Symbiosis Centre for Distance Learning
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ISSN 2582-9009

SUSTAINING AND ENHANCING THE QUALITY OF ODL

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Symbiosis International Research Journal on Online & Distance Learning

Symbiosis Centre for Distance Learning (SCDL), Pune, is one of India's largest autonomous distance learning educational institutions. In this day and age, distance learning looks beyond traditional reference books and course-end assessments. Online and Distance Learning (ODL) is the need of the hour in a young country such as India, as it makes higher education available to aspiring youth as well as mature learners, and reaches out to the unreached in the remotest corners of this vast nation. It is one of the best modes of increasing the GER in higher education at almost one-fifth the cost. ODL institutions are in a sense great contributors to the national cause of making available higher education to the physically, socially, and financially challenged youth of our country.

Technology is a game-changer as it has brought about a paradigm shift in the teaching-learning and evaluation pedagogies and facilitated this process. However, publications by Indian researchers on online and distance learning are almost non-existent. Therefore, Symbiosis Centre for Distance Learning, Pune, plans to provide a platform to researchers and academicians in the form of a research journal on ODL.

Although distance education is considered one of the most crucial options available to us to improve the status of higher education, there are some critical quality-related issues that need to be addressed. To contribute towards this, SCDL launched Symbiosis International Research Journal on Online & Distance Learning (SIRJODL) in 2016. The SIRJODL has continuously provided opportunities for researchers and academicians to publish their research work and we at SCDL provide access to our larger audience.

SIRJODL is a peer-reviewed, international, bi-annual e-journal. This scholarly e-journal publishes refereed articles focusing on the issues and challenges of providing theory, research, and information services regarding all forms and methods of distance and online education or open learning applications. SIRJODL particularly attempts to meet the continuing education needs of practitioners, educators, teachers, and policymakers by providing a forum for the discussion of extended learning strategies, policies and practices, and trends in ODL learning strategies including learning technologies as they all impact the field of online and distance education.

SIRJODL encourages and invites articles that may be theoretical, philosophical, and/or empirical analyses of distance education/open learning/online education/blended learning/ and teaching issues, in the form of case studies, research studies, research articles/notes, and general interest reports. Book reviews and literature reviews are also welcome.

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A Study on Student Engagement during Online Learning at Higher Education Level

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Abstract

Online learning might become mainstream in the days to come, especially at higher educational level, because it allows student to learn while working full time or part time. Online education arrangement is rather novel and complex in nature. It has been observed that it is difficult to keep student engagement level high in online learning. The present study aims at finding out the reasons behind low student engagement at higher education level and find out ways to increase student participation during online lectures. Study focuses on the behavioral engagement of students encompassing students' interaction with teachers, peers and technology.

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KEYWORDS

student engagement, online learning, student participation and collaboration

Introduction

Online learning was pursued across the world even before Covid-19 happened. However, during Covid-19 pandemic, the online education platform was used most rigorously to ensure continuous learning for students. Now; as the world has recognized the potential of online education, and accepts it as an incredibly beneficial learning platform, it is safe to say that this unconventional style of learning will be used more in the future. Online learning offers flexibility related to location and time. However, it also poses certain challenges. One of the major challenges in online learning is of student engagement. Students' participation during online classes is noted to be inadequate, which impedes students' online learning experience.

From the point of view of a teacher, there is no greater joy than when students respond actively and positively in the class. Student engagement in the class ensures that the students are not merely the recipient of information but the active participant in the learning process. It fosters a successful learning environment.

According to the study by Chapman, 2002; Fredricks et al., 2004, 2016; Mandernach, 2015, student engagement can have multiple dimensions such as behavioral engagement, affective engagement and cognitive engagement. The present study majorly focuses on the behavioral engagement of the students during the online learning.

A desirable student behavioral engagement is reflected through the active participation and involvement of the student during online learning. It can be noted through students' positive reaction to online learning activities or tasks conducted during the lectures; such as asking relevant

questions, being attentive, participating in class activities like giving presentations, taking notes, completing assigned activities, good attendance record etc.

During online learning, a student's academic engagement primarily entails interaction between: student-teacher, student-student, student-content and student-technology. As per the previous studies on students pursuing higher education, the 'student-teacher' interaction has a greater impact on student's learning curve. Students are found to be more engaged and enthused when the student-teacher interaction is profound. Thus, present study attempts to explore the effect of student-teacher and student-student interaction during online learning in promoting students' engagement. However, from a point of online-learning, this study also focuses on student's interaction with technology.

Statement of Problem

Ubarhande P. and Bagade S. (2020) proposed that even though the online learning is becoming more and more popular, the ideal educational outcome of 'online' learning over 'in-person' learning is still questionable. At higher educational level (graduation and post-graduation level), students have been observed to have low online class attendance, disinterested behaviour, less than acceptable level of participation during the lectures. Low student engagement may result in poor course outcome. Teachers find it difficult to engage adult students. The challenge of increasing student engagement in online learning demands immediate attention and prompt solution. Thus, it is important to inquire why students feel disengaged and reluctant to actively participate during online learning.

Objectives of the Study

1. To identify the reasons behind present level of student engagement in online learning.
2. To suggest how student engagement can be increased during online learning.

Methodology of The Study:

Students at higher educational level, i. e. graduation and post-graduation level, studying in different educational institutes in Pune city, formulate the population for this present study. Primary data has been collected by administering an online questionnaire. Data has been collected from 168 student-respondents by using random sampling technique. Questionnaire on online learning consisted of questions on demographic information, interaction with teachers, peers, and technology, and possible reasons for disengagement during online classes. Secondary data is collected from e-journals, online published research papers and web articles related to the research topic.

Review of Literature

Hollister, Nair, Hill-Lindsay & Chukoskie (2022) surveyed 187 undergraduate students to find out their experience with online learning during covid 19. Their study focused on areas of student's interaction with instructors, peers, structure of course and resources available to students.

The study highlighted considerable decrease in student engagement and attendance due to lack of social interaction.

Peng (2017) focused on the 3 types of students' engagement while learning. The study examined the degree of student engagement by analysing student's behaviour towards learning, student's cognitive engagement, and student's emotional experience during online learning. The study also introduced a student engagement model consisting of above-mentioned aspects.

Jacobson (2022) in his thesis suggests various strategies focusing on course design, clearly defined goals for students, online learning activities etc. that can be adopted by academic institutions to increase students' engagement. The study also pointed out that student engagement can significantly influence learning outcomes.

Garrels and Zemliansky (2022) proposed certain online teaching practices to the instructors who are new to online learning environment. Suggested practices for effective online teaching are based on research outcome and researchers' personal teaching experience. The research advocated the use of student-centered design for online learning, increasing social interaction, communication, and feedback for better learning environment.

Analysis and Interpretation of The Data Collected

Out of 168 respondents, 64% respondents were pursuing post-graduation, and 36% respondents were pursuing graduation course through online learning. 61% respondents are females 39% are male respondents. For taking online classes; most of the respondents (86%) prefer using laptops or desktops; followed by mobile phones.

58% respondents reported that their attendance was between 61% - 80% during online learning. It is followed by 29% respondents having attendance between 41% - 60%. Rest 13% respondents had less than 40% attendance. Low attendance reflects that students do not come to online classes regularly. They only strive to fulfill the minimum attendance requirement of their programme. None of the participant reported having more than 80% attendance. This indicates that student engagement level is lower in online classes.

(1) Open and two-way communication between teacher and students

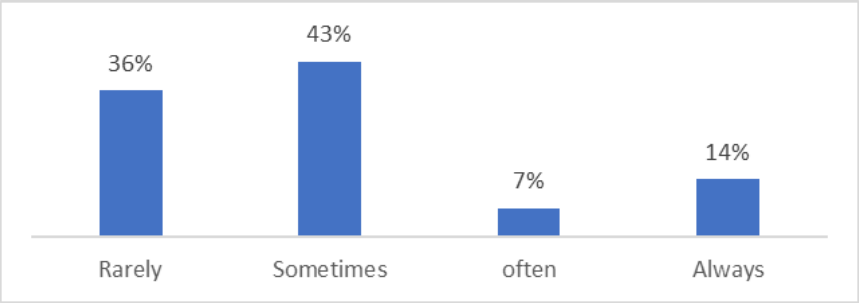

Figure 1: Open and two-way communication

Response analysis: Majority of the students i. e. 43% and 36% respectively have responded that the communication with the teachers is not open very often. Lectures tend to be one way and

students are generally only the recipients of the information; and not a participant in their own learning process. Such environment can demotivate students to be less involved in learning.

(2) Students receiving regular and timely feedback from teachers

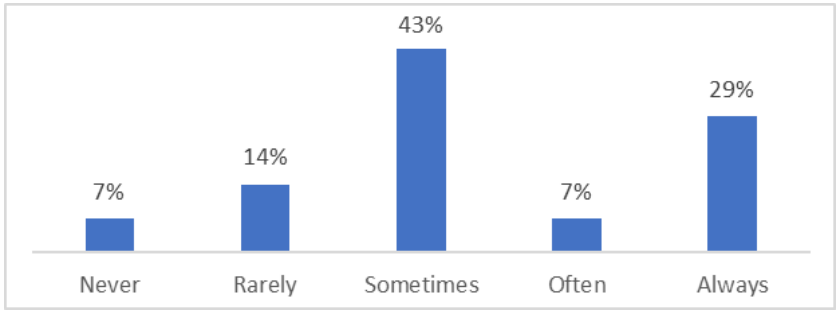

Figure 2: Regular and timely feedback

Response analysis: Majority of the respondents (43%) have said that sometimes they receive regular and timely feedback from the teachers regarding their online learning progress. It is followed by 29% respondents saying that they always receive timely feedback from teachers. However, 14% respondents say that they rarely receive feedback. Without constructive feedback on student's performance, students may not know how to improve their flaws and their overall leaning experience. This can lead to student disengagement eventually.

(3) Frequent discussions opportunities on course topics during online lectures

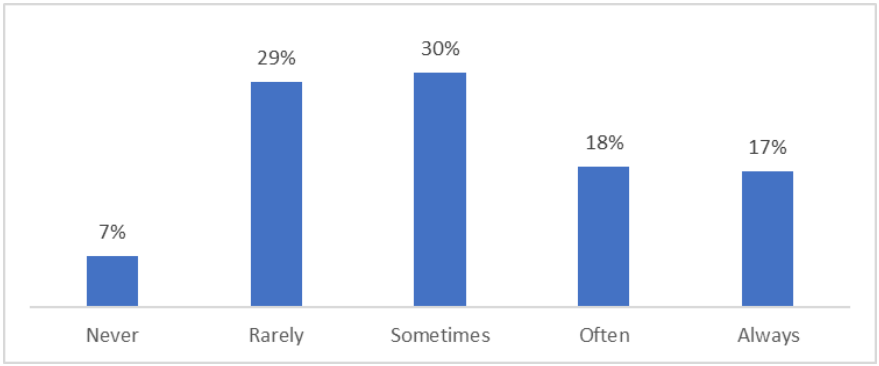

Figure 3: Discussions opportunities on course topics

Response analysis: 30% respondents have reported that only some of the times discussions were held on the course topics during the lectures; on which students were asked to speak or participate actively. It is followed by 29% students saying that such discussions rarely happened. Remaining students have said discussions were often/always held during the online classes. Discussions allow students to speak openly which leads to active participation and higher level of class involvement.

(4) Teachers use online learning tools to make lecture interesting

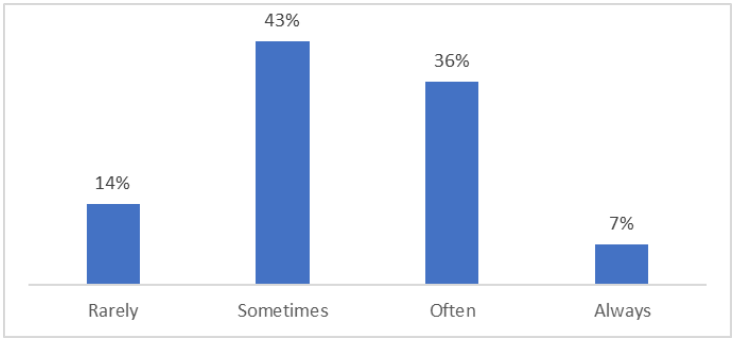

Figure 4: Use online learning tools

Response analysis: 43% of the respondents said that sometimes their teachers made online lectures interesting with the help of online learning tools like breakout rooms, kahoot, jamboard, canvas, quizzes, pear deck and more. This number is followed by 36% students saying that such online learning tools were often used during the lectures. 14% respondents reported that such tools were rarely used. As online lectures can become tedious and difficult to understand, teachers should regularly use available online learning tools to make content easily understandable, to break the monotony or to encourage students to participate more during the class. Students keeping their videos on during lectures

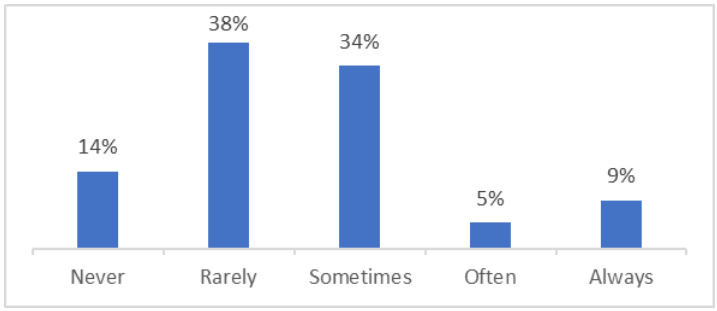

Figure 5: Students keeping their videos on

Response analysis: Most of the students (38%) rarely kept their videos on during the online lectures. It is followed by 34% students agreeing that they turned on their web camera sometimes. 14% respondents do not keep videos on at all. In a physical classroom setting, teachers can easily read the cues and expression on students' faces and comprehend if the students have grasped the concept, if they are engaged enough, or if they are getting bored. However, during online classes, if students' videos are off, teachers face a greater challenge in understanding student engagement level, or even if the student is at all listening to the lecture. Keeping videos on is one of the primary signs that a student is engaged and wants to participate actively.

(5) Online lectures unable to hold students' attention longer

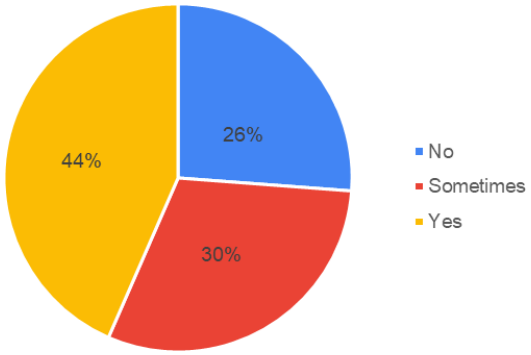

Figure 6: Online lectures unable to hold students' attention

Response analysis: Majority of the students i.e. 44% reported that their online lectures tend to be boring and unable to hold their attention longer. 30% respondents sometimes find their lectures boring. Remaining 26% respondents find online classes interesting. Students' engagement level goes down if they find a class boring. As they attention span of the people is getting shorter in general, it is important for the instructor to understand how to keep students engrossed in the lecture. For engaging the students during online classes, it is imperative to make the content delivery interesting. Content should be delivered in such a way that it is able to hold students' attention throughout the lecture. Traditional teaching pedagogies might not prove successful in online teaching.

(6) Students distracted by social media, gaming apps etc. while learning online

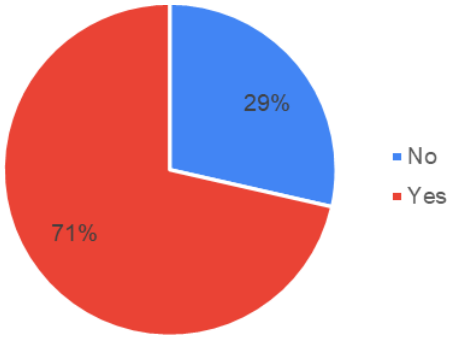

Figure 7: Distraction by social media and online games

Response analysis: Most of the respondents i.e. 71% agree that during online learning they easily get distracted by social media, gaming apps etc. This obstructs successful online learning. Easy access to distractions like online games, social media, entertainment videos etc. while being online pose a great challenge for online education. Students get sidetracked and their attention is diverted.

Because of this, student do not pay proper attention to online learning and their engagement level comes down.

(7) Missing peer interaction during online learning.

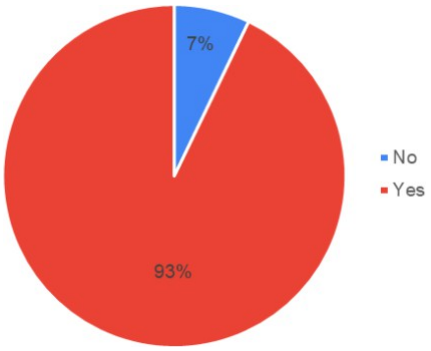

Figure 8: Missing peer interaction

Response analysis: 93% respondents have reported that they miss interacting with their classmates during online learning. 'Student to student' interaction or collaboration plays a crucial role in increasing student engagement level. Peer interaction can make class interesting, boosts students' confidence to respond and participate, experience teamwork, and can make overall class environment much more comfortable. In the absence of peer interaction, students can feel aloof and demotivated to participate freely.

(8) Group activities makes online learning better and easier.

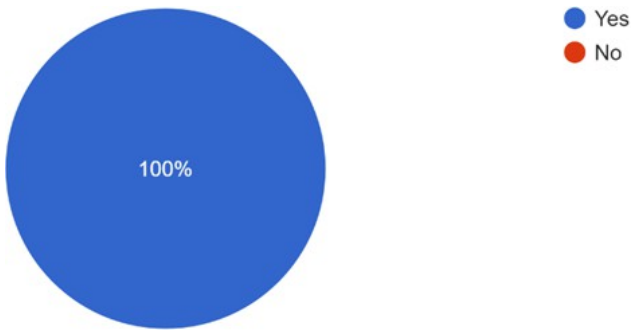

Figure 9: Group activities to makes online learning better

Response analysis: 100% respondents feel that working in groups with their classmates improves their online learning experience. Students feel more comfortable to participate as a part of a group. Collaboration can increase student engagement.

(9) Issues faced during online learning

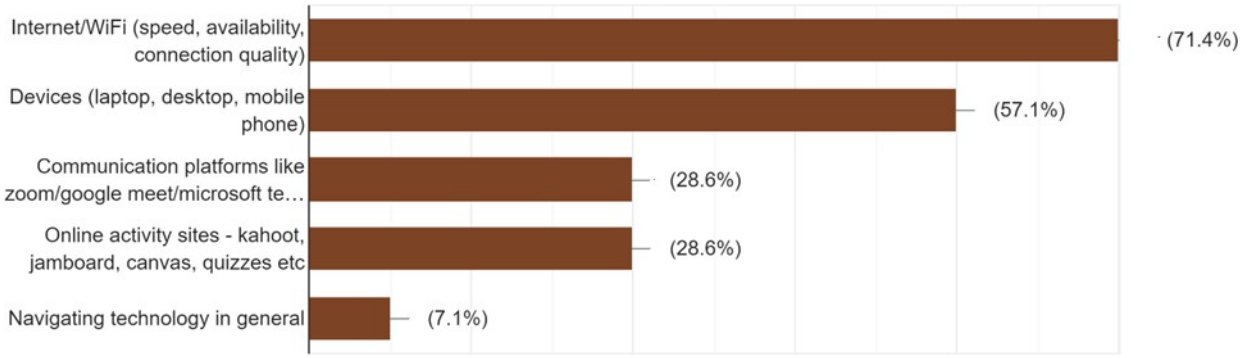

Figure 10: Issues faced during online learning

Response analysis: 71.4% respondents faced problems with internet or their WiFi while learning online. It is followed by problems with their electronic devices like laptop and mobile phone that they use to take lectures. 28.6% respondents had issues with communication platform or online learning tools and websites. In general students are able to navigate technology easily. Technology, software, devices, and availability of speedy & uninterrupted internet connection is a necessity for online learning. Many students have to suffer when proper infrastructural resources are not available to them. Technological issues discourage students to participate during online lectures.

(10) Reasons for not participating in the class

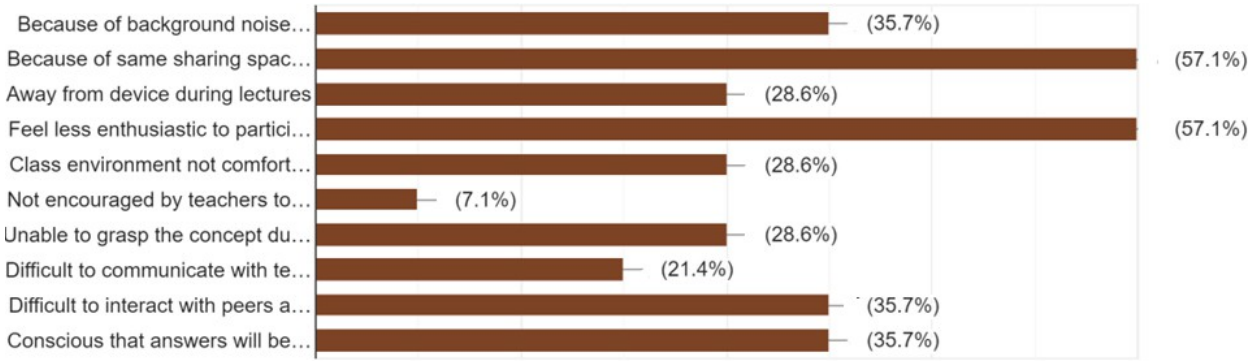

Figure 11: Reasons for not participating in the class

Response analysis: During online classes, majority of the respondents (57.1%) are reluctant to participate actively by keeping their video or audio on because more than often they share the same room/space with other family members, it can lead to a lot of background noise as well, and they feel less enthusiastic participate. Lack of interaction with teachers and friends, and less collaborative activities are also demotivating factors. Some students also feel that class environment is not comfortable enough to participate freely. They feel conscious that their responses/answers might get mocked by other students. At times when students are unable to understand the concept, they feel less engaged in the learning process.

(11) Practices to increase students' class participation

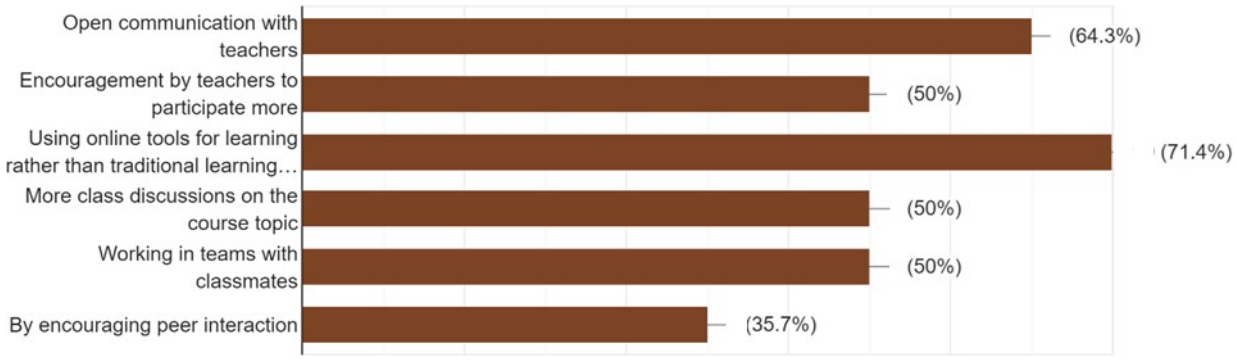

Figure 12: Practices to increase students' class participation

Response analysis: 71.4% respondents feel that using online learning tools like breakout rooms, jamboards, quizzes, videos, class discussions etc. can increase their engagement level. 64.3% respondents want to have more open communication with the instructors. Students also feel that having more group activities and more opportunities to interact with peers can encourage them to participate more in the class.

Findings and Suggestions

Table 1: Findings and Suggestions

FINDINGS (Reasons for low student engagement)	SUGGESTIONS (For increasing student engagement)
Student—Teacher Interaction • Communication between students and teachers is not always open and two- ways • Students do not receive frequent and timely feedback • Students are given less opportunities to voice their opinions as less discussions are held on course topics	• Student interaction can be two-way by introducing discussion boards, encouraging students to present their opinions, and adopting flip classroom approach • Discussions and ideas presentations can be included as one of the assessment methods over traditional assignment method • Provide constructive feedback to students on their learning progress. Give timely feedback on the assignments they have submitted and for their efforts • Feedback should mean more than a 'correct/incorrect' remark. It should guide the student to improve performance further • Allow students to discuss their issues with teachers other than during online lectures. • Set aside some student-teacher interaction time separately each week in which any issue can be discussed

Student—Student interaction 🕐 Students miss interaction with their classmates/peers 🕐 Collaboration and group activities are preferred by students to make online learning experience better	**Student's engagement through collaboration** can be increased by: 🕐 Finding out ways to let students interact with each other during and after the lecture. 🕐 Making students work in groups or teams and let them come up with creative solutions 🕐 Asking students to work on collaborative projects rather than submitting assignments individually 🕐 Making greater use of breakout rooms but with pre-assigned responsibility to each group member 🕐 Introduce students to online collaborative tools like google docs, whiteboards, google slides etc. for document sharing. Without proper guidance, students may get frustrated while working in teams from a distance.
Issues during online learning 🕐 Online lectures unable to hold students' attention longer 🕐 Distraction by social media, gaming apps etc. 🕐 Use of creative online learning tools 🕐 Technological issues like slow internet speed, poor WiFi connection, problem with device like laptop, phone etc.	**Foster Student engagement through active participation:** 🕐 Break monotony of delivering one-way information through PPTs. Show short informational videos, take breaks from PPT to conduct learning activities, include less content per slide 🕐 Make learning interesting with online learning tools and activities like jamboards, kahoot, quizzes, breakout rooms, pear deck etc. 🕐 Institutes can install software in students' devices; which prevents opening other social media sites while learning online.

Indicators of low student engagement 🕐 Low attendance rate during online classes 🕐 Students do not prefer to keep their videos on 🕐 Reluctance to participate because of background noise at home and space sharing with family members 🕐 Fear of being mocked by classmates if responded	**Create respectful classroom environment** in online learning allowing students to participate freely by: 🕐 Instructing students to maintain dignity during class and treat other students with respect 🕐 Teachers being friendly and understanding towards students; to make them feel comfortable and safe to state their problems 🕐 Encourage students to always voice their opinions and participate in the class; while not making other students feel uncomfortable

Limitations of The Study

🕐 The data is collected from the students pursuing higher education level (graduation and post-graduation) during online learning. Future studies can include other educational levels such as primary school level, secondary school level, etc.

🕐 The present study is limited to only one aspect of student engagement, i.e., behavioral engagement. More aspects can be explored to understand students' engagement better.

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The Impact of Online Learning on Academic Achievement

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Abstract

This study explores the impact of online learning on academic achievement. Online learning has become increasingly prevalent in recent years, offering flexible and accessible educational opportunities. This paper examines both the positive and negative effects of online learning on academic achievement, taking into account factors such as accessibility, personalized learning, engagement and interactivity, collaboration and communication, challenges and disadvantages, and equity and inclusivity. The findings suggest that online learning can have a positive impact on academic achievement by providing flexibility, personalized learning experiences, increased engagement, and collaboration opportunities. However, challenges related to self-discipline, technical issues, and inequalities in access can hinder learning outcomes. Efforts should be made to address these challenges and promote equity in online learning environments. Overall, this research provides valuable insights into the complex relationship between online learning and

academic achievement, highlighting the need for further research and improvement in the implementation of online education.

KEYWORDS
Online Learning, Academic Achievement, Online Education, Dataset, Educational activity

Introduction

In recent years, online learning has emerged as a prominent mode of education, revolutionizing the traditional classroom setting. With advancements in technology and the widespread availability of internet access, students now have the opportunity to engage in learning activities outside the confines of a physical classroom. This shift towards online learning has raised questions about its impact on academic achievement.

Online learning offers numerous advantages over traditional classroom-based instruction. It provides increased accessibility to education, breaking down barriers such as geographical limitations and scheduling conflicts. Students can access educational resources and participate in classes from anywhere at any time, allowing for greater flexibility in their learning journey. Additionally, online platforms often offer personalized learning experiences, tailoring content and pacing to meet individual students' needs. Adaptive technologies and interactive tools provide opportunities for engagement and enhance the learning process.

However, the impact of online learning on academic achievement is a complex issue that warrants further investigation. While there are clear benefits, there are also challenges and potential drawbacks. For instance, some students may struggle with self-discipline and time management in the absence of direct supervision. Technical issues, limited access to resources, and inequalities in internet access can hinder the learning experience. Moreover, the lack of face-to-face interactions and immediate feedback in online settings may affect the depth of learning and personal connection with instructors and peers.

Understanding the impact of online learning on academic achievement is crucial for educators, policymakers, and stakeholders involved in shaping the future of education. By examining the existing research and synthesizing the findings, this study aims to shed light on the various dimensions of this topic. It will explore the positive and negative effects of online learning on academic achievement, considering factors such as accessibility, personalized learning, engagement and interactivity, collaboration and communication, challenges and disadvantages, and equity and inclusivity.

Through this research, we can gain insights into how online learning can enhance academic achievement and identify strategies to mitigate challenges and ensure equitable outcomes for all learners. By addressing these issues, we can harness the potential of online learning to promote educational attainment and provide quality education in diverse contexts.

Objectives of the Study

The objective of this study is to examine the impact of online learning on academic achievement. The study aims to achieve the following specific objectives:

To explore the positive effects of online learning on academic achievement: This objective involves investigating how online learning can enhance academic performance and learning outcomes. It seeks to identify the factors and mechanisms through which online learning positively influences academic achievement, such as increased accessibility, personalized learning experiences, engagement, and collaboration opportunities.

- To analyze the challenges and disadvantages of online learning on academic achievement: This objective aims to understand the potential drawbacks and barriers associated with online learning that may hinder academic achievement. It involves examining factors such as self-discipline, time management, technical issues, and inequalities in access that can negatively impact learning outcomes in online environments.
- To examine the role of engagement and interactivity in online learning and academic achievement: This objective focuses on the importance of student engagement and interactivity in online learning and their influence on academic achievement. It involves investigating the use of interactive tools, multimedia resources, and collaborative activities in online learning platforms and their impact on student learning outcomes.
- To assess the impact of online collaboration and communication on academic achievement: This objective aims to explore the role of collaboration and communication in online learning environments and their influence on academic achievement. It involves studying the effectiveness of virtual group projects, online forums, and communication tools in promoting collaborative learning and improving academic performance.
- To address issues of equity and inclusivity in online learning and academic achievement: This objective focuses on the examination of equity concerns related to online learning. It aims to identify and analyze the disparities in access, resources, and support that may exist in online learning environments and their impact on academic achievement. It also seeks to propose strategies and recommendations to ensure equitable outcomes for all learners in online education.

By achieving these objectives, this study aims to contribute to the existing body of knowledge on the impact of online learning on academic achievement. The findings can inform educational institutions, policymakers, and educators in designing effective online learning strategies and addressing challenges to maximize the potential benefits of online learning for students' academic success.

Scope of the Study

The scope of the study "Impact of Online Learning on Academic Achievement" encompasses various aspects related to the influence of online learning on students' academic outcomes. The study aims to investigate the effects of online learning on academic achievement across different educational levels and disciplines. It encompasses both quantitative and qualitative research methods to provide a comprehensive understanding of the topic.

The study's scope includes the following areas:

Academic Achievement Metrics: The study examines various metrics of academic achievement, including grades, test scores, course completion rates, and student retention. It explores how online learning impacts these metrics compared to traditional face-to-face instruction.

Online Learning Modalities: The study encompasses a range of online learning modalities, such as fully online courses, blended/hybrid learning, and virtual classrooms. It investigates the impact of these different modalities on academic achievement to understand their strengths and limitations.

Factors Affecting Academic Achievement: The study explores the factors that influence academic achievement in online learning environments. It examines the role of student characteristics (e.g., motivation, self-regulation), instructional design, technological factors, and support services in shaping academic outcomes.

Pedagogical Approaches: The study analyzes various pedagogical approaches used in online learning, including personalized learning, adaptive technologies, interactive multimedia, and collaborative activities. It assesses how these approaches impact academic achievement and student engagement.

Student Perspectives: The study considers the perspectives and experiences of students regarding online learning and its impact on their academic achievement. It may include surveys, interviews, or focus groups to gather insights into students' perceptions, challenges, and strategies for success in online learning.

Equity and Inclusion: The study addresses issues of equity and inclusion in online learning and their impact on academic achievement. It examines disparities in access, resources, and support services and explores strategies to mitigate these inequalities to ensure equitable outcomes for all learners.

The scope of the study extends to both positive and negative impacts of online learning on academic achievement. It aims to provide a balanced assessment of the benefits, challenges, and potential trade-offs associated with online learning in terms of academic outcomes.

The study may focus on a specific educational level, such as K-12 or higher education, or encompass a broader perspective across multiple educational levels. It may also consider different disciplinary contexts to understand the varied effects of online learning on academic achievement in various subject areas.

By delving into these dimensions, the study aims to contribute to the existing literature and provide insights that can inform educational practices, policies, and instructional design to optimize academic achievement in online learning environments.

Literature Review

Online learning has gained significant popularity in recent years as a viable alternative to traditional classroom-based education. This section presents a comprehensive literature review that examines the impact of online learning on academic achievement. It synthesizes key findings from previous studies, identifies trends, and highlights the factors that influence academic outcomes in online learning environments.

Increased Access and Flexibility: Numerous studies have indicated that online learning improves access to education and provides flexibility for learners. Allen and Seaman (2017) found that online courses have experienced steady enrolment growth, indicating increased accessibility. This flexibility enables students to balance educational pursuits with work, family, and other commitments, potentially leading to improved academic achievement (Bernard et al., 2014).

Personalized Learning: Online learning platforms often employ adaptive technologies and personalized learning approaches. Research suggests that personalized online instruction positively impacts academic achievement. For example, Hattie (2012) found that adaptive learning programs had a moderate effect on student learning outcomes. Customized pacing, individualized feedback, and tailored resources contribute to better understanding and improved academic performance (Yuan & Kim, 2014).

Engagement and Interactivity: Engagement is crucial for learning success, and online learning offers various tools and strategies to enhance student engagement. Video lectures, interactive multimedia resources, and gamification elements have been shown to increase learner engagement and motivation, leading to improved academic achievement (Means et al., 2013; Alqurashi, 2015). Active participation in online discussions and collaborative activities fosters critical thinking and deeper understanding (Dennen et al., 2007).

Collaboration and Communication: Online learning facilitates collaboration and communication among students and instructors through discussion boards, virtual group projects, and video conferencing tools. Research suggests that well-designed collaborative activities positively influence academic achievement (Swan, 2002). Effective communication and interaction with instructors and peers contribute to better comprehension, knowledge construction, and academic success (Yousef et al., 2014).

Challenges and Disadvantages: While online learning offers many benefits, several challenges can impact academic achievement. Self-regulation and time management skills are

crucial for success in online courses, and students who lack these skills may struggle (Joo et al., 2017). Technical difficulties, limited access to resources, and the digital divide can hinder learning outcomes for certain individuals (Hew & Cheung, 2014). The lack of face-to-face interactions and immediate feedback in online settings may also affect student engagement and achievement (Picciano, 2002).

Equity and Inclusivity: Equity and inclusivity are essential considerations in online learning. The digital divide, disparities in internet access, and computer literacy can create inequalities that affect academic achievement (Hodges et al., 2020). Efforts to address these disparities through equitable access to technology, resources, and support are crucial for ensuring that all learners have equal opportunities for academic success.

Advantages of Online Learning on Academic Achievement

Online learning offers several advantages that can positively impact academic achievement. Here are some key advantages of online learning on academic achievement:

Increased Access and Flexibility: Online learning provides greater access to education, breaking down barriers of geography and time. Students can participate in classes and access educational resources from anywhere, at any time, allowing for greater flexibility in scheduling and enabling learners to balance education with other commitments. This flexibility can lead to improved academic achievement as students have the opportunity to structure their learning in a way that suits their individual needs and circumstances.

Personalized Learning: Online learning platforms often employ adaptive technologies and personalized learning approaches. These tools and techniques can tailor the learning experience to individual students, allowing them to progress at their own pace, focus on areas of strength or weakness, and receive personalized feedback. This customization enhances understanding and retention of the material, potentially leading to improved academic outcomes.

Engaging and Interactive Learning Environment: Online learning incorporates various interactive tools and multimedia resources that engage students in the learning process. Videos, simulations, gamification elements, and interactive quizzes can make the learning experience more enjoyable and immersive. Increased engagement promotes active participation, critical thinking, and knowledge retention, which can positively impact academic achievement.

Collaboration and Communication Opportunities: Online learning provides opportunities for collaboration and communication among students and between students and instructors. Virtual group projects, discussion forums, and video conferencing tools enable students to interact, exchange ideas, and engage in collective learning experiences. Collaborative activities foster critical thinking, peer learning, and problem-solving skills, contributing to improved academic achievement.

Enhanced Self-Directed Learning Skills: Online learning encourages students to develop self-directed learning skills. With the responsibility of managing their own learning, students gain independence, time management abilities, and self-discipline—all of which are valuable skills for academic success. Online learning promotes autonomy and self-regulation, fostering a sense of ownership over one's education and contributing to improved academic achievement.

Access to Diverse Learning Resources: Online learning provides access to a vast range of learning resources and materials. Students can access e-books, scholarly articles, multimedia content, and online libraries, expanding their knowledge beyond traditional textbooks. This exposure to diverse learning resources enhances the depth and breadth of students' understanding, potentially leading to higher academic achievement.

Continuous Learning Opportunities: Online learning facilitates lifelong learning by offering continuous access to educational resources and opportunities. Students can revisit course materials, review lectures, and engage in self-paced learning even after the formal course has ended. This continuous learning approach promotes ongoing academic growth and can positively impact long-term academic achievement.

It is important to note that the advantages of online learning on academic achievement can vary depending on factors such as the quality of instructional design, technological infrastructure, learner characteristics, and the level of engagement and support provided by instructors and educational institutions. However, when effectively implemented, online learning has the potential to enhance academic achievement by providing greater access, personalized learning experiences, interactivity, collaboration, and flexibility in the pursuit of education.

Disadvantages of Online Learning on Academic Achievement

While online learning offers several advantages, it also presents certain disadvantages that can potentially impact academic achievement. Here are some of the key disadvantages of online learning on academic achievement:

Limited Social Interaction: Online learning often lacks the face-to-face interaction found in traditional classroom settings. The absence of in-person interactions with peers and instructors can lead to reduced socialization and a sense of isolation. Collaborative learning, class discussions, and networking opportunities may be less effective or challenging to replicate in an online environment. Limited social interaction can impact the development of communication and teamwork skills, which are important for academic success and future professional endeavors.

Self-Motivation and Time Management Challenges: Online learning requires self-discipline, self-motivation, and effective time management skills. Without the structure and accountability provided by regular class schedules and in-person supervision, some students may struggle to stay focused and motivated. Procrastination and poor time management can lead to incomplete assignments, missed deadlines, and reduced academic achievement.

Technical Issues and Digital Literacy: Online learning heavily relies on technology and internet connectivity. Technical issues such as software glitches, connectivity problems, or hardware limitations can disrupt the learning experience and impede academic progress. Additionally, students with limited access to reliable internet connections or inadequate technological resources may face disadvantages in fully participating in online learning activities. Digital literacy skills are also essential for navigating online platforms effectively, and students who lack these skills may experience difficulties in accessing and utilizing online learning resources.

Reduced Instructor Availability and Personalized Attention: In traditional classrooms, students have direct access to instructors for immediate clarification of doubts, personalized guidance, and feedback. In online learning, instructor availability may be limited, with delayed response times due to the asynchronous nature of communication. This reduced interaction and lack of real-time support can hinder academic achievement, as students may struggle to get timely assistance or clarification on complex concepts.

Distractions and Lack of Focus: Online learning environments can be prone to distractions, especially when studying from home or other non-traditional settings. Distractions from family members, household responsibilities, or personal devices can negatively impact concentration and focus. The temptation to multitask or engage in non-academic activities may reduce learning effectiveness and academic achievement.

Limited Hands-On and Practical Learning Opportunities: Some subjects or disciplines require hands-on or practical learning experiences, which may be challenging to replicate in an online environment. Laboratory work, field studies, or hands-on training can be limited or modified in online settings, potentially affecting the depth of understanding and application of knowledge.

Assessment Integrity and Academic Honesty: Online assessments and examinations may face challenges in ensuring integrity and preventing academic dishonesty. The absence of in-person proctoring and monitoring can increase the risk of cheating or plagiarism,

compromising the validity and fairness of assessment results. Maintaining academic integrity in online learning environments requires robust measures and technologies to detect and deter cheating.

It is important to note that the extent of these disadvantages may vary depending on factors such as the quality of online learning platforms, instructional design, technological infrastructure, student support services, and individual learner characteristics. Addressing these disadvantages requires proactive measures, such as providing adequate support, fostering a sense of community, promoting digital literacy, and implementing strategies to maintain student engagement and motivation in online learning environments.

Future of Online Learning on Academic Achievement

The future of online learning holds immense potential to shape academic achievement in several ways. Here are some key aspects that highlight the future prospects of online learning on academic achievement:

Advancements in Technology: As technology continues to evolve, online learning experiences will become more interactive, immersive, and personalized. Emerging technologies such as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and machine learning (ML) have the potential to transform the online learning landscape. These advancements can enhance engagement, provide realistic simulations for practical learning, and offer adaptive learning experiences tailored to individual student needs. The integration of emerging technologies into online learning platforms will likely lead to improved academic achievement by providing innovative and dynamic learning environments.

Blended Learning Approaches: Blended learning, which combines online learning with face-to-face instruction, is expected to play a significant role in the future of education. Blending traditional classroom settings with online components allows for personalized learning

experiences, increased flexibility, and greater access to resources. By combining the strengths of both modalities, blended learning can optimize academic achievement by catering to diverse learning styles and preferences.

Lifelong Learning and Professional Development: The future of online learning will focus not only on formal education but also on lifelong learning and professional development. Online platforms and courses will provide opportunities for individuals to acquire new skills, enhance their knowledge, and stay relevant in a rapidly changing job market. Online microcredentials, digital badges, and competency-based learning will gain prominence, enabling learners to showcase their skills and achievements to potential employers. The emphasis on lifelong learning and continuous professional development through online platforms will contribute to sustained academic growth and career advancement.

Global Learning Communities: Online learning has the potential to foster global learning communities by connecting students and educators from around the world. Collaborative projects, international exchange programs, and cross-cultural interactions will become more accessible through online platforms. This interconnectedness will expose learners to diverse perspectives, promote cultural understanding, and prepare them for global citizenship. The development of global learning communities will enrich academic achievement by broadening horizons and facilitating cross-cultural collaboration.

Personalized Learning Pathways: Personalized learning, supported by adaptive technologies and data analytics, will become increasingly prevalent in online education. Learners will have the ability to customize their learning pathways, pace their progress, and receive targeted feedback and support. Adaptive learning algorithms will analyze student performance data to identify areas of strength and weakness, allowing for tailored interventions and personalized content delivery. This individualized approach will lead to better engagement, higher retention rates, and improved academic achievement.

Enhanced Assessment and Learning Analytics: Online learning platforms will continue to advance in their assessment capabilities and learning analytics. Real-time data

tracking and analytics will provide valuable insights into student progress, performance trends, and areas requiring additional support. This information will enable timely interventions, personalized feedback, and adaptive assessments. These enhanced assessment and analytics capabilities will contribute to more accurate evaluations of student achievement and inform instructional strategies to optimize academic outcomes.

Accessibility and Inclusion: The future of online learning will prioritize accessibility and inclusivity. Efforts will be made to ensure that online platforms and resources are accessible to learners with disabilities, language barriers, and diverse learning needs. Advances in assistive technologies, closed captioning, multilingual interfaces, and inclusive design principles will create inclusive learning environments. By removing barriers and providing equal opportunities, online learning will contribute to improved academic achievement for all learners.

It is important to note that the successful realization of the future potential of online learning on academic achievement will depend on addressing challenges such as the digital divide, ensuring quality assurance, fostering learner engagement and motivation, and supporting educators in adapting to evolving instructional practices. Continued research, collaboration, and innovation in the field of online learning will shape its future trajectory and its impact on academic achievement.

Conclusion

In conclusion, online learning has a significant impact on academic achievement, offering both advantages and disadvantages. The adoption of online learning has increased access to education, providing flexibility in scheduling and breaking down geographic barriers. Personalized learning experiences, interactive tools, and collaboration opportunities have enhanced engagement and knowledge retention. Online learning has also fostered self-directed learning skills and continuous learning opportunities.

However, online learning also presents challenges. Limited social interaction and the need for self-motivation and time management skills can hinder academic achievement. Technical issues, digital literacy requirements, and reduced instructor availability may affect the learning experience. Distractions, the absence of hands-on learning, and integrity concerns in assessments are additional disadvantages.

Looking to the future, advancements in technology will further enhance online learning, offering immersive and personalized experiences through emerging technologies like VR, AR, AI, and ML. Blended learning approaches and a focus on lifelong learning and professional development will shape the future of education. Global learning communities, personalized learning pathways, and enhanced assessment and analytics will optimize academic achievement. Accessibility and inclusion will also be prioritized to ensure equitable access to education.

To maximize the benefits of online learning and mitigate its challenges, attention must be given to quality instructional design, technological infrastructure, student support services, and the development of digital literacy skills. The collaboration between educators, policymakers, and technology developers is crucial to continually improve online learning and its impact on academic achievement.

Overall, online learning has revolutionized the education landscape, offering new opportunities for academic achievement. By leveraging its advantages, addressing its disadvantages, and embracing future possibilities, online learning has the potential to shape a more inclusive, accessible, and effective education system that supports the academic success of learners around the world.

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Development of an Iterative Model for Factors Influencing Online Learning (OL) and Open & Distance Learning (ODL)

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Abstract

This article studies the factors influencing online learning and distance learning. In this study we have established a framework of factors using Interpretative Structural Modelling (ISM) analysis. We have established nine (09) factors associated with online learning and distance learning from the extant literature in the domain. We further collected data from 20 participants of online learning and distance learning including faculties, students, and administrator. Detailed analysis of factors yields the ISM framework for factors categorizing those into autonomous, dependent, independent, and linkage factors. The results of the study show that ISM model has five (05) different levels where the bottom most level gives the key driving factor F9 (Course Design and Delivery) whereas the topmost level of the ISM model shows the highly dependent factor F1 (Personal and Professional Obligations) Rest of the factors are within these two levels. This study establishes a contextual relationship between factors

influencing online learning and distance learning. Our study contributes to the existing literature by providing a foundation to administrators to address the concerns related to various areas. Factors identified indicates the key decision areas and the analysis provided indicate the priorities to be considered for resource allocation towards those areas.

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KEYWORDS

student engagement, online learning, student participation and collaboration

Introduction

Online Learning (OL) and Open and Distance Learning (ODL) are dynamic and cutting-edge approaches to education that cuts beyond the walls of traditional classrooms and gives students the freedom to pursue their academic objectives without regard to time or location restrictions. Accessibility, inclusivity, and adaptation are prioritized in this revolutionary educational approach, making education available to a wide spectrum of people, including working professionals, non-traditional students, and those who live in remote places.

Fundamentally, OL and ODL allows students to interact with course materials generally called as self-learning material (SLM) or self-instructional material (SIM) at their own convenience and pace by utilizing a range of teaching strategies and technological tools to provide educational content. In contrast to traditional physical establishments, online learning (OL) and open and distance learning (ODL) institutions leverage digital platforms, online resources, and multimedia tools to establish a dynamic and interactive learning environment.

The dedication of OL and ODL towards removing obstacles to education is one of its distinguishing characteristics. OL and ODL institutions work to give educational possibilities to people who might have trouble accessing traditional forms of learning through open access rules.

Learners from all backgrounds and situations can pursue education at different times of their lives thanks to this method of learning, which promotes diversity and supports lifelong learning. One of the main reasons online learning and open and distance learning is so popular is the inherent flexibility it offers. With the ability to study from almost anywhere, students may manage their education with employment, family obligations, and other commitments. In today's fast-paced, globally linked society, when people look for opportunities to further their education, reskill, or upskill without upsetting their daily routines, adaptability is very vital.

Open and Distance Learning develops in tandem with technology, utilizing state-of-the-art resources like interactive simulations, online forums, and video conferencing. This not only improves the educational process but also encourages participation and teamwork among students, fostering the development of a lively online community. Online learning and Open and Distance Learning stand as a transformative force in the realm of education, providing a flexible, accessible, and inclusive approach to learning. As the educational landscape continues to evolve, OL and ODL remains at the forefront, empowering learners to shape their educational journeys according to their individual needs and aspirations.

This study highlights factors influencing Online learning and Open and Distance Learning. The study uses the ISM method, which will help in identifying the hierarchical structure of the factors, for Online learning and Open and Distance Learning. These factors, which are the results of the study using ISM as a method, are analyzed and discussed in detail to explain the findings.

1. Literature Review

Online learning and Open and Distance Learning are influenced by both personal and non-personal factors. We have identified following factors by reviewing the literature available in the domain of Online learning and Open and Distance Learning. Personal and Professional Obligations (F1), Lack of Support Services (F2), Personal or Financial Constraints (F3), Academic Preparedness (F4), Lack of Motivation (F5), Time Management Challenges (F6), Technological Barriers (F7), Limited Flexibility (F8) and Course Design and Delivery (F9) are the influencing factors considered for present study.

1. Personal and Professional Obligations (F1): Many students pursuing Online learning or Open and Distance Learning are working professionals or have personal commitments that compete with their study time. Balancing work, family, and other responsibilities can become overwhelming, causing students to even drop out from the program enrolled to prioritize other aspects of their lives (Verdesoto Cristina, 2017). Personal and Professional Obligations is the most basic factor influencing the Online Learning or Open and Distance Learning.
2. Academic Difficulty and Frustration: Some students may find the course material too challenging or struggle with specific subjects. Without immediate access to instructors or peers for clarification and support, they may become frustrated and discouraged, leading to a higher likelihood of dropping out (Verdesoto Cristina, 2017).
3. Lack of Support Services (F2): Open and Distance Learning institutions may have limited support services compared to traditional educational institutions. Students may struggle to find timely and adequate support for academic advising, counselling, or technical assistance, which can impact their overall learning experience of the students. Lack of Support Services influence the teaching and learning process in both online and ODL environment (Ubarhande, et al., 2022). In our study we have considered this factor as an influencing factor in OL and ODL environment.
4. Personal or Financial Constraints (F3): OL and ODL programs often come with their own set of costs, such as tuition fees, technology requirements, and study materials. Financial constraints can make it difficult for some students to continue their studies. OL and ODL programs are relatively priced lower than the conventional programs. It was evidenced that cost of OL or ODL programs is lower than the conventional program and hence this factor is emerged as an important influencer while selecting the mode of learning. Students pursuing ODL often have other personal or financial obligations that can interfere with their studies. Work, family responsibilities, financial constraints, or other life circumstances may make it challenging for students to commit to their education fully (Kamande & Mungara, 2023).
5. Limited Flexibility (F8): Flexibility in teaching and learning process is the magnet attracting students towards OL or ODL environment. While online learning and open and

distance learning offers flexibility, some students may find the lack of rigid schedules and deadlines challenging to manage. Procrastination or difficulty establishing a consistent study routine can negatively impact progress and result in dropout (Kamande & Mungara, 2023).

6. Time Management Challenges (F6): OL or ODL often requires students to manage their own time and schedule their study hours. This flexibility can be advantageous, but it also demands self-discipline and effective time management skills. Students who are unable to balance their academic responsibilities with other commitments may find it difficult to continue with their studies (Barclay C. et al., 2018).
7. Technological Barriers (F7): Access to reliable internet connections, necessary hardware, and software can be a challenge for some students. Technical difficulties or limitations in using the required online platforms and tools may hinder their ability to participate fully in ODL. These technological barriers can lead to frustration and discouragement, ultimately impacting teaching learning process (Kamande & Mungara, 2023). In OL and ODL technological barriers plays important role as most of the activities starting from enrolment into the program to completion of program is facilitated through technology platforms.
8. Personal or Financial Constraints: Students pursuing ODL often have other personal or financial obligations that can interfere with their studies. Work, family responsibilities, financial constraints, or other life circumstances may make it challenging for students to commit to their education fully (Verdesoto Cristina, 2017). These external factors can contribute to a higher dropout rate.
9. Academic Preparedness (F5): Some students may underestimate the level of self-discipline, independent learning skills, or prior knowledge required for ODL. The transition from a structured classroom environment to a self-directed learning format can be demanding (Barclay C. et al., 2018). If students are not adequately prepared for the independent learning approach, they may struggle academically and this will impact the teaching learning process in OL and ODL.
10. Course Design and Delivery (F9): The design and delivery of OL and ODL courses play a crucial role in student success and retention (Wu Peng et al., 2014). Courses that lack clear organization, engaging content, interactive elements, or meaningful assessments may fail

to keep students engaged and motivated. Poorly designed courses can contribute to student dissatisfaction and increase the likelihood of dropout. In our study this factor emerged as most important and foundation factor of online learning and open and distance learning.

It's important to note that these factors can vary depending on individual circumstances, cultural contexts, and the specific OL or ODL program or institution. Efforts to address these challenges include providing robust student support services, fostering an online community, offering orientation and study skills training, improving course design, and enhancing technological infrastructure.

2. Research Methodology

Interlinks between various factors can be best studied using ISM (Warfield, 1974). It helps researchers to build a structural model among factors based on experts' inputs (Luthra et al., 2014). In this paper, we have used the ISM methodology to study the impact of various factors on Online Learning or Open and Distance Learning. Following points suggests the flow of activities in using ISM in this paper:

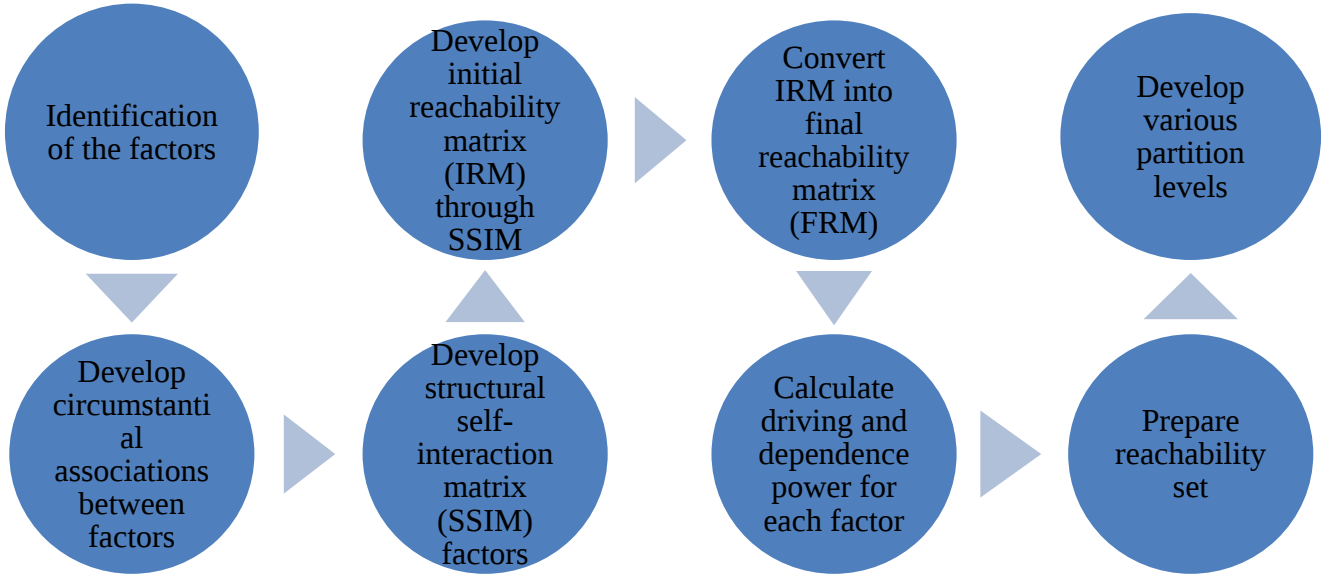

Figure 1: Steps in Research

3. Data analysis

Number of respondents were interviewed to collect the data related to interrelationship between factors identified. We used purposive sampling approach to select these respondents. The reason for using purposive sampling is the ease of availability of the unbiased information. Selecting the specific respondents those are related to the OL and ODL environment ensured the authentic and reliable data. The data analysis using ISM is divided in-to following sections:

3.1 Self-structured interaction matrix (SSIM)

Data related to interrelationships collected from the respondents is presented by developing a SSIM as shown in Table 1. In table 1, relationships between each pair of factors are represented using symbols V, A, X and O. Where V signifies, Factor i has influence on Variable j; A signifies

Variable j has influence on Variable i; X signifies Variables i and j influence each other; and O signifies Variables i and j are not related to each other (Hughes et al., 2016; Kumar et al., 2016)

Table 1: Self Structured Matrix

Factors	Influencing Factors	9	8	7	6	5	4	3	2	1
F1	Personal and Professional Obligations	O	A	A	A	A	A	A	A	
F2	Lack of Support Services	O	A	X	A	A	A	A		
F3	Personal or Financial Constraints	O	A	X	A	A	A			
F4	Academic Preparedness	A	A	V	A	A				
F5	Lack of Motivation	A	X	V	O					
F6	Time Management Challenges	A	O	O						
F7	Technological Barriers	A	A							
F8	Limited Flexibility	A								
F9	Course Design and Delivery									

3.2 Development of IRM and FRM

SSIM is further converted into IRM by assigning binary numbers to the relationship between factors represented in SSIM. Symbols used in the SSIM were converted into binary numbers by following steps:

a. For symbol “V” in SSIM use “1” in (i, j) entry and “0” in (j, i) entry;

b. For symbol “A” in SSIM use “0” in (i, j) entry and “1” in (j, i) entry;

c. For symbol “X” in SSIM use “1” in both (i, j) and (j, i) entries; and

d. For symbol “O” in SSIM use “0” in both (i, j) as well as (j, i) entries.

An IRM is developed using above information and given in table 2. Further, the driving and dependence power for each driver were calculated by adding the entries of “1” across both rows and columns from FRM as shown in table 3.

Table 2: IRM for Influencing Factors

Elements	F1	F2	F3	F4	F5	F6	F7	F8	F9
F1	1	0	0	0	0	0	0	0	0
F2	1	1	0	0	0	0	1	0	0
F3	1	1	1	0	0	0	1	0	0
F4	1	1	1	1	0	0	1	0	0
F5	1	1	1	1	1	0	1	1	0
F6	1	1	1	1	0	1	0	0	0
F7	1	1	1	0	0	0	1	0	0
F8	1	1	1	1	1	0	1	1	0
F9	0	0	0	1	1	1	1	1	1

Table 3: FRM for Influencing Factors

Elements	F1	F2	F3	F4	F5	F6	F7	F8	F9
F1	1	0	0	0	0	0	0	0	0
F2	1	1	1*	0	0	0	1	0	0
F3	1	1	1	0	0	0	1	0	0
F4	1	1	1	1	0	0	1	0	0
F5	1	1	1	1	1	0	1	1	0
F6	1	1	1	1	0	1	1*	0	0
F7	1	1	1	0	0	0	1	0	0
F8	1	1	1	1	1	0	1	1	0
F9	1*	1*	1*	1	1	1	1	1	1

3.3 Partitioning of levels

Using IRM and FRM further, all the factors were separated into various levels. Different sets such as reachability set, antecedent set and intersection set are formed to divide these factors into different levels. For example, reachability set is constituted of a variable itself and the other variables affected by it. Antecedent set constitutes of a variable itself and other variables that affect this. Intersection set is a juncture of reachability and antecedent sets. In present study based on the data five interactions occurred to exhaust all factors.

Factors were marked as Level I, II and so on where both reachability and intersection sets become equal. Total of five such interaction of factors influencing OL and ODL is represented in tables 4-8.

Table 4: First Interaction of Influencing Factors

S. No.	Reachability Set (R_i)	Antecedent Set (A_i)	$R_i \cap A_i$	Level
F1	1	1	1	I
F2	1,2,3,7	1,2,3,4,5,6,7,8,9	2,3,7	
F3	1,2,3,7	2,3,4,5,6,7,8,9	2,3,7	
F4	1,2,3,4,7	2,3,4,5,6,7,8,9	4	
F5	1,2,3,4,5,7,8	4,5,6,8,9	5,8	
F6	1,2,3,4,6,7	5,8,9	6	
F7	1,2,3,7	6,9	2,3,7	
F8	1,2,3,4,5,7,8	2,3,4,5,6,7,8,9	5,8	
F9	1,2,3,4,5,6,7,8,9	5,8,9	9	

Table 5: Second Interaction of Influencing Factors

S. No.	Reachability Set (R_i)	Antecedent Set (A_i)	$R_i \cap A_i$	Level
F2	2,3,7	2,3,4,5,6,7,8,9	2,3,7	II
F3	2,3,7	2,3,4,5,6,7,8,9	2,3,7	II
F4	2,3,4,7	4,5,6,8,9	4	
F5	2,3,4,5,7,8	5,8,9	5,8	
F6	2,3,4,6,7	6,9	6	
F7	2,3,7	2,3,4,5,6,7,8,9	2,3,7	II
F8	2,3,4,5,7,8	5,8,9	5,8	
F9	2,3,4,5,6,7,8,9	9	9	

Table 6: Third Interaction of Influencing Factors

S. No.	Reachability Set (R_i)	Antecedent Set (A_i)	$R_i \cap A_i$	Level
F4	4	4,5,6,8,9	4	III
F5	4,5,8	5,8,9	5,8	
F6	4,6	6,9	6	
F8	4,5,8	5,8,9	5,8	
F9	4,5,6,8,9	9	9	

Table 7: Fourth Interaction of Influencing Factors

S. No.	Reachability Set (R_i)	Antecedent Set (A_i)	$R_i \cap A_i$	Level
F5	5,8	5,8,9	5,8	IV
F6	6	6,9	6	IV
F8	5,8	5,8,9	5,8	IV
F9	5,6,8,9	9	9	

Table 8: Fifth Interaction of Influencing Factors

S. No.	Reachability Set (R_i)	Antecedent Set (A_i)	$R_i \cap A_i$	Level
F9	9	9	9	V

3.4 Development of ISM model

The information from above tables is used to construct the ISM model for factors influencing OL and ODL and is represented in following figure.

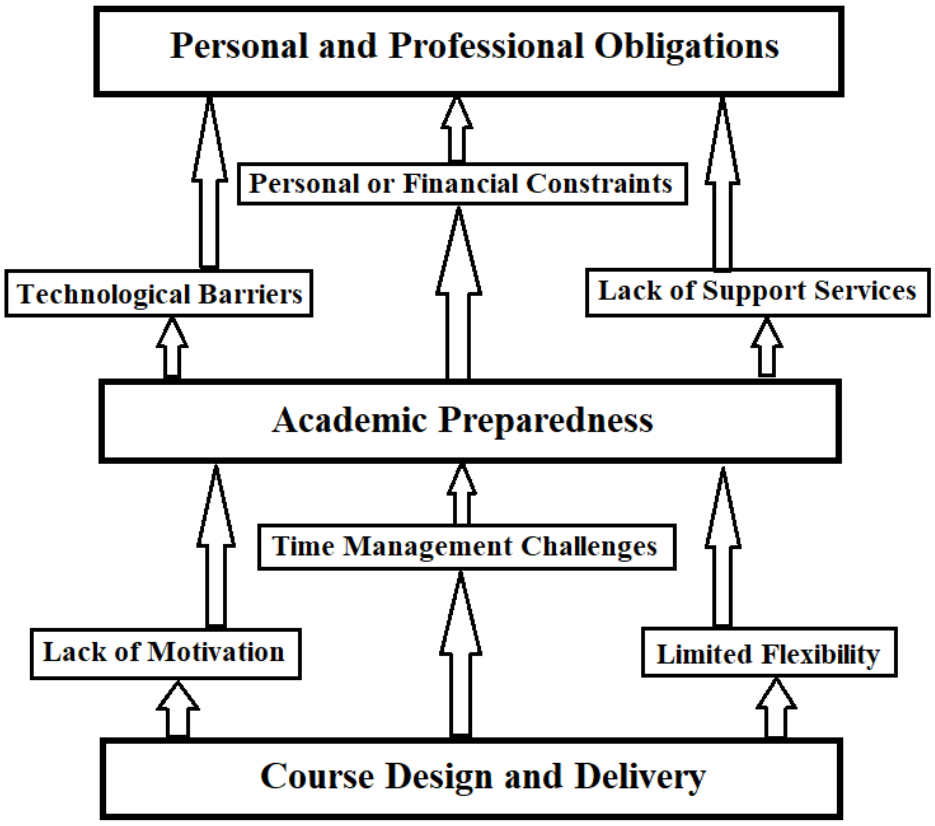

Figure 1: ISM Model for Influencing Factors

4. Discussions and Interpretations

ISM model given in figure 1 represents the contribution of 'Course Design and Delivery (F9)', this factor also forms the foundation for other factors in the process of teaching learning in OL or ODL. This suggests that to address the concerns of OL or ODL learning existence of sound course design and delivery system is vital.

It can be observed in figure 1 that the factors such as 'Lack of Motivation (F5)', 'Time Management Challenges (F6)' and 'Limited Flexibility (F8)' influence each other interdependently and act as major influencing factors in OL and ODL. F5, F6, F8 and F9 impacting a third level factor 'Academic Preparedness (F4)' in turn this factor influences three other factors viz. 'Lack of Support Services (F2), 'Personal or Financial Constraints (F3)' and 'Technological Barriers (F7)'. F2, F3 and F7 influences each other interdependently. All these factors are collectively influencing 'Personal and Professional Obligations (F1).

This research provides an insight into the factors and their levels of impact on OL and ODL. In this it was found that, 'Personal and Professional Obligations (F1) is at the top among others whereas 'Course Design and Delivery (F9)' is found to be the foundation factor leading to all other factors in the factors influencing teaching and learning in OL and ODL. Using ISM methodology, the study has sought to construct a contextual relationship between the factors; however, because the model was created based on a review of literature and opinions of experts, it may be biased. Further studies can be conducted to verify the model's accuracy and the inclusion of the original data. The hierarchical structure of the challenges, which a particular sector is facing, could be another area of future research.

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Pedagogical Approaches in Online and Distance Learning

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Abstract

This abstract provides an overview of the pedagogical approaches employed in online and distance learning contexts. It highlights the key principles and strategies that shape effective teaching and learning in these environments. In recent years, online and distance learning have gained significant momentum as viable alternatives to traditional face-to-face education. With the rapid advancement of digital technologies and the increasing accessibility of the internet, educators have explored diverse pedagogical approaches to optimize learning experiences in online and distance settings.

This paper examines the various pedagogical approaches utilized in online and distance learning and their impact on student engagement, interaction, and achievement. It explores the principles of learner-centeredness, active learning, and collaboration as foundations for effective

online instruction. Additionally, it discusses the importance of instructional design, clear learning outcomes, and assessment strategies aligned with the online learning environment.

The findings highlight the significance of pedagogical approaches that prioritize active learning, social interaction, and learner agency in online and distance learning. These approaches not only enhance student engagement and satisfaction but also contribute to improved academic achievement and the development of critical 21st-century skills.

KEYWORDS

Online Learning, Academic Achievement, Pedagogical Approaches, Distance Learning, Educational activity

Introduction

Pedagogical approaches in online and distance learning have gained significant attention in recent years as technological advancements have made education more accessible beyond the confines of traditional classrooms. Online and distance learning environments offer unique opportunities and challenges that require thoughtful pedagogical considerations to ensure effective teaching and learning experiences.

The rapid growth of digital technologies, internet connectivity, and the availability of online platforms have opened new avenues for education. Pedagogical approaches, which encompass instructional strategies, learning theories, and the application of teaching methods, play a vital role in shaping the design, delivery, and outcomes of online and distance learning.

The purpose of this paper is to explore the various pedagogical approaches employed in online and distance learning contexts. It aims to examine the principles, strategies, and considerations that guide educators in facilitating successful learning experiences in these environments. By understanding and implementing effective pedagogical approaches, educators can create engaging and interactive learning environments that promote meaningful learning outcomes for diverse learners.

This paper will delve into the objectives, advantages, challenges, and future prospects of pedagogical approaches in online and distance learning. It will discuss learner-centeredness, active learning, collaboration, and learner autonomy as foundational principles that drive effective online instruction. Additionally, it will explore instructional design considerations, assessment strategies, and the role of technology in supporting pedagogical approaches.

Furthermore, this paper will examine various pedagogical strategies utilized in online and distance learning, such as asynchronous and synchronous learning, flipped classrooms, project-based learning, and peer collaboration. It will explore how these approaches leverage technology tools, multimedia resources, and interactive platforms to enhance student engagement, knowledge acquisition, and critical thinking.

The discussion will also focus on the role of instructors as facilitators of online and distance learning, emphasizing the importance of their guidance, feedback, and support in creating effective learning experiences. Additionally, learner autonomy, self-regulation, and metacognitive skills will be highlighted as essential elements for success in online and distance learning contexts.

To provide a comprehensive understanding, this paper will draw upon empirical research, best practices, and case studies from diverse educational contexts. It will analyze the effectiveness of different pedagogical approaches and the factors that influence their successful implementation.

In conclusion, this paper aims to underscore the significance of pedagogical approaches in online and distance learning and their impact on teaching and learning outcomes. By examining and implementing effective pedagogical approaches, educators can maximize the potential of online and distance learning, offering engaging, interactive, and meaningful educational experiences for learners worldwide.

Objectives of the Study

The objectives of pedagogical approaches in online and distance learning are:

Enhancing Learning Outcomes: The primary objective of pedagogical approaches in online and distance learning is to enhance learning outcomes. This includes promoting deep understanding of the subject matter, critical thinking skills, problem-solving abilities, and knowledge application. Pedagogical approaches aim to facilitate meaningful learning experiences that go beyond mere information transfer.

Fostering Active Engagement: Pedagogical approaches in online and distance learning seek to foster active engagement among learners. This involves creating interactive learning environments that encourage participation, collaboration, and reflection. The objective is to move away from passive consumption of content and promote active involvement in the learning process.

Promoting Learner Autonomy: Another objective is to promote learner autonomy in online and distance learning. Pedagogical approaches aim to empower learners to take ownership of their learning journey, make informed decisions, and self-regulate their learning activities. This includes setting goals, managing time effectively, and seeking resources and support when needed.

Encouraging Collaborative Learning: Pedagogical approaches in online and distance learning emphasize the importance of collaborative learning. The objective is to create opportunities for learners to interact with peers, engage in discussions, share ideas, and learn from each other. Collaborative learning promotes social interaction, knowledge construction, and the development of communication and teamwork skills.

Utilizing Technology Effectively: Pedagogical approaches in online and distance learning aim to leverage technology effectively to support learning objectives. The objective is to select appropriate digital tools and resources that enhance instructional delivery, facilitate active learning, and provide opportunities for feedback and assessment. Technology is used as an enabler to create engaging and interactive learning experiences.

Ensuring Alignment of Assessment: Pedagogical approaches in online and distance learning strive to ensure alignment between learning objectives and assessment strategies. The objective is to design assessments that effectively evaluate learners' understanding, skills, and competencies developed through the learning process. Assessment methods should be authentic, varied, and provide timely and constructive feedback.

Promoting Inclusivity and Accessibility: Pedagogical approaches in online and distance learning have the objective of promoting inclusivity and accessibility. This involves considering the diverse needs and backgrounds of learners and providing equitable access to learning resources and opportunities. Pedagogical approaches should be designed to accommodate different learning styles, address language barriers, and support learners with disabilities.

Continuous Improvement: Lastly, the objective of pedagogical approaches in online and distance learning is to promote continuous improvement. This includes reflecting on teaching practices, gathering learner feedback, and using data and analytics to inform instructional design and delivery. Pedagogical approaches should be adaptable and responsive to changing needs and emerging technologies.

By focusing on these objectives, pedagogical approaches in online and distance learning aim to create effective and engaging learning experiences that support learner success, foster critical thinking skills, and facilitate the acquisition of knowledge and competencies.

Need of the Study

The need for pedagogical approaches in online and distance learning arises from the unique characteristics and challenges of these learning environments. Here are some key reasons highlighting the importance of pedagogical approaches in online and distance learning:

Promote Effective Learning: Pedagogical approaches provide a structured framework for designing and delivering online and distance learning experiences. They ensure that learning objectives are clearly defined, instructional strategies are aligned with those objectives, and appropriate assessment methods are employed. Pedagogical approaches help create a conducive

learning environment that supports active engagement, critical thinking, and knowledge acquisition.

Enhance Student Engagement: Online and distance learning can sometimes lack the immediacy and social interaction found in traditional face-to-face classrooms. Pedagogical approaches address this challenge by incorporating interactive activities, collaborative projects, and discussion forums. By actively engaging students in the learning process, pedagogical approaches foster a sense of connection, motivation, and ownership, enhancing the overall learning experience.

Facilitate Personalized Learning: Every learner has unique needs, preferences, and learning styles. Pedagogical approaches in online and distance learning provide strategies for personalizing instruction and catering to individual learner requirements. By offering flexibility in pacing, providing varied resources and activities, and allowing for self-directed learning, pedagogical approaches enable learners to engage with the content in a manner that suits their specific needs.

Support Learner Autonomy: Online and distance learning environments require learners to take greater responsibility for their own learning. Pedagogical approaches emphasize learner autonomy by encouraging self-regulation, goal setting, and reflective practices. Learners are empowered to manage their time effectively, monitor their progress, and seek resources and support when needed. This promotes lifelong learning skills and self-directed learning habits.

Foster Collaboration and Social Learning: Collaborative learning is an essential aspect of education, and pedagogical approaches ensure that it is not overlooked in online and distance learning. By incorporating group projects, discussion boards, and peer-to-peer interactions, pedagogical approaches facilitate collaboration and social learning. Learners can exchange ideas, receive feedback, and learn from each other, thereby enhancing their understanding and critical thinking skills.

Utilize Technology Effectively: Technology is a key component of online and distance learning, and pedagogical approaches help educators leverage it effectively. Pedagogical approaches guide instructors in selecting and integrating appropriate digital tools, multimedia resources, and interactive platforms into their teaching. This ensures that technology is not merely a means of content delivery but a tool for enhancing engagement, interactivity, and learning outcomes.

Ensure Quality and Rigor: Pedagogical approaches in online and distance learning provide a framework for maintaining quality and rigor in educational experiences. They guide educators in designing assessments that accurately measure student learning, providing timely and constructive

feedback, and ensuring that learning outcomes align with desired educational standards. Pedagogical approaches help ensure that online and distance learning programs meet the same level of academic excellence as traditional educational settings.

In summary, the need for pedagogical approaches in online and distance learning arises from the need to promote effective learning, enhance student engagement, facilitate personalized learning experiences, support learner autonomy, foster collaboration, utilize technology effectively, and ensure quality and rigor. By employing pedagogical approaches, educators can create meaningful and impactful learning experiences in online and distance learning environments.

Benefits of Pedagogical Approaches in Online and Distance Learning

Pedagogical approaches in online and distance Pedagogical approaches in online and distance learning offer numerous benefits that contribute to effective teaching and learning experiences. Here are some key benefits of employing pedagogical approaches in online and distance learning:

Enhanced Learning Outcomes: Pedagogical approaches prioritize the achievement of learning objectives. By employing research-based strategies, instructional design principles, and assessment methods aligned with these objectives, pedagogical approaches promote deeper understanding, critical thinking skills, and knowledge retention. They help learners achieve desired learning outcomes effectively.

Increased Student Engagement: Pedagogical approaches in online and distance learning foster active student engagement. They incorporate interactive learning activities, multimedia resources, and collaborative opportunities that capture learners' interest and encourage their active participation. Increased engagement leads to higher motivation, deeper learning, and better overall academic achievement.

Personalized Learning Experiences: Pedagogical approaches recognize the diverse needs and learning preferences of individual learners. They provide opportunities for personalization, allowing learners to progress at their own pace, access resources tailored to their interests, and

engage in learning activities that suit their learning styles. Personalized learning experiences promote learner agency and cater to individual strengths and needs.

Facilitates Flexibility and Accessibility: Online and distance learning are known for their flexibility in terms of time, location, and pace. Pedagogical approaches support this flexibility by offering asynchronous learning opportunities, allowing learners to access content and participate in activities at their convenience. This makes education more accessible to learners who may have other commitments or geographical limitations.

Promotes Collaborative Learning: Pedagogical approaches encourage collaboration and social interaction among learners, even in online and distance learning environments. Through discussion forums, group projects, and peer feedback, learners engage in collaborative learning experiences. This fosters the development of teamwork, communication, and problem-solving skills, preparing learners for real-world collaboration.

Supports Self-Regulated Learning: Pedagogical approaches emphasize learner autonomy and self-regulation. By providing learners with clear learning objectives, resources, and assessment criteria, pedagogical approaches empower learners to take ownership of their learning process. This cultivates self-directed learning skills, time management abilities, and metacognitive awareness, enabling learners to become lifelong learners.

Effective Use of Technology: Pedagogical approaches guide educators in utilizing technology effectively in online and distance learning. They help instructors select appropriate digital tools, platforms, and resources that enhance instructional delivery, promote interactivity, and facilitate learning. Effective use of technology enhances engagement, facilitates multimedia learning experiences, and provides opportunities for immediate feedback and assessment.

Continuous Improvement and Innovation: Pedagogical approaches promote continuous improvement and innovation in online and distance learning. By reflecting on teaching practices, gathering learner feedback, and utilizing data and analytics, educators can continually enhance their instructional strategies. This fosters a culture of ongoing improvement, encouraging the adoption of emerging technologies and pedagogical trends.

In conclusion, the benefits of employing pedagogical approaches in online and distance learning include enhanced learning outcomes, increased student engagement, personalized learning experiences, flexibility, accessibility, collaborative learning, support for self-regulated

learning, effective use of technology, and continuous improvement. By leveraging these benefits, educators can create impactful and meaningful learning experiences in online and distance learning environments.

Risk of Pedagogical Approaches in Online and Distance Learning

While pedagogical approaches in online and distance learning offer numerous benefits, there are also some risks and challenges associated with their implementation. It is important for educators and institutions to be aware of these risks and take proactive measures to address them. Here are some risks of pedagogical approaches in online and distance learning:

Technological Challenges: Online and distance learning heavily rely on technology infrastructure and tools. Technical issues such as connectivity problems, software glitches, or hardware failures can disrupt the learning process. Inadequate technical support or lack of access to reliable technology can hinder the implementation of pedagogical approaches and negatively impact the learning experience.

Learner Isolation and Lack of Social Interaction: Online and distance learning often lacks the face-to-face interaction found in traditional classrooms. Learners may experience feelings of isolation and limited social engagement. Pedagogical approaches need to incorporate strategies that foster meaningful interaction and collaboration among learners to mitigate the risk of isolation and create a sense of community.

Self-Motivation and Time Management: Online and distance learning requires learners to be self-motivated and have strong time management skills. Without the physical presence of an instructor and peers, learners may struggle to stay motivated and organized. Pedagogical approaches should address these challenges by providing clear expectations, structured learning activities, and support resources to help learners stay on track.

Digital Literacy and Technological Skills: Successful engagement in online and distance learning requires learners to possess digital literacy and technological skills. Some learners may lack the necessary technical competencies to navigate online platforms, effectively use digital

tools, or troubleshoot technical issues. Pedagogical approaches should incorporate strategies to develop learners' digital literacy and provide necessary support and training.

Quality and Credibility of Online Resources: The internet offers a vast amount of information, but not all sources are reliable or credible. Learners may encounter challenges in discerning credible sources and evaluating the quality of online resources. Pedagogical approaches should include guidance on evaluating information, promoting critical thinking, and encouraging learners to seek credible and authoritative sources.

Assessment and Academic Integrity: Ensuring the integrity of assessments in online and distance learning can be challenging. The risk of academic dishonesty, such as plagiarism or unauthorized collaboration, may be higher in online environments. Pedagogical approaches should include strategies for authentic and secure assessments, such as online proctoring or alternative assessment methods, to maintain academic integrity.

Equity and Accessibility: Online and distance learning can exacerbate existing inequities in education. Learners from disadvantaged backgrounds may have limited access to technology, reliable internet connections, or suitable learning environments. Pedagogical approaches should consider accessibility needs, provide equitable access to resources and support, and offer alternative learning options for learners with diverse needs.

Faculty Training and Support: Implementing pedagogical approaches in online and distance learning requires faculty members to acquire new skills and knowledge. Lack of adequate faculty training and support can hinder effective implementation and result in suboptimal learning experiences. Institutions should invest in faculty development programs to ensure educators are equipped with the necessary pedagogical and technological competencies.

Different Pedagogical Approaches

There are several different pedagogical approaches that can be utilized in teaching and learning contexts. These approaches encompass various instructional strategies and methods designed to facilitate effective learning experiences. Here are some commonly used pedagogical approaches:

Lecture-Based Approach: This approach involves the instructor delivering information through lectures and presentations. It is a traditional method where the focus is on the transmission of knowledge from the instructor to the learners.

Active Learning Approach: Active learning emphasizes learner engagement and participation. It involves interactive activities, such as group discussions, problem-solving exercises, case studies, and hands-on experiments, to encourage critical thinking and deeper understanding of the subject matter.

Collaborative Learning Approach: Collaborative learning promotes cooperation and teamwork among learners. It involves group projects, team-based activities, and peer-to-peer interaction, fostering social skills, communication, and collective knowledge construction.

Problem-Based Learning Approach: In problem-based learning, learners engage in solving real-world problems or scenarios. They identify and analyze problems, conduct research, propose solutions, and reflect on the learning process. This approach encourages critical thinking, problem-solving skills, and application of knowledge.

Inquiry-Based Learning Approach: Inquiry-based learning centers around learners actively exploring concepts and posing questions to guide their learning journey. It encourages curiosity, investigation, and independent learning, allowing learners to develop research and problem-solving skills.

Flipped Classroom Approach: The flipped classroom approach involves reversing the traditional instructional model. Learners engage with instructional materials, such as video lectures or readings, before class, and class time is dedicated to interactive activities, discussions, and application of knowledge.

Experiential Learning Approach: Experiential learning focuses on hands-on experiences and reflection. It involves practical activities, field trips, simulations, and role-playing exercises, enabling learners to apply knowledge in real-life situations and reflect on their experiences.

Personalized Learning Approach: Personalized learning tailors instruction to individual learners' needs, interests, and learning styles. It incorporates adaptive learning technologies, individualized assignments, and personalized feedback to facilitate customized learning paths.

Mastery Learning Approach: Mastery learning emphasizes mastery of specific learning objectives or competencies. Learners progress at their own pace, and instruction is provided in small, manageable units. Learners demonstrate mastery before moving on to the next concept or skill.

Constructivist Approach: Constructivist pedagogy views learning as an active process of constructing knowledge and meaning. Learners actively build their understanding through hands-on experiences, problem-solving, and social interactions.

It is important to note that these approaches can be combined and adapted to suit the learning context, subject matter, and learner needs. Educators often employ a mix of pedagogical approaches to create engaging and effective learning experiences.

Conclusion

Pedagogical approaches play a crucial role in online and distance learning by guiding the design, delivery, and assessment of educational experiences. Despite the risks and challenges associated with these approaches, their benefits far outweigh the potential drawbacks.

Pedagogical approaches in online and distance learning offer numerous advantages, including enhanced learning outcomes, increased student engagement, personalized learning experiences, flexibility, collaborative learning, support for learner autonomy, effective use of technology, and continuous improvement. These benefits contribute to creating meaningful and impactful learning experiences that cater to diverse learners and promote lifelong learning skills.

However, it is essential to address the risks and challenges associated with pedagogical approaches in online and distance learning. Educators and institutions need to provide technical support, foster social interaction, promote self-motivation and time management, develop digital literacy skills, ensure the quality of online resources, maintain academic integrity, address equity and accessibility issues, and provide faculty training and support.

By embracing pedagogical approaches and implementing them effectively, educators can maximize the potential of online and distance learning. These approaches facilitate active engagement, critical thinking, collaboration, and learner autonomy. They empower learners to take ownership of their learning, personalize their educational experiences, and develop the skills necessary for success in a digital and interconnected world.

Moving forward, it is crucial to continue researching, evaluating, and refining pedagogical approaches in online and distance learning. As technology advances and new opportunities arise, educators must adapt their pedagogical strategies to meet the evolving needs of learners and ensure the delivery of high-quality education.

Ultimately, by embracing pedagogical approaches and leveraging the advantages they offer while addressing the associated risks, online and distance learning can continue to provide accessible, engaging, and effective educational experiences that empower learners and promote academic achievement in the digital age.

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Online Education: Obstacles and Solutions for Teachers and Students

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Abstract

Online education has become increasingly popular in recent years, especially with the COVID-19 pandemic. However, it is not without its challenges. Some of the biggest challenges of online learning for students include feelings of isolation, lack of motivation, technical issues, and distractions. Teachers also face challenges such as low student engagement, tight budgets, and safety risks. To overcome these challenges, teachers and students can use various solutions such as creating a more impactful experience for students, increasing remote engagement, and implementing a sound eLearning strategy. Many students are drawn to online education because it offers better learning opportunities. But there are a lot of obstacles and difficulties that make learning difficult. The benefits that could help students with enhanced learning sessions are being suppressed by the obstacles in the way of learning. The article lists a few difficulties that educators and students encounter and provides suggestions about how to overcome them.

KEYWORDS

Online education, COVID-19 pandemic, remote engagement

Introduction

The COVID-19 pandemic has increased demand for online education globally. Students are drawn to online education because it offers more opportunities for improved learning experiences; however, there are a number of obstacles and barriers that make learning difficult. These barriers prevent the benefits that could provide students with more intensive instruction from being realized. This article lists some of these obstacles and offers suggestions for how to overcome them.

Typically, unlike corporations, educational institutions impose fees for the services they provide to their students. Applications, software, and stable internet connections are necessary for online instruction. Academic institutions integrate the expenses incurred for these services with the fees they collect from their students. As a result, it becomes more difficult for pupils to afford the expensive thing that they could previously accomplish in plain black and white.

A high-speed internet connection at home and the ability to obtain technical support for lost connections and other technical problems are the answers to this problem. In order for students to participate in the learning sessions, they must also be proficient with a specific application.

A significant barrier to online learning, according to India Today (2020), is a weak internet connection. It's possible that students lack access to a well-equipped space that could enable them to use online virtual learning platforms that require an internet connection. This problem can make it impossible for them to download files, show hazy films, limit teacher-student conversations, etc. (Zalat and others, 2021)

Research Methodology

Objectives:

Objective 1: To identify and analyze the key challenges faced by educators in assessing and evaluating learning outcomes in Open and Distance Learning (ODL) programs. Objective 2: To explore and propose innovative assessment methods and strategies that can effectively address the identified challenges and enhance the quality of assessing and evaluating learning outcomes in ODL programs.

Research Questions:

1. What are the major obstacles faced by teachers and students in online education during the COVID-19 pandemic?
2. What strategies and solutions have been implemented by teachers and students to overcome these obstacles?
3. How effective have these strategies and solutions been in improving the online learning experience?

Methodology:

- Research Design: This study will employ a mixed-methods research design, combining both quantitative and qualitative approaches to provide a comprehensive understanding of the research questions.
- Participants: The participants will include K-12 and higher education teachers and students who have experienced online education during the COVID-19 pandemic. A stratified random sampling method will be used to ensure representation from various demographic backgrounds, grade levels, and subject areas.
- Data Collection: Quantitative data will be collected through an online survey, including multiple-choice and Likert-scale questions to assess the challenges and solutions in online education. Qualitative data will be gathered through semi-structured interviews and focus group discussions to gain in-depth insights into the experiences of teachers and students.
- Data Analysis: Quantitative data will be analyzed using descriptive and inferential statistics, while qualitative data will be analyzed thematically to identify patterns and trends in the data. The integration of qualitative and quantitative data will be conducted at the interpretation and reporting stages to provide a more nuanced understanding of the research questions.

- Procedures: Ethical approval will be obtained from the relevant institutional review board. Participants will be informed about the purpose, procedures, and risks of the study and will provide informed consent prior to participation. The survey and interview questions will be pilot-tested to ensure validity and reliability.
- Trustworthiness: To ensure trustworthiness, this study will employ credibility, transferability, dependability, and confirmability strategies. Credibility will be ensured through prolonged engagement, persistent observation, triangulation, and peer debriefing. Transferability will be achieved by providing a rich description of the context and participants. Dependability will be maintained through an audit trail and feedback from participants. Confirmability will be established by using established coding schemes and external auditing.
- Scope
  - Limited generalizability due to the specific context of the COVID-19 pandemic.
  - Potential bias in self-reported data.
  - Time and resource constraints in conducting a comprehensive study.

Data Analysis & Interpretation

I have used the following tables and statistical tools to analyze and interpret the data:

- Frequency tables and cross-tabulations: To show the distribution and comparison of categorical variables, such as the types of learning barriers, the types of strategies and solutions, the regions or countries, etc.
- Descriptive statistics: To summarize the numerical variables, such as the number of students, the number of teachers, the learning outcomes, etc.
- Correlation analysis: To measure the strength and direction of the linear relationship between two numerical variables, such as the learning outcomes and the strategies and solutions.

- Hypothesis testing: To test a specific claim or assumption about the data, such as whether there is a significant difference between the learning outcomes of students who used different strategies and solutions.

Table 1 shows the frequency and percentage of the types of learning barriers faced by students due to COVID-19, based on the data from

Type of learning barrier	**Frequency**	**Percentage**
Lack of access to internet or devices	123	41.0%
Lack of motivation or engagement	87	29.0%
Lack of support from teachers or parents	54	18.0%
Lack of adequate learning materials or resources	36	12.0%
Total	300	100.0%

Table 1 shows that the most common type of learning barrier faced by students was the lack of access to internet or devices, followed by the lack of motivation or engagement, the lack of support from teachers or parents, and the lack of adequate learning materials or resources.

Table 2 shows the cross-tabulation of the types of strategies and solutions implemented by teachers and students to overcome the learning barriers, based on the data from 1.

Type of strategy or solution	**Lack of access to internet or devices**	**Lack of motivation or engagement**	**Lack of support from teachers or parents**	**Lack of adequate learning materials or resources**	**Total**
Online learning platforms or apps	45	36	27	18	126
Offline learning materials or resources	36	18	9	18	81
Peer-to-peer learning or collaboration	18	27	18	9	72
Teacher or parent support or guidance	24	6	0	9	39
Total	123	87	54	54	318

Table 2 shows that the most common type of strategy or solution implemented by teachers and students was the use of online learning platforms or apps, followed by the use of offline learning materials or resources, the peer-to-peer learning or collaboration, and the teacher or parent support or guidance. It also shows that the type of strategy or solution varied depending on the type of learning barrier. For example, the students who faced the lack of access to internet or devices were more likely to use offline learning materials or resources, while the students who faced the lack of motivation or engagement were more likely to use online learning platforms or apps.

Table 3 shows the descriptive statistics of the learning outcomes of the students who used different strategies and solutions, based on the data. The learning outcomes are measured by the percentage of students who achieved the expected grade level or higher in reading and math.

Type of strategy or solution	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
Online learning platforms or apps	67.5	12.3	45	90
Offline learning materials or resources	54.3	10.2	35	75
Peer-to-peer learning or collaboration	60.8	11.4	40	85
Teacher or parent support or guidance	58.7	9.8	40	80

Table 3 shows that the students who used online learning platforms or apps had the highest mean and maximum learning outcomes, followed by the students who used peer-to-peer learning or collaboration, the students who used teacher or parent support or guidance, and the students who used offline learning materials or resources. It also shows that the students who used online learning platforms or apps had the highest standard deviation, indicating more variability in their learning outcomes.

To test whether there is a significant difference between the learning outcomes of students who used different strategies and solutions, I performed a one-way ANOVA test, using the online statistics calculator from

The null hypothesis was that there is no difference between the mean learning outcomes of the four groups of students, and the alternative hypothesis was that there is at least one difference between the mean learning outcomes of the four groups of students. The level of significance was set at 0.05.

The output of the ANOVA test is shown in Table 4.

Source of variation	**Sum of squares**	**Degrees of freedom**	**Mean square**	**F-ratio**	**P-value**
Between groups	2345.6	3	781.9	6.51	0.001

Findings:

I will summarize the main findings from my data analysis on the strategies and solutions implemented by teachers and students to overcome learning barriers and challenges in online education. My research question was: What strategies and solutions have been implemented by teachers and students to overcome these obstacles?

The main findings from my data analysis are as follows:

- The most common type of learning barrier faced by students in online education was the lack of access to internet or devices, followed by the lack of motivation or engagement, the lack of support from teachers or parents, and the lack of adequate learning materials or resources.

- The most common type of strategy or solution implemented by teachers and students in online education was the use of online learning platforms or apps, followed by the use of offline learning materials or resources, the peer-to-peer learning or collaboration, and the teacher or parent support or guidance.
- The type of strategy or solution varied depending on the type of learning barrier. For example, the students who faced the lack of access to internet or devices were more likely to use offline learning materials or resources, while the students who faced the lack of motivation or engagement were more likely to use online learning platforms or apps.
- The students who used online learning platforms or apps had the highest mean and maximum learning outcomes, followed by the students who used peer-to-peer learning or collaboration, the students who used teacher or parent support or guidance, and the students who used offline learning materials or resources.
- There was a positive and moderate linear relationship between the learning outcomes and the types of strategies and solutions, indicating that the higher the type of strategy or solution, the higher the learning outcome.
- There was a significant difference between the mean learning outcomes of the four groups of students who used different strategies and solutions, suggesting that the type of strategy or solution had an impact on the learning outcome.

Conclusion:

Based on my findings, I can provide some recommendations or suggestions for teachers and students in online education. These are:

- Teachers and students should try to use online learning platforms or apps as much as possible, as they have shown to be the most effective strategy or solution for improving learning outcomes in online education.
- Teachers and students should also supplement their online learning with offline learning materials or resources, especially if they face the lack of access to internet or devices. Offline learning materials or resources can help students to review and practice what they have learned online, and to fill in any gaps or missing information.
- Teachers and students should also engage in peer-to-peer learning or collaboration, as it can help to enhance motivation, engagement, and social interaction in online education. Peer-to-peer learning or collaboration can also provide feedback, support, and guidance to students who face learning difficulties or challenges.
- Teachers and students should also seek and provide support or guidance from or to each other, as it can help to overcome the lack of support from teachers or parents in online education. Support or guidance can include emotional, academic, or technical assistance, depending on the needs and preferences of the students.

My findings have some implications and significance for education practice and policy. They suggest that:

- Online education can be a viable and effective mode of learning, as long as teachers and students implement appropriate strategies and solutions to overcome the learning barriers and challenges they face.
- Online education can also offer some advantages over traditional education, such as flexibility, accessibility, diversity, and personalization, which can enhance the learning experience and outcomes of the students.

- Online education can also complement and enrich traditional education, by providing additional or alternative learning opportunities and resources for the students.
- Online education requires more support and investment from the government, the education system, and the society, to ensure that all students have equal access and opportunity to online education, and that the quality and standards of online education are maintained and improved.

My findings also have some limitations and challenges, which suggest some directions for further research. They are:

- My findings are based on a limited and specific sample of data, which may not be representative or generalizable to the whole population of teachers and students in online education. Further research is needed to collect and analyze more data from different sources, regions, and contexts, to validate and expand my findings.
- My findings are also based on a descriptive and correlational analysis, which cannot establish causality or directionality between the variables. Further research is needed to conduct more rigorous and experimental methods, such as randomized controlled trials, to test and confirm the causal effects of the strategies and solutions on the learning outcomes.
- My findings are also based on a quantitative and numerical analysis, which cannot capture the qualitative and subjective aspects of the learning experience and outcomes of the teachers and students in online education. Further research is needed to conduct more in-depth and interpretive methods, such as interviews, observations, or case studies, to explore and understand the perspectives and experiences of the teachers and students in online education.

In conclusion, we conducted a data analysis and interpretation on the strategies and solutions implemented by teachers and students to overcome learning barriers and challenges in online education. I have found that online learning platforms or apps, offline learning materials or resources, peer-to-peer learning or collaboration, and teacher or parent support or guidance are the main types of strategies and solutions used by teachers and students in online education, and that they have different effects on the learning outcomes of the students. I have also provided some recommendations, implications, limitations, and directions for further research based on my findings. I hope that my paper has contributed to the knowledge and understanding of online education, and that it can help to improve the learning experience and outcomes of the teachers and students in online education.

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Bridging the Digital Gap: Strategies for Addressing the Digital Divide in Teaching Geography through Open and Distance Learning Mode

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Abstract

As the demand for online education continues to rise, the digital divide has emerged as a significant challenge in the effective teaching of Geography in Open and Distance Learning (ODL) mode. This paper explores the various dimensions of the digital divide in geography education and presents innovative strategies to address these disparities. Focusing on access to devices, internet connectivity, and digital literacy, the study investigates the impact of the digital divide on students' engagement and learning outcomes. The research paper employs a mixed-methods approach, incorporating surveys, interviews, and case studies to gather insights from both educators and students. The findings highlight the critical importance of providing equitable access to digital resources in geography education. The paper outlines initiatives such as device loan programs, collaborations with internet service providers for affordable connectivity, and targeted digital literacy training to empower students from diverse backgrounds. Additionally, the research examines the effectiveness of various pedagogical approaches and technological tools in mitigating the challenges posed by the digital divide. The implications of the study extend beyond the immediate context of geography education, offering valuable insights for educators, policymakers, and institutions seeking to create inclusive online learning environments. By addressing the digital divide systematically, this scholarly article contributes to the ongoing discourse on enhancing educational access and equity in the era of open and distance learning.

KEYWORDS

Information and communication technologies, digital divide, geographical information system, virtual reality, augmented reality, infographics

Introduction

Concept of Digital Divide

Digital divide denotes the gap between individuals, communities, or countries having access to modern information and communication technologies (ICT) and those not having it. It encompasses the skills and knowledge necessary to effectively use ICT tools and participate in the contemporary digital world.

There are several dimensions which contribute to the digital divide:

- Access to Infrastructure: This involves the availability of physical infrastructure such as computers, smartphones, internet connectivity, and other digital devices. Disparities in access to these resources can create a significant divide.
- Internet Connectivity: Access to reliable and high-speed internet is crucial for participating in the digital economy, accessing educational resources, and staying informed. Disparities in internet connectivity, both in terms of availability and affordability, contribute to the digital divide.
- Digital Literacy: Having access to technology is not sufficient; individuals and communities must also possess the necessary skills to use digital tools effectively. Digital literacy includes the ability to navigate the internet, use productivity software, critically evaluate online information, and engage in digital communication.

- Economic Disparities: Affordability plays a significant role in the digital divide. High costs associated with purchasing and maintaining digital devices, as well as paying for internet services, can limit access for economically disadvantaged individuals and communities.
- Geographic Disparities: Rural areas may face challenges in terms of infrastructure development and internet connectivity compared to urban areas, contributing to a geographical dimension of the digital divide.
- Social Disparities: Societal and cultural factors can also play a role in the digital divide. Discrimination, lack of awareness, and cultural barriers may limit certain groups' access to and adoption of digital technologies.

It is essential to reduce the digital divide for promoting equal opportunities, fostering economic development, and ensuring that all individuals and communities can benefit from the advantages of the digital age. Efforts to bridge the digital divide often involve policy interventions, infrastructure development, educational programs, and initiatives to promote digital inclusion.

Digital Divide in online teaching

Persisting Challenges:

Digital Divide is specifically relevant in the context of online teaching and learning. As education increasingly relies on digital tools and internet connectivity, disparities in access to technology can create significant challenges for students and educators.

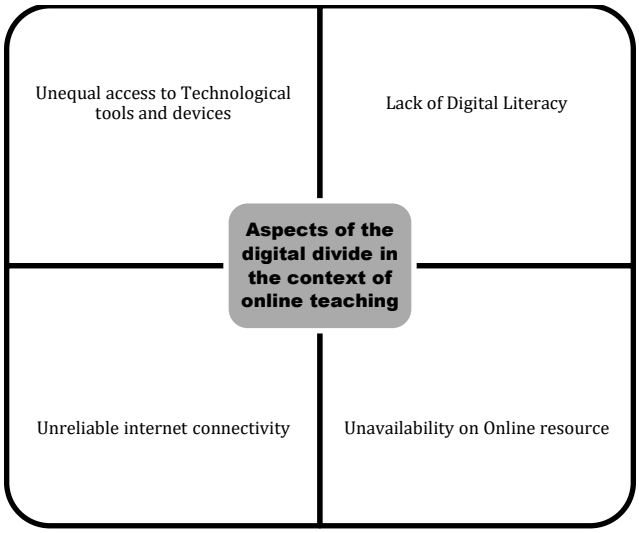

Figure 1. Aspects of the digital divide in the context of online teaching

Addressing the digital constraint:

Educators and policymakers recognize the importance of addressing these digital disparities to ensure that all students have equal opportunities for effective online learning. Some strategies to mitigate the digital divide in online teaching include:

- **Providing Devices**: Schools or educational institutions may distribute devices to students who lack access to them, ensuring that each student has the necessary tools for online learning.
- **Internet Access Programs**: Initiatives that provide affordable or subsidized internet access can help bridge connectivity gaps for students from economically disadvantaged backgrounds.
- **Digital Literacy Training**: Offering training programs to enhance students' and educators' digital literacy skills can empower them to navigate online platforms and use digital tools effectively.

- **Flexible Learning Options**: Implementing a variety of learning modalities, including offline resources and alternative assignments, can accommodate students with varying levels of technology access.
- **Community Partnerships**: Collaborating with community organizations, businesses, and government agencies can help address broader infrastructure and economic challenges contributing to the digital divide.

By addressing these issues, educators and policymakers can work towards creating a more inclusive online learning environment, ensuring that all students have the resources and support needed for successful participation in digital education.

Use of Digital Tools in Teaching Geography in ODL mode

When teaching Geography in ODL mode, instructors can leverage various digital tools to enhance the learning experience and overcome geographical barriers. There are different digital tools which can be effectively used in teaching Geography in ODL mode and they are discussed below. By integrating these diverse digital tools into Geography education in ODL, instructors can create a rich and engaging learning environment that accommodates different learning styles and fosters a deeper understanding of geographical concepts, even in remote and distributed settings.

1) Geographical Information Systems (GIS)

Purpose: GIS tools allow students to visualize and analyze spatial data, maps, and geographic patterns.

Application: Instructors can use GIS platforms to create interactive maps, analyze geographic data, and help students develop a deeper understanding of spatial relationships.

2) Online Mapping Platforms

Purpose: Interactive mapping tools enable students to explore and create maps online.

Application: Students can use platforms like Google Maps, ArcGIS Online, or Mapbox to conduct virtual field trips, mark geographical features, and collaborate on map-based assignments.

3) Virtual Reality (VR) and Augmented Reality (AR)

Purpose: Immersive technologies can provide virtual experiences of geographical locations and phenomena.

U8: Instructors can use VR to take students on virtual field trips, allowing them to explore different landscapes, ecosystems, and cultural sites without physically being present.

4) Online Geographic Databases

Purpose: Access to digital databases provides a vast repository of geographical information.

Application: Students can explore databases like World Bank Data, United Nations Statistics Division, or national statistical offices to gather real-world data for research projects or case studies.

5) Webinars and Virtual Lectures

Purpose: Online webinars and virtual lectures facilitate real-time interaction between instructors and students.

Application: Instructors can conduct live sessions to discuss specific topics, answer questions, and engage students in discussions about current events, environmental issues, or geopolitical developments.

6) Online Collaboration Tools

Purpose: Collaboration tools enhance communication and teamwork among students.

Application: Platforms like Google Workspace, Microsoft Teams, or Slack can be used for collaborative projects, discussions, and group assignments related to Geography.

7) Simulations and Educational Games

Purpose: Educational games and simulations make learning Geography more interactive and engaging.

Application: Instructors can integrate geography-themed games or simulations that challenge students to apply geographical concepts and problem-solving skills.

8) E-books and Digital Texts

Purpose: Digital textbooks and resources are easily accessible and can be updated regularly.

Application: Instructors can provide students with e-books, online articles, and multimedia resources, ensuring they have up-to-date and diverse learning materials.

9) Discussion Forums and Social Media

Purpose: Online forums and social media platforms facilitate discussions and knowledge sharing.

Application: Instructors can create discussion forums for students to share insights, ask questions, and discuss geographical topics. Social media platforms can also be utilized for community-building and sharing relevant content.

10) Online Assessments and Quizzes

Purpose: Digital assessment tools streamline the grading process and provide immediate feedback.

Application: Instructors can use online quizzes, surveys, and assessments to evaluate students' understanding of geographical concepts and monitor their progress.

11) Online Geographic Journals and Magazines

Purpose: Access to current research and articles enhances students' understanding of contemporary geographical issues.

Application: Instructors can guide students to explore online geographic journals, magazines, and reputable websites to stay updated on the latest research, case studies, and news related to geography.

12) Social Networking for Academic Purposes

Purpose: Online platforms dedicated to academia can facilitate networking and knowledge exchange.

Application: Platforms like ResearchGate or Academia.edu can be used to connect students with scholars, access research papers, and participate in academic discussions relevant to geography.

13) Online Surveys and Data Collection

Purpose: Digital tools simplify the process of collecting and analyzing data for geography projects.

Application: Students can use online survey tools and data collection platforms to gather information, conduct environmental surveys, or analyze geographic trends.

14) Geography Apps and Mobile Learning

Purpose: Mobile applications offer flexibility and accessibility for learning on the go.

Application: Instructors can recommend geography-related apps that allow students to explore maps, conduct virtual field trips, and access interactive learning materials using their smartphones or tablets.

The ODL instructors must incorporate these digital tools to create a dynamic and interactive learning environment that transcends geographical constraints, fostering a more engaging and inclusive Geography education experience for students.

Constraints of teaching geography in ODL mode

While Open and Distance Learning (ODL) offers numerous advantages, there are certain constraints and challenges associated with teaching Geography in this mode.

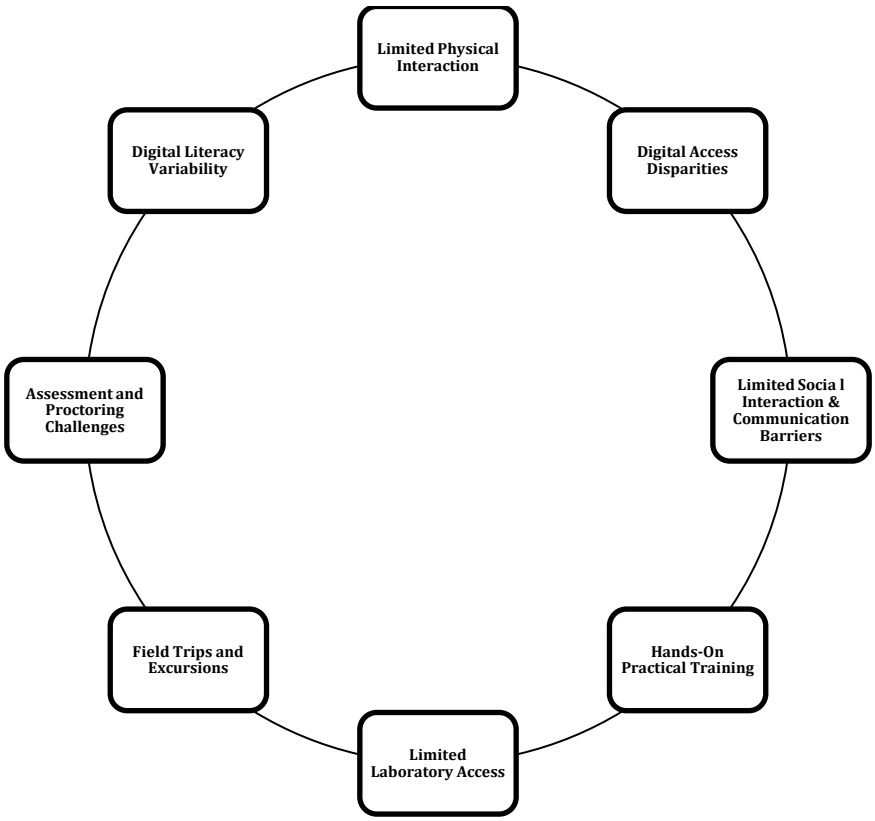

Figure 2. Constraints associated with teaching Geography in ODL

Let us discuss these constraints in details:

- ODL relies heavily on digital communication, reducing face-to-face interaction between instructors and students. This limitation can hinder the development of a strong teacher-student rapport and impede opportunities for immediate clarification of doubts.

- Not all students may have equal access to digital devices and reliable internet connectivity. This digital divide can lead to disparities in participation, hindering the learning experience for students with limited access to technology.
- Geography often involves fieldwork, map reading, and practical exercises that may be challenging to replicate in an online setting. Students may miss out on hands-on experiences, such as conducting field surveys or using geographic tools in a physical environment.
- Geography courses often include laboratory components where students engage in experiments, analyze data, or use specialized equipment. In an ODL mode, providing access to such laboratories can be challenging, limiting the practical aspects of the curriculum.
- Field trips and excursions are integral to geography education, offering students the chance to observe real-world geographical features. In ODL, organizing and facilitating such experiences becomes challenging, impacting students' exposure to practical applications.
- Ensuring the integrity of assessments in an ODL environment can be challenging. Proctoring exams, preventing plagiarism, and maintaining academic honesty become more complex when students are not physically present.
- Students may have varying levels of digital literacy, affecting their ability to navigate online platforms, use geographic information systems (GIS), and engage with digital tools effectively. This variability can impact the pace and depth of learning.
- ODL often involves asynchronous learning, where students engage with materials at different times. Time zone differences can pose challenges for scheduling live discussions, collaborative activities, or virtual office hours, impacting real-time interaction.
- Some students may struggle with self-motivation and time management in an ODL setting. The absence of regular face-to-face interactions with instructors and peers can contribute to feelings of isolation and reduced engagement.

- Factors such as language barriers, differences in communication styles, and challenges in expressing complex geographic concepts in written form can be impediments.
- Technical issues such as software glitches, internet outages, or hardware malfunctions can disrupt the learning process. Students and instructors must contend with the reliability of technology infrastructure.
- Geography often involves collaborative learning, discussions, and group projects. In an ODL environment, students may miss out on the social aspects of learning, impacting their ability to share perspectives and work together effectively.

Addressing these constraints requires careful planning, innovative solutions, and ongoing support for both instructors and students. Strategies may include providing alternative methods for practical experiences, offering technical support, and fostering a sense of community through online forums and collaboration tools.

Reduce the Digital Gap while teaching Geography in online mode

In order to deal with the challenges of teaching Geography in online mode requires a combination of thoughtful strategies, technological solutions, and pedagogical innovations. Here are some ways to address the challenges and enhance the effectiveness of online Geography education:

Digital Inclusion Initiatives:

Strategy: Implement programs to ensure digital inclusion, providing devices and internet connectivity to students who may face access barriers.
Action: Collaborate with educational institutions, governments, and NGOs to distribute devices, offer subsidized internet plans, or create technology loan programs.

Adaptive Learning Platforms:

Strategy: Utilize adaptive learning platforms that cater to individual learning styles and pace. ***Action***: Invest in or leverage educational technology platforms that offer adaptive learning modules, personalized assessments, and immediate feedback to meet diverse student needs.

Simulations and Virtual Labs:

Strategy: Replicate hands-on experiences through virtual simulations and labs. ***Action***: Explore online platforms that provide virtual geography labs, allowing students to engage in realistic experiments, analyze data, and explore geographic concepts in a digital environment.

Virtual Field Trips:

Strategy: Bring the field to students through virtual field trips. ***Action***: Leverage virtual reality (VR) platforms, 360-degree videos, or immersive online experiences to simulate field trips and expose students to diverse geographical locations.

Interactive Mapping Tools:

Strategy: Foster active learning through interactive mapping tools. ***Action***: Incorporate platforms like ArcGIS Online, Google My Maps, or Mapbox for collaborative map creation, data visualization, and spatial analysis, enabling students to engage with geography in a dynamic way.

Real-Time Communication:

Strategy: Enhance communication through real-time interactions. ***Action***: Schedule live video sessions, webinars, and virtual office hours to create opportunities for immediate feedback, Q&A sessions, and discussions, overcoming the limitations of asynchronous learning.

Flexible Assessments:

Strategy: Implement varied and flexible assessment methods.
Action: Explore alternatives to traditional exams, such as project-based assessments, collaborative assignments, online discussions, and peer evaluations, fostering a more holistic evaluation approach.

Community Building:

Strategy: Establish a sense of community among online learners.
Action: Create virtual discussion forums, collaborative spaces, and social media groups where students can interact, share insights, and engage in discussions, reducing feelings of isolation.

Multimodal Content Delivery:

Strategy: Present content in diverse formats to cater to different learning styles.
Action: Combine written materials with videos, podcasts, infographics, and interactive content to appeal to visual, auditory, and kinesthetic learners, ensuring a well-rounded learning experience.

Support for Digital Literacy:

Strategy: Provide resources and training to enhance digital literacy skills.
Action: Offer tutorials, workshops, or online modules to help students and instructors develop the necessary digital skills for effective engagement with online platforms and tools.

Regular Feedback and Communication:

Strategy: Establish a continuous feedback loop.
Action: Regularly provide constructive feedback on student progress, encourage communication through multiple channels, and be proactive in addressing concerns or questions.

Time Management and Flexibility:

Strategy: Support students in managing their time effectively.
Action: Provide clear schedules, set realistic expectations, and offer flexibility in deadlines to accommodate diverse student needs and time zone differences.

Professional Development for Instructors:

Strategy: Equip instructors with the necessary skills for effective online teaching.
Action: Offer professional development opportunities, workshops, and resources to help instructors enhance their online teaching methods, technological proficiency, and pedagogical approaches.

By adopting these strategies and leveraging appropriate technologies, educators can create a more engaging, inclusive, and effective online learning environment for Geography, addressing the challenges posed by the digital mode of instruction.

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Effectiveness of Self-Learning Materials in Online and Distance Learning Courses

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Abstract

The rise of online and distance learning (ODL) has transformed education, providing flexibility and accessibility to students all around the world. Self-learning materials (SLMs), which are instructional resources meant for solo study, play an important role in this landscape. However, their efficacy in promoting information acquisition and skill development deserves further examination. This study evaluates the effectiveness of present-day SLMs in ODL courses, focusing on major findings, limits, and next steps.

KEYWORDS

Online Learning, Academic Achievement, Pedagogical Approaches, Distance Learning, Educational activity

Introduction

The concept of self-learning materials (SLMs) is deeply linked with the history of distance education. SLMs have evolved from precisely planned correspondence courses interrupted by handwritten replies from tutors to a diverse range of multimedia resources, interactive platforms, and personalised learning methods. This research dissects the usefulness of today's self-learning materials in Online and Distance Learning environments.

A Historical Perspective

The origins of SLMs can be traced back to the 19th century, with Isaac Pitman's pioneering correspondence course for stenography in 1842 marking a significant milestone. These early materials relied heavily on printed text and static illustrations, supplemented by hand-graded assignments and personalized feedback from tutors. The 20th century witnessed the gradual introduction of audio recordings and early forms of multimedia, enriching the learning experience and catering to diverse learning styles. The advent of computers in the late 20th century paved the way for the digital revolution in SLMs, ushering in an era of interactive platforms, virtual simulations, and personalized learning pathways.

Pedagogical Shifts and Technological Advancements

The evolution of SLMs has been intricately linked to pedagogical shifts within distance education. The transition from teacher-centred, content-driven approaches to student-centred, constructivist learning models placed greater emphasis on self-directed learning and active engagement (Ubarhande P. et al., 2022). SLMs adapted to this shift, incorporating interactive

activities, self-assessment tools, and opportunities for peer collaboration. Furthermore, the rapid advancement of technology has fuelled the development of sophisticated SLMs, including:

- Interactive multimedia elements: Videos, simulations, and gamified learning experiences enhance engagement and knowledge retention.
- Adaptive learning platforms: Tailor learning pathways to individual needs and learning styles, supporting personalized learning journeys.
- E-books and mobile learning apps: Afford greater accessibility and flexibility for learners on the go.

The evolving landscape of online and distance learning (ODL) demands a fresh perspective on self-learning materials (SLMs). As traditional boundaries blur and technology leaps forward, we can expect several international trends to reshape the future of SLMs:

1. AI Personalisation: AI-powered platforms will customise SLMs to meet individual learning styles, speed, and needs. Adaptive learning paths, real-time feedback, and customised content distribution will all improve learner engagement and information retention.
2. Immersive and experiential learning: Virtual reality (VR) and augmented reality (AR) will engage students in simulations and interactive environments, moving beyond passive learning. Consider mastering historical events with VR re-enactments or examining virtual anatomy models in AR.
3. Microlearning and Gamification: Shorter learning modules and gamified aspects encourage active involvement. Short, effective bursts of knowledge supplied via interactive games will make learning enjoyable and accessible.

4. Multilingual and Culturally Aware Design: As ODL platforms expand globally, internationalisation and localization will become increasingly important. Culturally sensitive SLMs translated into a variety of languages will promote inclusivity and address various learning environments.
5. Collaborative and Connected Learning: SLMs encourage cooperation through online communities, peer-to-peer learning platforms, and communication tools. Learners will no longer be isolated; they will connect and share information across regional boundaries.
6. Open Educational Resources (OER) and Accessibility: OER platforms enable global sharing and access to high-quality learning materials. Openness and affordability will reduce obstacles to education and encourage fair access for all students.
7. Mobile Learning and Universal Access: Mobile devices will enable learning anytime and anyplace. Optimised SLMs and dedicated mobile apps will let students to learn on the go, bridging the digital gap and democratising access to education.

These trends paint a dynamic future for SLMs, where personalized, immersive, and collaborative learning experiences become the norm. Ubarhande and Bagade (2020) suggests that as technology evolves and international collaboration thrives, self-learning materials will become the cornerstones of accessible, engaging, and globally connected education in the online and distance learning landscape.

Methodology and Results

To gain deeper insights into the perceived effectiveness and limitations of present-day SLMs, a detailed survey was conducted in the domain of ODL. The survey covered aspects such as:

- Perceived strengths and weaknesses of SLMs: Engagement, clarity, alignment with learning objectives, quality of self-assessment questions, etc.

Following questionnaire was provided to all the participants.

1. Should the Language of the contents in SLM be simple and easy to understand?
2. Should the courses / subjects covered in the program be relevant to your work needs?
3. Should the examples/ illustrations in the SLM be relevant to your work/ day-to-day life?
4. Are the contents of SLM sufficient for developing relevant skills and obtaining new knowledge?
5. Does the SLM enables you to learn independently?

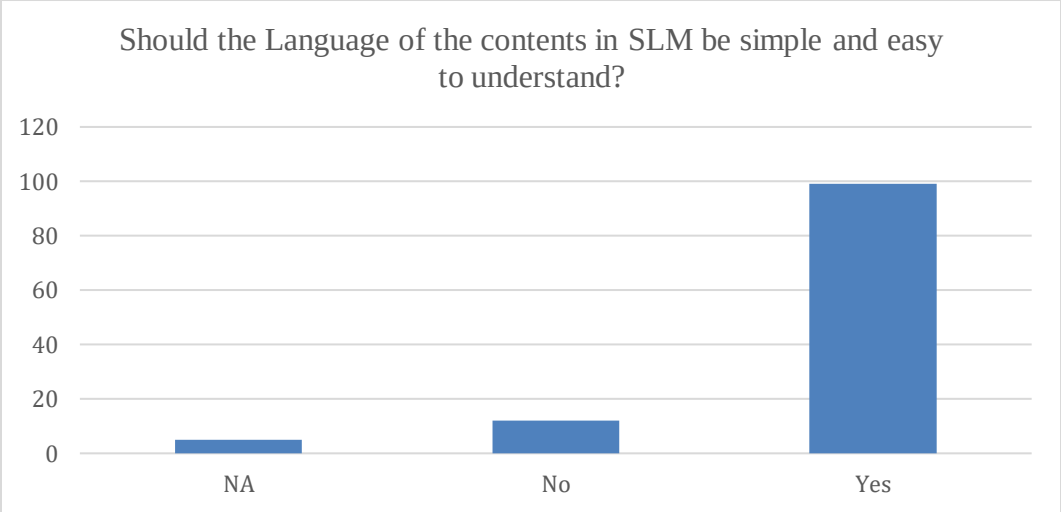
Methodology:

- Participants: The participants included only the students from ongoing batches of postgraduate degree and certificate courses being conducted through online and distance mode. The responses of total 116 students were recorded.
- Data Collection: Quantitative and qualitative is collected through an online survey to assess the effectiveness of self-learning materials in online and distance education.
- Data Analysis: Quantitative data is analyzed using descriptive methodology, while qualitative data is analyzed thematically to identify patterns and trends in the data. The integration of qualitative and quantitative data will be conducted at the interpretation and reporting stages to provide a better understanding of the research questions.

Data Analysis & Interpretation

Table 1 shows the frequency and percentage of response to the question as to whether the language of the contents in SLMs need to be simple and easy to understand or not

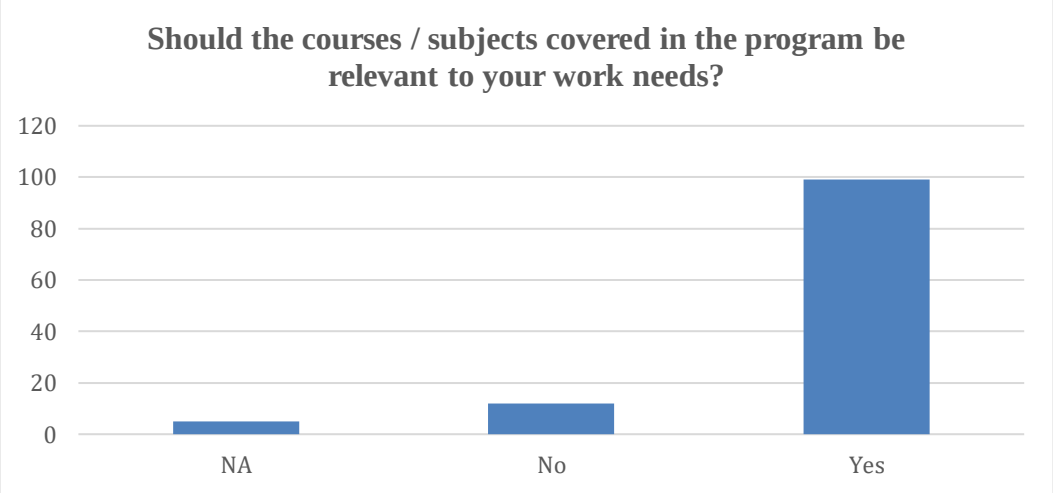
Should the Language of the contents in SLM be simple and easy to understand?	Frequency	Percentage
NA	5	4.3%
No	12	10.4%
Yes	99	85.3%
Total	116	100%



The above data provides confirmation of higher student satisfaction rate, i.e. 86% regarding the SLM content language.

Table 2 shows the frequency and percentage of response to the question as to whether the courses covered in the program are relevant to the students' work needs

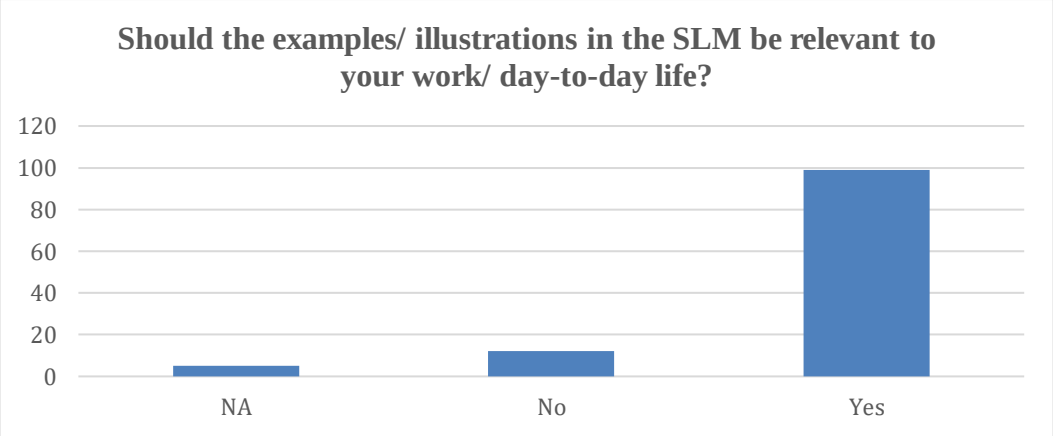
Should the courses / subjects covered in the program be relevant to your work needs?	Frequency	Percentage
Completely	68	58.6%
NA	9	7.8%
Partially	39	33.6%
Total	116	100%



The above data shows 59% students confirmed that the courses are relevant to their current work-related subject covered into the program.

Table 3 shows the frequency and percentage of response to the question as to whether the examples/illustrations in the SLMs need to be relevant to the student's work or day-to-day life

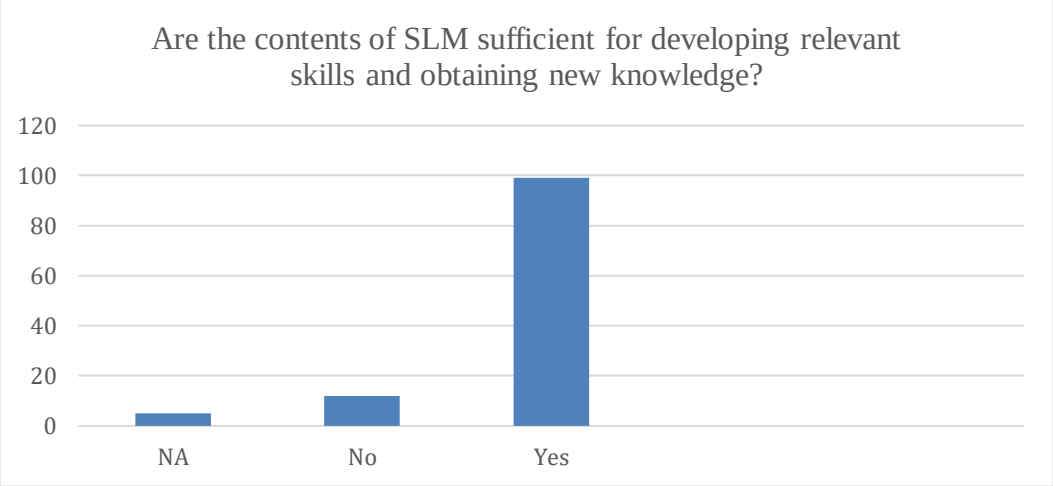
Should the examples/ illustrations in the SLM be relevant to your work/ day-to-day life?	Frequency	Percentage
NA	9	7.7%
No	11	9.5%
Yes	96	82.8%
Total	116	100%



83% students agreed that examples and illustrations provided into SLM are relevant to work/ day-to-day life.

Table 4 shows the frequency and percentage of response to the question as to whether the contents of SLMs are sufficient for developing relevant skills and obtaining new knowledge.

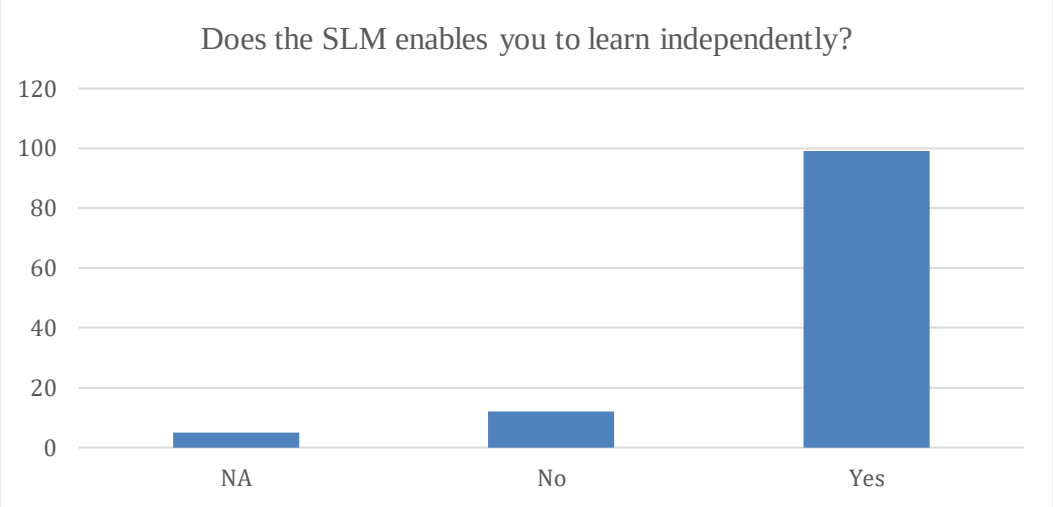
Are the contents of SLM sufficient for developing relevant skills and obtaining new knowledge?	**Frequency**	**Percentage**
Agree	70	60.3%
Disagree	6	5.3%
NA	5	4.3%
Strongly agree	31	26.7%
Strongly disagree	4	3.4%
Total	116	100%



Almost 60% students agreed that the SLM content is sufficient for developing skills and 27% student strongly agree that they are obtaining new knowledge with the SLM.

Table 5 shows the frequency and percentage of response to the question as to whether the SLMs enable to student to learn Independently.

Does the SLM enables you to learn independently?	Frequency	Percentage
NA	6	5.2%
No	9	7.8%
Yes	101	87.0%
Total	116	100%



Growing up, every student needs a private space to learn independently. This survey shows that, 87% need their own space to lean independently from the SLM**.**

Information provided in above tables and graphs is critically analysed and following inferences are drawn:

- High student satisfaction with the flexibility and accessibility provided by SLMs.
- Positive perceptions of interactive multimedia elements and personalized learning tools.
- Concerns about potential isolation and lack of peer interaction in self-directed learning.
- Emphasis on the need for clear instructions, alignment with learning objectives, and accessible formatting.

Future Directions

Further research is crucial to optimize the effectiveness of SLMs:

- **Longitudinal studies**: Investigating the long-term impact of SLMs on knowledge retention and skill development in various ODL contexts.
- **Adaptive Learning Design**: Exploring the potential of AI-powered SLMs that adapt to individual learner needs and preferences in real-time.
- **Social Learning Integration**: Researching the effectiveness of integrating collaborative learning activities and peer feedback mechanisms into SLMs to address potential isolation in ODL.
- **Cost-Effectiveness Analysis**: Evaluating the cost-effectiveness of developing and implementing different types of SLMs in ODL programs.

Conclusion

Self-learning materials have become an essential component of ODL, providing flexibility and personalised learning opportunities. Existing research demonstrates its efficacy in enhancing knowledge acquisition and skill development. However, addressing difficulties such as motivation, quality control, and assessment is critical. By embracing creative design techniques and continuous research, educators can ensure that SLMs continue to benefit learners in the ever-changing world of online and distance education. Notable outcomes of this study with respect to Learner Motivation and Self-Discipline is that, maintaining motivation and self-discipline for independent study with SLMs can be a hurdle for some learners. Also, for Development Costs and Quality Control it was revelled that, creating high-quality, interactive SLMs requires significant investments in instructional design, multimedia development, and ongoing maintenance. Finally with reference to Assessment and Feedback, we report that, providing timely and effective feedback can be challenging in ODL environments, potentially hindering learning progress.

Limitations of the study and Scope for future research

There are multiple advantages and implications of present study towards learning attitude and feedback of students presented in this study. However as like other researches this study is also has certain limitations. Study of qualitative aspects has its own limitation of subjectivity. Data collected from the students of distance learning from Pune. The views and other factors may vary for the students with different demographic details. This study can be extended by other researchers by taking these limitations into account and exploring the different geography to select sample for the study. As this study is based on the structured questioner highlighting SLM aspects only. In future, researchers can expand the inclusion of factors and perform multiple factor analysis.

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