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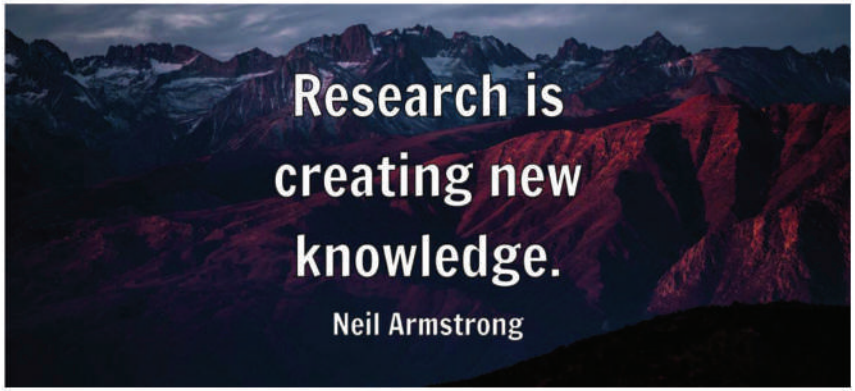

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Affiliated to Tamil Nadu Teachers Education University, Chennai
Palayamkottai, Tirunelveli - 627 002, India.
Office : 0462 - 2560558, Cell : +91 94886 62905
www.ignatiuscollegeofeducation.com

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GLOBAL ACCESS TO QUALITY EDUCATION THROUGH AI TECHNIQUES

*** Maria Saroja,M ** Vasanthi Medona,L**
**Research Director, IQAC Coordinator & Associate Professor of Biological Science*
***Principal*
St.Ignatius College of Education (Autonomous),Palayamkottai

ABSTRACT

Artificial Intelligence (AI) is transforming various industries, and education is no exception. Rapid advancements in AI technology have become essential for educators and educational assessment professionals to enhance teaching and learning experiences. AI-powered educational assessment tools provide numerous benefits, including improving the accuracy and efficiency of assessments, generating personalized feedback for students, and enabling teachers to adapt their teaching strategies to meet the unique needs of each student. Therefore, AI has the potential to revolutionize the way education is delivered and assessed, ultimately leading to better educational outcomes for students. The use of Artificial Intelligence (AI) in education is transforming various dimensions of the education system, such as instructional practices, assessment strategies, and administrative processes. It also plays an active role in the progression of science education. So, the present paper focuses on how artificial intelligence techniques promote global access to quality education.

Keywords: artificial intelligence, instructional practices, assessment strategies, ethical implications

Introduction

Technology in education is important because it helps today's teachers to integrate new technologies and tools into their classrooms. Teachers are able to upgrade and improve the learner-centeredness of their classrooms. It enables teachers to engage their students in unique, innovative and equitable ways. The world today is rapidly progressing on the road to utilization, with the ever-increasing number of technical applications that are used to communicate and pass on knowledge. In a traditional classroom, knowledge acquisition is limited to the information the teacher has and that which they can access. However, connecting students to the outside world enhances their ability to construct new knowledge. With the rapid progress in technology and the advancement in learning systems, it is now embraced by the masses. The introduction of Artificial Intelligence in the teaching-learning process is a great achievement in the education field (Bhagat,2024). In the realm of artificial intelligence in education (AIEd), artificial intelligence technologies are being applied to transform instructional design and student learning. The significance of AI tools in education is multi-faceted and holds the potential to address various challenges and innovate in teaching and learning practices(Prakash & Vasta, 2023).

AI-powered educational assessment tools provide numerous benefits, including improving the accuracy and efficiency of assessments, generating personalized feedback for students, and enabling teachers to adapt their teaching strategies to meet the unique needs of each student (Owan et al. 2023). Teachers play a pivotal

role in the academic trajectory of their students. Their daily responsibilities are multifaceted, encompassing lesson planning, crafting learning activities, selecting appropriate resources, delivering onsite or online lessons, guiding students through various tasks, monitoring students' performance and progress, adjusting teaching methods flexibly, and offering feedback that is both constructive and diagnostic. With the advent of AI technology, teachers now have access to tools that can transform the dynamics of teaching and learning, offering significant support across a spectrum of educational tasks (Tammets & Ley, 2023). AI-powered tools and applications improve educational measurement, including testing, assessment, and evaluation. These tools can provide educators with valuable insights into student performance, learning outcomes, and instructional effectiveness (Huang, 2018). AI-powered assessment tools can analyze student responses to assignments and provide personalized feedback to help students identify areas of strengths and weaknesses (Nazaretsky et al.2022).

Role of Artificial Intelligence in Personalized Learning

Education is one of the many industries that is using AI-powered tools and applications to improve the quality of services offered to teachers and students (Suh & Ahn, 2022). Artificial Intelligence tools, like Bing and Chat GPT, have been dubbed objects people can think with, particularly in the context of teaching and learning, where students can improve their capacity for critical and reflective thought, encourage creativity, develop problem - solving abilities, and successfully understand concepts (Vasconcelos et al. 2023). Learner-centered learning was successfully attained through the use of AI in the classroom (Huang, 2018). Testing, assessment, and evaluation in education are all improved by AI-powered tools and applications. These resources can give teachers insightful knowledge of student performance, learning objectives, and the efficacy of their instruction. To assist students in identifying their areas of strength and weakness, AI-powered assessment systems, for instance, can evaluate student assignment replies and offer tailored feedback (Nazaretsky et al. 2022). These resources can also give educators feedback on how well their lessons are working and point out areas in which they might need to modify their pedagogical approaches. Furthermore, a lot of the evaluation process can be automated with the use of AI-powered tools, which will free up instructors' time and ease their workload. Teachers' time spent grading essays can be reduced by using AI-powered grading systems, which can evaluate student works and offer feedback on grammar, structure, and topic (Huang et al. 2023).

According to Delgado et al. (2020), AI-powered solutions can also assist in identifying students who may be in danger of falling behind or who might benefit from extra support or remediation. These technologies can examine student data, including attendance logs and test results, and spot trends that might point to the need for intervention. This can assist educators in giving focused support to pupils who need it most. Conventional classroom environments frequently find it difficult to meet every student's unique learning needs,

preferences, and rates of progress. A one-size-fits-all approach to education can fail to push some kids while leaving others behind. Contrarily, personalized learning adapts training to each learner's unique needs, creating a more welcoming and productive learning environment. The utilization of data analytics, adaptive algorithms, and intelligent tutoring systems can enhance personalized learning through the application of AI technology breakthroughs, providing tailored learning experiences. Even if AI-driven personalized learning is gaining popularity, there are still a lot of unanswered questions in the literature that need to be looked at. First off, despite the fact that a large body of research has examined the theoretical underpinnings and technological potential of artificial intelligence (AI) in education, little empirical study has been done on the actual efficacy of AI in raising academic achievement and student engagement. Furthermore, in-depth analyses of the potential biases and ethical ramifications of AI algorithms utilized in personalized learning systems are required. Moreover, there is a dearth of research on the opinions of different stakeholders, such as educators, students, and legislators, about the application and uptake of AI in educational environments.

Advantages of AI in Education

AI technology holds tremendous potential for enhancing the quality of education at all levels of study. The key advantages of AI are enhanced learning outcomes, time and cost efficiency, and global access to quality education.

Enhanced Learning Outcomes: AI in education has the capacity to significantly improve student learning outcomes by providing tailored learning experiences with the help of knowledge tracing (KT) and collaborative filtering. AI technology can be used to customize learning experiences to match and predict specific student needs (and future performance) by identifying individual strengths and limitations, tracing knowledge states (Long et al.2022), and analyzing past interactions and navigational patterns. As a result, more engaged and motivated students, increased information retention, and, ultimately, enhanced academic success may be achieved. Patterns and trends in student data (actionable intelligence) can be identified with the assistance of AI to help educators identify and address any learning gaps or challenges in real-time.

Time and Cost Efficiency: One of the key advantages of AI is the automation of manual tasks. The introduction of AI in education has resulted in a paradigm shift, with the potential to dramatically improve time and cost efficiency for both students and educators. The automation of teachers' duties will provide time savings that would allow a greater focus on personalized learning.

AI can streamline various educational processes such as generating questions using prompts grading, and content creation, reducing the workload on educators and enabling them to focus on higher-order tasks including thinking and problem-solving (Elkins et al.2023). Specifically, AI can be trained to grade a range of subjects and assessments including essays, problem-solving questions, and even graphing assessments (Lodge,2023). Since grading consumes up to half of educators' time, the potential time savings are enormous. In addition, the instant

grading provided on assessments ensures that students receive timely and constructive feedback on their performance. AI-Generated Lesson Plan creation is another avenue for improved efficiency. AI can be used to create lecture slides, custom images and videos, homework and exam questions, and other course content, allowing academics to focus on human-centric tasks. AI tools can provide cost-effective solutions for institutions, particularly in resource-constrained settings, by offering scalable and accessible learning opportunities (Luan, 2020).

Global Access to Quality Education: The lack of access to quality education is one of the key issues in many developing nations (Shah,2019). It is a sentiment that is expressed by the leading experts in international education. Since education is an important factor in driving economic growth, providing universal education has huge financial benefits to both individuals and countries. The emergence of AI has paved the way for significant breakthroughs in worldwide access to high-quality education. As a result, AI-based education has recently attracted a significant amount of interest from around the globe. AI-powered educational tools and materials can cross geographical, socioeconomic, and linguistic boundaries, allowing for a fairer distribution of information. In this regard, it is important to consider the technological challenges of delivering AI-based education to remote locations. Thus, the next-generation communication networks, such as 6G, play a crucial role in enabling the above vision (Huang, 2020).

Role of Teachers in Artificial Intelligence-Based Assessment

AI-based assessments have been gaining popularity in recent years due to their ability to provide a quick and efficient evaluation of student learning. However, the role of teachers in AI-based assessments is still critical and cannot be undermined. According to Dillenbourg (2016), the shift from traditional education to digital education does not necessarily mean that teachers will become obsolete in the future. Rather than debating whether AI will replace teachers, Hrastinski et al. (2019) suggest that it would be more sensible to recognize AI's benefits and how these benefits could transform their role in the classroom. Therefore, in educational assessment, teachers still have a critical role in ensuring that AI is appropriately used for measurement and evaluation purposes. Some of these roles include

Interpreting Results: While AI-based assessments provide immediate feedback, the teacher's role is to interpret the results and provide actionable feedback to students. Teachers can use their professional judgment to evaluate student responses and provide personalized feedback based on their strengths and weaknesses.

Continuous Improvement: Teachers can use the results from AI-based assessments to improve their teaching practices. By analyzing the data, teachers can identify areas of weakness and adapt their teaching strategies to meet the needs of their students better.

Ethical Considerations: Teachers play a critical role in ensuring the ethical use of AI-based assessments. They must ensure that the assessment is fair, reliable, and valid and that student data is protected and used responsibly.

Providing Feedback: Teachers can provide additional feedback to students beyond the automated feedback generated by AI-based assessments. This feedback can be more personalized and help students better understand their strengths and weaknesses and identify areas for improvement.

Individualizing Instruction: Teachers can use the results from AI-based assessments to individualize instruction for students based on their learning needs. For example, if a student struggles with a particular concept, the teacher can provide additional resources or work with the student to develop a personalized learning plan.

Monitoring Progress: Teachers can use AI-based assessments to monitor student progress over time. By tracking student performance, teachers can identify trends and patterns and adjust their teaching strategies accordingly.

Fostering Critical Thinking*:* While AI-based assessments are designed to evaluate student knowledge, teachers can use them to foster critical thinking skills. By asking students to reflect on their responses and analyze the feedback provided, teachers can help students develop their ability to think critically about their learning.

Ensuring Accuracy: Finally, teachers play a crucial role in ensuring the accuracy of AI-based assessments. They must ensure that the data is reliable and valid and that the assessment measures what it intends. Teachers can also identify and correct any errors or inaccuracies in the assessment process.

AI Tools in Education

AI tools in the educational sector refer to the application of artificial intelligence technologies within learning environments to enhance teaching methods, personalize learning experiences and optimize educational outcomes. These tools encircle a wide range of AI applications and systems that assist educators and students in various aspects of the learning process (Tammets & Ley,2023). In a traditional education system where the presence of a tutor is a must, artificial intelligence is changing the role of a tutor and replacing it with AI tools. The AI implements advanced analytics approaches using machine learning and deep learning approaches to get the best results.

AI Chatbots: AI chatbots are computer programs designed to simulate human conversation and interact with users through natural language. These chatbots leverage artificial intelligence technologies, such as natural language processing (NLP) and machine learning, to understand and respond to user queries or provide information and assistance (Jain et al.2018). In the education sector, AI chatbots can serve various purposes. They can assist faculty members and teachers in tasks such as following up with students, responding to inquiries, reviewing students' backgrounds, assessing homework, and more (Khosravi et al. 2022). By automating these tasks, chatbots can save educators time and provide timely assistance to students.

Natural Language Processing : NLP is a branch of AI that focuses on enabling computers to understand, interpret, and generate human language. It involves techniques for processing, analyzing, and extracting meaningful information from text or speech data (Okonkwo & Ade-Ibijola, 2021). The core objective of NLP is to enable computers to process and interpret

natural language, allowing them to interact with humans in a more intuitive and meaningful way. This includes understanding the meaning, context, and sentiment behind words and sentences, as well as extracting relevant information from large volumes of textual data.

AI-Powered Grading Software: AI-powered grading software can streamline the grading process by combining machine learning algorithms with teachers' inputs. These tools can understand and replicate human grading processes, saving time for educators and providing consistent and efficient grading.

Personalized Learning*:* AI tools can comply with individual learning styles and paces, offering personalized educational content and pathways for students. These tools can analyze student performance and behaviour to provide tailored materials and learning experiences, catering to the specific needs of each learner.

Virtual Reality (VR) and Augmented Reality (AR)

VR and AR technologies can enhance education by providing immersive learning experiences. Students can access interactive content, engage in virtual learning environments, receive counselling services, and benefit from an immersive and engaging educational experience (Khosravi et al. 2022). VR headsets can also assist students with attention-related conditions by reducing distractions.

Adaptive Learning Systems: AI algorithms are used in these systems to assess student's strengths and weaknesses. They adjust the curriculum or learning materials in real-time based on students' progress, ensuring a more tailored learning experience.

Virtual Tutors and Chatbots: AI-powered virtual tutors or chatbots are available to students, offering support, answering questions, and providing explanations in real-time. These tools can assist in reinforcing learning materials, offering immediate help to students when educators might not be available.

Automated Grading Systems*:* AI-driven grading systems are capable enough to efficiently evaluate assignments, quizzes, and exams, providing quicker feedback to students. This technology can save educator's time on grading, allowing them to focus more on teaching and mentoring students.

Language Learning and Translation Tools: Language learning applications powered by AI and translation tools facilitate language acquisition by offering interactive lessons and real-time translation services, breaking down language barriers in educational settings (Sharma et al.2024).

Challenges and Ethical Implications of AI

AI-supported digital services are increasingly prevalent in schools. However, there are concerns regarding the loss of human decision-making, laziness, and privacy issues (Khosravi et al. 2022). Lack of trust, cost, and potential bias associated with AI in education. The challenges include the need for careful consideration of ethical concerns, integration into current educational systems, and the potential lack of human interaction in classrooms due to automation processes enabled by AI (Slimi & Villarejo-Carballido, 2023). Ethical implications arise from the potential risks of AI-generated content, such as plagiarism, loss of critical thinking skills, and reduced creativity in academic writing

(Stefan,2023). Additionally, there is a need to promote awareness among students and researchers regarding the ethical implications of using AI in academic writing. The ethical considerations of AI in education include autonomy, privacy, trust, and responsibility. It is important to address these concerns by strengthening plagiarism detection methods, promoting ethical AI usage, incorporating AI into the educational curriculum, and developing guidelines and regulations surrounding the use of AI in academic settings. The integration of AI in education presents challenges and ethical implications. Biased algorithms used in admission or grading processes can have devastating effects on students (Ma & Jiang,2023). The displacement of human educators by AI systems raises concerns about transparency and accountability. Privacy and security issues arise from the use of big data in education, algorithm recommendation, and the "digital divide" exacerbating educational inequity. Protecting student data privacy is crucial, and ethical risks related to AI technology must be addressed. The launch of ChatGPT has brought attention to legal and ethical implications in education, highlighting the need to understand its capabilities and potential issues (Huang,2023).

Conclusion

AI tools hold great promise for transforming education by personalizing learning, enhancing assessment, providing valuable insights, and automating administrative tasks. However, addressing ethical considerations, providing adequate training and support, ensuring equitable access, and maintaining the balance between technology and human interaction are critical challenges that need to be navigated for the successful implementation of AI tools in education.

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GAMIFY TO LEARN: ENHANCING STUDENTS ENGAGEMENT AND PERFORMANCE THROUGH ACTIVE LEARNING STRATEGIES

***Maheswari,G ** Keerthana, S**

**Assistant Professor, Department of Biological Science*

***Student Teacher, Department of Biological Science*

Dr. SNS College of Education, Coimbatore

ABSTRACT

Improving student performance and engagement is a significant challenge in modern education. Gamification, the application of game design principles in non-gaming contexts, offers a promising solution by fostering active learning environments. This study explores how gamification enhances motivation, engagement, and academic success, addressing the limitations of traditional teaching methods that often lead to passive learning and low retention rates. Gamification elements such as points, badges, leaderboards, and interactive challenges make learning more dynamic and enjoyable. Additionally, the study examines the cognitive and psychological mechanisms that contribute to its effectiveness in promoting deeper comprehension, knowledge retention, and critical thinking skills. However, potential drawbacks, including over-reliance on extrinsic motivation and the need for a well-balanced implementation, are also discussed. Findings suggest that gamification can transform education by creating interactive and immersive learning experiences, ultimately improving student outcomes.

Keywords: gamification, active learning, student engagement, educational technology.

Introduction

In recent years, digital technology integration and cutting-edge pedagogical strategies have been the main forces behind the revolutionary change in the educational system. Traditional teaching methods, often characterized by passive knowledge delivery, are increasingly criticized for failing to fully engage students or foster deep learning. To improve student engagement, motivation, and performance, educators are consequently investigating novel approaches. Gamification is a technique that introduces elements of game design into non-gaming situations, such as education is one of the most promising methods in this area. Gamification is becoming a popular strategy for increasing the fun, interactivity, and rewards of learning.

Teachers can build a dynamic learning environment where students are motivated to actively participate in their learning by incorporating components like leaderboards, badges, point systems, challenges, and incentives into the learning process. In contrast to conventional methods that frequently depend on rote memory or passive information consumption, gamified learning fosters competitiveness, teamwork, and engagement, which eventually improves content retention and comprehension. Through a combination of quantitative and qualitative analysis, this research seeks to understand how gamification can improve academic performance and student engagement. Using this combined methodology, the study will provide a thorough analysis of gamification in

education, taking into account both the complex individual experiences of teachers and students as well as the concrete facts of performance outcomes. This examination will clarify how gamification can be successfully incorporated into contemporary teaching methods, raising student interest and producing better academic outcomes.

Gamification

Gamification is incorporating aspects, mechanisms, and ideas of game design- like challenges, leaderboards, badges, and point systems into non-gaming environments to engage and inspire players. Through the introduction of interactive, reward-based systems that promote sustained interest and active involvement, gamification revolutionizes traditional learning experiences in the field of education. Gamification aims to increase learning through deeper learning, better knowledge retention, and increased engagement through both internal and extrinsic motivation. Gamification creates a dynamic, goal-oriented environment that pushes students to meet predetermined goals while encouraging critical thinking, problem-solving, and creativity. It does this by mimicking elements of games, such as competition, teamwork, and quick feedback. Gamification in the classroom stimulates students' drive for mastery and performance by matching learning assignments with incentives and challenges. By making learning more interesting, tailored to each student, and pertinent to their objectives, it appeals to their innate motivations, which include curiosity, competitiveness, and the desire for achievement.

Active Learning

Focusing students at the center of the learning process and encouraging them to actively participate in debates, case studies, problem-solving, and group projects is known as active learning. With active learning, students participate as active contributors who engage with the subject, their peers, and the instructor, in contrast to traditional, passive learning approaches where students are primarily receivers of knowledge. By encouraging students to examine, assess, and apply their information in hypothetical or real-world situations, this method promotes deeper comprehension. Active learning techniques aim to foster higher-order cognitive abilities including analysis, synthesis, and assessment as well as critical thinking, retention, and enhancement. Active learning enhances communication and teamwork abilities by motivating students to actively interact with the material. By providing dynamic, interactive exercises that encourage critical thinking and teamwork among students to achieve learning objectives, gamification enhances active learning. When combined, these strategies create an immersive learning environment that raises student engagement and results.

Educational Technology

The use of digital tools, platforms, and resources to improve academic administration, teaching, and learning is referred to as educational technology. Virtual reality simulations, online courses, interactive software, and learning management systems (LMS) are just a few of the advances that fall under this broad category. With the use of educational technology, teachers will be able to better address the varied requirements of their pupils by streamlining, personalizing, and increasing accessibility to learning.

Multimedia content, online collaboration, and real-time feedback from adaptive learning systems are just a few of the ways that integrating educational technology into the classroom can improve student engagement. Educational technology enables teachers to track student performance and identify areas needing support by offering data-driven insights into their progress. Educational technology raises new possibilities for developing immersive, interactive learning experiences that enhance student engagement and learning results when paired with strategies like gamification in the education system.

Objectives of the study

- To examine how gamification affects student engagement.
- To find out how incorporating gamification into active learning techniques motivates and engages students in the learning process.
- To examine how game components affect student's comprehension, retention of material, and general academic performance in comparison to more conventional teaching techniques.
- To examine the contribution of game mechanics to active learning.
- To recognize how technology can help gamified learning.

Methodology

The present study used a mixed-methods approach, integrating quantitative and qualitative research, to evaluate the effects of gamification on academic performance and student engagement.

Research Design

In this study, a mixed- methods research strategy integrating both quantitative and qualitative techniques will be used in this investigation. Pre- and post-tests, surveys, and participation indicators are used in the quantitative phase of the study to measure student performance and engagement. This enables statistical analysis of the data. Focus groups and interviews are used in the qualitative component to acquire detailed information on how students feel about gamified learning.

Sample Selection

Participants in this study are 9th and 10th-grade students with an age gap between 14 -16 years, from a variety of academic areas. Participants are randomized at random to either the experimental group, which will use gamified active learning methodologies, or the control group, which will use conventional learning techniques.

Data Collection

Data collection of this study involves systematically gathering quantitative and qualitative information to evaluate the effectiveness of gamification in enhancing student engagement and academic performance.

Quantitative data collection

Pre- and Post-Tests: To gauge students' understanding of growth and academic achievement, tests are given both before and after the gamified intervention.

Engagement Metrics: The Learning Management System (LMS) is used to automatically track and gather information on student participation. Metrics like assignment completion rates, time spent on tasks, and points gained will give quantitative information on how engaged students were with the intervention.

Academic Performance: The overall academic performance of the students in the experimental and control groups is evaluated using the results of quizzes, assignments, and final exams.

Qualitative Data Collection

Questions and Surveys: Following the intervention, students answer the questions and surveys intended to gauge how they feel about gamified learning. Their perceptions of the effects of gamification on their learning process, motivation, and enjoyment are questioned.

Interviews and Focus Groups: To learn more about how the gamification components affected their experiences, a portion of the participants take part in semi-structured interviews or focus groups. Themes pertaining to motivation, engagement, and possible obstacles encountered during the learning process are identified with the aid of this qualitative feedback.

Data Analysis

This study's data analysis uses both quantitative and qualitative methods to evaluate how gamification affects academic performance and student involvement. The analysis comprises content analysis, thematic analysis, inferential statistics, and descriptive statistics.

Quantitative Data Analysis

Descriptive Statistics

Descriptive statistics summarize the performance of students before and after the gamification intervention. This analysis provides valuable insights into the effectiveness of gamification as an educational strategy.

Table 1. Descriptive Statistics of Pre- and Post-Test Scores.

Group	Sample Size	Pre-test Mean (SD)	Post-test Mean (SD)	Change in Mean
Experimental Group	50	64(11)	86.4(9)	+22.4
Control Group	50	65(10)	75.8(8)	+10.8

Interpretation of Data

The experimental group (gamified learning) exhibited a substantial increase in mean post-test scores (86.4), compared to the control group (75.8), indicating a greater effectiveness of the gamification intervention.

Inferential Statistics

A t-test was conducted to determine if the differences in post-test scores between the two groups were statistically significant.

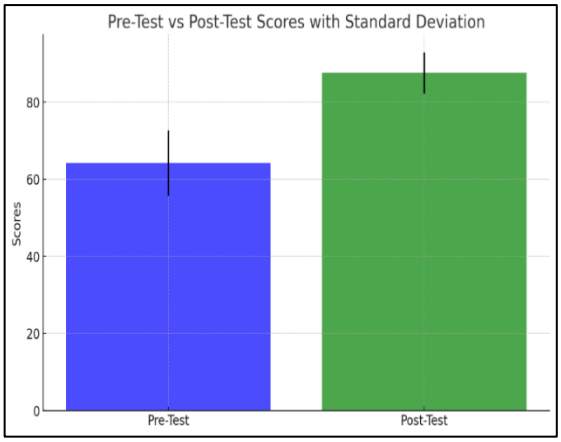
Table 2. Results of t-Test for Post-Test Scores

Comparison	Mean Difference	t-value	df	p-value	Effect size (cohen'sd)
Experimental Vs Control	10.6	4.25	98	<0.01	1.15

Interpretation of Data

The t-test results indicate a significant difference in post-test scores ($t(98) = 4.25$, $p < 0.01$) with a large effect size (Cohen's $d = 1.15$), demonstrating that gamification positively influenced academic performance.

Figure 1. Comparison of Descriptive Statistics of Pre- and Post-Test Scores



Qualitative Data Analysis

Thematic Analysis

Thematic analysis was conducted and it shows the qualitative data gathered from student interviews to identify key themes regarding their experiences with gamification.

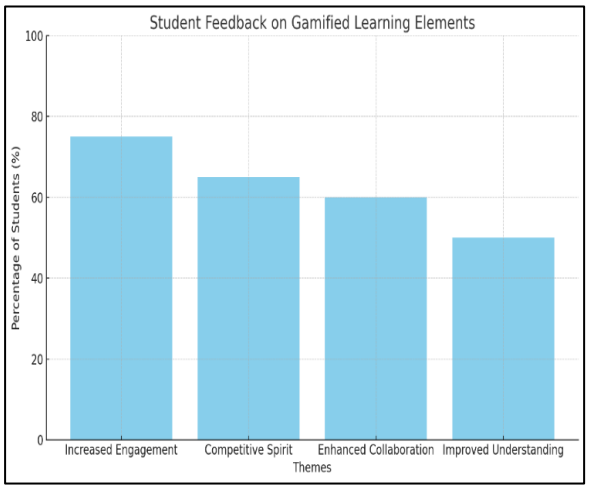
Table 3. Qualitative Themes from Student Interviews

Interpretation of the Data

According to the themes found, most students believed that gamification improved their

educational experience, especially in terms of motivation and comprehension.

Figure 2. Comparison of Qualitative Themes from Student Interviews



Findings of the Study

The results of the study showed that gamification significantly improved student performance. Higher post-test scores signified enhanced performance, with averages rising from 75.8 to 86.4 and the score distribution shifting toward higher achievement levels. Students showed greater enthusiasm for learning activities that included gaming components, resulting in enhanced engagement and motivation.

Lower-performing students showed progress, as evidenced by the reduction in performance variability, which helped narrow the achievement gap. Gamified activities fostered critical thinking and collaboration, enabling students to apply concepts more effectively and engage in cooperative learning. Additionally,

Theme	Description	Percentage of students
Increased Engagement	Students reported feeling more motivated to participate due to gamified elements.	75%
Competitive Spirit	Many students mentioned that leaderboards encouraged them to engage more actively.	65%
Enhanced Collaboration	Students appreciated group challenges that fostered teamwork and communication.	60%
Improved Understanding	A significant number noted that gamified tasks helped them grasp complex concepts better.	50%

students reported sustained interest and retention, attributing their long-term knowledge retention to the engaging learning experience. According to the research, gamification can be a useful strategy for raising student interest and enhancing academic performance in dynamic learning settings.

Discussion & Interpretation of Results

Improved Student Performance

The results of the study demonstrate that student performance improved significantly as a result of the gamification intervention. The average post-test scores rose significantly, from 75.8 to 86.4, suggesting that the use of gamified learning methodologies can significantly improve academic performance. This enhancement is in line with recent research showing how gamification improves learning by making the process less boring and more engaging. The lower standard deviation and higher mean scores imply that students of all performance levels profited from the intervention, proving that gamification can close gaps between various learner groups.

Increased Engagement and Motivation

The results demonstrated that gamified instruction increased student motivation and engagement, which is critical for increasing involvement in dynamic learning settings. Students were encouraged to stay engaged and participate more actively by the introduction of game components like points, awards, and challenges, which produced a sense of achievement and progress.

Gamification as a Tool for Equity

A significant discovery of the research is the decrease in performance variability, which is demonstrated by a reduced standard deviation in the post-test results.

This suggests that the gamified learning strategy helps both high achievers and struggling students improve their performance. By offering dynamic and engaging challenges that cater to various learning styles, gamification fosters an inclusive environment where students of all levels can succeed.

Practical Implications for Educators

The results of the study suggest that gamification can be an effective strategy for enhancing student performance and classroom dynamics. To create a more engaging learning environment, educators can incorporate game-based elements such as leaderboards, point systems, and team-based challenges. It has been demonstrated that gamification in active learning enhances students' critical thinking, cooperation, and teamwork. Additionally, as students are more likely to interact with and remember material when it is presented in an engaging and rewarding way, gamification can support the development of long-term interest in learning.

Limitations of the Study

Although the study shows how beneficial gamification can be, it should be noted that it has several limitations. The generalizability of the findings may be limited due to the brief duration of the intervention and the small sample size. Furthermore, the study focused primarily on immediate learning outcomes and did not assess long-term information retention. Future research should include longer-term evaluations to assess the sustained effects of gamified learning on academic achievement. Additionally, the study relied mainly on quantitative performance indicators; future studies could incorporate more qualitative methods, such as student surveys or interviews, to gain a deeper understanding of how students perceive and engage with gamified learning.

Recommendations

Practical applications for educators, ideas for further study, and possible advancements in the implementation of gamification techniques should be the main focuses of gamification in active learning, and the suggestion;

***Explore Long-Term Effects of Gamification*:** Future research should focus on examining the long-term effects of gamification on student engagement, academic performance, and knowledge retention.

Examine the Impact on Different Types of Learners: Future research should investigate the impact of gamification on various subsets of learners, including those with auditory, visual, or kinesthetic learning styles, learning disabilities, or differing levels of academic performance.

Role of Technology in Gamification: Further studies should explore how technology-based platforms, such as mobile apps, online learning environments, and virtual reality, can enhance the effectiveness of gamified learning, as digital tools are integral to gamification. Additionally, the research could assess how AI-driven customization, using adaptive learning algorithms to tailor the gamified experience to each student's abilities and progress, contributes to the success of gamified learning.

Conclusion

This study shows how gamification significantly improves academic achievement and student engagement in an active learning environment. By including components of a game, like challenges, incentives, and progress tracking, students

demonstrated increased motivation and engagement in addition to improved test scores. The results are consistent with other research that demonstrates how well gamification works to increase interaction and enjoyment in the learning process. Furthermore, the decrease in performance variability raises the possibility that gamification can aid in closing the achievement gap between top and bottom performers, promoting a more diverse and equal learning environment. Despite the promising results, the study's limitations such as its brief duration and small sample size are acknowledged. This emphasizes the need for more research to fully understand the long-term consequences and wider applicability of gamification. The study's findings ultimately highlight the potential of gamification as a useful tool for instructors looking to raise student engagement and enhance learning outcomes in a variety of learning environments.

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IMPACT OF SOCIAL MEDIA USAGE ON THE ACQUISITION OF ENGLISH LANGUAGE SKILLS

*** Sunitha,G ** Lenin, S**
**Research Scholar*
*** Department of Education, Manonmaniam Sundaranar University, Tirunelveli*

ABSTRACT

This study examines social media as a learning platform for acquiring communication skills with regard to gender and locality. Secondary student teachers' acquisition of communication skills from social media is assessed with regard to personal variables like gender and locality. The sample consists of 80 secondary student teachers in Tirunelveli district. In the study, the investigator used a simple random technique to select the samples The investigator used the self-made tool "Impact of Social Media Usage on the Acquisition of Communication Skills" to collect data. Statistics techniques such as t-tests are used for data analysis. The result of the study revealed that no significant difference was found between male and female secondary student teachers, as well as urban and rural secondary student teachers, in terms of the impact of social media usage on English language skill development.

***Keywords**:* social media, acquisition, English language skills, secondary student teachers.

Introduction

Social media plays an extremely significant part in everyone's life from childhood to adulthood. Rather than the entertainment field social media plays a major part in the educational field. In the academic field, the individual can access the content by sitting at home in the form of online sessions of meetings, workshops, seminars, etc. Four major English language skills are very important for every secondary student teacher. Secondary student teachers must be skilful in listening speaking, reading, and writing these four major skills are needed for the subject called English. These skills are easily learned through social media Broadly, some pupils are wisely using social media for developing language skills. Secondary student teachers are the prime sources for the forthcoming generation. During training, they push themselves to learn the content to deliver in a proper way to make the students understand that through proper delivery of content, they are preparing effective content through social media. Social media fast-track the way to improve their listening, speaking, reading, and writing skills while they are in the period of training called internship. During the period of training if they encounter any doubt, particularly in the English language (pronunciation or grammatical error), they switch to social media to clear their doubts, saving all the precious time of the individual.

Research Imperative

From dawn to night, we use a wide range of items. We rely heavily on our mobile phones. We facilitate communication via voice, messaging, and email. Social media has become a vital element of our schooling. Colleges use video calls or recorded films to conduct lectures, and social media is essential for connecting with students. Teachers share materials, notes, and papers via WhatsApp and use YouTube to clarify any doubts.

Communication skills are essential for all educators, and secondary student teachers represent the next generation of instructors. Currently, social media is booming all over the world, and communication skills are essential for all teachers. The researcher analyzes whether social media has an impact on secondary student teachers' communication skills or not.

Objectives of the Study

A research objective is a statement of purpose in which the investigator plans to attain a study in the field of reference (Creswell, 2011).

The objectives of this study include:

- To find out the significant difference between male and female secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.
- To find out the significant difference between rural and urban secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.

Hypotheses

According to James E.Greighton, A hypothesis is a tentative supposition or provisional guess that seems to explain the situation under observation (Singh & Bajpai, 2008).

The hypotheses of this study include:

- There is no significant difference between male and female secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.
- There is no significant difference between rural and urban secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.

Methodology

The investigators used a survey method for this present study. The investigators collected data from eighty secondary student teachers in the Tirunelveli district and the ‘t’ test was used for data analysis.

Tool used

The investigators developed a self-made tool (2024). The tool has four dimensions and 28 items with a five-point rating scale which respondents can answer with the option of strongly agree, agree, undecided, disagree, and strongly disagree.

Data analysis

The investigators used the ‘t’ test to assess the impact of social media usage on the acquisition of English language skills. The collected data have been analyzed and the results are given in the following data.

Hypothesis 1: There is no significant difference between male and female secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.

Table 1. Significant difference between Male and Female Secondary Student Teachers in their Impact of Social Media Usage on the Acquisition of English Language Skills.

Variables	Gender	N	Mean	S. D	t-value	p-value
Listening skills	Male	14	31.57	4.161	.644	.527 NS
	Female	17	30.54	5.417		
Speaking skills	Male	14	26.57	3.995	1.145	.262 NS
	Female	17	25.08	4.530		
Reading skills	Male	14	29.29	5.136	.152	.880 NS
	Female	17	29.03	6.108		
Writing skills	Male	14	19.29	2.614	.132	.896 NS
	Female	17	19.16	3.768		
Impact of social media usage on the acquisition of communication skills (whole)	Male	14	106.72	17.162	0.145	0.282 NS
	Female	17	103.81	18.567		

S- Significant at 5% level NS – Not Significant at 5% level

Table 1.1 shows that p- value (=0.282) is higher than 0.05, hence the null hypothesis is accepted. It shows that there is no significant difference between male and female secondary student teachers in their impact of social media usage on the acquisition of English language skills.

Hypothesis 2: To find out the significant difference between rural and urban Secondary student teachers with regard to impact of social media usage on the acquisition of English language skills.

Table 1.2 Significant difference between Rural and Urban Secondary Student Teachers in their Impact of Social Media Usage on the Acquisition of English Language Skills.

Variables	Locality	N	Mean	S. D	t- value	p-value
Listening skills	Rural	10	28.70	5.122	1.509	.157
	Urban	41	31.34	4.252		NS
Speaking Skills	Rural	10	24.00	2.667	-1.661	.110
	Urban	41	25.85	4.683		NS
Reading Skills	Rural	10	25.50	5.442	-2.274	.036
	Urban	41	29.98	5.610		S
Writing Skills	Rural	10	19.70	2.058	.717	.480
	Urban	41	19.07	3.738		NS
Impact of social media usage on the acquisition of communication skills (whole)	Rural	10	97.9	15.289	1.13	0.118
	Urban	41	106.24	18.283		NS

Table 1.2 shows that the p-value (=0.118) is higher than 0.05, hence the null hypothesis is accepted. It shows that there is no significant difference between male and female secondary student teachers in their impact of social media usage on the acquisition of English language skills.

Findings

Based on the above findings, the investigators conclude that there is no significant difference found between male and female secondary student teachers and urban and rural secondary student teachers with regard to the impact of social media usage on the acquisition of English language skills.

Conclusion

These days, social media and education go hand in hand, with social media having a big impact on both teachers' and students' lives. When it comes to education, teachers are the most important resource for the next generation. Social media provides a platform for learning for all educators, including secondary student teachers. Students are largely developing their communication abilities through social media. According to recent studies, social media use affects secondary student teachers' ability to communicate equally in both urban and rural settings, as well as between genders. The results of this study indicate that among secondary student teachers, social media usage and the development of English language skills is not significantly impacted by gender and location.

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CHALLENGES FACED BY FIRST-GENERATION COLLEGE STUDENTS IN TIRUNELVELI DISTRICT

***Gabirieal Raj, S**

**Assistant Professor, St.Joseph College of Education, Kadamboduvalvu*

ABSTRACT

This study delves into the unique challenges faced by first-generation college students (FGCS) in Tirunelveli District, Tamil Nadu. Students whose parents have not pursued higher education often find themselves navigating unfamiliar academic paths and facing challenges that their peers with college-educated parents may not encounter. Using a sample size of 100 students drawn from various colleges in the district, the research sheds light on the socio-economic, academic, and psychological barriers that hinder their educational journey. Socio-economic challenges such as financial constraints, lack of parental guidance, and societal expectations play a significant role in shaping the experiences of these students. Academically, the transition from school to college is often marked by gaps in preparedness, especially for those from underprivileged backgrounds. These gaps are further compounded by limited access to resources such as study materials, internet connectivity, and language proficiency. Psychologically, feelings of isolation, low self-esteem, and performance anxiety add to the pressures these students face, impacting their overall academic and personal growth.

Keywords: psychological barriers, socio-economic challenges, language proficiency

Introduction

First-generation college students (FGCS) are defined as individuals whose parents have not pursued or attained a college degree. Unlike their peers with college-educated parents, FGCS often lack the familial guidance and support needed to navigate the complexities of higher education. These students face unique challenges stemming from their socioeconomic background, limited exposure to academic environments, and the lack of a clear roadmap for pursuing higher education. These difficulties are not merely academic but also extend to financial, social, and psychological domains. In rural regions such as Tirunelveli District in Tamil Nadu, these challenges are amplified by deep-seated socio-economic disparities. Financial constraints are a predominant issue, as many FGCS come from low-income families where higher education is seen as a financial burden rather than a gateway to opportunities. Parents in such households may prioritize immediate employment over long-term educational investments, pressuring students to either drop out or juggle studies with part-time jobs to support their families. Cultural expectations also play a significant role in shaping the experiences of FGCS in Tirunelveli. Traditional gender roles and societal norms may limit opportunities for female students, while male students might face expectations to contribute financially to the household at an early age. In addition, the lack of awareness among parents about the importance of higher education and the resources available further hinders the progress of these students. Academically, FGCS often struggle with the transition

from secondary school to college. Many come from rural schools where resources, infrastructure, and teaching quality may not adequately prepare them for the rigour of higher education. Language barriers, particularly for students who shift to English-medium instruction, exacerbate these difficulties. Furthermore, these students may lack access to essential learning resources such as textbooks, libraries, and digital tools, which are crucial for success in a competitive academic environment. Psychologically, the journey of FGCS is marked by feelings of isolation and inadequacy. These students may perceive themselves as less capable than their peers, leading to low self-esteem and a fear of failure. Socially, they might find it challenging to integrate into college life due to differences in socio-economic status and cultural background, resulting in a sense of exclusion. This study investigates the various barriers faced by FGCS in Tirunelveli District, analyzing their impact on academic performance, mental health, and overall well-being. By exploring the coping mechanisms adopted by these students and evaluating the effectiveness of existing institutional support systems, the research aims to identify gaps and propose strategies for improvement. The ultimate goal is to provide actionable recommendations to enhance the academic success and well-being of FGCS, ensuring that they are equipped to overcome their challenges and achieve their full potential.

Statement of the Problem

First-generation college students (FGCS) in Tirunelveli District, Tamil Nadu, face significant challenges that hinder their academic success and well-being. Without the familial guidance and support available to their peers, these students struggle with financial constraints, cultural expectations, and limited access to educational resources. Socio-economic disparities and inadequate preparation from earlier schooling exacerbate their difficulties, leading to academic and psychological stress. Although institutions provide support mechanisms such as scholarships and counselling, awareness and utilization of these resources remain low. This study aims to identify the barriers faced by FGCS, evaluate the effectiveness of available support systems, and propose strategies to address their needs, ensuring equitable access to higher education and personal development opportunities.

Objectives of the Study

- To identify the socio-economic, academic, and psychological challenges faced by first-generation college students in Tirunelveli District.
- To analyze the coping mechanisms adopted by these students.
- To evaluate the effectiveness of institutional support systems in addressing their needs.
- To provide recommendations to enhance educational outcomes for FGCS in the region.

Research Methodology

Sample Size and Sampling Method

100 first-generation college students from various colleges in Tirunelveli district. Stratified random sampling to ensure representation across gender, socio-economic backgrounds, and disciplines.

Data Collection and Analysis

Structured questionnaires and in-depth interviews. Literature reviews, institutional reports, and government policies. A mixed- method approach combining

quantitative (statistical tools) and qualitative (thematic analysis) techniques.

Table 1. Socio-Economic Challenges Faced by First-Generation College Students.

Socio-Economic Challenge	Percentage
Financial Constraints	72%
Balancing Academic and Household Roles	65%
Limited Parental Awareness / Support	58%
Lack of Access of Study Resources	50%
Pressure to Enter Workforce Early	43%

Interpretation

This table highlights that financial constraints are the most significant challenge, impacting 72% of students. Additionally, 65% struggle to balance academics with household responsibilities, especially in rural settings where cultural expectations often demand more involvement in family duties. A lack of parental awareness further exacerbates their difficulties, limiting their access to necessary support systems. These findings underline the need for targeted financial aid, awareness campaigns, and resource accessibility initiatives.

Table 2. Utilization of Institutional Support Services

Type of Support Service	Percentage of Students Accessing Service	Effectiveness Rating (1-5 Scale)
Scholarships and Financial Aid	40%	3.8
Counselling (Academic /Mental Health)	25%	3.5
Peer Mentorship Programs	30%	3.9
Skill Development Workshops (Language, Tech)	35%	4.2
Career Guidance and Placement Services	20%	3.2

Interpretation

The table reveals that while several institutional support services exist, utilization rates are low**,** with only 40% of students availing of scholarships and financial aid. Counselling services, accessed by just 25% of students, are underutilized despite the challenges faced. Skill development workshops received the highest effectiveness rating (4.2), suggesting their relevance in bridging academic and employment readiness gaps. This indicates a pressing need for better awareness campaigns and simplified access to these services to improve utilization rates and impact.

Findings

- 72% of respondents reported difficulty in paying tuition fees and managing living expenses.
- Many students faced pressure to balance academic pursuits with part-time work or household responsibilities.
- Due to a lack of awareness, parents often could not provide academic guidance or emotional support.
- 68% of students indicated they struggled with the transition from school to college, especially in English-medium instruction.
- Limited access to textbooks, internet connectivity and study materials were a common issue.
- Fear of failure and comparison with peers were significant stressors.
- 54% of students felt socially excluded due to socio-economic status or cultural background differences.
- Many students doubted their abilities and perceived themselves as less competent than their peers.
- Building friendships with classmates helped 63% of students adapt to college life.
- Some students benefited from mentorship programs and approachable faculty members.
- A strong personal drive to succeed was evident in many respondents.
- While several schemes were available,

awareness and accessibility were limited.

- Only 25% of students reported accessing mental health or career counselling services.
- Workshops on communication skills, computer literacy, and career planning were appreciated but insufficiently frequent.

Recommendations

- Conduct workshops to inform students and parents about scholarships, financial aid, and counselling services.
- Offer remedial classes, peer tutoring, and language development programs to bridge learning gaps.
- Encourage colleges to create mentorship initiatives and peer groups to support FGCS.
- Simplify the application process for government and institutional aid programs.
- Ensure access to libraries, internet facilities, and affordable housing near colleges.

Conclusion

First-generation college students in Tirunelveli District face significant socio-economic, academic, and psychological challenges. Despite these barriers, many demonstrate remarkable resilience. By addressing these challenges through targeted institutional support and inclusive policies, colleges and governments can play a pivotal role in empowering these students and fostering equitable education opportunities.

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PARENTAL IMPOSITION ON THE CHOICE OF STUDY AMONG UNDERGRADUATE STUDENTS WITH REGARD TO SEX, NATIVITY, AND YEAR OF STUDY

*** Sundaravalli, S. R ** Keerthiga, M.**

** Assistant Professor, Department of Education*
*** M. Ed, Department of Education, Manonmaniam Sundaranar University, Tirunelveli*

ABSTRACT

This study explores the parental imposition on the choice of study among undergraduate students in Tirunelveli. Choice of study is a crucial aspect of personal and academic success, and its significance in the context of higher education is increasingly recognized. This study examines the level of parental imposition among undergraduate students, considering various factors such as sex, nativity, and year of study. The findings reveal that a significant portion of both female and male students demonstrate a level of parental imposition, suggesting a relatively balanced distribution across sex. Moreover, Parental imposition remains consistent across different years of study. Additionally, the Nativity of the students also depends on the way of parental imposition. Additionally, the study finds that among undergraduate students, parental impositions regarding sex, nativity, and year of study do not significantly differ. In light of these findings, recommendations are made for educational institutions to prioritize emotional intelligence development and create a more inclusive and supportive learning environment. This study emphasizes the role of parental imposition in enhancing the personal and academic success of college students.

***Keywords**:* parental imposition, sex, nativity, year of study, undergraduate students.

Introduction

Indian parents often have high expectations for their children, which can put significant pressure on their offspring to excel academically, socially, and in various other aspects of their lives. These expectations are driven by the parents' dreams and ambitions for their children, sometimes at the expense of the child's own goals and aspirations. In fact, it's worth noting that Indian parents are often seen as one of the most demanding groups worldwide, second only to Chinese parents in terms of exerting pressure. The excessive imposition of parental expectations, whether it pertains to the choice of study, making friends, or participating in pressure always yields positive outcomes. Parental imposition refers to the emotional burden that parents unintentionally place on their children, often related to expectations for academic success, adherence to cultural and social norms, and other factors. This imposition typically stems from parents' concern for their children's well-being and future employment prospects. It can also be influenced by parents who were unable to achieve their own aspirations and thus attempt to pass on the same goals to their children, leading to confusion for the child. This parental imposition often begins with well-meaning intentions. Most parents want their children to succeed, have good relationships, and do well in school. However, at times, parents may not realize that they are exerting excessive pressure on their children. Excessive parental pressure is frequently linked to a parent's idea of

success in various aspects of life, including academics, sports, social life, appearance, and cultural or religious activities (Smetana, 2011).

Role of Parents

When it comes to helping their children become self-sufficient adults, parents are essential. Children look to their parents for approval and support since they are bonded to them. For our children to develop properly and holistically, we must spend enough time with them, even if we are working parents. It is impossible to downplay the importance of parents in a student's life.

***Offering Emotional Support*:** Parents must spend time with their children to ascertain whether they are experiencing difficulties in their lives or at school and to offer them emotional assistance. Offering reassurance, inspiration, and encouragement to students who may feel depressed and aimless at times promotes their mental health and self-confidence. Offering consolation to pupils in trying circumstances like tests, improves their spirits.

***Providing Academic Support*:** While teachers in schools assist students in developing and resolving their questions, independent study at home can also cause uncertainty. When completing assignments or projects, students may encounter difficulties. Parents can actively supervise their children's homework, help them develop better study techniques, and discipline them for consistently adhering to their schedules.

Cultural Development: Children receive a lot of cultural education from their parents. Children must be taught the value of familial ties, participate in family celebrations, and hear stories from their parents for the family ancestry to endure. It aids pupils in developing a cultivated sense.

***Ethical Development*:** Ethics in education is integral to the school curriculum, where students learn righteous and moral codes of conduct. Students practise these at all places. A student's character development begins at home; therefore, parents must teach socially acceptable values and prevent their children from going down any wrong path.

***Act as a Role Model*:** It is very often that parents are the role models for their children, and every child learns to imitate and become like the parent when they grow up. Parents must strive to serve as positive role models for their children where they demonstrate qualities of empathy, respect, responsibility, and a strong work ethic. Teach the children how to tackle challenges, make ethical decisions, and constructively handle stress by narrating or through advice. (Scikablogs, 2024).

Objectives

A research objective is a statement of intent used in quantitative research that specifies the goals that the investigator plans to achieve in a study (Cresswell, 2012). A research objective is a clear concise, declarative statement, which provides direction to investigate the variable under the study (Jaikumar, 2018).

- To find out the level of parental imposition on the choice of study among undergraduate students with regard to sex, year of study, and nativity.
- To find out the difference between parental imposition on the choice of study among undergraduate students with regard to sex, nativity, and year of study.

Hypotheses of the Study

A hypothesis is a comparison of some

variables that have some specific position or role of the variables that are to be verified empirically (Bhatt, 2013).

- There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to sex.
- There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to nativity.
- There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to the year of study.

Methodology of Study Research

Methodology refers to the systematic theoretical analysis of the procedures applied to a particular
field of study. It is the scientific approach employed to conduct research. For this study, the investigator has chosen to adopt the survey method. A sample is a subset of people or items taken from a larger population and studied, tested, or questioned to gather information. In this study, the investigator has employed a simple random sampling technique to select a sample consisting of 297 undergraduate students from various Arts and Science colleges and Engineering colleges in Tirunelveli, Tamil Nadu. The investigators collected data using a rating scale that Parental Imposition on the Choice of Study. This scale included 30 items under three dimensions Behavioural expectation, Career aspiration, and Social Norms, rated on a 5-point scale.

Data Analysis

Data analysis encompasses a set of interconnected procedures conducted to condense the gathered data and structure it in a way that responds to research inquiries. It also can propose hypotheses or inquiries in situations where the study was not initially guided by such questions or hypotheses

Table 1. Level of Parental Imposition on the Choice of Study among Undergraduate Students with Regards to Sex

Sex	Low		Moderate		High		Total	
	N	%	N	%	N	%		
Male	75	60.5%	21	16.9%	28	22.6%	124	100%
Female	83	48%	48	27.7%	42	24.3%	173	100%
Total	158	53.2%	69	23.2%	70	23.6%	297	100%

Table 1 shows that Half of the male students have a low level of parental imposition on the choice of study among undergraduate students.

Table 2. Level of Parental Imposition on the Choice of Study among Undergraduate Students with Regards to Nativity.

Nativity	Low		Moderate		High		Total	
	N	%	N	%	N	%		
Rural	96	53%	44	24.3%	41	22.7%	181	100%
Urban	62	53.4%	25	21.6%	29	25%	116	100%
Total	158	53.2%	69	23.2%	70	23.6%	297	100%

Table 2 shows that half of the urban students have a low level of parental imposition on the choice of study and half of the students have a low level of Parental imposition on the choice of study among undergraduate students with regards to nativity.

Table 3. Level of Parental Imposition on the Choice of Study among Undergraduate Students with Regards to Year of Study

Year of Study	Low		Moderate		High		Total	
	N	%	N	%	N	%		
I Year	50	54.3%	24	26.1%	18	19.6%	92	100%
II Year	48	53.3%	20	22.2%	22	24.4%	90	100%
III Year	43	53.8%	20	25%	17	21.3%	80	100%
IV Year	17	48.6%	5	14.3%	13	37.1%	35	100%
Total	158	53.8%	69	23.2%	70	23.6%	297	100%

Table 3 shows that half of the first-year students have a low level of parental imposition on the choice of study and half of the students have a low level of Parental imposition on the choice of study among undergraduate students with regards to year of study.

$H_0$1: There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to Sex.

Table 5. Significance of difference in parental imposition on the choice of study among undergraduate students with regard to Sex.

Dimension	Sex	No	Mean	SD	t	P	Remark
Behavioural Expectation	Male Female	124 173	32.42 33.62	6.501 6.160	1.307	0.257	NS
Career Aspiration	Male Female	124 173	29.27 30.26	4.962 4.276	3.329	0.069	NS
Social Norms	Male Female	124 173	37.69 37.84	4.035 3.849	1.217	0.271	NS
Total	Male Female	124 173	99.39 101.72	11.757 10.573	1.936	0.165	NS

In the above table 5 shows that, the p value (=0.165) is greater than greater than 0.05, the null hypothesis $H_0$1 is accepted at 0.5% level of significance. Hence there is no significant difference between the Parental imposition on the choice of study among undergraduate students with regards to Sex.

$H_0$2: There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to Nativity.

Table 6. Significance of Difference in Parental Imposition on the Choice of Study among Undergraduate Students with Regard to Nativity.

Dimension	Nativity	No	Mean	SD	t	P	Remark
Behavioural Expectation	Rural Urban	181 116	33.19 33.01	6.076 6.712	0.238 0.233	0.812 0.816	NS
Career Aspiration	Rural Urban	181 116	29.74 30.02	4.656 4.507	-0.506 -0.510	0.613 0.611	NS
Social Norms	Rural Urban	181 116	37.67 37.95	3.966 3.863	-0.587 -0.591	0.557 0.555	NS
Total	Rural Urban	181 116	100.60 100.97	10.985 11.380	-0.301 -0.279	0.779 0.781	NS

In the above table 6 shows that the p value (=0.781) is greater than 0.05, the null hypothesis $H_0$2 is accepted at 0.5% level of significance. Hence, there is no significant different between Parental imposition on the choice of study among undergraduate students with regards to Nativity.

$H_0$3: There is no significant difference in parental imposition on the choice of study among undergraduate students with regard to Year of Study

Table 7. Significance of Difference in Parental Imposition on the Choice of Study among Undergraduate Students with Regard to Year of Study.

		Sum of Square	df	Mean Square	F	P	Remarks
Behavioral Expectation	Between Groups Within groups Total	20.682 279.992 300.673	24 272 296	0.862 1.029	0.837	0.688	NS
Career Aspiration	Between Groups Within groups Total	13.165 307.508 300.673	19 277 296	0.693 1.038	0.668	0.850	NS
Social Norms	Between Groups Within groups Total	14.835 305.838 300.678	17 279 296	0.873 1.025	0.852	0.632	NS
Total	Between Groups Within groups Total	45.359 255.314 300.673	44 252 296	1.031 1.013	1.018	0.449	NS

In the above table 7, shows that the p-value (=0.449) is greater than 0.05, and the null hypothesis $H_0$3 is accepted at a 0.5% level of significance. Hence, there is no significant difference between Parental imposition on the choice of study among undergraduate students with regards to the Year of Study.

Findings of the Study

Findings refer to the information that the researcher discovers or ideas that the researcher receives after doing research. Findings are the principal outcomes of a research project, what the project suggested, revealed, or indicated which refers to the totality of outcomes, rather than the conclusion or recommendation drawn from them (Campbell & Stanley, 1963). The findings for the collected data are presented below:

(i) Level of Parental imposition on the

choice of study among undergraduate students.

- Half of the male students have a low level of parental imposition on choice of study among undergraduate students with regards to sex.
- Half of the urban students have a low level of parental imposition on the choice of study among undergraduate students with regards to nativity.
- Half of the I-year students have a low level of parental imposition on the choice of study among undergraduate students with regards to year of study.

(ii) Significance difference between the Parental imposition on the choice of study among undergraduate students.

- There is no significant difference between the Parental imposition on the choice of study among undergraduate students with regards to Sex.
- There is no significant difference between Parental imposition on the choice of study among undergraduate students with regards to Nativity.
- There is no significant difference between Parental imposition on the choice of study among undergraduate students with regards to the Year of Study.

Implications

- This study found there is no significant difference in parental imposition on the choice of study with respect to gender. This suggests that gender does not influence parental imposition significantly among undergraduate students.
- There is no significant difference in parental imposition based on the nativity of the students. This implies that the nativity does not play a significant role in parental imposition levels among undergraduate students.
- Similarly, this study found there is no significant difference in parental imposition on the choice of study based on the year of study. Parental imposition levels remain relatively consistent across different years of undergraduate students.

Conclusion

The decision-making process regarding the choice of study among undergraduate students is a pivotal phase in their academic journey. This process not only significantly influences their personal and professional development but also contributes to the overall success and satisfaction of their educational pursuits. However, in many cultures and societies, parents often play a substantial role in shaping their children's academic choices, either directly or indirectly. This phenomenon is not limited to a specific region or demographic, as it is observed worldwide. According to findings, Parental imposition on choice of study among undergraduate students has no significant role with regards to sex, nativity, and year of study.

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AN INVESTIGATION INTO THE DIFFICULTIES ENCOUNTERED BY HIGHER SECONDARY STUDENTS IN LEARNING PHYSICS

*** Suresh, B ** Mathana Gopal, L**
**Research Scholar*
*** Assistant Professor in Physics, Kamaraj College, Thoothukudi*

ABSTRACT

The impact and advantages of science influence every aspect of modern society. Physics plays a crucial role in meeting the needs and wants of people in today's world, and it has also emerged as a significant human pursuit. Physics forms the foundation of all sciences. The goal of teaching physics is to acquire knowledge and skills and to achieve an understanding of the connections that link the solution to the problem. Teaching and learning physics at the higher secondary level has become increasingly intricate. Consequently, many of the principles and methods of mathematics directly apply to comprehending physics. The main focus of this study was to pinpoint the challenges that physics students encounter while learning and provide them with recommendations at the higher secondary level. The research was conducted on a sample of 200 higher secondary students in the Thoothukudi district of Tamil Nadu, India. The results indicated that higher secondary students face more advanced problems when it comes to understanding physics concepts. There was no significant variation in the difficulties experienced in learning physics based on the student's class level (Standard XI and XII) and locality, but there were noticeable differences in terms of gender.

Keywords: physics, science, learning, higher secondary

Introduction

The cultural life of modern society, a product of science, has been significantly influenced by physics. The impact of physics practically guides the thoughts, emotions, and behaviours of contemporary individuals. Studying physics leads to changes in behaviour and enhances the learner's character and personality. Physics fosters creative thinking and constructive imagination. Additionally, it is a subject that allows ideas to be tested and confirmed through experiments. Learners develop a habit of seeking the truth, which in turn influences their behaviour patterns. These skills can be applied by students to solve personal and social problems. Physics is fundamental to all sciences. The progress of physics determines the possibilities of development in a wide range of sciences.

Aim of Physics Teaching

The aim of physics teaching is the acquisition of information and skills and the attainment of an understanding of the relationship that relates the answer to the problem. The task of teaching and learning physics at the higher secondary level has become more complex. The excitement and diverse possibilities of physics must be infused into the minds of the pupils in an appropriate, interesting and dynamically evolving way. The conventional way of teaching physics is considered passive of gaining and storing a specific quantum of knowledge in the form in which it is presented. Physics teaching should emphasize processes rather than facts, such as performing experiments, taking

observations, collecting data, objectives analysis and classification of data, objectives analysis and drawing inferences. These process skills help in changing attitudes and values that make up the scientific temper among the learners. The teachers' duty will not be merely the transmission of information but more of a facilitating of learning. Physics learning provides a lot of problem-solving situations and it has a great intellectual value. It helps to develop the habit of critical observation among students. Physics helps in reporting things and events without bias. This helps in promoting intellectual honesty among students. The study of physics develops positive attitudes like open-mindedness, reasoning, weighing evidence and unbiased thinking.

Students Problems in Learning Physics at Higher Secondary Level

Students are trained to perform the experiments knowing only the 'hows' and not bothering with the 'ways' of the experiments, the main emphasis remains on carrying out the experiments as prescribed by the curriculum and obtaining the 'right result' in the process. The study of physics is concerned with how objects interact with one another when they follow specific laws, which are almost always quantitative. When studying physical systems, it becomes imperative to follow quantitative logical connections. Mathematics is the study of the laws regulating all such connections. Therefore, a great deal of mathematics' procedures and rules apply directly to the comprehension of physics. In all but the most straightforward circumstances, mathematics offers by far the most convenient means of tracing the logical relationships that emerge during the analysis of physical systems, hence physics requires the application of mathematical tools. Pupils struggle to distinguish between the various physics concepts.

Need of the Study

As they studied physics concepts, students merely committed the formulas to memory and replicated them on the answer sheet. They are able to explain the meaning of the symbols used in formulas but the students are unable to do so because they struggle to understand the abstract ideas of physics. The researcher is therefore eager to learn more about the challenges that upper secondary students face when learning physics.

Objectives of the Study

The following objectives are framed by the investigators,

1. To find out the intensity of the problems encountered by the students in learning physics concepts.
2. To find out the significant difference if any between the various groups of biographical variables in experiencing the problems of higher secondary students in learning physics concepts.
3. To give some remedial measures to solve the problems of higher secondary students in learning physics concepts.

Hypotheses of the Study

The following hypotheses were framed by the investigators for the present study,

1. The intensity of the problem encountered by the students in learning physics concepts at a higher secondary level is found to be at a high level.
2. There is no significant difference between the mean scores of boys and girls higher secondary students in respect of their problems in learning physics.
3. There is no significant difference between the mean scores of rural and urban higher secondary students with

respect to their problems in learning physics.

4. There is no significant difference between the mean scores of higher secondary students studying in the standard XI and XII standard in respect of their problems in learning physics.

Methodology

The present investigation was undertaken by using the normative survey method. The methodological details like sample, tools used, procedure of data collection, scoring procedure and statistical techniques are given below.

Sample

The sample of the present study consisted of 200 higher secondary students who are studying physics as one of the subjects in standard XI and XII at higher secondary schools situated in the Thoothukudi district of Tamil Nadu, India have been chosen through a simple random sampling technique.

Tools Used

In the current study, a questionnaire was utilized by the researcher to identify the difficulties pupils were having understanding physics ideas at the upper secondary level. The researcher created the Questionnaire for Problems in Learning Physics. There are forty items in the final version of the problem in the learning physics questionnaire. This instrument has a minimum score of 40 and a maximum score of 120. Every item on this scale has three possible answers: "greater extent," "lesser extent," and "not at all." These answers result in scores of 3, 2, and 1, respectively.

Using the split-half approach and the Spearman-Brown prophecy formula, the tool's reliability is determined to be 0.65. The researcher employed content validity in this procedure based on the judgment of the expert.

Statistical Techniques Used

In the present study, statistical techniques such as descriptive (Mean and Standard Deviation) and differential analysis (‘t’ test) were used.

Analysis and Interpretation

Table 1. Percentage Scores of Higher Secondary Students in Experiencing Problems in Learning Physics Concepts

Category	Maximum Score	Obtained Score	Percentage
Overall	16123	20000	80.62

Table 1 shows that 80.62% of pupils had difficulty in understanding physics concepts at the upper secondary level. Therefore, it can be concluded that the majority of students experience difficulties as a result of the subject matter being below their comprehension level.

Table 2. Difference between the Mean Scores of Problems in Learning Physics of Boys and Girls Higher Secondary Students

Gender	N	Mean	SD	Calculated ‘t’ value	Level of Significance
Boys	148	95.56	13.56	4.56	Significant at 5% level
Girls	52	104.99	14.52		

Table 2 shows that, at the 0.05 level of significance, the obtained "t" value of the higher secondary pupils, with respect to gender, is greater than the table value. When studying physics ideas at the upper secondary level, boys and girls score differently on average when it comes to experiencing difficulties. Consequently, it can be concluded that girls encounter more physics-related problems than boys do.

Table 3.Difference between the Mean Scores of Problems in Learning Physics of Rural and Urban Higher Secondary

Students

Locale	N	Mean	SD	Calculated 't' value	Level of Significance
Rural	89	96.523	14.625	0.0598	Not Significant
Urban	111	98.248	17.659		

Table 3. shows that, at the 0.05 level of significance, the higher secondary students' acquired "t" values in relation to their location are smaller than the table value 1.96. Therefore, there is no significant difference in the mean scores of students from rural and urban areas when it comes to encountering difficulties when learning physics ideas. Therefore, it can be concluded that students studying in both urban and rural settings have similar difficulties in understanding physics ideas.

Table 4.Difference between the Mean Scores of Problems in Learning Physics of Higher Secondary Students

Class	N	Mean	SD	Calculated 't' value	Level of Significance
XI Standard	65	98.40	14.214	0.8259	Not Significant
XII Standard	135	96.514	14.78		

Table-4 reveals that the obtained 't' value of the higher secondary students is less than the critical value of 1.96 at the 0.05 level of significance. There is no significant difference between the mean scores of standard XI and standard XII students in the experience of problems when learning physics concepts. Hence, it can be inferred that the students of standard XI and standard XII are experiencing problems in learning physics concepts.

Findings of the Study

1. Learning physics concepts in a classroom environment is problematic for 80.95% of higher secondary students.
2. Higher secondary students experience significant differences in the way they experience problems when learning physics concepts, depending on their gender. The problems faced by girls in learning physics concepts are greater than those faced by boys. Higher secondary students have similar experiences.
3. Problems arise when learning physics concepts in terms of their location and class. Rural and urban students face problems in learning physics concepts are found to be equal and also the students of standard XI and standard XII are experiencing problems in learning physics concepts are found to be equal.

Educational Implications and Suggestions

1. The goal of a physics teacher is to cultivate in their students a favourable attitude toward learning physics, as well as interests and study habits.
2. When teaching physics, teachers should build strong relationships with their students and create a democratic learning atmosphere. Thus, it will enhance students' psychological capacity to learn.
3. Provides a sufficient opportunity to foster problem-solving skills and mathematics-based applications for more complex and abstract concepts in physics.
4. P.G. Physics teachers must instill in their students a basic understanding of physics by creating basic models, flow charts, and three-dimensional images of the numerous tools utilized in the field.
5. Using straightforward instruments for assessing the data utilized in issues, teachers can spark students' creative curiosity. When teaching physics, the instructor makes connections and associations with actual natural processes.
6. To keep current with the latest teaching techniques and make physics easier to

learn, teachers must complete in-service training.

Conclusion

The results of this inquiry showed that higher secondary pupils had a very poor achievement level due to their high levels of difficulty acquiring physics concepts. All of these issues are taken into consideration from the perspectives of the teacher and the student. Students studying physics should have fewer difficulties in the most appropriate and practical ways. Furthermore, teachers should be very concerned about each individual student during class activities. They also need to be aware of the true issues that students are facing because this will help to lessen those issues and boost student efficiency.

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PALAYAMKOTTAI-627002.

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Sl. No	Name and Designation	Area of expertise
1.	Rev.Dr.L.Vasanthi Medona Principal Mobile : 9442075912 Mail Id : vasanthimedona@gmail.com	Mathematics Education Educational Statistics Educational Administration Special Education
2.	Dr.M.Maria Saroja Research Director, IQAC Coordinator & Associate Professor of Biological Science Mobile : 9488662905 Mail Id : shaanmaria@gmail.com	Guidance and Counselling Biological Science Education
3.	Dr.E.C.Punitha Dean & Associate Professor of English Mobile : 9443583079 Mail Id : elcpunitha@gmail.com	English Language Education
4.	Dr.N.Theresita Shanthi Assistant Professor of Physical Science Mobile : 9486225033 Mail Id : navisk506@gmail.com	Physical Science Education Advanced Educational Psychology Special Education
5.	Dr.R.Indra Mary Ezhilselvi Controller of Examinations & Assistant Professor of Psychology Mobile : 9442394778 Mail Id : indraezhilselve@gmail.com	Educational Psychology
6.	Dr.A.Jeya Sudha Vice-Principal & Assistant Professor of History Mobile : 9486528506 Mail Id : jeyasudha@gmail.com	History Education Sociological Perspectives of Education
7.	Dr.J.Maria Prema M.Ed. Coordinator & Assistant Professor of Education Mobile : 9894689732 Mail Id : jmariaprema@gmail.com	Educational Philosophy Sociological Perspectives of Education
8	Sr.L.Arul Suganthi Agnes Assistant Professor of Education Mobile : 8610541303 Mail Id : sugaagnes11@gmail.com	Women Empowerment Philosophical Sociological Perspectives of Education