

IMPACT OF ICT ON THE PROGRESS AND PRODUCTIVITY OF STUDENTS AT UNIVERSITY LEVEL

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Abstract

Modern educational institutions cannot function without information and communication technology (ICT), which has revolutionized how students learn, access information, and interact with educational materials. The purpose of this literature review is to examine how ICT affects university students' academic success and productivity. To comprehend how ICT has impacted students' academic performance, learning outcomes, and overall educational experience, a number of studies and research papers are analyzed. The review emphasizes the benefits of ICT integration, such as increased motivation, engagement, critical thinking abilities, individualized learning, collaborative learning, and efficient student-teacher communication. However, there are obstacles that prevent ICT from reaching its full potential in higher education, including issues like digital inequality and aversion to change. The article suggests that embracing innovative ICT-driven approaches can empower university students to excel in their academic pursuits in the digital age.

Keywords: ICT, higher education, academic performance, productivity, e-learning, gamification, mobile learning, virtual reality, augmented reality, inclusivity.

Introduction & Literature Review

Information and Communication Technology (ICT) has turned into an indispensable piece of current school systems, changing the manner in which understudies learn, access information, and draw in with instructive substance. With the boundless reception of ICT apparatuses and stages in college settings, this writing audit means to investigate and break down the effect of ICT on the advancement and efficiency of understudies at the college level. The survey will dive into different investigations, research articles, and insightful distributions to introduce a far reaching understanding of what ICT has meant for understudies' scholarly presentation, learning results, and by and large instructive experience (Bibi, Ayub, & Ismail, 2023).

A few specialists have featured the significance of incorporating ICT into advanced education to further develop understudy learning results and efficiency. In research study, it was found that the utilization of ICT in the homeroom emphatically impacted understudies' inspiration, commitment, and decisive reasoning abilities. This recommends that consolidating ICT devices in showing practices can prompt improved scholarly execution and expanded efficiency among college understudies (Nwigbo, & Madhu, 2016).

E-learning stages have acquired noticeable quality as of late, offering adaptable and available learning open doors for college understudies. A meta-examination directed by Means et al. (overall, than those participated in customary up close and personal guidance. This shows that ICT-driven e-learning stages can add to worked on scholarly advancement and efficiency in the college setting (Skryabin, Zhang, Liu, & Zhang, 2015).

ICT empowers customized opportunities for growth by fitting instructive substance and exercises to individual understudy needs. Customized learning, worked with by ICT devices, emphatically influences understudies' independent picking up, prompting more significant levels of scholarly accomplishment. In this manner, ICT-driven customized learning can encourage expanded efficiency and scholastic accomplishment among college understudies (Aristovnik, 2012).

ICT apparatuses advance cooperative learning and successful communication among understudies and educators. Cooperative learning through ICT stages upgraded understudies' critical abilities to think and decisive reasoning abilities. Besides, further developed communication channels among understudies and personnel have been related with more significant levels of commitment and scholastic advancement (Lu, & Song, 2020).

Regardless of the positive effect of ICT on college understudies' advancement and efficiency, different difficulties and obstructions exist. Distinguished issues, for example, computerized imbalance, protection from change, and absence of mechanical skill among understudies and staff. These difficulties could thwart the maximum capacity of ICT combination in advanced education (Carnoy, 2004).

Gamification, the use of game components and mechanics in non-game settings, has arisen as a promising way to deal with upgrade understudy commitment and inspiration in learning. The effect of gamified learning conditions in advanced education and found that gamification decidedly impacted understudies' characteristic inspiration, prompting more significant levels of efficiency and accomplishment. Consolidating gamification procedures in ICT-based learning stages could be a powerful technique to cultivate a feeling of achievement and drive among college understudies (Asif, Sheeraz, & Sacco, 2022)

The broad utilization of cell phones has opened up new roads for instructive conveyance through versatile learning or m-learning. The viability of m-learning on understudies' scholarly execution and tracked down a positive connection between's m-learning intercessions and further developed learning results. M-learning permits understudies to get to instructive assets whenever and anyplace, empowering adaptability and customized growth opportunities that can add to improved progress and efficiency (Picatoste, Pérez-Ortiz, & Ruesga-Benito, 2018).

Computer generated Reality (VR) and Expanded Reality (AR) advances have shown extraordinary potential in changing the instructive scene. Utilization of VR in college degree and featured its positive effect on understudies' growth opportunities and mental commitment. VR and AR offer vivid and intuitive learning potential open doors, which can prompt further comprehension and information maintenance, eventually affecting understudy progress and efficiency (Aboderin, 2019).

The approach of Enormous Information and Learning Examination has given teachers significant bits of knowledge into understudies' learning ways of behaving and execution. A concentrate by Siemens and Long (2011) examined the capability of learning examination in advanced education and its part in predicting understudies' scholastic results. Overwhelmingly of information created by understudies'

cooperation's with ICT devices, educators can distinguish learning holes and designer intercessions to enhance understudies' advancement and efficiency (Ritzhaupt, Liu, Dawson, & Barron, 2013).

ICT can possibly resolve issues of inclusivity and openness in advanced education. The effect of ICT on understudies with handicaps and found that versatile innovations and open e-learning stages decidedly impacted their scholastic commitment and execution. Incorporating ICT with an emphasis on widespread plan standards can establish a comprehensive learning climate, helping all understudies and advancing efficiency (Chillas, Marks, & Galloway, 2015).

The writing explored in this study features the critical effect of ICT on the advancement and efficiency of college understudies. Reconciliation of ICT in advanced education has been connected to work on scholastic execution, customized growth opportunities, cooperative learning open doors, and improved communication. Nonetheless, challenges like computerized disparity and mechanical obstruction expect consideration regarding guarantee impartial access and full acknowledgment of ICT's true capacity in the college climate. Future examination ought to zero in on addressing these obstructions and keep investigating imaginative ways of utilizing ICT for enhancing understudies' learning results and generally instructive involvement with the college level (Pagani, Argentin, Gui, & Stanca, 2016).

This further literature review reinforces the significant impact of ICT on the progress and productivity of students at the university level. The integration of gamification, mobile learning, virtual reality, augmented reality, big data analytics, and inclusive ICT practices have all shown promising results in enhancing students' learning experiences and academic performance. However, continuous research and implementation efforts are necessary to address challenges and fully leverage the potential of ICT in higher education. By embracing innovative ICT-driven approaches, universities can empower their students to thrive in the digital age and achieve greater progress and productivity in their academic pursuits (Qi, 2019).

Objectives of the Study

1. To examine the extent of ICT integration in higher education and its impact on the progress and productivity of students at the university level.
2. To assess the effectiveness of e-learning platforms in comparison to traditional face-to-face instruction in terms of student performance and productivity.
3. To investigate the impact of ICT in fostering inclusivity in higher education and it's potential to address the needs of students.

Research Methodology

A cross-sectional survey design was used for the quantitative research approach to examine how ICT affects university students' growth and productivity. Using a stratified random sampling approach, a structured questionnaire was created to gather information from a representative sample of students. A variety of ICT-related topics, including e-learning platforms, personalized learning, collaborative learning, gamification, mobile learning, virtual reality, augmented reality, big data analytics, and inclusive practices, was covered using closed-ended and Likert-scale survey questions. To find connections and correlations between ICT use and students' academic achievement, statistical analysis comprising descriptive statistics, t-tests, correlation, and regression analysis was carried out. The study was adhering to ethical principles, such as data confidentiality and voluntary participation.

In conclusion, the objective of this quantitative study is to offer important insights into the impact of ICT on the academic performance and experiences of university students. The study aims to investigate the function of various ICT tools and platforms in influencing students' development and productivity in higher education settings by using a well-structured survey and solid statistical analysis.

Table 1

The extent of ICT integration in higher education and its impact on the progress and productivity of students at the university level

| <i>ICT Integration Aspects</i> | <i>Frequency (n)</i> | <i>Percentage (%)</i> |
|---|----------------------|-----------------------|
| Regular use of LMS (e.g., Moodle, Blackboard, etc.) | 250 | 55.60% |
| Utilization of online databases for research | 180 | 40.00% |
| Engagement in online discussion forums | 220 | 48.90% |
| Interactive virtual simulations or labs | 150 | 33.30% |
| Participation in webinars or virtual lectures | 130 | 28.90% |
| Use of educational mobile apps | 170 | 37.80% |

This table shows the degree of ICT integration in higher education and its effect on university students' development and production. It displays the frequency and proportion of pupils using various ICT integration strategies. The "Regular use of LMS" component is the one that students use the most frequently (55.60%), followed by the "Utilizations of online databases for research" component (40.00%). Overall, the chart emphasizes the widespread use of ICT tools in higher education, highlighting the potential impact on students' academic advancement and productivity.

Table 2
 Students' Perception of ICT Impact on Progress and Productivity

| <i>Perception</i> | <i>Frequency (n)</i> | <i>Percentage (%)</i> |
|------------------------------|----------------------|-----------------------|
| Improved Time Management | 300 | 66.70% |
| Enhanced Learning Experience | 380 | 84.40% |
| Increased Productivity | 260 | 57.80% |
| Better Academic Performance | 350 | 77.80% |
| Improved Collaboration | 210 | 46.70% |

This table sheds light on how students view how ICT affects productivity and advancement. The majority of students believe that they have achieved their goals, with "Enhanced Learning Experience" receiving the highest ratings (84.40%). A sizable portion of students (66.70% and 77.80%, respectively) also see "Better Academic Performance" and "Improved Time Management" favorably. These results imply that students think ICT enhances their academic success and productivity.

Table 3
 Frequency of ICT Use for Different Academic Activities

| <i>Academic Activity</i> | <i>Daily</i> | <i>Mostly</i> | <i>Once a week</i> | <i>Rarely</i> | <i>Never</i> |
|---|--------------|---------------|--------------------|---------------|--------------|
| Accessing Course Materials on LMS | 240 | 140 | 40 | 25 | 5 |
| Conducting Research using Online Databases | 180 | 90 | 30 | 15 | 135 |
| Participating in Online Discussion Forums | 150 | 70 | 40 | 45 | 145 |
| Engaging in Interactive Virtual Simulations or Labs | 120 | 30 | 40 | 60 | 200 |
| Attending Webinars or Virtual Lectures | 100 | 20 | 10 | 80 | 240 |
| Using Educational Mobile Apps | 80 | 50 | 40 | 100 | 180 |

Table 3 offers details on how frequently 450 university students utilize ICT for various academic tasks. The daily tasks that are most commonly completed are "Accessing Course Materials on LMS" (240 students) and "Conducting Research using Online Databases" (180 students). Daily participation from 150 students in "Participating in Online Discussion Forums" is active. The daily participation rates are lower for "Attending Webinars or Virtual Lectures" (100 students) and "Using Educational Mobile Apps" (80 students). With 120 pupils each day, "Engaging in Interactive Virtual Simulations or Labs" reveals a modest level of involvement. These results show that students heavily rely on LMS and online databases, whilst other activities would need more marketing. For instructors looking to improve student engagement at the university level through ICT integration, the data provides insightful information.

Table 4

| Comparison of Student Performance and Productivity between E-Learning and Face-to-Face Instruction | | |
|--|---------------------------------|-----------------------------------|
| <i>Aspect of Comparison</i> | <i>E-Learning Group (n=200)</i> | <i>Face-to-Face Group (n=200)</i> |
| Average Exam Scores (%) | 78.5 | 75.20 |
| Assignment Completion Rate (%) | 92 | 87.50 |
| Time Spent on Learning (hours/week) | 15.4 | 14.20 |
| Student Satisfaction (Scale: 1-5) | 4.3 | 4.1 |
| Self-Directed Learning Rating (Scale: 1-10) | 7.8 | 6.5 |

This table contrasts the productivity and performance of students who received face-to-face education vs. those who received e-learning. In comparison to the face-to-face group, the e-learning group has higher average test scores (78.5%) and assignment completion rates (92%) than those groups (75.20% and 87.50%, respectively). Additionally, compared to the face-to-face group (14.20 hours/week), the e-learning group devotes a little bit more time to learning (15.4 hours/week). According to the findings, e-learning could offer a modest edge in terms of student productivity and performance.

Table 5

Independent sample t-test to compare Student's Performance and Productivity between E-Learning and Face-to-Face Instruction

| <i>Group</i> | <i>Sample Size (n)</i> | <i>Mean Performance Score (M)</i> | <i>Standard Deviation (SD)</i> | <i>t-value</i> | <i>p-value</i> |
|---------------------|------------------------|-----------------------------------|--------------------------------|----------------|----------------|
| E-learning Platform | 200 | 82.631 | 6.211 | 4.78 | 0.01 |
| Face-to-face | 250 | 78.323 | 7.192 | | |

This table displays the findings of an independent sample t-test to compare the productivity and performance of students in the groups receiving face-to-face teaching with those receiving e-learning. The e-learning group surpasses the face-to-face group in terms of student performance and productivity, as shown by the t-value of 4.78 and p-value of 0.01, which show a statistically significant difference between the groups.

Table 6

| <i>Inclusivity Aspect</i> | <i>Sample Size (n)</i> | <i>Mean Score (M)</i> | <i>Standard Deviation (SD)</i> |
|--|------------------------|-----------------------|--------------------------------|
| Accessibility for Students with Disabilities | 120 | 4.2 | 0.9 |
| Support for English Language Learners | 100 | 3.8 | 0.7 |
| Catering to Diverse Learning Styles | 150 | 4 | 0.8 |
| Flexibility for Non-Traditional Students | 130 | 4.1 | 0.6 |
| Overall Inclusivity Score | 500 | 4.05 | 0.75 |

Through the use of ICT, this table evaluates many dimensions of inclusion in higher education. The high (over 4) mean ratings for "Accessibility for Students with Disabilities," "Catering to Diverse Learning Styles" and "Flexibility for Non-Traditional Students" show that inclusion is seen favorably. The mean score for "Support for English Language Learners" is slightly lower (3.8), though. Overall, the research indicates that ICT integration is supporting diversity in higher education in a favorable way.

Findings

1. ICT integration in higher education is pervasive, and many students use a variety of ICT tools. "Regular use of LMS" (55.60%) and "Utilisation of online databases for research" (40.00%) are the two aspects that are most often used. This shows how ICT may affect how far pupils may develop academically.

2. Students see the effects of ICT on their productivity and academic progress favourably. "Enhanced Learning Experience" (84.40%) received the highest rating, followed by "Better Academic Performance" (77.80%) and "Improved Time Management" (66.70%).
3. ICT use varies in frequency depending on the academic activity. While "Attending Webinars or Virtual Lectures" and "Using Educational Mobile Apps" have lower daily participation rates, "Accessing Course Materials on LMS" and "Conducting Research using Online Databases" are completed the most frequently each day.
4. Regarding student performance and productivity, e-learning seems to have a little edge over in-person education. In comparison to the face-to-face group, the e-learning group has higher average test scores and assignment completion rates.
5. Positive mean scores for factors like "Accessibility for Students with Disabilities," "Catering to Diverse Learning Styles," and "Flexibility for Non-Traditional Students" show that ICT integration in higher education promotes inclusion.

Conclusion

The analysis shows how important ICT is to higher education and how actively students use various ICT tools to improve their academic performance. ICT's usefulness in promoting a good learning environment is highlighted by students' favorable perceptions of its effects on learning and performance. E-learning may also have benefits in terms of student productivity and performance, according to a comparison between it and face-to-face education. Further evidence that ICT integration is promoting diversity and inclusion in higher education comes from the positive mean ratings for inclusivity-related factors.

Recommendations:

1. To improve students' academic development and productivity, educational institutions should keep encouraging and supporting the incorporation of ICT technologies into their teaching and learning processes.
2. In order to successfully present material and include students in interactive learning experiences, instructors should concentrate on utilising e-learning platforms.
3. In order to promote collaborative learning and engagement, efforts should be made to get more students to take part in virtual simulations, webinars, and online discussion forums.
4. For teachers and students to effectively use ICT tools and platforms, educational institutions should offer training and assistance.
5. In order to foster inclusion in higher education, more study is required to examine the potential of ICT in meeting the unique requirements of different student populations, such as English language learners and students with impairments.

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