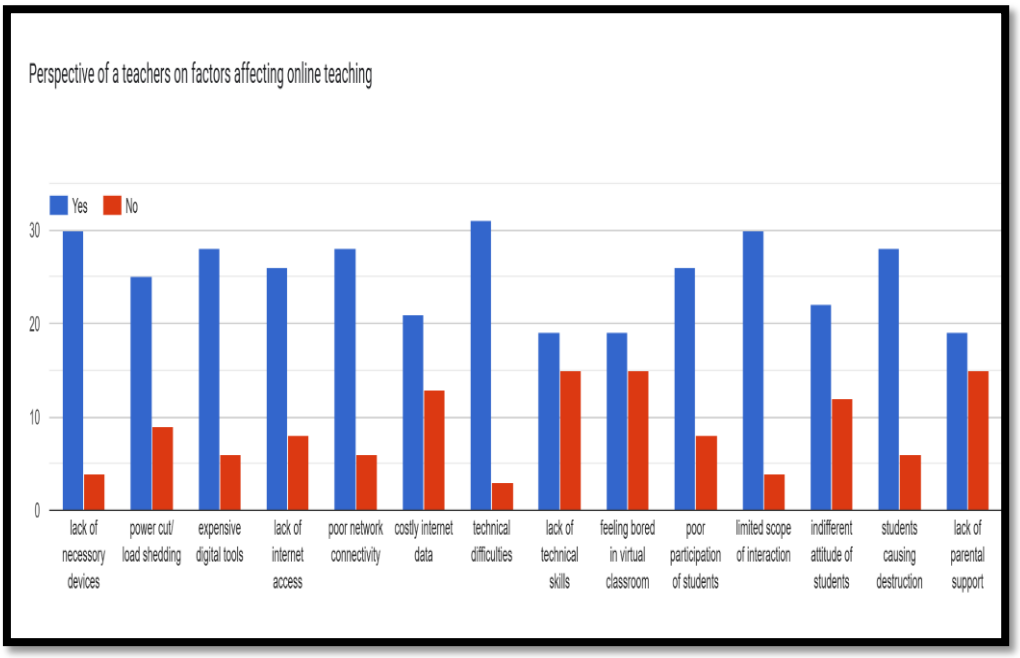
Interpretation:-

Graph showing the majority of respondents acknowledged the impact of challenges on educational outcomes. Specifically, **55.9%** (19 respondents) indicated that challenges *"affect"* the teaching and learning process, while **29.4%** (10 respondents) stated that challenges "much affect" it. Taken together, these two categories represent **85.3%** of the responses, indicating a strong consensus that challenges and issues significantly influence educational practices. In contrast, only **11.8%** (4 respondents) selected *"no affect"*, suggesting that a minority of participants believe challenges do not influence the process. Additionally, **2.9%** (1 respondent) selected the option labeled *"affect"* (in lowercase), which appears to be a duplicate or formatting inconsistency.

Graph showing the Perspective of a teachers on factors affecting online teaching



(**Sources**: Compiled by Author using Primary data)

Interpretation:-

The data indicates that hardware access, stable infrastructure, and student engagement are the most pressing challenges faced by teachers during online teaching. The overwhelming agreement on these issues emphasizes the need for the provision of digital devices to both teachers and students, reliable internet connectivity and electricity, and strategies to enhance student motivation, discipline, and participation in virtual settings. Moreover, the findings suggest that while technical training remains important, many teachers may already possess the basic skills required for online instruction, thereby shifting the focus from individual capabilities to broader systemic and environmental factors.

FINDINGS

1. The findings indicate that **Learning Management Systems (LMS)** are the most effective digital technology supporting higher education learning, chosen by the respondents.

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2. The data highlights a clear preference for **Google Meet** and **Zoom** as primary platforms for online teaching in higher education. These tools appear to be favoured due to their accessibility, institutional integration, and ease of use.
3. "The data suggests that the most significant challenges encountered are related to **technical problems** and **connectivity issues** highlighting the need for better technical support and reliable internet infrastructure.
4. Majority of respondents acknowledged the impact of challenges on educational outcomes. This indicated that challenges *"affect"* the teaching and learning process, while stated that challenges *"much affect"*
5. The data indicates that **hardware access, stable infrastructure, and student engagement** are the most pressing challenges faced by teachers during online teaching. The overwhelming agreement on these issues emphasizes the teaching.

SUGGESTIONS

1. Strengthen ICT Infrastructure.
2. Enhance Technical Support Services.
3. Provide Training for Faculty and Students.
4. Offer Equipment and Hardware Support.
5. Promote Student Engagement Strategies.
6. Integrate Blended Learning Models.

CONCLUSION

The integration of technology into teaching and learning processes in higher education institutions has become both a necessity and an opportunity in the digital age. The findings of this study underscore the central role of Learning Management Systems (LMS) in supporting academic delivery, alongside the widespread adoption of platforms like Google Meet and Zoom for online instruction. While these tools offer flexibility and accessibility, the study also highlights significant challenges, including technical issues, poor internet connectivity, limited hardware access, and difficulties in maintaining student engagement. These challenges not only disrupt instructional flow but also negatively impact educational outcomes. To address these concerns and enhance the effectiveness of technology-enhanced learning, several key measures are recommended. Strengthening ICT infrastructure, enhancing technical support, offering comprehensive training, and ensuring access to necessary hardware are critical steps. Furthermore, strategies to boost student engagement and the implementation of blended learning models can provide a more resilient and inclusive educational experience. Ultimately, for technology integration to be truly transformative, higher education institutions must adopt a strategic, inclusive, and sustainable approach one that supports both educators and learners while continuously adapting to emerging educational needs.

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