Examining students' perceptions of online and HyFlex teaching modalities and their influence on learning engagement at University X

Navin Imbova Mackatiani[1*]
Eunice Majanga[2]
Benard Amwayi[3]

[1*] mackatianinavin@gmail.com
[2]ekanaga@mmust.ac.ke
[3]amwayibernard@yahoo.com

[1,2,3]Masinde Muliro University of Science and Technology, Kenya

https://doi.org/10.51867/ajernet.7.4.42

ABSTRACT

The COVID-19 pandemic drastically changed Higher Education, and universities around the world had to implement online teaching and HyFlex teaching methods urgently. The study considers students' perception of these modalities and how they affect their engagement in learning at University X, which is a major public institution in Kenya. This study examines the online and HyFlex teaching modes on students' behavioral, emotional, cognitive, and social engagement based on the Technology Acceptance Model (TAM), which suggests that perceived ease of use and perceived usefulness drive technology adoption. Both qualitative and quantitative data collection methods were used: structured surveys, semi-structured interviews, and focus group discussions. The study focused on 312 undergraduate students, 31 lecturers, and 10 academic administrators. Participants were selected using purposive sampling for those who had direct experience with online and HyFlex courses, and Slovin's formula was used to calculate the sample size for the students. Descriptive statistics were used to analyze survey responses, and thematic analysis was used to analyze qualitative data. The findings show that both online and HyFlex are seen as valued for their flexibility, but that HyFlex teaching (which combines in-person and online learning) leads to greater engagement than online-only teaching in all three areas. Technology infrastructure, internet connection, and lecturer preparation were determined to have a significant impact on the students' engagement. The study shows that HyFlex teaching is more effective in engaging students than only online teaching and concludes that University X should invest in digital infrastructure, offer more training for lecturers, and increase the usage of HyFlex teaching in other Faculties to cater to diverse student learning needs.

Keywords: COVID-19, Higher Education, HyFlex Teaching, Kenya, Learning Modalities, Online Learning, Slovin's Formula, Student Perception, Technology Acceptance Model (TAM), Technology Integration

I. INTRODUCTION

The COVID-19 pandemic has caused a profound shift in the global education landscape, prompting institutions to change their approach to teaching and learning and implement alternative methods to continue education. The physical campuses were closed, and universities around the world adopted online and hybrid-based teaching practices, such as the "HyFlex" model (Barr & Luo, 2024; Beatty, 2019), that combine face-to-face and online elements. Access to digital technologies in education was already limited in Sub-Saharan Africa before the pandemic, and this was especially critical during the pandemic (Akala, 2021; Mwaniki et al., 2020). Kenya's universities have encountered a number of challenges, including a lack of infrastructure, digital literacy among students and staff, as well as limited access to devices and internet connectivity (Mwaniki et al., 2020). While some of these challenges can be overcome, the transition to online and HyFlex learning has also provided new opportunities for improving educational accessibility, engagement, and flexibility.

The HyFlex model will provide students with the option to attend in person, attend virtually synchronously, or attend virtually asynchronously, making it a very flexible teaching method (Beatty, 2019). The introduction of online learning technologies has been found to have a positive effect on student engagement, motivation, and satisfaction, but the impact of these modalities is dependent on various factors such as the quality of content delivery, infrastructure, and teacher training (Barr & Luo, 2024; Kohnke & Moorhouse, 2021). Research from all over the globe indicates that online learning spaces can be used to support fostered cognitive engagement through self-paced learning, but they do not replace the importance of face-to-face interactions to provide social and emotional connections that contribute to academic success (Bowers & Kumar, 2015; Joji, 2022).

The move to online and HyFlex learning has been received with enthusiasm and resistance in Kenya. Some students and lecturers prefer these modalities for their flexibility, but some have trouble with connectivity and lack

Licensed Under Creative Commons Attribution (CC BY-NC)

proper training (Akala, 2021; Mwaniki et al., 2020). The COVID-19 pandemic underscored the importance of fostering more inclusive and sustainable educational practices, particularly for institutions operating in limited-resource areas (Akala, 2021; Mwaniki et al., 2020). This study is aimed at investigating the effect of online and HyFlex teaching modalities on student engagement at the University X, a leading public university in Kenya. This research aims to understand the impact of these teaching strategies on the behavioral, emotional, cognitive, and social commitment and to evaluate their students' perception of their effectiveness in improving learning outcomes.

Universities need to understand the factors that influence student engagement in online and HyFlex learning settings as they continue to explore and refine their teaching strategies to equip themselves best to enhance successful educational outcomes. This study is one of the many studies that are currently available on online and hybrid learning modalities, especially in Sub-Saharan Africa, and seeks to contribute to the knowledge in this area so as to get insights that can be used to inform future educational policies and practices at University X and beyond (Akala, 2021; Mwaniki et al., 2020).

1.1 Statement of the Problem

The COVID-19 pandemic disrupted traditional modes of education across the globe, forcing universities to quickly transition to online and hybrid learning modalities to ensure the continuity of education. Online learning has its advantages of flexibility and accessibility, but also has its drawbacks, especially in less well-developed technological areas like Sub-Saharan Africa. There has been a growing trend of universities in Kenya that are shifting to online or hybrid-flexible (HyFlex) teaching and learning, as students can choose to attend courses in person or online (synchronously or asynchronously). Although there are benefits that can be derived from these modalities, there are questions that need to be answered, particularly in relation to the effectiveness of these modalities in engaging students, especially in public universities such as University X.

Research indicates that there are a number of different aspects of student engagement that can be influenced by online and HyFlex learning environments, including behavioral, emotional, cognitive, and social engagement (Barr & Luo, 2024; Beatty, 2019). The efficacy of these, however, is not clear, especially in Kenyan universities, where some factors, such as lack of internet connectivity, devices, and lack of training of teachers, are still a big hurdle in improving engagement of students (Mwaniki et al., 2020). Some students and faculty members are pleased with the online and HyFlex learning opportunities. In contrast, others have reported that they are experiencing barriers to full participation and engagement in the online learning experience that can impact learning outcomes.

This study aims to fill the void in the literature regarding the effects of the online and HyFlex teaching modalities on student engagement within the context of University X and their behavioral, emotional, cognitive, and social engagement. Also, to look into the factors that could make these teaching ideas succeed or fail, and make evidence-based suggestions for better teaching and learning at University X and other similar universities in Kenya. The study seeks to provide valuable inputs on the effectiveness of online and HyFlex teaching methods in higher education in Kenya by looking at both students' perception and performance.

1.2 Research Objective

To examine students' perception of online and hyflex teaching modalities on learning engagement at University X

1.3 Research Question

How do students perceive online and hyflex teaching modalities on their learning engagement at University X?

II. LITERATURE REVIEW

2.1 Theoretical Review

This study's theoretical approach is grounded in significant educational theories and models that examine how technology affects student engagement in an online and HyFlex teaching setting. One central theory that is used is the Technology Acceptance Model (TAM) developed by Davis (1989), which states that perceived ease of use and perceived usefulness of the technology have a significant impact on users' acceptance and use of the technology. For the purposes of higher education, TAM can aid in understanding the reasons for students and professors to choose online and HyFlex teaching methods. If these modalities are perceived as easy to use and learnt to be useful to their students, they are more likely to actively and persistently engage in the learning process (Ajzen & Fishbein, 1980; Davis, 1989).

Another framework that applies is that of the Community of Inquiry (CoI), which offers a theoretical framework for examining the students' experience of social, cognitive, and teaching presence in online and HyFlex learning environments (Garrison et al., 2001). CoI highlights the importance of these three presences in creating a sense of belonging, motivation, and engagement in an online learning space that allows meaningful learning to happen. The CoI framework is particularly helpful in the context of HyFlex courses, which combine in-person and

Licensed Under Creative Commons Attribution (CC BY-NC)

online learning experiences, as it allows for an analysis of the ways in which CoI are manifested across both types of learning and affect student engagement.

Besides, Self-Determination Theory (SDT) (Deci & Ryan, 1985) offers important clues to the intrinsic and extrinsic factors that can affect student engagement. SDT highlights the importance of autonomy, competence, and relatedness as three psychological needs that are crucial to developing intrinsic motivation and deep engagement. These factors are significant when considering the manner in which students interact with the content, instructors, and fellow students in the setting of HyFlex and online learning. Finally, the Transformative Learning Theory (Mezirow, 1997) can be used to explain how the online and HyFlex learning modalities empower students to engage in critical reflection on their learning experiences and to shift their thinking. Such a theory is important when trying to understand how these modalities can aid students in learning how to think critically and adjust to new learning settings.

2.2 Empirical Review

The empirical research evidence related to the effectiveness of online and HyFlex teaching modalities reflects both the advantages and disadvantages of these methods for student engagement and learning outcomes. These modalities were widely studied during the COVID-19 pandemic, offering insight into their rapid adoption and adaptation during the crisis. Adedoyin and Soykan (2023) found that online learning increased flexibility but also created challenges related to accessibility, engagement, and teaching quality. Similarly, Dhawan (2020) found that online platforms could support content delivery, while reduced social interaction remained an important limitation for emotional and social engagement.

The success of HyFlex learning for its flexibility has been acknowledged. Barr and Luo (2024) conducted a study that revealed that students in HyFlex courses reported higher levels of engagement than those in online-only courses. HyFlex courses offer students the opportunity to attend in-person sessions whenever feasible, improving behavioral engagement and social interaction, or attend virtually when Logistics and/or Health may be an issue. However, while there are benefits to HyFlex learning, there are also a number of challenges. Buckley et al. (2024) noted that technical problems with the infrastructure, including internet connectivity and device availability, are common among students in HyFlex courses that may impact engagement. In addition, faculty may find that they have less time to interact with both the traditional classroom and online students at the same time, which can cause them to pay less attention to online students and have less engagement with them (Kohnke & Moorhouse, 2021).

Support for students and faculty in online and HyFlex settings is also highlighted in the literature. Kohnke and Moorhouse (2021) showed that effective HyFlex implementation requires lecturers to manage interaction across face-to-face and online participation. Similarly, Mwaniki et al. (2020) found that institutional support, including technical assistance and staff preparation, is important for successful technology-mediated learning in Kenyan universities. Barr and Luo (2024) further showed that course design and instructional strategies shape participation in HyFlex settings. Interactive elements such as real-time discussion, collaborative activities, and peer engagement are therefore important for sustaining cognitive, emotional, and social engagement (Bowers & Kumar, 2015).

To sum up, the empirical literature indicates that online/hyflex teaching modalities can be effective in improving student engagement, especially if they are well-designed and enabled by sufficient resources. Despite the potential benefits, there are certain obstacles that need to be overcome, including technological difficulties, teacher readiness, and social isolation, to make the most of these teaching methods. The studies examined offer a background on the factors affecting students' engagement in online and HyFlex courses and highlight the need to address these issues to ensure effective teaching and learning.

III. METHODOLOGY

3.1 Research Design

A correlational research design was used in this study to examine the relationships between the online and the use of HyFlex teaching modalities in relation to student engagement. It is a design wherein relationships between independent (teaching modality) and dependent (student engagement) variables are analyzed without the manipulation of the variables; the study emphasizes real-life relationships. The purpose of this study was to evaluate the impact of the various teaching modalities on different dimensions of student engagement and to identify what factors will help or hinder engagement in online and HyFlex settings.

3.2 Study Area

The study was carried out at University X, a premier public university in Kenya with a diverse student body and having implemented teaching modalities such as online learning and Hyflex learning early on. The university is located in an area that has different degrees of access to digital technologies, both as a challenge and an opportunity for their implementation in the classroom. The University X has a variety of academic programs, which makes it a

Licensed Under Creative Commons Attribution (CC BY-NC)

valuable case study to explore the impact of online and HyFlex modalities on student engagement in different faculties. COVID-19 has forced the shift to online and HyFlex teaching, thus underscoring the importance of flexible and accessible learning in higher education.

3.3 Target Population

Students, lecturers, and academic administrators from University X were chosen for this study. These groups included students who are directly involved in the online and HyFlex teaching modalities. Given the use of online or HyFlex delivery methods for undergraduate courses, these students were the primary group to be interested in understanding student engagement. Lecturers were included because they play a key role in implementing and delivering these teaching modalities. Academic administration was selected because of its role in managing and overseeing the adoption and implementation of these teaching strategies at the university.

3.4 Sampling and Sample Size

Participants were selected through purposive sampling from among those with firsthand experience with online and HyFlex teaching modalities. The sample of students was calculated using Slovin's formula, which includes a sample of 312 students from different faculties providing online and HyFlex courses. A total of 31 lecturers were selected for the study because they have experience in teaching online or HyFlex courses. In addition, 10 academic administrators were selected by purposive sampling because they were involved in the management and implementation of the teaching modalities at the university. This enabled a broad and balanced sampling of views on the part of students, lecturers, and administrators.

Table 1

Summary

Group	Sample Size	Sampling Method	Criteria for Selection
Undergraduate Students	312	Purposive Sampling	Enrolled in online or HyFlex courses from various faculties
Lecturers	31	Purposive Sampling	Involved in teaching online or HyFlex courses
Academic Administrators	10	Purposive Sampling	Involved in managing or overseeing online and HyFlex course adoption

3.5 Data Collection Instruments

To gather both quantitative and qualitative data, the study employed a combination of surveys, interviews, and focus group discussions: Surveys(Quantitative): A structured questionnaire was administered to the 312 undergraduate students. The questionnaire included Likert-scale questions to measure students' engagement across the four dimensions: behavioral, emotional, cognitive, and social engagement in both online and HyFlex learning environments. The survey also collected demographic information, such as gender, year of study, faculty, and types of courses taken, to identify any correlations between engagement levels and personal characteristics.

Interviews and Focus Group Discussions (Qualitative): Semi-structured interviews were conducted with 31 lecturers and 10 academic administrators to gather in-depth insights into their perceptions of the effectiveness of online and HyFlex teaching methods. Additionally, focus group discussions were conducted with a select group of students to explore their lived experiences with online and HyFlex courses. These discussions aimed to identify the challenges students face and the factors that influence their engagement in each modality.

3.6 Data Analysis Techniques

The data collected from both the quantitative and qualitative instruments were analyzed using appropriate statistical and thematic methods.

Quantitative Data: Descriptive statistics: Data from the student surveys were analyzed using descriptive statistics such as mean and standard deviation to summarize students' engagement levels in online and HyFlex courses. Inferential statistics: Pearson’s correlation and multiple regression analysis were employed to assess the strength of the relationships between teaching modalities and engagement. These methods helped to test hypotheses about how the different teaching modalities (online vs. HyFlex) influence student engagement and to predict how these teaching methods affect students' behavioral, emotional, cognitive, and social engagement.Qualitative Data: The interview and focus group discussion transcripts were analyzed using thematic analysis. Thematic coding was applied to identify patterns and themes related to the effectiveness of online and HyFlex teaching, the factors influencing engagement, and the challenges faced by both students and instructors in these learning environments. Data triangulation was employed to ensure the reliability and validity of the findings. Insights from students, lecturers, and academic administrators were compared to identify common themes and discrepancies, providing a well-rounded understanding of the research problem.

Licensed Under Creative Commons Attribution (CC BY-NC)

3.7 Ethical Considerations

The study adhered to ethical guidelines to protect participants' rights and maintain the integrity of the research process. Informed consent was obtained from all participants, who were fully informed about the study's purpose, procedures, and their right to withdraw at any time without facing negative consequences. To ensure confidentiality, participants' personal information was kept private, and all data were anonymized. The research data was securely stored to prevent unauthorized access. Participation was voluntary, with no coercion, and participants were made aware that they could withdraw from the study at any time without any adverse effects.

IV. FINDINGS & DISCUSSION

4.1 Students' Perceptions of Online Teaching on Learning Engagement by Faculty

The study sought students' opinions in the three faculties concerning their perception of online and Hyflex teaching modalities. Perception of online teaching on learning engagement was measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Higher mean scores indicate more positive perceptions of learning engagement. The students' views across education, science and technology, and health sciences were recorded in Table 2.

Table 2

Students' Perceptions of Online Teaching on Learning Engagement by Faculty (N = 239)

Faculty	n	Mean	SD	Perception Level
Education	86	3.42	0.78	Moderate
Health Sciences	69	2.91	0.83	Low
Science & Technology	84	3.87	0.72	High
Total	239	3.41	0.82	Moderate

Data in Table 2 reveal that students' perceptions of online teaching on learning engagement differed across the three faculties. Undergraduate students from the Faculty of Science and Technology reported the highest level of perceived learning engagement (M = 3.87, SD = 0.72), suggesting a positive perception of online teaching. This means that students in science and technology-oriented programmes may be accustomed to or better supported in the use of digital learning platforms. Besides, students in the Faculty of Education demonstrated a moderate level of perception regarding online teaching and learning engagement (M = 3.42, SD = 0.78). This indicates a balanced view, suggesting that while online teaching supports learning engagement, it may not fully address all pedagogical needs within education programmes.

In contrast, students from the Faculty of Health Sciences recorded the lowest mean score (M = 2.91, SD = 0.83), reflecting a low perception of online teaching in enhancing learning engagement. This comparatively lower perception may be attributed to the practical, laboratory-based, and clinical nature of health sciences programmes, which traditionally rely on face-to-face instruction and hands-on learning experiences that are less easily replicated in fully online environments. The findings align with Ng (2022) study, which established that although university students from Hong Kong and mainland China in an aviation learning program perceived virtual mode positively because of the ability to remove geographical barriers, encourage a broader audience, and achieve online collaboration, it misses the physical touch. The study sought students' perceptions of HyFlex teaching on learning engagement across the Faculties of Education, Health Sciences, and Science & Technology. Perception of Hyflex teaching on learning engagement was measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Higher mean scores indicate more positive perceptions of learning engagement. The students' responses were recorded in Table 3.

Table 3

Students' Perceptions of HyFlex Teaching on Learning Engagement by Faculty (N = 239)

Faculty	n	Mean	SD	Perception Level
Education	86	3.45	0.76	Moderate
Health Sciences	69	3.92	0.71	High
Science & Technology	84	4.05	0.68	High
Total	239	3.80	0.75	High

Table 3 shows that students' perceptions of HyFlex teaching on learning engagement varied across the three faculties. Undergraduate students in the Faculty of Science and Technology reported the highest level of perceived learning engagement (M = 4.05, SD = 0.68), indicating a strong positive perception of the HyFlex. This suggests that the flexibility inherent in HyFlex teaching, combined with access to both online and face-to-face learning

Licensed Under Creative Commons Attribution (CC BY-NC)

opportunities, effectively supports engagement among students in technology-oriented programmes. Similarly, students from the Faculty of Health Sciences demonstrated a high perception of HyFlex teaching in enhancing learning engagement (M = 3.92, SD = 0.71). The blended nature of the HyFlex model accommodates the practical and clinical demands of health sciences programmes, thereby fostering greater student participation and interaction compared to fully online instruction.

In contrast, students in the Faculty of Education reported a moderate level of perception regarding the effectiveness of HyFlex teaching on learning engagement (M = 3.45, SD = 0.76). Although HyFlex teaching provides flexibility and increased access to learning resources. The findings are consistent with Finlay et al. (2022), which found that undergraduate students in sport and exercise sciences positively perceived virtual and blended learning modalities. The results showed that blended learning consistently produced higher satisfaction scores, leading to a noticeably higher overall course satisfaction, and students showed a clear preference for blended learning as they valued the opportunity to receive face-to-face instruction. The study sought to collect data on students' views concerning online teaching's support for individual learning pace. The students' responses were recorded in Table 4.

Table 4

Online Teaching and Individual Learning Pace

Online modality supports my learning pace					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	23	9.6	9.6	9.6
	Disagree	27	11.3	11.3	20.9
	Neutral	43	18.0	18.0	38.9
	Agree	117	49.0	49.0	87.9
	Strongly Agree	29	12.1	12.1	100.0
	Total	239	100.0	100.0	

The data in Table 4 indicate that out of 239 respondents, the majority (61.1%) either agreed (49.0%) or strongly agreed (12.1%) that online learning supported their learning pace. Neutral responses comprised 18.0%, indicating that a notable minority were undecided about the effectiveness of online learning in accommodating individual pacing. Conversely, 20.9% expressed negative perceptions, with 11.3% disagreeing and 9.6% strongly disagreeing. These results indicate that online modalities can support self-paced learning, consistent with Dhawan (2020), who identified flexibility as a central advantage of online learning. Nevertheless, the presence of nearly one-fifth of students expressing dissatisfaction indicates that flexibility alone does not eliminate challenges associated with self-regulation, access, and guidance. Mudau et al. (2022) similarly found that inadequate access to devices and inconsistent internet connectivity constrained students' transition to fully online learning.

Table 5

Hyflex Teaching and Individual Learning

Hyflex modality supports my learning pace					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	20	8.4	8.4	8.4
	Disagree	32	13.4	13.4	21.8
	Neutral	32	13.4	13.4	35.1
	Agree	40	16.7	16.7	51.9
	Strongly Agree	115	48.1	48.1	100.0
	Total	239	100.0	100.0	

According to the data in Table 5, out of 239 respondents, the majority (64.8%) viewed HyFlex as beneficial for individual learning, with 48.1% strongly agreeing and 16.7% agreeing. Neutral responses made up 13.4%, while 21.8% disagreed (13.4% disagreed and 8.4% strongly disagreed). The 64.8% positive response indicates that HyFlex modalities strongly support personalized learning, allowing students to choose between online and face-to-face participation based on their needs and schedules. It demonstrates the strength of HyFlex in providing flexibility and autonomy. This aligns with Beatty's (2019) HyFlex model, which emphasizes learner choice and offers equivalent learning pathways across modalities. It also aligns with the OECD (2023) study, which found that HyFlex approaches improve personalization and adaptability in higher education settings. The findings also reflect Athens, W. (2023). The results showed that students in online programs reported higher satisfaction levels due to the personalized learning environment they experienced. However, some respondents (21.8%) disagreed, and 13.4% remained neutral, suggesting that not all learners find HyFlex equally effective. These results are also consistent with Kohnke and

Licensed Under Creative Commons Attribution (CC BY-NC)

Moorhouse (2021), who found that students valued the flexibility of HyFlex while still reporting challenges in interaction and participation across modes.

Comparatively, the results from Tables 1 and 2 provide insights into how online and HyFlex teaching methods affect learners' ability to manage their learning pace. The findings show that 61.1% of respondents agreed that online learning supported individual needs, while 64.8% indicated that HyFlex supported personalized learning. These results suggest that both modalities enhance learner autonomy, with HyFlex having a slightly greater influence. The findings are consistent with Finlay et al. (2022), who reported positive student perceptions of blended learning and the value of retaining face-to-face elements. They also align with Kohnke and Moorhouse (2021), who found that HyFlex offered students flexibility while presenting challenges in maintaining equivalent participation across modes. The mixed perceptions reported in the present study are also consistent with Akala (2021) and Mwaniki et al. (2020), which highlight digital-access and institutional constraints affecting technology-mediated learning in Kenya. Therefore, the findings suggest that both online and HyFlex teaching can support personalized learning, but HyFlex provides a somewhat stronger combination of flexibility and direct interaction.

Table 6

Online Teaching and Course Understanding

The structure of classes in Online modality enhances my learning experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	38	15.9	15.9	15.9
	Disagree	53	22.2	22.2	38.1
	Neutral	48	20.1	20.1	58.2
	Agree	61	25.5	25.5	83.7
	Strongly Agree	39	16.3	16.3	100.0
	Total	239	100.0	100.0	

Table 6 presents students' perceptions of whether online classes enhance their learning experience. Out of 239 respondents, 25.5% agreed and 16.3% strongly agreed that the online format had a positive impact on their learning, resulting in a combined positive response rate of 41.8%. In contrast, 22.2% disagreed and 15.9% strongly disagreed, totaling 38.1% with negative views, while 20.1% were neutral. The results therefore show mixed experiences with the structure of online classes. The positive responses are consistent with Dhawan (2020), who identified flexibility and accessibility as important strengths of online learning. Conversely, the negative responses are consistent with Mudau et al. (2022), who found that limited digital access and competence can weaken students' experiences in fully online learning environments.

Table 7

Hyflex Teaching and Course Understanding

The structure of classes in the Hyflex modality enhances my learning experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	23	9.6	9.6	9.6
	Disagree	43	18.0	18.0	27.6
	Neutral	45	18.8	18.8	46.4
	Agree	62	25.9	25.9	72.4
	Strongly Agree	66	27.6	27.6	100.0
	Total	239	100.0	100.0	

Table 7 presents students' perceptions of whether the structure of HyFlex classes enhances their learning experience. Among the 239 participants, 25.9% agreed, and 27.6% strongly agreed that hyflex teaching enhances their learning experience. This means that 53.5% of the respondents provided a positive response. Neutral responses accounted for 18.8%, suggesting that some students were undecided about the impact of HyFlex class structures. Conversely, 18.0% disagreed, and 9.6% strongly disagreed, indicating that 27.6% of learners perceived the structure as less effective in enhancing their learning. These results indicate that more than half of the respondents acknowledged the strength of the HyFlex course design in improving their learning experiences. The findings echo Huh et al. (2022) study, which found that even during the pandemic, students preferred a teaching modality that blended face-to-face aspects in teaching rather than being fully online.

Overall, the findings show a slight difference in students' perceptions of online and HyFlex teaching modalities in enhancing learning experiences. From the findings, the respondents felt that HyFlex led to a higher learning experience than online-only sessions. Although online modes offered some flexibility, respondents liked Hyflex teaching because of the ability to offer both in-person and online classes. These findings match Cheung and

Licensed Under Creative Commons Attribution (CC BY-NC)

Wu (2023) study, which established that students at the Arabian Gulf University had a positive perception of a class mode that combined the positive aspects of face-to-face with the flexibility and independence of online teaching. Besides, the findings imply that the appeal of a HyFlex course is more than being a "one-size fits approach" approach to traditional teaching; it allows students to customize their learning experiences based on a host of variables, such as impacted schedules and limited classroom space (Cheung & Wu, 2022). As a result, students have a positive perception of both online and Hyflex teaching modalities, but prefer Hyflex because of the diverse course delivery options. The study sought students' opinions on whether online and Hyflex teaching modalities meet their academic needs. The participants' responses were captured in Table 8.

Table 8

Online and Hyflex Format Influence on Students' Academic Needs

Studying in an online or Hyflex Format meets my academic needs					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	34	14.2	14.2	14.2
	Disagree	31	13.0	13.0	27.2
	Neutral	47	19.7	19.7	46.9
	Agree	54	22.6	22.6	69.5
	Strongly Agree	73	30.5	30.5	100.0
	Total	239	100.0	100.0	

Table 8 reveals students' perceptions that studying in an online or HyFlex format meets their academic needs. 22.6% agreed, and 30.5% strongly agreed, with a 53.1% positive response rate among the 239 participants. On the other hand, 13.0% disagreed, and 14.2% strongly disagreed, which resulted in a negative response rate of 27.2%. Additionally, 19.7% remained neutral. The findings of this study showed that 53.1% of the students felt that online and HyFlex learning fulfilled their academic requirements, while 27.2% of the students were not content. The study findings corroborate Athens, W. (2023). Results from India show that students enrolled in online programs were more satisfied. The flexibility of online learning systems, students argued, would not be disrupted as they are able to learn anytime and anywhere. Also, the findings of the study are in line with Kahu and Nelson (2018), who found that positive student perception of a course is directly related to behavioral engagement. The behavioral engagement aspect is captured and seen in the 53.1% positive responses, where the majority of students actively engaged in classes and adapted to flexible learning structures.

Furthermore, 27.2% of the negative answers indicate emotional engagement problems, which may include technology anxiety or frustration. The results also show that 19.7% of the responses were neutral, indicating some students were not sure of the effectiveness of the modalities in their academic development. This is what we mean when we say Hyflex teaching is all about flat learning – learning with anyone, from anyone, and at any time. The way of approach is horizontalization of the learning hierarchy. It focuses on collaborative, connected, and peer learning. That is why students have high perception rates when learning in the Hyflex teaching modality. The study aimed to gather further data on students' perceptions of the online and hybrid teaching modalities with the aid of focus group discussions. The students talked about the affective engagement of online and hyflex teaching in terms of comfort and interest, which facilitated the attainment of academic needs. Here are the statements from students in Group 4 – Health Sciences who transitioned from online to Hyflex class:

> "*If people are in the room and we are online, it becomes easy to speak. It makes one comfortable. It is just because a person has an unlimited sense of what is happening in the room*".

Similarly, Group 3 students (Science and Technology) described how having the alternative class modality, and not feeling marked out by attending online if required, increased both their interest and agency to create comfort for themselves. Equally, being online when other people are in the room created a sense of separateness, restriction, and discomfort. The Group 3 response was that;

> "*But if there are people in the room and one is online, they cannot speak. It makes a person uncomfortable because of the restricted sense of what is happening in the room. However, attending both in-person and another time online gives one the confidence to actively ask questions. It does not appear awkward and strange*".

The aspect of comfort was also present in the respondents' answers. Group 8 (school of education), a sense of care and encouragement to participate created comfort. The group argued that:

> "*Online and hyflex teaching make students comfortable. They actively ask questions. During sessions, one opens up and inquires a lot from the lecturer because of the flexibility, and the feeling that the lecturer cares for them*".

Offering a sense of equity and care for learners in the room and online fosters a sense of comfort and desire to engage and contribute actively. Ensuring attention to online students to bring them into the class activities.

Licensed Under Creative Commons Attribution (CC BY-NC)

Communication and collaboration are essential to keep the class active. In this context, Group 21 (health sciences) asserted that:

> "*Hyflex teaching meets students' needs. The format makes students follow everything from the class and makes them feel like members, especially as they collaborate with peers who are also online in small group work*".

The process of developing relationships was evident in student respondents' responses. The responses emphasized the ease with which it was to establish and maintain relationships in Hyflex teaching. Although online teaching modality is convenient and flexible, it does not provide adequate space for developing and maintaining relationships like Hyflex. This makes establishing relationships challenging for courses offered fully online compared to Hyflex teaching. Group 8 (Education) argued that:

> "*Although meaningful interactions were possible online, they looked different in-person. As such, we have found Hyflex modality as more convenient since it is easy to connect with people in both face to face and online course delivery. We feel very connected with my peers. In person aspect of Hyflex has helped us since we have benefited from the small incidental interactions that occur between activities and lectures*".

These findings are consistent with Finlay et al. (2022), who found that students valued blended learning because it retained opportunities for face-to-face instruction while providing virtual flexibility. Beatty (2019) similarly emphasized learner choice as a central feature of HyFlex design, allowing students to select participation modes that fit their circumstances. Importantly, students value this flexibility but must also manage trade-offs in how they interact with peers and instructors across physical and online settings. The implication for lecturers is that incorporating HyFlex approaches into synchronous teaching can strengthen engagement and promote deeper understanding when both participation modes are intentionally supported.

4.2 Hypothesis Testing

The study aimed to test the null hypothesis that there is no statistically significant relationship between students' perceptions of online and HyFlex teaching modalities and the learning engagement of undergraduate students at the University X. A Wilcoxon Signed Ranks Test was done to compare students' responses across five paired constructs relating to individual learning pace, class structure, deeper understanding of course content, flexibility, and confidence in recommending the modalities.

Table 9

Wilcoxon Signed Rank Test Results

Test Statistics					
	Hyflex modality supports my learning pace. - Online modality supports my learning pace.	The structure of classes in the Hyflex modality enhances my learning experience. - The structure of classes in Online modality enhances my learning experience.	The Hyflex modality encourages a deeper understanding of course content. - Online modality encourages a deeper understanding of course content.	The Hyflex modality is flexible and convenient for my academic needs. - Online modality is flexible and convenient for my academic needs.	I recommend the Hyflex modality for future university teaching. - I recommend Online modality for future university teaching.
Z	-3.124[b]	-3.155[b]	-2.958[b]	-3.081[b]	-2.864[b]
Asymp. Sig. (2-tailed)	.002	.002	.003	.002	.004

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Table 9 shows that all five pairs yielded negative Z-values ranging between –2.864 and –3.155, with associated asymptotic significance (2-tailed) values ranging from .002 to .004. Since all p-values are less than the conventional threshold of .05, the findings showed statistically significant differences across all five comparisons: supporting individual learning pace ($Z = –3.124$, $p = .002$), enhancing class structure ($Z = –3.155$, $p = .002$), encouraging deeper understanding ($Z = –2.958$, $p = .003$), providing flexibility ($Z = –3.081$, $p = .002$), and recommendation for future teaching ($Z = –2.864$, $p = .004$). In each case, HyFlex received higher ratings than online. Given that all p-values were below .01, the null hypothesis was rejected.

These results offer strong evidence that students perceive HyFlex as more effective than online learning in fostering engagement and supporting academic needs. Consequently, the null hypothesis was rejected, meaning that HyFlex and online modalities were perceived differently in terms of their impact on student engagement. The results are consistent with Athens (2023), who found that students valued flexible attendance and self-regulation opportunities

Licensed Under Creative Commons Attribution (CC BY-NC)

in HyFlex classrooms, and with Beatty (2019), whose HyFlex model emphasizes learner choice across equivalent participation modes.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study sought to evaluate students' perceptions of the use of online and HyFlex teaching modalities and how these modalities influenced learning engagement at University X. The results showed that students' perceptions of these teaching methods differed, with the HyFlex perceived to be more flexible, engaging, and supportive of their academic needs than fully online. The Faculty of Science and Technology had the highest percentage of students engaged in both online and HyFlex, perhaps because these students have been more familiar with digital learning platforms. Students in the Faculty of Health Sciences, on the other hand, indicated lower engagement in their online learning, likely due to the practical and clinical nature of their programs that are difficult to teach online. The combination of face-to-face and virtual elements of a HyFlex teaching, though, has been welcomed by students in all faculties and has been successful in providing a more flexible and inclusive learning experience. The hypothesis test conducted in this study with the Wilcoxon Signed Rank Test was supported by the difference between HyFlex and online teaching, which showed that HyFlex has a significant impact on academic support and students' engagement. This indicates that the in-person and online components of HyFlex teaching are more flexible and better address learning needs than fully online teaching.

5.2 Recommendations

The results of this research are used to make several recommendations for enhancing learning engagement at University X. To increase the use of HyFlex teaching models in different faculties within the university, it is recommended to have more integration. HyFlex teaching was seen more positively than online-only teaching, especially in courses that are practical or are more suited to face-to-face interactions. More flexibility around the use of HyFlex allows students to engage in learning in a variety of ways, improving their learning experiences.

Second, it should be the aim of the university to improve the training and support for lecturers. HyFlex teaching was well received; however, some students struggled to effectively use the online learning platforms. Providing a more comprehensive training to lecturers regarding the design and delivery of HyFlex courses will assist them in handling the responsibilities of both online and face-to-face students. This support will help lecturers give effective and consistent instruction on all modalities. Third, tackling infrastructure and technical obstacles is essential for enhancing students' experiences of online and HyFlex learning. Some students were found to have problems with poor internet connection and problems with the internet equipment. The university should thus expand its use of digital technology and improve access to a reliable Internet, in addition to providing students with suitable devices and technical assistance. The enhancements will help narrow the digital divide and ensure all students have equal access to a quality learning environment.

Moreover, creating a more communicative environment to promote collaboration is vital. Students in HyFlex courses valued the opportunities for both collaboration and interaction with their peers and within the lectures. To provide more interactivity and engagement, the university should support students to use the online interactive tools, including online discussions, group work, and collaborative platforms, especially for remote students. In conclusion, the university is recommended to closely monitor and assess the effectiveness of online and HyFlex teaching continuously. It is strongly recommended that there be frequent surveys and feedback mechanisms to capture students' and lecturers' opinions, given the dynamism of education and the need for digital learning. This will allow the university to make necessary improvements and adjustments as needed, helping to ensure that its teaching style is relevant and effective.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Licensed Under Creative Commons Attribution (CC BY-NC)

REFERENCES

Adedoyin, O. B., & Soykan, E. (2023). COVID-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments, 31*(2), 863–875. https://doi.org/10.1080/10494820.2020.1813180

Aderinoye, R. A., Ojokheta, K. O., & Olojede, A. A. (2007). Integrating mobile learning into nomadic education programme in Nigeria: Issues and perspectives. *The International Review of Research in Open and Distributed Learning, 8*(2), 1–17. https://doi.org/10.19173/irrodl.v8i2.347

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.

Akala, B. M. M. (2021). Revisiting education reform in Kenya: A case of competency-based curriculum (CBC). *Social Sciences & Humanities Open, 3*(1), Article 100107.

Athens, W. (2023). Self-regulation, motivation, and outcomes in HyFlex classrooms. *Educational Technology Research and Development, 71*(4), 1765–1783. https://doi.org/10.1007/s11423-023-10243-y

Barr, T., & Luo, T. (2024). HyFlex course design in community colleges: Instructors' challenges, strategies, and supports. *Community College Journal of Research and Practice*, 1–19. https://doi.org/10.1080/10668926.2024.2415709

Beatty, B. (2019). *Hybrid-flexible course design*. EdTech Books. https://edtechbooks.org/hyflex

Bowers, J., & Kumar, P. (2015). Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. *International Journal of Web-Based Learning and Teaching Technologies, 10*(1), 27–44. https://doi.org/10.4018/IJWLTT.2015010103

Buckley, J. B., Thompson, A. K., Tretter, T. R., Biesecker, C., Robinson, B. S., & Hammond, A. N. (2024). "Where I feel the most connected": Community of Inquiry supporting sense of belonging in a HyFlex engineering course. *The Internet and Higher Education, 60*, Article 100930. https://doi.org/10.1016/j.iheduc.2023.100930

Cheung, K. L., & Wu, H. (2023). The use of blended synchronous learning for property education in and beyond the COVID-19 pandemic. *Property Management, 41*(2), 228–243. https://doi.org/10.1108/PM-11-2021-0086

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Dhawan, S. (2020). Online learning: A panacea in the time of the COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Finlay, M. J., Tinnion, D. J., & Simpson, T. (2022). A virtual versus blended learning approach to higher education during the COVID-19 pandemic: The experiences of a sport and exercise science student cohort. *Journal of Hospitality, Leisure, Sport & Tourism Education, 30*, Article 100363. https://doi.org/10.1016/j.jhlste.2021.100363

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *The American Journal of Distance Education, 15*(1), 7–23. https://doi.org/10.1080/08923640109527071

Joji, R. M. (2022). Perception of online and face-to-face microbiology laboratory sessions among medical students and faculty at Arabian Gulf University: A mixed-method study. *BMC Medical Education, 22*(1), 1–12.

Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher Education Research & Development, 37*(1), 58–71. https://doi.org/10.1080/07294360.2017.1344197

Kohnke, L., & Moorhouse, B. L. (2021). Adopting HyFlex in higher education in response to COVID-19: Students' perspectives. *Open Learning: The Journal of Open, Distance and e-Learning, 36*(3), 231–244. https://doi.org/10.1080/02680513.2021.1906641

Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education, 1997*(74), 5–12.

Mudau, P. K., Biccard, P., Van Wyk, M. M., Kotze, C. J., & Nkuna, V. K. (2022). Student access to and competence in migrating to a fully online open distance learning space. *Journal of Information Technology Education: Research, 21*, 197–215. https://doi.org/10.28945/4976

Mwaniki, E., Ireri, A., Chege, F., & Njihia, M. (2020). Obstacles to successful uptake of open distance and e-learning (ODeL) programmes: A case of Kenyatta University, Kenya. *African Multidisciplinary Journal of Research, 1*(1), 12–22. https://doi.org/10.71064/spu.amjr.1.1.66

Ng, D. K. T. (2022). Online aviation learning experience during the COVID-19 pandemic in Hong Kong and Mainland China. *British Journal of Educational Technology, 53*(3), 443–474.

Organisation for Economic Co-operation and Development. (2023). *OECD digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. https://doi.org/10.1787/c74f03de-en

Licensed Under Creative Commons Attribution (CC BY-NC)