International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Evaluation of Students' Perception, Attitude, and Experience Toward Interactive E-content in Extension Education

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Abstract

The increasing incorporation of interactive E-content into academic courses is a result of the swift digital change in education. The perception, attitude, and experience of undergraduate Extension Education students with relation to E-content-based learning are investigated in this study. Data about students' awareness, digital literacy, engagement, and perceived advantages and difficulties of E-learning were gathered using structured questionnaires with a sample of 220 students from four universities. According to the data, there is a high preference for E-content, and most people recognize its convenience, adaptability, and accessibility. However, the findings also highlight issues with lack of individualized learning, suspicion over the legitimacy of E-learning credentials, and variation in material. A portion of students claimed to be overwhelmed by the technological needs of online platforms and scheduling flexibility, despite the majority expressing excitement and adaptation toward digital learning tools. The study finds that although students are generally open to digital learning, institutional support, high-quality instruction, and removing obstacles to fair access are critical to the success of E-content. The results call for the development of blended learning strategies, targeted digital training, and improved infrastructure to make E-content an inclusive and impactful component of Extension Education.

Keywords: Extension Education, Impact of Interactive E-content, E-learning, Learner-Centered Study.

1. Introduction

It has been standard practice to have a classroom with one or more teachers and students, with both groups meeting in person and synchronously in real time. But as computer technology and the Internet have advanced, the conventional learning environment is changing into what is commonly known as "E-learning." The word "E-learning" refers to a type of teaching and learning system where students and the instructor, or anybody else participating in the information exchange, are separated by time, distance, or both (Maneschijn, 2005). Technology affects both our work and leisure, particularly in digital media. The worlds of work and leisure, as well as education, have been revolutionized by technology and media. These issues can be resolved by employing more tangible models of instructional materials that

teachers deliver in the form of pictures, animations, or videos, as well as by implementing student-involved learning approaches, which can be accomplished by using the internet as a communication tool to maximize student participation and overcome time constraints, as well as by offering instructional materials that students can study independently outside of the classroom. Integrating the instructional design learning process with information and communication technology-better known as e-learning based interactive learning-is one example of an existent learning innovation (Smaldino, 2008). E-learning, or online learning, has become an increasingly popular method of education, particularly in higher education. Here are some reasons why E-learning is important for undergraduate students:

a. **Accessibility:** E-learning allows students to access course materials and participate in learning activities from anywhere, at any time. This can be especially beneficial for students who may have other commitments, such as work or family responsibilities, which make it difficult to attend traditional classes.
b. **Flexibility:** E-learning offers students flexibility in terms of the pace of learning. Students can work through course materials at their own pace, allowing them to spend more time on difficult concepts or move more quickly through material that is easier for them to grasp.
c. **Personalization**: E-learning allows students to personalize their learning experience. Students can choose to focus on areas that are of most interest to them or that they feel they need more help with. They can also interact with course materials in ways that are most effective for their learning style.
d. **Interactive learning:** E-learning often uses a variety of multimedia elements, such as videos, animations, and interactive simulations, to engage students and make learning more interactive. This can help students stay engaged and retain information better.
e. **Collaboration:** E-learning can facilitate collaboration between students and instructors. Online discussion forums, video conferencing, and other collaborative tools can be used to facilitate communication and collaboration between students and instructors, regardless of their physical location.
f. **Cost-effective:** E-learning can be a cost-effective alternative to traditional classroom-based learning. It can reduce costs associated with physical infrastructure, such as classrooms and equipment, and can allow for a larger number of students to be accommodated in a single course.

2. Literature Review

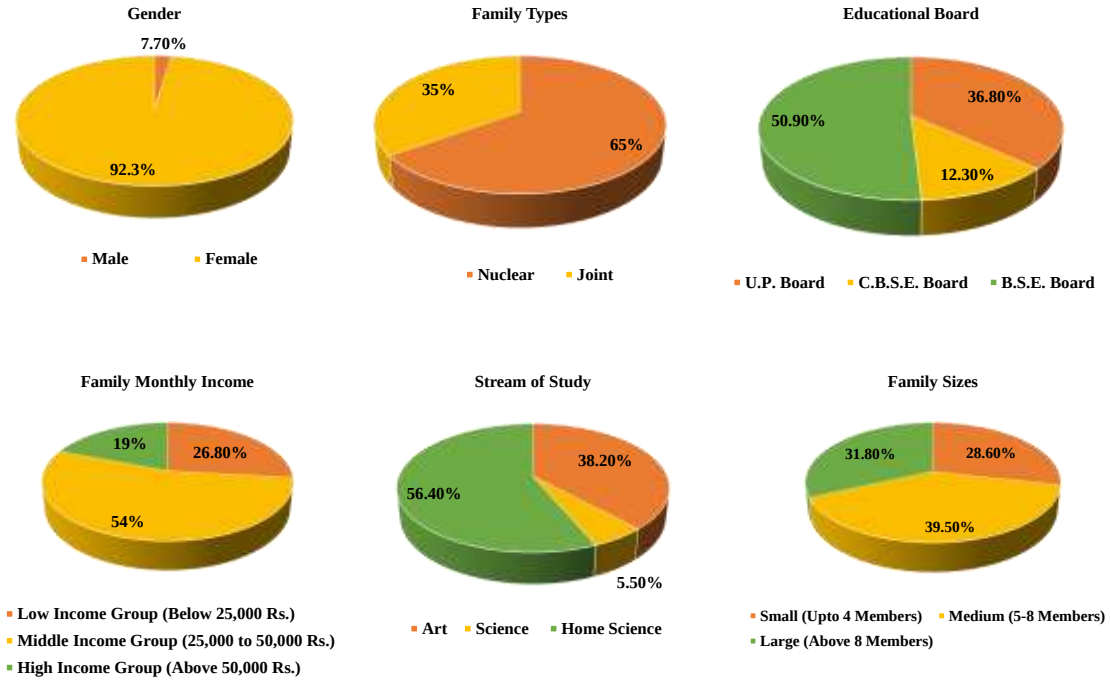
The rapid advancement of digital technology has transformed the landscape of education, making interactive E-content an increasingly vital tool in higher education. In the field of Extension Education, where practical knowledge dissemination and learner engagement are crucial, the integration of digital content supports flexible, self-paced, and student-centered learning. The New Education Policy (NEP) 2020 emphasizes the adoption of digital pedagogy to enhance access and equity in education (Kalyani et al., 2020). However, the success of such initiatives largely depends on students' perceptions, attitudes, and prior experiences with E-content. In the rapidly evolving educational landscape, traditional teaching methods in Extension Education often face challenges such as limited interactivity, lack of flexibility, and inconsistent learning experiences. With the increasing integration of digital tools and e-learning platforms, there is a growing need to design and develop structured E-content that enhances student engagement, comprehension, and retention (Parizad et al., 2023).

The role of technology in education has been a major area of research. Gaur (2015) notes that technology has the potential to transform education by making learning more engaging, accessible, and comprehensive. E-learning tools, in particular, have the capacity to revolutionize the educational

landscape, but challenges such as psychological and infrastructural barriers remain. While extensive research has been conducted on e-learning, it continues to evolve as a popular research domain. Somayeh et al. (2016) further highlight the need for a structured approach to e-learning implementation, particularly in urban settings where students face high commuting costs, environmental pollution, and logistical challenges. The development of appropriate infrastructure, including high-speed internet, affordable hardware, and software support, is essential for fostering a conducive e-learning environment. Their study emphasizes that while e-learning is still in its early stages, its significant impact on education cannot be ignored, necessitating continuous investment in its growth and promotion. Amutha (2016) explores the effectiveness of E-content-based learning in promoting critical thinking and active learning. E-content facilitates a shift from traditional fact-based teaching to a more interactive and facilitative approach, where teachers act as learning facilitators rather than mere providers of information. Empirical studies have demonstrated that E-content significantly enhances students' academic performance at the tertiary level.

Higher education institutions also play a significant role in community development through Extension Education. Kasworm (2017) emphasizes that universities, as knowledge hubs, facilitate knowledge transfer, outreach programs, and cooperative projects, bridging the gap between academia and real-world societal needs. By integrating Extension Education into their core missions, universities uphold their social responsibility and contribute to public welfare. Meanwhile, Suresh et al. (2018) state that advancements in e-learning technologies have laid the foundation for a transformative shift in education. Personalized learning experiences, enhanced student interactions, and evolving teacher roles are reshaping the education system. While e-learning adoption has grown significantly, challenges persist in ensuring universal accessibility. Their study concludes that e-learning has the potential to enhance students' cognitive abilities and learning efficiency, making it a crucial area for further research and development.

Figure 1: Distribution of the students' demographic profile in percentage (N=220).



The literature review underscores the evolution of Extension Education, its integration with technology, and the emergence of digital pedagogy. While e-learning and E-content development offer significant opportunities for enhancing learning outcomes, challenges such as infrastructural limitations, cognitive overload, and accessibility must be addressed. This study aims to evaluate how undergraduate students in Extension Education respond to interactive E-content, focusing on their readiness, digital literacy, and the perceived benefits and challenges. Understanding these factors is essential for designing effective, inclusive, and sustainable digital learning strategies in the extension education domain.

3. Methodology

A purposive sampling procedure has been used for the selection of the respondents. First-year and second-year students of B.Sc. Community Science has been selected purposively first. But because of COVID-19, fewer admissions took place during that period. To increase the number of students, the researcher had to enroll all undergraduate students from the first to the fourth year. A total of 220 respondents were selected from four selected Universities. For validation of the developed E-content, 05 experts were selected purposively.

The Figure 1 reveals that most students in community science courses are females (92.3%) and males (7.7%). Most of the students belong to nuclear family types (65%) rather than joint families which is (35%) in total. The family size of the students varied between small, medium, and large whereas the majority belonged to medium size family five to eight members (39.5%), the next large families above eight members (31.8%), and the rest belonged to small families up to four members (28.6%). Looking at family monthly income revealed the number of students belonging to a middle-income group (54%) and lower income group (26.8%) whereas approximately (19%) of students belonged to the higher-income group. The majority (56.4 %) of the students had Home science in their stream of study or equivalent examination, whereas the rest (38.2%) of students had an art stream, and (5.5%) students had a science stream in their higher secondary examination or equivalent examination. One of the interesting findings of this experimental study is most of the (50.9%) students studied from Bihar School Examination Board and (36.8%) students from Uttar Pradesh State Board of High School and Intermediate Education, very few (12.3%) studied from Central Board of Secondary Education.

Questionnaires have been used as instruments for data collection from the respondents, as shown in Table 1. Keeping in view the objectives and the variables under the study, a well-structured interview questionnaire has been prepared and pre-tested to locate any ambiguity in the questions. After pre-testing certain modifications have been made to the questionnaire by consulting experts and finalized questionnaire were used for data collection. Questionnaires were chosen as the primary data collection tool due to their ability to gather standardized information from a relatively large sample efficiently. The questionnaires included combinations of Likert-type items, yes/no, and open-ended questions to assess participants' existing knowledge, perception, and attitude towards e-education and E-content. The Participants completed the questionnaires anonymously or using their e-mail ID online via Google Forms. The questionnaire was developed in simple language using simple coded questions and their relevant options. The questionnaires have been developed to evaluate the student's knowledge and behaviour towards E-content awareness, Understanding of E-content, Digital literacy, Benefits, and challenges, E-content in the classroom, Future of E-content, Bridging the digital divide, Based on the perception and attitude of learners about e-learning education.

Table 1: Students' response based on the their perception and attitude-based experience toward Interactive E-content (N=220).

Questions to Respondent	Answers of Respondent	
	Frequency	Percentage (%)
Q.1: How do you think E-content can enhance the learning experience in a classroom?		
a. By reducing teacher-student interactions.	12	5.4%
b. By making learning more accessible and engaging.	169	76.8%
c. By increasing the need for printed textbooks.	23	10.4%
d. By slowing down the learning process.	16	7.2%
Q.2: What advancements or changes do you expect to see in E-content in next 5 years?		
a. Widespread use of virtual reality in education.	123	55.9%
b. Decreased reliance on digital resources.	13	5.9%
c. No significant changes.	19	8.6%
d. A shift back to traditional teaching methods.	65	29.5%
Q.3: In your opinion, what steps can be taken to ensure equitable access to E-content for all students, regardless of their background or location? (Select all that apply).		
a. Providing subsidies for digital devices.	87	39.5%
b. Expanding internet access in underserved areas.	62	28.1%
c. Encouraging the use of print textbooks only.	45	20.4%
d. Offering in-person classes exclusively.	26	11.8%
Q.4 What is a common perception among learners regarding e-learning education?		
a. Limited accessibility	28	12.7%
b. Increased flexibility	92	41.8%
c. Lower educational quality	61	27.7%
d. Reduced interaction with peers	39	17.7%
Q.5: How do learners typically view the convenience of e-learning compared to traditional classroom learning?		
a. Equally convenient	71	32.2%
b. Less convenient	41	18.6%
c. More convenient	89	40.4%
d. Depends on the subject	19	8.6%
Q.6: What do learners express a potential concern about e-learning?		
a. Limited course variety	85	38.6%
b. Lack of personalized learning	64	29%
c. Inability to access course materials remotely	49	22.2%
d. Excessive face-to-face interactions	22	10%
Q.7: How do learners generally perceive the level of engagement in e-learning courses?		
a. Higher engagement	108	49%
b. Similar engagement to traditional classes	75	34%
c. Lower engagement	15	6.8%
d. Depends on the instructor	22	10%
Q.8: What attitude do learners often have towards the technological requirements of e-		

learning?		
a. Excitement and adaptability	109	49.5%
b. Resentment and resistance	45	20.4%
c. Indifference	3	1.3%
d. Mixed feelings	63	28.6%
Q.9: How do learners typically feel about the flexibility of scheduling in e-learning cours-es?		
a. Overwhelmed by too much flexibility	47	21.3%
b. Prefer fixed schedules in traditional classes	53	24%
c. Appreciate the flexibility	107	48.6%
d. Find it challenging to manage time	13	5.9%
Q.10: What is a common positive perception of learners about e-learning assessments?		
a. More challenging than traditional exams	34	15.4%
b. Limited feedback and interaction	32	14.5%
c. Increased transparency in grading	81	36.8%
d. Prefer face-to-face assessments	73	33.1%
Q.11: How do learners usually feel about the social aspects of e-learning?		
a. Enjoy the online community	96	43.6%
b. Prefer isolation during studies	61	27.7%
c. Miss in-person interactions	59	26.8%
d. Social aspects are not important	4	1.8%
Q.12: What do learners express a potential concern about the credibility of e-learning credentials?		
a. Equal credibility to traditional degrees	73	33.1%
b. Higher credibility	49	22.2%
c. Lower credibility	52	23.6%
d. Depends on the institution	46	20.9%
Q.13: How do learners generally perceive the cost-effectiveness of e-learning compared to traditional education?		
a. More expensive	34	15.4%
b. Similar costs	71	32.2%
c. More cost-effective	95	43.1%
d. Depends on the course	20	9%

4. Results and Discussion

This study assessed the perceptions, attitudes, and experiences of 220 undergraduate students enrolled in Extension Education courses across different universities, with a focus on the effectiveness and reception of interactive E-content.

- **Perceptions on Learning Enhancement and Future of E-content**

A significant majority of students (76.8%) believe that E-content enhances learning by making it more accessible and engaging, which aligns with the learner-centered philosophy of digital education. Only a small fraction (5.4%) perceived it as reducing teacher-student interaction, indicating minimal concern

about digital learning undermining classroom dynamics. Additionally, when asked about the future of E-content, 55.9% expected increased use of virtual reality (VR), showing optimism toward technological integration in education. However, 29.5% anticipated a return to traditional methods, suggesting a segment still holds reservations about the permanence of digital learning.

- **Concerns About Accessibility and Quality**

In terms of equity and access, 39.5% of respondents recommended providing subsidies for digital devices, and 28.1% supported expanding internet access in underserved regions. Interestingly, 20.4% still favored print textbooks, and 11.8% preferred in-person classes only—indicating that for some students, traditional learning methods remain essential. This suggests that while digital solutions are widely accepted, a hybrid approach may better address diverse learner needs.

- **Flexibility, Convenience, and Engagement**

A plurality (41.8%) recognized increased flexibility as a key benefit of E-learning, followed by 40.4% who found E-learning more convenient than traditional classroom settings. Meanwhile, 38.6% expressed concern over limited course variety, and 29% cited the lack of personalized learning as a drawback. Regarding engagement, 49% of students reported higher engagement in E-learning courses, and 34% noted similar engagement levels as in traditional settings. Only 6.8% reported lower engagement, affirming that interactive content can be as stimulating—if not more—than conventional methods, depending on its design and delivery.

- **Student Attitudes Toward Technology and Scheduling**

Nearly half the respondents (49.5%) showed excitement and adaptability toward the technological demands of E-learning, demonstrating a positive shift in digital readiness. Conversely, 20.4% expressed resistance, and 28.6% had mixed feelings, suggesting a need for better orientation and support to bridge digital confidence gaps.

On scheduling flexibility, 48.6% appreciated the freedom to manage their learning time, while 24% preferred fixed schedules and 21.3% felt overwhelmed by too much flexibility. These findings highlight the importance of structured guidance in E-learning systems, especially for students transitioning from traditional settings.

- **Assessment, Social Interaction, and Credibility Concerns**

Regarding assessments, 36.8% of students believed E-learning offered increased transparency in grading, while 33.1% preferred face-to-face evaluations. This underscores a divide in student preferences and trust in online assessment methods.

Socially, 43.6% enjoyed the online community experience, but 26.8% missed in-person interaction and 27.7% preferred isolation. These responses indicate varied social needs among learners, emphasizing the role of interactive platforms in fostering online engagement.

When asked about the credibility of E-learning credentials, only 33.1% saw them as equal to traditional degrees, with 23.6% perceiving lower credibility. This reflects persistent skepticism among students regarding the value of online education in the job market, suggesting a need for institutional standardization and better communication of E-learning outcomes.

- **Cost-Effectiveness Perception**

Finally, 43.1% of participants considered E-learning more cost-effective, while 32.2% felt the costs were similar to traditional education. Only 15.4% perceived it as more expensive. This demonstrates that digital learning is widely seen as a financially viable alternative, reinforcing its appeal for large-scale adoption.

5. Conclusion and recommendations

Conclusion: This study concludes that interactive E-content is widely accepted and valued by undergraduate students in Extension Education for its flexibility, accessibility, and potential to enhance learning. A significant proportion of students demonstrated positive attitudes and technological readiness toward digital learning. However, challenges such as limited course variety, lack of personalized learning, and concerns over credential credibility highlight the need for strategic improvements in content development and delivery. The research also found varied social and academic responses to E-learning, with some students thriving in flexible, digital environments, while others expressed a preference for traditional structures and in-person interaction. These mixed experiences indicate the importance of offering diverse learning models to cater to a broad range of learner preferences and capabilities.

Recommendations: By implementing following strategies, educational institutions can maximize the benefits of E-content and provide a more inclusive, engaging, and effective learning experience for students in Extension Education and beyond.

1. **Enhance Digital Infrastructure:** Institutions must invest in high-speed internet, access to devices, and reliable learning management systems to ensure equal participation across demographics.
2. **Develop Comprehensive Training Modules:** Digital literacy programs for both students and faculty should be implemented to enhance confidence and proficiency in using E-content tools.
3. **Promote Blended Learning Models:** Combining online and face-to-face instruction can bridge the gap between digital innovation and traditional educational expectations.
4. **Improve Content Variety and Personalization:** Interactive E-content should be diverse, curriculum-aligned, and adaptable to different learning styles to maintain student engagement.
5. **Establish Quality Standards and Recognition:** Institutions and accreditation bodies should work to standardize online learning credentials to improve their acceptance and perceived value.
6. **Encourage Collaborative Learning:** Online forums, group assignments, and virtual discussions should be integrated to address the lack of social interaction in digital classrooms.

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