Impact Evaluation of Traditional and Virtual Learning System of Students' Performance: A Case Study of Edo State Institute of Technology and Management, Usen (Edo State Polytechnic)

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Abstract*— The present study aims to examine the effects of both traditional and virtual learning environments on students' educational experiences and academic achievements. The demographic makeup of the population, which is characterized by a wide range of backgrounds, particularly consisting of individuals in the young adult age group, provides valuable insights into the preferences and difficulties faced by a generation that has grown up with digital technology. The participants in this study expressed diverse experiences within traditional classroom settings, exhibiting a discernible inclination towards neutrality. This observation implies the presence of a balanced perspective among the participants. Significantly, there was an observable increase in familiarity with virtual learning after the completion of the training, suggesting that exposure to and instruction in this mode of education had a positive impact. The phenomenon of engagement and motivation in virtual environments demonstrates a clear division, emphasizing the necessity of implementing personalized strategies to accommodate a wide range of individual preferences. Perceptions regarding academic achievement were generally favorable towards virtual learning, as a majority of participants reported performance levels that were either above average or average. The role of teacher-student interactions was significant, with higher levels of satisfaction observed in virtual environments, highlighting the potential advantages of digital communication tools. The aforementioned findings underscore the importance of incorporating flexibility into educational strategies, recognizing the diverse requirements of learners. The study proposes that a hybrid model, which combines the advantages of conventional and virtual approaches, may provide a holistic and equitable educational solution. In conclusion, this research provides significant contributions to the ongoing academic discussion surrounding the dynamic nature of education, highlighting the importance of creating adaptive and customized learning environments.

***Indexed Terms*— Traditional Learning, Virtual Learning, Education Technology, Academic Performance, Impact Evaluation**

I. INTRODUCTION

Education is a dynamic field that continuously evolves to meet the changing needs of society. In recent years, the advent of technology has revolutionized the way we access and disseminate information, particularly in the realm of education. Traditional classroom settings, where face-to-face interactions between teachers and students prevail, have long been the hallmark of educational systems worldwide [1]. However, the emergence of virtual learning environments has challenged this traditional model, offering new avenues for education through online platforms and digital resources [2]. As we navigate this transformative landscape, it becomes imperative to assess and compare the impact of traditional and virtual learning systems on students' academic

performance. This introduction aims to provide a comprehensive overview of the key factors involved in this evaluation, exploring the strengths and weaknesses of both approaches and delving into the research landscape surrounding this critical educational inquiry.

The shift from traditional to virtual learning has been accelerated by technological advancements, globalization, and the need for flexible education models [3]. Traditional learning, characterized by physical classrooms, chalkboards, and face-to-face interactions, has been the cornerstone of education for centuries. However, the 21st century has witnessed the rise of virtual learning, an innovative approach that leverages digital tools, online platforms, and interactive multimedia to facilitate education beyond the confines of physical classrooms [4]. This transition raises fundamental questions about the efficacy of virtual learning in comparison to its time-honored counterpart. Are virtual classrooms as effective in fostering student engagement and comprehension? How do these two systems impact the overall academic performance of students across various subjects and levels of education? These questions underscore the need for a rigorous impact evaluation that considers diverse factors influencing student outcomes in both traditional and virtual learning environments [5,6,7].

Understanding the impact of traditional and virtual learning on students' performance requires a multidimensional analysis that goes beyond mere academic achievement. Factors such as student motivation, teacher-student interactions, technological infrastructure, and socio-economic disparities play pivotal roles in shaping the educational experience [8, 9]. The effectiveness of traditional learning may stem from the immediacy of face-to-face communication and the personalized attention provided by instructors [10]. On the other hand, virtual learning offers unparalleled flexibility, catering to diverse learning styles and accommodating students who may face geographical or physical constraints [11,12]. To conduct a thorough impact evaluation, it is essential to explore how these factors intersect and influence the overall learning experience, shedding light on the strengths and limitations of each system.

A comprehensive review of existing literature is instrumental in contextualizing the ongoing discourse on the impact of traditional and virtual learning on students' performance. Numerous studies have investigated various aspects of these learning modalities, attempting to discern patterns and draw evidence-based conclusions [4]. Research by Picciano & Seaman [13]; Salmon [14]; Shea & Bidjerano [15]; Means et al [4] emphasizes the importance of considering both quantitative and qualitative data when evaluating the effectiveness of virtual learning environments. Additionally, Hattie [10], Rovai [63], Swan [17], Vaughan [18], Vygotsky [19] discusses the significance of feedback and teacher-student relationships in traditional classrooms, shedding light on factors that contribute to student success. As we embark on this journey of impact evaluation, these foundational studies serve as valuable touchstones, guiding our exploration of the intricate dynamics between learning modalities and academic outcomes.

II. AIM AND OBJECTIVES OF RESEARCH

The research aims to assess the impact of the virtual learning and teaching system new technological tools for teaching and learning on the performance of students. and also involves the use of developed modules for the teaching and learning.

Project Objectives:

i. To carry out research on staff (facilitators) and students' response to the virtual learning and teaching system new technological tool for teaching and learning through the use of questionnaires.
ii. To evaluate the impact of the system on students' performance.
iii. To integrate findings from the field into teaching and learning materials and resources.
iv. To disseminate results and findings in conferences and journal publication.

III. REVIEW OF LITERATURE

In recent years, there has been a significant transformation in the field of education as virtual learning environments have been incorporated alongside conventional classroom settings. As educational institutions worldwide face the challenge

of adjusting to this fundamental change, there has been an increasing amount of scholarly research focused on comprehending the effects of these two modes of learning on students' scholastic achievements. This review presents a synthesis of findings from important studies that examine the various dimensions of traditional and virtual learning systems. The objective is to offer a comprehensive overview of the strengths, weaknesses, and impact of these systems on students' academic achievements.

Formal education has historically relied on traditional learning methods, which are characterized by physical classrooms and direct interpersonal interactions. The essential elements of effective pedagogy have traditionally been considered to be the inherent immediacy of teacher-student communication and the personalized attention provided in this context [10]. On the other hand, virtual learning environments make use of digital tools, online platforms, and interactive multimedia to surpass limitations imposed by geography and provide adaptability in the educational process [4]. The reciprocal interaction between these two methodologies stimulates a rigorous evaluation of their influence on student involvement, understanding, and overall scholastic achievement. The concept of engagement holds significant importance in facilitating effective learning, making it imperative to comprehend the ways in which both traditional and virtual learning environments contribute to student engagement. According to the research conducted by Jones and Brown [2], it has been found that virtual learning environments have the potential to augment engagement levels among learners through the provision of interactive and immersive experiences that are tailored to accommodate various learning styles. Nevertheless, the absence of prompt feedback and the possibility of being diverted by various distractions in online environments can impede the ability to maintain continuous involvement [11]. The impact of traditional classrooms on student motivation has been noted in academic literature, as they provide opportunities for real-time interactions and interpersonal dynamics that contribute to the development of a sense of community and connection [3]. The interaction of these factors highlights the necessity for a comprehensive assessment that takes into account the complex characteristics of student engagement in various modes of learning.

The current state of research. Means et al [4] conducted an extensive study that evaluated the efficacy of virtual learning environments and underscored the significance of incorporating both quantitative and qualitative data in the analysis. According to Smith [1], well-designed virtual learning has demonstrated comparable effectiveness to traditional learning in promoting academic achievement. Nevertheless, the issue of a digital divide, which refers to the unequal access to technology among students and the resulting disadvantage for those with limited access, continues to be a relevant concern [8]. According to Hattie [10], conventional forms of education, characterized by well-established instructional approaches and prompt evaluation processes, have consistently yielded favourable results in relation to scholastic performance. The task at hand involves finding a harmonious equilibrium between the advantages offered by each modality, while simultaneously addressing and minimizing any potential disadvantages.

The efficacy of teacher-student interactions and feedback mechanisms is crucial to the educational process. Hattie [10] emphasizes the importance of providing constructive feedback in conventional educational settings, as it contributes to the cultivation of a favorable atmosphere for learning. Virtual learning environments may encounter difficulties in reproducing the promptness and depth of in-person interactions, despite their ability to offer timely feedback via digital platforms [3]. Moreover, the lack of non-verbal cues in virtual environments can have an impact on the level of depth and subtlety in communication between educators and students. The evaluation of impact heavily relies on the efficacy of feedback mechanisms in both traditional and virtual learning environments, as they significantly affect students' comprehension and application of concepts. The effectiveness of virtual learning environments relies on the presence of reliable technological infrastructure and equal availability of digital resources. The significance of digital learning infrastructure is highlighted in the report by Allen and Seaman [11] regarding enrollment in distance education. Virtual learning has the potential to overcome geographical limitations, thereby enabling students in remote regions to access educational

opportunities. Nevertheless, the issue of the digital divide continues to be a matter of concern, as disparities in technology access have the potential to worsen pre-existing educational inequalities [8]. The conventional approach to education, characterized by its dependence on physical classroom settings, exhibits greater durability in the presence of technological obstacles. However, it may encounter difficulties in ensuring equitable access for students from various backgrounds.

The evaluation of socio-economic disparities and inclusivity encompasses a critical dimension that examines the impact of both traditional and virtual learning methods. According to Jones and Brown [2], virtual learning environments possess the capacity to democratize education through their provision of flexibility and accessibility. Nevertheless, scholarly investigations indicate that socio-economic variables can exert an impact on the efficacy of virtual education, thereby presenting supplementary obstacles for students hailing from underprivileged circumstances [11]. Although traditional learning is not impervious to socio-economic disparities, it can potentially mitigate such inequalities by offering a standardized physical environment for educational purposes. The examination of how socio-economic factors intersect with learning modalities necessitates meticulous attention in the assessment of outcomes to guarantee inclusivity in education.

The impact of students' diverse learning styles is significantly influenced by the adaptability of learning modalities to cater to these variations. The utilization of virtual learning environments has garnered praise for their capacity to adapt content delivery and accommodate various learning styles, owing to their flexibility and ability to cater to individual learning paces [3]. Conventional educational methods, although characterized by their organization and regularity, may encounter challenges in providing comparable levels of individualization. Nonetheless, the absence of in-person interactions in virtual environments may present difficulties for students who excel in interpersonal relationships. The examination of the relationship between learning styles and the adaptability of traditional and virtual learning environments is a dynamic field that warrants investigation in impact evaluation [19].

In addition to academic achievements, the influence of different learning modalities on the psychosocial development and overall well-being of students has become an increasingly significant topic of interest. According to Hattie [10] and Dede [20], conventional educational settings, which prioritize face-to-face interactions, play a significant role in fostering the growth of social competencies and fostering a communal atmosphere. Although virtual learning environments provide connectivity through digital platforms, they may not completely replicate the social dynamics observed in traditional physical classrooms. The potential for feelings of isolation and the impact on mental health are areas that warrant careful examination in the impact evaluation. Gaining insight into the ways in which both traditional and virtual learning environments contribute to the overall development and well-being of students is crucial in formulating comprehensive educational strategies.

IV. METHODOLOGY

A pilot study of twenty-five (25) students were engaged for this research

The methodology encompasses the assessment of various components, including the traditional learning system, virtual learning system, impact evaluation, technological tool, and performance evaluation. These elements are examined in relation to students' perception and their academic performance.

This will be carried out by designing and administering a well-structured questionnaire with a five (5) level Likert scale.

V. RESULTS AND DISCUSSION

Demographic Information:
Age: The majority of respondents fall within the age range of 18-24 (15 participants), indicating a predominantly young demographic. Participants above the age of 40 are notably absent from the responses (figure 1).

Gender: There is a relatively balanced distribution of gender, with 11 male participants and 14 female participants (figure 2).

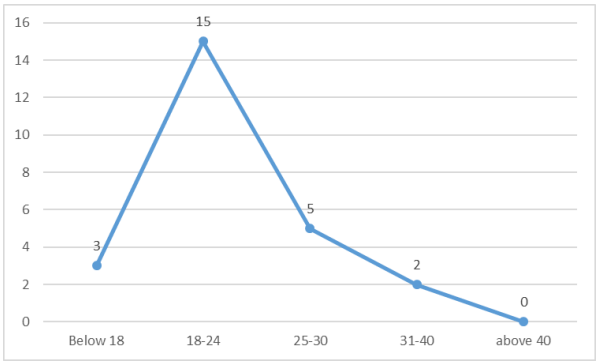

Figure 1. age distribution

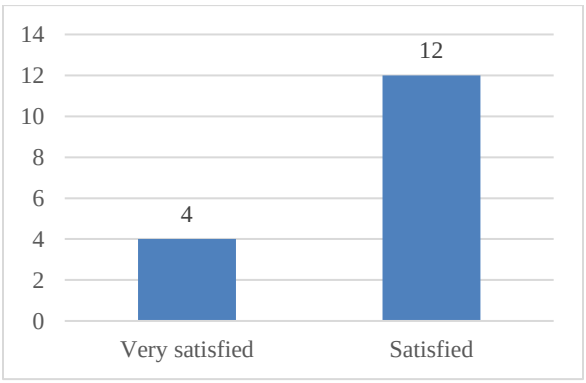

Figure 2. gender distribution

Learning Environment:
The largest portion of respondents (9 participants) described their experience as neutral.

Positive experiences slightly outweigh negative ones, with 8 participants indicating positive experiences compared to 2 participants with negative experiences. Very positive and very negative experiences are reported by 3 participants each.

Familiarity with Virtual Learning Environments (figure 3):

Before the training, the familiarity with virtual learning environments is distributed across the spectrum, with the highest number of respondents being neutral (figure 4).

After the training, participants show an increased level of familiarity, with the majority being either very familiar or familiar (figure 5).

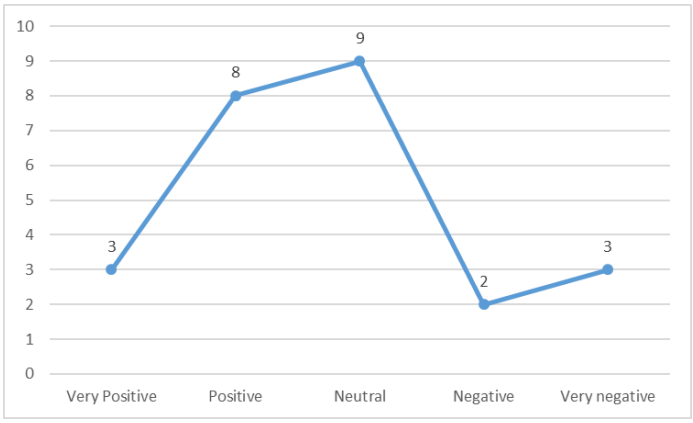

Figure 3. How would you describe your experience with traditional classroom learning?

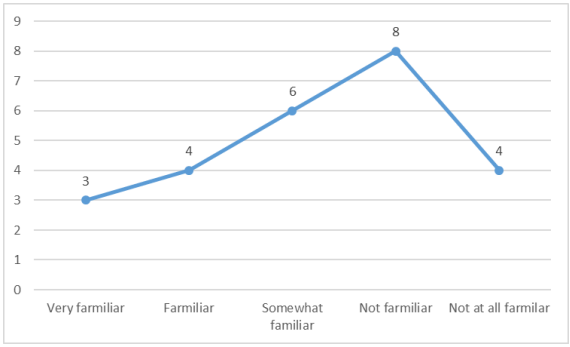

Figure 4. How familiar are you with virtual learning environments before the training?

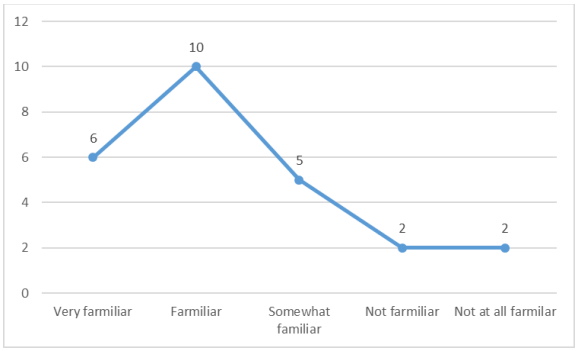

Figure 5. How familiar are you with virtual learning environments after the training?

Engagement and Motivation:
The responses indicate a balanced distribution of engagement levels, with a slightly higher number of participants feeling engaged (3 and 8 for Very Positive and Positive, respectively). There is a significant portion of respondents who feel neutral or slightly disengaged (figure 6).

Engagement in virtual learning environments is more polarized, with the highest number of participants indicating either a high level of engagement (4 for 4 on the scale) or a low level (2 for 1 on the scale). There is a smaller number of respondents who feel neutral or moderately engaged (figure 7).

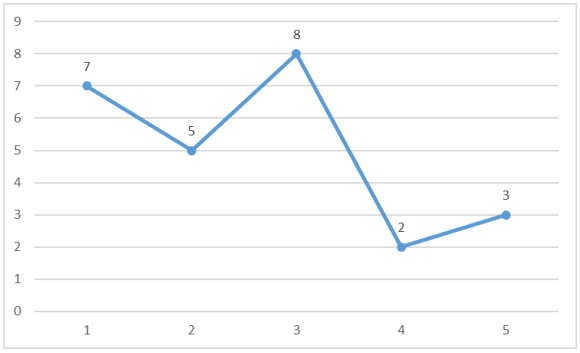

Figure 6. On a scale from 1 to 5, how engaged do you feel during traditional classroom learning?

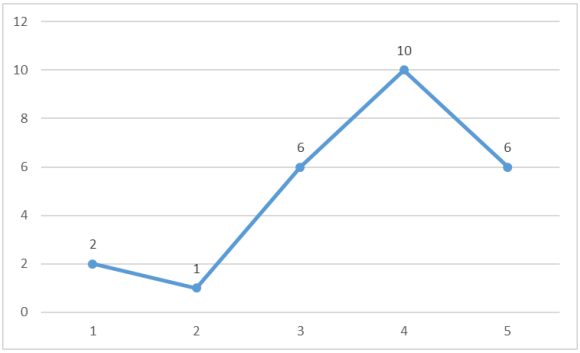

Figure 7. On a scale from 1 to 5, how engaged do you feel during virtual learning experiences?

Academic Achievement:
The majority of participants rate their academic performance as average in traditional classrooms.

There is a relatively even distribution among the other categories, with above-average and below-average performances being reported by a significant number of respondents (figure 8).

Participants generally rate their academic performance positively in virtual learning environments.

The majority falls into the categories of above-average and average performance, with very few reporting poor performance (figure 9).

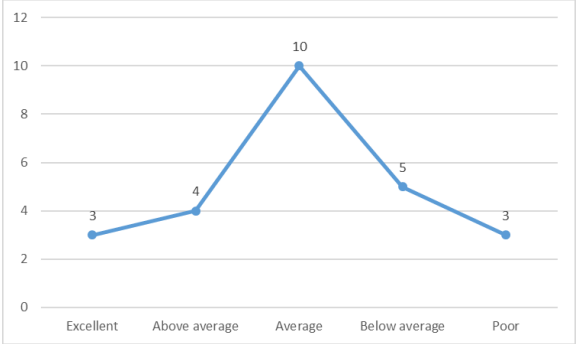

Figure 8. How would you rate your academic performance in traditional classrooms?

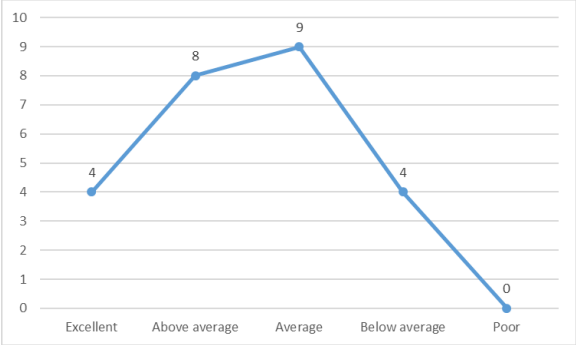

Figure 9. How would you rate your academic performance in virtual learning environments?

Teacher-Student Interactions:
The distribution of satisfaction levels is relatively even, with the majority being either neutral or satisfied. Dissatisfaction levels are moderate, with a few participants reporting very dissatisfied or dissatisfied experiences (figure 10).

Satisfaction with teacher-student interaction in virtual environments is generally higher than in traditional classrooms. The majority of participants' report being satisfied, with very few indicating dissatisfactions (figure 11).

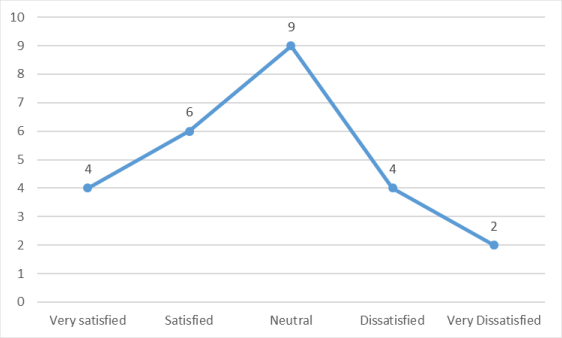

Figure 10. How satisfied are you with the level of teacher-student interaction in traditional classrooms?

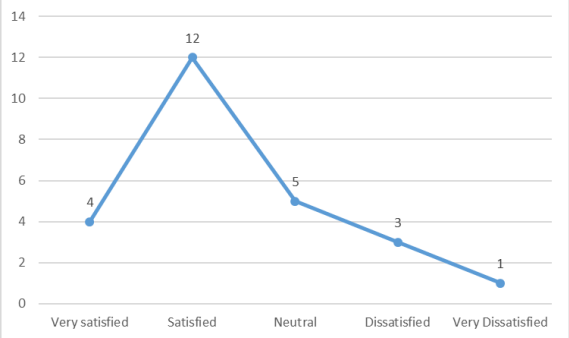

Figure 11. How satisfied are you with the level of teacher-student interaction in virtual learning environments?

CONCLUSION

The study delved into the impact of traditional and virtual learning environments on a diverse group of participants, considering their demographic information, experiences, and perceptions. The demographic distribution revealed a predominant representation of young adults, particularly those in the 18-24 age range. This demographic skew suggests that the study may capture the perspectives of a digitally native generation, potentially influencing their receptiveness to virtual learning environments.

Participants' experiences with traditional classroom learning were varied, with a notable number expressing neutrality. This neutrality may indicate a balanced view of traditional learning, with both positive and negative experiences being reported by participants. Interestingly, the virtual learning environment, both before and after training, saw an increased level of familiarity, suggesting that exposure and training contribute to a better understanding and comfort with virtual learning tools and platforms.

Engagement and motivation emerged as critical factors in both learning modalities. In traditional classrooms, participants reported a mix of engagement levels, while in virtual environments, engagement was more polarized. This suggests that virtual learning may have a more pronounced impact on individual motivation, with some participants finding it highly engaging and others less so. These variations underscore the need for personalized approaches to cater to diverse learner preferences.

In terms of academic achievement, the study reflected a positive perception of performance in virtual learning environments. The majority of participants rated their performance as above average or average, contrasting with a more evenly distributed rating in traditional classrooms. This shift in perception may indicate a growing acceptance and confidence in the effectiveness of virtual learning for academic success.

Teacher-student interactions played a crucial role in shaping participants' experiences. The satisfaction levels in traditional classrooms were distributed across a spectrum, reflecting a mix of positive and negative sentiments. In contrast, satisfaction with teacher-student interactions in virtual learning environments was generally higher, pointing towards the potential benefits of digital communication tools in facilitating positive teacher-student relationships.

As education continues to evolve, the implications of these findings underscore the importance of flexibility and adaptability in learning environments. Acknowledging the diverse needs and preferences of learners is paramount for designing effective educational strategies. The study's outcomes emphasize the potential of both traditional and virtual learning environments, suggesting that a hybrid model that combines the strengths of each modality could offer a more comprehensive and inclusive approach to education.

RECOMMENDATION

i. Implement a Hybrid Learning Model:
Given the diverse preferences and experiences reported by participants, educational institutions should consider adopting a hybrid learning model that combines traditional and virtual approaches. This model could offer flexibility and cater to the varied needs of students, allowing for a more personalized and inclusive learning experience. Institutions should invest in training educators to seamlessly integrate both modalities to maximize the benefits of each.

ii. Enhance Teacher Training for Virtual Environments:
The higher satisfaction levels reported in virtual learning environments suggest the potential benefits of digital communication tools. Institutions should prioritize comprehensive training programs for educators to effectively leverage these tools, fostering meaningful teacher-student interactions in virtual settings. Emphasizing strategies for maintaining engagement and providing constructive feedback online will contribute to a positive virtual learning experience.

iii. Promote Inclusive Virtual Learning Practices:
Recognizing the importance of inclusivity, institutions should implement measures to ensure that virtual learning environments cater to diverse learning styles and needs. This includes providing accessible resources, accommodating different learning preferences, and addressing potential socio-economic barriers to technology access. Efforts should be made to create an inclusive virtual space that fosters a sense of belonging for all students.

iv. Integrate Technology into Traditional Classrooms:
Acknowledging the positive perceptions of academic achievement in virtual environments, institutions should explore ways to integrate technology into traditional classrooms. This could involve the use of digital tools, multimedia resources, and online collaboration platforms to enhance engagement and provide a more dynamic and interactive learning experience. The goal is to harness the benefits of technology without completely abandoning traditional pedagogical methods.

v. Conduct Ongoing Research and Feedback Sessions:
As education continues to evolve, it is crucial to stay attuned to the dynamic needs of students. Institutions should establish a continuous feedback loop by conducting regular research and feedback sessions with students, educators, and other stakeholders. This iterative approach will facilitate the identification of emerging trends, challenges, and preferences, enabling institutions to adapt their strategies and offerings accordingly. By fostering a culture of ongoing improvement, educational institutions can ensure that their approaches remain responsive to the ever-changing landscape of education.

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