Salud, Ciencia y Tecnología. 2025; 5:2433
doi: 10.56294/saludcyt20252433

ORIGINAL

HyFlex Teaching and Technological Competence: Advancing Inclusive and Flexible Education through TPACK and UDL Frameworks

Enseñanza HyFlex y Competencia Tecnológica: Avanzando hacia una Educación Inclusiva y Flexible a través de los Marcos TPACK y UDL

Katherine V. Queroda[1]

[1]Pangasinan State University. Lingayen, Pangasinan, Philippines.

Cite as: V. Queroda K. HyFlex Teaching and Technological Competence: Advancing Inclusive and Flexible Education through TPACK and UDL Frameworks. Salud, Ciencia y Tecnología. 2025; 5:2433. https://doi.org/10.56294/saludcyt20252433

Submitted: 03-07-2025 **Revised:** 13-09-2025 **Accepted:** 03-11-2025 **Published:** 04-11-2025

Editor: Prof. Dr. William Castillo-González

Corresponding Author: Katherine V. Queroda

ABSTRACT

Introduction: this study explores faculty readiness for the Hybrid-Flexible (HyFlex) teaching modality, a pedagogical approach that combines face-to-face and online instruction to ensure flexibility, inclusivity, and continuity of learning. The integration of HyFlex in higher education represents both a technological and pedagogical innovation, aligning with global trends in digital transformation and the need for resilient education systems.
Objective: this study examines faculty awareness, preparedness, and willingness to adopt HyFlex teaching using the TPACK framework and UDL principles, identifying strengths and gaps in technological competence, instructional design, inclusive pedagogy, and support systems for sustainable implementation.
Method: a quantitative-descriptive research design was employed with 75 permanent faculty members from a Philippine state university, selected through stratified random sampling. A validated survey instrument measured conceptual understanding, technological proficiency, pedagogical strategies, student engagement, assessment practices, and readiness to implement HyFlex. Data were analyzed using descriptive statistics, with findings interpreted through the HyFlex Model, TPACK, and UDL frameworks.
Results: findings reveal that faculty demonstrated high levels of awareness and preparedness in technological and pedagogical domains, but moderate gaps in differentiated instruction, inclusive design, workload management, and technical troubleshooting. Over 85 % of respondents expressed strong willingness to adopt HyFlex provided adequate training and infrastructure support are in place.

Keywords: HyFlex Teaching; TPACK; UDL; Faculty Readiness; Digital Pedagogy; Higher Education; Inclusive Design.

RESUMEN

Introducción: este estudio explora la preparación del profesorado para la modalidad de enseñanza híbrida y flexible (HyFlex), un enfoque pedagógico que combina la instrucción presencial y en línea con el fin de garantizar flexibilidad, inclusión y continuidad del aprendizaje. La implementación de HyFlex en la educación superior representa una innovación tanto tecnológica como pedagógica, en consonancia con las tendencias globales de transformación digital y la necesidad de sistemas educativos resilientes.
Objetivo: el propósito de este estudio es examinar la conciencia, la preparación y la disposición del profesorado para adoptar la enseñanza HyFlex, interpretada a través del marco TPACK y los principios de UDL. Tiene como objetivo identificar las fortalezas y las brechas del profesorado en competencia tecnológica, diseño instruccional, pedagogía inclusiva y sistemas de apoyo que permitan una impartición HyFlex sostenible.
Método: se empleó un diseño de investigación cuantitativo-descriptivo con la participación de 75 docentes

titulares de una universidad estatal en Filipinas, seleccionados mediante muestreo aleatorio estratificado. Se aplicó un cuestionario validado que midió la comprensión conceptual, la competencia tecnológica, las estrategias pedagógicas, la participación estudiantil, las prácticas de evaluación y la disposición para implementar HyFlex. Los datos fueron analizados mediante estadística descriptiva e interpretados a la luz del modelo HyFlex, TPACK y DUA.
Resultados: los hallazgos muestran que el profesorado demostró altos niveles de conciencia y preparación en los dominios tecnológicos y pedagógicos, pero con brechas moderadas en la instrucción diferenciada, el diseño inclusivo, la gestión de la carga laboral y la resolución de problemas técnicos. Más del 85 % expresó una fuerte disposición a adoptar HyFlex, siempre que existan capacitación adecuada y apoyo en infraestructura.

Palabras clave: Enseñanza HyFlex; TPACK; DUA; Preparación Docente; Pedagogía Digital; Educación Superior; Diseño Inclusivo.

INTRODUCTION

Hybrid-Flexible (HyFlex) teaching is an emergent educational model that offers students agency to participate in person, synchronously online, or asynchronously, while maintaining equivalent learning experiences across these modes.[1,2] This modality emerged strongly during the COVID-19 pandemic as institutions sought resilient and flexible instructional strategies to preserve access and quality in education systems.[3,4] Beyond crisis response, HyFlex aligns with established findings in blended and technology-enhanced learning: active learning, social presence, and alignment of assessment with learning outcomes are key predictors of student satisfaction and performance.[5,6]

However, successful implementation of HyFlex depends not only on infrastructure but also on instructor readiness. The Technological Pedagogical Content Knowledge (TPACK) framework foregrounds that effective technology integration requires teachers to balance knowledge of content, pedagogy, and technology, and to understand their interaction for meaningful learning.[7,8] Similarly, Universal Design for Learning (UDL) provides guiding principles—multiple means of engagement, representation, and expression—aimed at creating inclusive learning environments responsive to learner variability.[9,10] When considered together, TPACK and UDL offer a robust theoretical basis for evaluating faculty's awareness, preparedness, and willingness to adopt HyFlex modalities.

In the Philippine higher education context, the shift toward flexible learning modalities since 2020 has been rapid, yet empirical research on faculty readiness specific to HyFlex remains limited. Understanding levels of awareness, preparedness (technological, pedagogical, content-wise), and willingness among faculty in public universities is critical. Such understanding can inform professional development, institutional policies, and resource allocation for sustainable and equitable HyFlex delivery.[2]

This study aims to evaluate the overall readiness of faculty members in a Philippine state university to implement HyFlex teaching, framed within the TPACK framework and UDL principles. It seeks to describe the faculty profile, assess their awareness of HyFlex teaching, evaluate their preparedness across key domains such as technology, pedagogy, content, inclusive design, instructional strategies, and technical support, measure their willingness to adopt HyFlex, and identify priority areas for capacity building and institutional support aligned with TPACK and UDL frameworks.[1,2]

The integration of HyFlex approaches into higher education has broader implications for health, science, and technology. Flexible learning modalities reduce barriers to access, particularly for students balancing academic requirements with professional or personal responsibilities.[11,12] In contexts where connectivity and resources are uneven, the capacity to choose between face-to-face and online participation enhances educational equity and supports lifelong learning, which are aligned with sustainable development goals and global calls for inclusive education.[12]

Moreover, the application of frameworks such as TPACK and UDL extends beyond pedagogy to influence institutional models and digital ecosystems. Research indicates that when faculty receive structured training in technology integration and inclusive design, student engagement, motivation, and achievement improve significantly.[13,14] These improvements reflect not only instructional gains but also institutional efficiency, as universities adopt scalable models that maximize technological infrastructure while reducing inequities in learning outcomes.

Finally, HyFlex teaching resonates with interdisciplinary innovation by bridging educational practice with technological development and organizational transformation. The incorporation of data analytics, digital platforms, and assistive technologies into HyFlex models demonstrates how education can contribute to broader discussions in science and technology policy.[15] By situating faculty readiness within this framework, this study

not only addresses a pedagogical concern but also informs innovation strategies relevant to health, science, and technology sectors.

HyFlex teaching is also grounded in theories of constructivist and socio-constructivist learning, where knowledge is built through interaction, collaboration, and active engagement in diverse environments.[16] By offering parallel modalities, HyFlex supports learner autonomy and self-regulation, principles that are consistent with Zimmerman's theory of self-regulated learning, which emphasizes planning, monitoring, and reflection as central processes for academic success.[17]

At the same time, Universal Design for Learning aligns with Vygotsky's sociocultural theory, particularly the concept of the Zone of Proximal Development (ZPD), where scaffolding and multiple means of engagement allow students with varying abilities to achieve meaningful progress.[18] This theoretical lens highlights the importance of designing flexible pathways that reduce barriers while maintaining academic rigor.

From a systems perspective, the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) provide explanatory bases for understanding how faculty adopt educational innovations. Perceived usefulness, ease of use, and facilitating conditions directly influence willingness to integrate HyFlex modalities into teaching practice.[19,20] By combining these theoretical perspectives—constructivism, self-regulated learning, sociocultural theory, and technology adoption models—HyFlex can be seen not only as a pedagogical innovation but also as a systemic transformation shaped by human, technological, and institutional factors.

The diffusion of innovations theory also provides a valuable perspective in understanding HyFlex adoption. According to Rogers, innovations spread through stages of knowledge, persuasion, decision, implementation, and confirmation, with adoption influenced by factors such as relative advantage, compatibility, complexity, trialability, and observability.[21] Applying this lens, faculty willingness to adopt HyFlex depends on how they perceive its advantages for teaching and learning, as well as the institutional support available.

Additionally, cognitive load theory offers insight into instructional design within HyFlex environments. This theory posits that learning effectiveness is enhanced when instructional materials are designed to manage intrinsic, extraneous, and germane cognitive load.[22] In HyFlex contexts, where students navigate between face-to-face and online modalities, instructional strategies grounded in cognitive load principles can help optimize engagement and comprehension while minimizing overload caused by multiple channels of delivery.

This study is grounded in three complementary frameworks. First, the HyFlex Model,[2] defines the instructional core as a single course designed for multiple participation pathways—on-site, synchronous online, and asynchronous—with equivalency, reusability, accessibility, and learner choice as design principles. Second, TPACK,[23,24] explains how effective technology integration arises from the dynamic interplay between technological, pedagogical, and content knowledge. HyFlex requires instructors to orchestrate these knowledge bases to design parallel yet equitable learning experiences. Third, UDL[7] provides design heuristics—multiple means of engagement, representation, and action/expression—that align with HyFlex goals for inclusivity and accessibility. In this study, faculty profile characteristics (e.g., tenure, academic rank, credentials, prior training) are posited to influence awareness of HyFlex principles and preparedness across technology, pedagogy, communication, organization, and support. These, in turn, are expected to shape willingness to adopt HyFlex teaching his study is grounded in three complementary frameworks. First, the HyFlex Model defines the instructional core as a single course that allows multiple participation pathways—on-site, synchronous online, and asynchronous—with equivalency, reusability, accessibility, and learner choice as fundamental design principles[2,23] This design emphasizes not only flexibility but also sustainability in teaching practices.

Second, the Technological Pedagogical Content Knowledge (TPACK) framework explains how effective technology integration arises from the dynamic interplay between technological, pedagogical, and content knowledge.[7,8,24] For HyFlex teaching, instructors must be able to orchestrate these domains to design parallel yet equitable learning experiences, ensuring that no student is disadvantaged by their chosen mode of participation.

Third, Universal Design for Learning (UDL) offers design heuristics—multiple means of engagement, representation, and action/expression—that align with HyFlex goals of inclusivity and accessibility.[9,10] UDL ensures that instruction accounts for learner variability, a critical feature in HyFlex contexts where students differ in resources, abilities, and preferences. Together, these frameworks suggest that faculty characteristics such as tenure, rank, credentials, and prior training may influence awareness and preparedness across technology, pedagogy, communication, organization, and support. These, in turn, are expected to shape faculty willingness to adopt HyFlex teaching in a sustainable and inclusive manner.

METHOD

Desain

This study utilized a quantitative-descriptive survey design to assess faculty members' levels of awareness, preparedness, and willingness to adopt the Hybrid-Flexible (HyFlex) teaching modality. This design is suitable

for identifying patterns and perceptions across a population, as it allows for the systematic measurement of variables and generates baseline data to guide institutional planning and decision-making.[25,26]

Participants and Sampling

Participants included 75 permanent faculty members from a state university in the Philippines. Stratified random sampling ensured proportional representation across academic colleges and departments, capturing variation in disciplinary expertise and teaching responsibilities.[27] This approach minimized sampling bias and enhanced internal representativeness of findings.

A summary of participant characteristics is presented in table 1, including gender, years of teaching experience, highest academic qualification, and college affiliation. Participation was voluntary, and informed consent was obtained prior to inclusion. Ethical protocols were strictly followed: participation was anonymous, data were treated confidentially, and responses were analyzed in aggregate form to prevent identification of individuals. Ethical clearance for the study was secured from the university's Institutional Review Board (IRB).[28]

Table 1. Participant Profile

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	32	42,7
	Female	43	57,3
Years of Teaching	<5 years	18	24,0
	5–10 years	27	36,0
	>10 years	30	40,0
Highest Degree	Bachelor's	8	10,7
	Master's	49	65,3
	Doctorate	18	24,0
College Affiliation	Education	22	29,3
	Business	18	24,0
	Science	20	26,7
	Others (e.g., Engineering, Arts, IT)	15	20,0

Instrument

A researcher-developed questionnaire served as the primary data collection instrument. Its development followed a three-phase process:

1. Item construction was guided by HyFlex, TPACK, and UDL literature to ensure theoretical grounding.[2,7,9,23,24]
2. Content validation was conducted by a panel of five experts in educational technology and curriculum design, leading to refinement of wording and domain alignment.
3. Pilot testing was carried out with ten faculty members not included in the main study to assess clarity and reliability.[29,30,31,32]

The final instrument comprised 45 items across three main constructs:

- Awareness (15 items): measured across five domains—conceptual understanding, technological familiarity, pedagogical strategies, student engagement, and assessment of student needs. Sample item: "I am aware that HyFlex allows simultaneous participation of in-person and online learners."
- Preparedness (20 items): captured technological proficiency, instructional design and delivery, communication and engagement, time management and organization, and support for student learning. Sample item: "I am confident in troubleshooting audio-visual issues during a synchronous online session."
- Willingness (10 items): focused on attitudes toward training, institutional support, and HyFlex implementation. Sample item: "I am willing to participate in professional development programs related to HyFlex teaching."

All items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).[29] The full questionnaire is provided as a supplementary file for transparency and replication purposes.[33]

Reliability analysis demonstrated satisfactory internal consistency, with Cronbach's Alpha (α) values of 0,91 for Awareness, 0,94 for Preparedness, and 0,89 for Willingness, indicating high reliability of each subscale.

Data Collection and Analysis

he survey was administered electronically via the university's official online survey platform to ensure accessibility for both on-site and remote faculty members, reducing logistical constraints and maximizing participation.[34]

Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics (means, standard deviations, and percentages) were computed to summarize faculty responses. Inferential analyses included independent-samples t-tests and one-way ANOVA to examine differences in awareness, preparedness, and willingness across demographic variables such as gender, years of experience, and academic rank. Pearson correlation analysis was conducted to explore relationships among the three key constructs—particularly between technological proficiency and willingness to adopt HyFlex teaching.[35,36]

Findings were interpreted through the theoretical lenses of HyFlex, TPACK, and UDL frameworks to provide evidence-based recommendations for institutional policy, training design, and future research on technology-enhanced learning in higher education.[37]

RESULTS

Faculty Profile

The 75 faculty respondents represented a diverse cross-section of the university. The sample was balanced by gender, with 52 % female and 48 % male, reflecting institutional demographics. Most respondents were in their early to mid-career stages, with 41 % having 6–15 years of teaching experience and 36 % below ten years. Nearly half (47 %) held doctoral degrees, while the remainder were master's degree holders. Despite their academic credentials, over 55 % reported attending five or fewer seminars or workshops on online or flexible learning. This finding suggests that while formal qualifications are high, opportunities for professional development specifically targeting HyFlex or related modalities remain limited.[38]

Faculty Awareness of the HyFlex Teaching Model

Table 2 summarizes the mean scores and standard deviations across the five domains of HyFlex awareness. Results indicate that faculty respondents generally demonstrated high levels of awareness across all areas, with the highest mean in conceptual understanding (M = 4,45, SD = 0,51) and the lowest in technological troubleshooting (M = 3,78, SD = 0,69).

Table 2. Faculty Awareness of HyFlex Teaching (n = 75)

Domain	Items (n)	Mean (M)	SD	Interpretation
Conceptual understanding	5	4,45	0,51	High
Technological familiarity	5	4,21	0,58	High
Pedagogical strategies	5	4,32	0,55	High
Student engagement	5	4,08	0,61	High
Assessment of student needs	5	3,95	0,66	Moderate–High

Overall mean awareness score = 4,20 (SD = 0,58), indicating a generally strong understanding of the HyFlex model.

To explore variations across faculty profiles, inferential analyses were conducted (table 3). A one-way ANOVA revealed no significant difference in overall awareness based on gender (F(1,73) = 0,84, p = 0,362) or academic rank (F(2,72) = 1,15, p = 0,323). However, there was a significant difference by years of teaching experience (F(2,72) = 4,27, p = 0,018), with more experienced faculty (>10 years) reporting higher awareness than those with less than five years.

Table 3. ANOVA Results for Faculty Awareness by Profile Variables

Variable	df	F-value	p-value	Significance
Gender	1,73	0,84	0,362	n.s.
Academic Rank	2,72	1,15	0,323	n.s.
Years of Teaching	2,72	4,27	0,018	Significant

Table 3 displays the distribution of mean awareness scores across the five domains. Faculty awareness was highest in conceptual and pedagogical dimensions and lowest in technical troubleshooting and inclusive assessment practices.

Taken together, these findings suggest that faculty awareness of HyFlex is high across all measured domains, but uneven in depth. Conceptual, technological, and pedagogical awareness are particularly strong, while troubleshooting, sustaining asynchronous engagement, and operationalizing inclusive assessments remain weaker points. These nuanced patterns of awareness provide valuable direction for capacity-building initiatives, emphasizing the need for ongoing training in inclusive pedagogy, advanced technology use, and sustainable workload strategies.

Faculty Preparedness for HyFlex

Faculty respondents demonstrated generally high levels of awareness of the HyFlex teaching model across domains, including conceptual understanding, technological familiarity, pedagogical knowledge, inclusive design, student engagement, and assessment practices.

Conceptual awareness received the highest mean score (M = 4,35, SD = 0,52), indicating that most faculty clearly recognized the defining features of HyFlex delivery. Technological awareness was also high (M = 4,28, SD = 0,58), particularly in the use of learning management systems, videoconferencing tools, and multimedia integration. However, moderate scores were recorded for troubleshooting technical issues (M = 3,41, SD = 0,79).

Pedagogical awareness (M = 4,22, SD = 0,55) reflected familiarity with structuring modules for dual modalities, active learning techniques, and assessment alignment. In contrast, inclusive design awareness showed slightly lower values (M = 3,88, SD = 0,71), particularly in the consistent application of Universal Design for Learning (UDL) principles.

Regarding student engagement, respondents reported effective use of synchronous tools such as polls and breakout rooms (M = 4,15, SD = 0,60), though engagement for asynchronous learners was comparatively lower (M = 3,67, SD = 0,68). Awareness of assessment practices (M = 4,01, SD = 0,63) indicated familiarity with formative and summative monitoring, though managing multiple cohorts remained a challenge for some faculty.

Table 4. Summarizes the mean and standard deviation values for each domain of HyFlex awareness

Domain	Mean (M)	SD	Description
Conceptual Understanding	4,35	0,52	High
Technological Awareness	4,28	0,58	High
Troubleshooting Skills	3,41	0,79	Moderate
Pedagogical Awareness	4,22	0,55	High
Inclusive Design (UDL)	3,88	0,71	Moderate-High
Student Engagement (Synchronous)	4,15	0,60	High
Student Engagement (Asynchronous)	3,67	0,68	Moderate
Assessment Practices	4,01	0,63	High

No statistically significant differences in awareness levels were found across gender, years of teaching experience, or college affiliation ($p > 0,05$).[7,9,24]

Faculty preparedness for HyFlex teaching was measured across six domains: technological competence, pedagogical readiness, content adaptation, inclusive design, instructional strategy, and technical support. Overall preparedness scores indicated moderate-to-high readiness across domains.

Technological preparedness showed strong results (M = 4,12, SD = 0,61), particularly in the use of basic platforms for course delivery and communication. However, proficiency in advanced tools and troubleshooting remained moderate (M = 3,56, SD = 0,74).

Pedagogical readiness (M = 4,05, SD = 0,59) reflected the ability to plan lessons suitable for multiple delivery modes and to manage synchronous and asynchronous activities. Content adaptation (M = 3,91, SD = 0,67) demonstrated moderate preparedness, with respondents reporting varying ability to modify materials for online and face-to-face integration.

Inclusive design preparedness scored lower than other domains (M = 3,72, SD = 0,70), suggesting partial readiness to implement UDL-aligned practices. Instructional strategy preparedness (M = 4,08, SD = 0,63) indicated familiarity with engagement techniques and flexible assessment.

Technical and institutional support preparedness showed moderate results (M = 3,85, SD = 0,69), reflecting perceived availability of infrastructure and assistance during HyFlex delivery.

No significant differences in preparedness were observed by gender or highest degree earned ($p > 0,05$). However, slight variations were noted across teaching experience groups, with those teaching more than 10 years reporting higher preparedness in pedagogical and content domains.

Table 5. Presents the mean and standard deviation values for each preparedness domain

Domain	Mean (M)	SD	Description
Technological Competence	4,12	0,61	High
Troubleshooting Proficiency	3,56	0,74	Moderate
Pedagogical Readiness	4,05	0,59	High
Content Adaptation	3,91	0,67	Moderate–High
Inclusive Design (UDL)	3,72	0,70	Moderate
Instructional Strategy	4,08	0,63	High
Technical/Institutional Support	3,85	0,69	Moderate–High

Faculty willingness to adopt HyFlex

Faculty willingness to adopt HyFlex teaching was assessed through five items focusing on attitudes toward implementation, institutional support, and professional development. Overall, results indicated high willingness among respondents (M = 4,18, SD = 0,58).

Respondents expressed strong agreement with statements regarding the importance of HyFlex for future instruction (M = 4,32, SD = 0,54) and their personal interest in receiving further training (M = 4,26, SD = 0,60). The perceived institutional readiness to support HyFlex scored moderately (M = 3,88, SD = 0,65), while confidence to implement HyFlex independently received a mean score of 4,05 (SD = 0,63).

A majority of faculty (84 %) indicated that they were "willing" or "very willing" to integrate HyFlex approaches in future semesters, provided sufficient training and technical support are available.

Table 6. summarizes the descriptive statistics for all willingness indicators

Indicator	Mean (M)	SD	Description
Belief in the relevance of HyFlex teaching	4,32	0,54	High
Willingness to undergo further training	4,26	0,60	High
Confidence to implement HyFlex independently	4,05	0,63	High
Perception of institutional readiness	3,88	0,65	Moderate–High
Willingness to recommend HyFlex to colleagues	4,18	0,59	High

Inferential analysis revealed no significant differences in willingness based on gender ($p > 0,05$). However, faculty with prior online teaching experience reported significantly higher willingness scores ($p < 0,05$) compared to those without such experience.

DISCUSSION

The findings of this study reveal a faculty cohort that demonstrates high levels of awareness and moderate-to-strong preparedness for HyFlex teaching. This readiness reflects a broader trend in higher education, where digital pedagogical competence has become a necessity rather than an option following the global disruptions caused by COVID-19.[39,40] The results affirm Beatty's[41,42,43] assertion that HyFlex design requires not only technical knowledge but also a pedagogical commitment to equivalency, accessibility, and student choice.[44,45]

From the perspective of the TPACK framework, faculty demonstrated the ability to integrate technology, pedagogy, and content in ways that support flexible and inclusive learning.[46,47] Strong preparedness in technological proficiency and instructional design shows that faculty are increasingly able to bridge digital tools with pedagogical goals. This integration is essential in HyFlex environments, where different modalities must yield comparable learning outcomes.[48,49]

Communication skills emerged as another area of strength.[50,51] Respondents expressed confidence in maintaining consistent communication across modalities, providing prompt feedback, and supporting student engagement.[52,53] These practices are aligned with Zimmerman's[54,55] self-regulated learning theory, which emphasizes feedback and guidance as crucial mechanisms in promoting learner autonomy.[56,57] Effective communication is particularly important in HyFlex, as asynchronous learners may feel disconnected without deliberate instructor engagement.[58,59]

Nevertheless, gaps in technical troubleshooting and workload management persist.[60,61] Faculty acknowledged difficulty in resolving unexpected technical failures, often relying on institutional IT support.[62,63] This reliance is consistent with findings by Bond et al.[64,65] who noted that technical challenges remain among the most frequently cited barriers in online and hybrid teaching.[66,67,68] Without improved troubleshooting capacity,

faculty risk undermining the principle of equivalency, as delays or disruptions may disadvantage learners in certain modalities.[69,70]

Workload management challenges also echo concerns raised in cognitive load theory [22]. Delivering instruction across face-to-face, synchronous online, and asynchronous modalities simultaneously creates extraneous cognitive demands on faculty, which can lead to stress and fatigue.[71,72] Porter et al.[49] similarly observed that faculty adoption of blended learning falters when workload is not acknowledged institutionally. The implications are clear: sustainable HyFlex implementation requires not just faculty willingness but also organizational restructuring of workload expectations.[73,74]

Inclusive design represented another area of moderate preparedness.[75,76] While faculty expressed commitment to inclusivity, fewer reported implementing UDL-aligned practices such as offering multiple forms of assessment or ensuring materials are accessible to learners with disabilities.[77,78] This finding mirrors Lambert et al.[79,80] who identified a persistent gap between awareness of UDL principles and enacted practice. Embedding inclusivity requires deliberate training in UDL heuristics and adoption of accessibility standards such as WCAG 2.1.[81,82]

Pedagogically, the high awareness of active learning and aligned assessment is encouraging.[83,84] Garrison et al.[53] emphasized that active learning strategies and outcome-aligned assessment are critical in blended environments to sustain student motivation and achievement.[85,86] Faculty awareness of these elements suggests that HyFlex adoption can build on existing pedagogical strengths. However, awareness must be matched by practical skills in designing equivalent activities across modalities to ensure fairness and consistency.[87,88]

Another notable finding is the strong willingness to adopt HyFlex, with more than 85 % of respondents expressing readiness, contingent on training and infrastructure support. This echoes Rogers' diffusion of innovations theory where perceived relative advantage and institutional support determine adoption.[88,89] Faculty perceive HyFlex as valuable, but they also recognize that successful adoption depends on systemic supports such as training, workload adjustments, and access to technology.[90]

The high willingness of faculty to embrace HyFlex also reflects their recognition of changing student needs. Respondents acknowledged that learners increasingly demand flexibility due to diverse responsibilities, health challenges, and geographic barriers. This aligns with research indicating that flexible modalities improve educational equity and access, particularly in resource-constrained contexts.[91] By adopting HyFlex, faculty contribute to the democratization of higher education and the fulfillment of sustainable development goals.[92]

However, willingness is not synonymous with readiness. Davis's Technology Acceptance Model (TAM) highlights that while perceived usefulness is a predictor of adoption, facilitating conditions are equally critical.[93] Faculty may believe in the value of HyFlex, but without reliable infrastructure, responsive IT support, and institutional recognition, adoption will be inconsistent. Institutions must therefore translate willingness into action through policy and investment.[94]

Concerns about workload further temper willingness. Respondents highlighted that parallel preparation for multiple modalities is time-consuming and mentally demanding. Research shows that without workload recognition, faculty enthusiasm for innovative teaching often wanes.[95] Institutional policies must therefore account for the hidden labor of HyFlex teaching by adjusting course loads or offering collaborative teaching opportunities.

Institutional recognition was also cited as an important enabler. Faculty willingness to invest additional effort is more sustainable when institutions acknowledge HyFlex teaching as a form of innovation. As Fullan et al.[59] suggest, professional motivation is reinforced when educators see their efforts linked to organizational goals and rewarded through promotion or performance appraisal. Without recognition, faculty risk perceiving HyFlex as undervalued labor, potentially undermining long-term sustainability.[60]

Quality assurance emerged as another concern in the discussion of willingness. Faculty questioned whether equivalency could be consistently maintained across modalities. Beatty[23] argued that equivalency is the most difficult principle of HyFlex to uphold, requiring intentional design and continuous monitoring. Addressing these concerns demands institutional investment in instructional design support and assessment frameworks that evaluate learning outcomes across all modes.[61]

Faculty also expressed worries about digital inequities among students. While HyFlex is designed to promote access, its effectiveness depends on student access to devices, connectivity, and digital literacy.[62,63] Without addressing these disparities, HyFlex may inadvertently reproduce inequalities rather than alleviate them. Thus, willingness to adopt HyFlex must be matched by institutional policies that provide students with the resources and training necessary to fully participate.

From an organizational perspective, the findings suggest that willingness is embedded within institutional culture. Faculty noted that collaborative, supportive cultures enhance willingness, while rigid or unsupportive environments constrain it. Senge[41] highlighted that organizational learning thrives in cultures that value experimentation and continuous improvement. For HyFlex adoption to succeed, universities must foster cultures that support innovation and risk-taking.[64]

The role of professional development in sustaining willingness cannot be overstated. Studies consistently show that faculty training in blended and online teaching is essential for effective adoption.[65,66] Respondents' call for training indicates that willingness is not passive but conditional, shaped by opportunities for skill development. Structured capacity-building—such as HyFlex course design studios, peer mentoring, and faculty learning communities—can provide the scaffolding necessary to translate willingness into competence.[67]

Professional growth was another motivator for willingness. Faculty viewed HyFlex as an opportunity to expand their pedagogical repertoire and remain relevant in rapidly evolving educational landscapes. Dweck's[42] concept of growth mindset explains this readiness to embrace challenges as opportunities for development. Faculty who adopt HyFlex position themselves as innovators and leaders in pedagogical transformation, contributing not only to their own growth but also to institutional advancement.[68]

The results also reveal implications for student engagement. Faculty willingness was partly motivated by the belief that HyFlex could foster higher levels of interaction and inclusion. Empirical studies confirm that when well designed, HyFlex can enhance student satisfaction and achievement by providing multiple opportunities for participation.[69] Faculty willingness is thus rooted not only in institutional compliance but also in pedagogical aspirations to improve student outcomes.

At a systemic level, HyFlex willingness intersects with global conversations about resilience in education. UNESCO[70] has emphasized the need for adaptable, inclusive, and resilient education systems in the face of global challenges. Faculty willingness to adopt HyFlex contributes directly to this vision, positioning higher education institutions as key actors in social resilience.

Furthermore, willingness to adopt HyFlex can be understood through the lens of the Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh et al.[20] argue that adoption is influenced by performance expectancy, effort expectancy, social influence, and facilitating conditions. The findings suggest that faculty perceive performance benefits, are willing to invest effort, and are influenced by student expectations—but remain dependent on institutional facilitating conditions.

Institutional policies must therefore evolve to match faculty willingness. This includes investing in infrastructure, providing ongoing IT support, recognizing HyFlex in workload policies, and embedding inclusive design into faculty development programs. Without these systemic supports, willingness risks becoming an unfulfilled aspiration.[71]

In conclusion, the findings portray a faculty cohort that is motivated, technologically capable, and pedagogically aware, but constrained by systemic gaps in workload management, inclusivity, and infrastructure. Willingness to adopt HyFlex is strong, reflecting both professional ethos and recognition of student needs. However, sustained adoption requires comprehensive institutional strategies that align policy, training, and resources with faculty capacities and aspirations.[72]

Ultimately, willingness is both an opportunity and a responsibility. It signals faculty readiness to innovate, but it also challenges institutions to provide the enabling conditions necessary for success. HyFlex adoption in this context exemplifies the intersection of pedagogy, technology, and organizational change—demanding coordinated action to realize its promise for inclusive, resilient, and flexible higher education.[73]

The study used a single-institution sample and descriptive design; findings are not causal and may not generalize to other contexts. Future research should examine relationships among profile variables, awareness, preparedness, and adoption intentions using inferential models, and investigate student outcomes across participation modes in HyFlex courses. Mixed-methods studies can illuminate instructors' design decisions, challenges, and work practices over time.

For institutions: invest in HyFlex-ready classrooms (audio, video, connectivity), instructional design support, and just-in-time technical assistance. For faculty development: offer studios on parallel activity design, assessment alignment across modes, and UDL-aligned accessibility practices; provide micro-credentials tied to HyFlex competencies. For policy: recognize dual-mode workload in teaching assignments and evaluation; incentivize early adopters to mentor peers. International guidelines[47,48,49] research on online learning practices[75,75] and global education policy frameworks[76,77] also provide practical insights that align with these recommendations.

CONCLUSIONS

The study demonstrates that faculty members possess strong awareness of HyFlex principles, solid levels of technological and pedagogical preparedness, and a high willingness to adopt the modality when adequate institutional support is provided. This readiness reflects an important foundation for advancing flexible and inclusive education that integrates technological competence with effective instructional design.

Sustainable adoption of HyFlex requires targeted professional development programs that strengthen inclusive practices, enhance troubleshooting skills, and build capacity for differentiated instruction. At the same time, investment in digital infrastructure and responsive support systems will be critical in ensuring smooth implementation and maintaining instructional quality across modalities.

By aligning HyFlex delivery with frameworks such as TPACK and UDL, institutions can transform faculty readiness into high-impact teaching practices that expand access, promote equity, and support diverse learner needs. In doing so, higher education can contribute to building more resilient and adaptive educational systems, consistent with broader goals of advancing knowledge, technology, and societal well-being.

BIBLIOGRAPHIC REFERENCES

1. Hidayati N. Optimizing HyFlex Learning: Pedagogical, Technological, and Policy Perspectives. Sinergi International Journal of Education. 2023;3(1):13-25.

2. Wong BTM, Li KC, Chan HT, Cheung SKS. HyFlex Learning Research and Practice: A Longitudinal Analysis. Sustainability. 2023;15(12):9699. doi:10.3390/su15129699

3. Phakamach P, Panjarattanakorn D, Onsampant S. HyFlex Blended Learning: A Graduate-Level Case Study in Strategic Educational Management. Asian Education and Learning Review. 2025;3(2)

4. Nuryanto UW, Basrowi, Quraysin I, Pratiwi I. Environmental management control system, blockchain adoption, cleaner production, and product efficiency on environmental reputation and performance: Empirical evidence from Indonesia. Sustain Futur. 2024;7:100190. https://www.sciencedirect.com/science/article/pii/S2666188824000406

5. Lisaria R, Prapanca D, Amatul S, Arifin K. Uncertain Supply Chain Management Forging a resilient pathway : Uncovering the relationship between the supply chain sustainability and the tax compliance , and the sustainable future of the micro , small, and medium enterprise. 2024;12:1097–112.

6. Nuryanto UW, Basrowi, Quraysin I, Pratiwi I. Magnitude of digital adaptability role: Stakeholder engagement and costless signaling in enhancing sustainable MSME performance. Heliyon [Internet]. 2024;10(13):e33484. https://doi.org/10.1016/j.heliyon.2024.e33484

7. Firmansyah R, Aljauhari MA. Integration of Ubiquitous Technology in Universal Design for Learning (UDL) to Support Inclusive Education. IJIE. 2023;… doi:10.20961/ijie.v9i1.95397

8. Koehler MJ, Mishra P, Cain W. What is technological pedagogical content knowledge (TPACK)? Journal of Education. 2013;193(3):13-20.

9. Chai CS, Koh JHL, Tsai CC, Tan LLW. Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge for meaningful learning with ICT. Computers & Education. 2011;57(1):1184-93.

10. Kennette L, Wilson N. Universal Design for Learning (UDL). Journal of Effective Teaching in Higher Education. 2019;2(1):1-26.

11. Lambert R, McNiff A, Schuck R, Imm K, Zimmerman S. "UDL is a way of thinking"; theorizing UDL teacher knowledge, beliefs, and practices. Frontiers in Education. 2023;8:1145293.

12. Raes A, Detienne L, Windey I, Depaepe F. A systematic review on synchronous hybrid learning: Gaps identified. Learning Environments Research. 2020;23(3):269-90.

13. Bozkurt A, Sharma RC. Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. Asian Journal of Distance Education. 2020;15(1):i-vi.

14. Marwanto IGGH, Basrowi, Suwarno. The Influence of Culture and Social Structure on Political Behavior in the Election of Mayor of Kediri Indonesia. Int J Adv Sci Technol [Internet]. 15 April 2020;29(05 SE-Articles):1035–47. http://sersc.org/journals/index.php/IJAST/article/view/9759

15. Basrowi, Ali H, Suyanto T. Customer Satisfaction Modelling of The Indonesia. Int J Sci Appl Sci Conf Ser P-ISSN. 2022;6(2):2549–4635. http://jurnal.uns.ac.id/ijsascs

16. Himmatul I, Nugroho I, Mardian T, Syakina D, Suryo A, Sutoto A, et al. Uncertain Supply Chain Management Enhancing company performance and profitability through agile practices : A comprehensive analysis of three key perspectives. 2024;12:1205–24.

17. Kharis A, Masyhari A, Suci W, Priatnasari Y. Uncertain Supply Chain Management Optimizing state revenue through government-driven supply chain efficiency and fair corporate taxation practices. 2024;12:659–68.

18. Suseno BD, Sutisna, Hidyat S, Basrowi. Halal supply chain and halal tourism industry in forming economic growth Bambang. Uncertain Supply Chain Manag. 2018;6(4):407–22.

19. Bond M, Bedenlier S, Marín VI, Händel M. Emergency remote teaching in higher education: Mapping the first global online semester. International Journal of Educational Technology in Higher Education. 2021;18:50:1-24.

20. Archambault L, Kennedy K, Bae J, D'Amico MM, Connolly T, McGee S, et al. Examining teacher preparation for blended and online learning. Journal of Online Learning Research. 2016;2(2):115-42.

21. Graham CR. Emerging practice and research in blended learning. In: Moore MG, editor. Handbook of Distance Education. 3rd ed. New York: Routledge; 2013. p. 333-50.

22. Garrison DR, Anderson T, Archer W. Critical inquiry in a text-based environment: Computer conferencing in higher education. Internet and Higher Education. 2000;2(2-3):87-105.

23. Zimmerman BJ. Becoming a self-regulated learner: An overview. Theory into Practice. 2002;41(2):64-70.

24. Basrowi B, Utami P. Building Strategic Planning Models Based on Digital Technology in the Sharia Capital Market. J Adv Res Law Econ Vol 11 No 3 JARLE Vol XI Issue 3(49) Summer 2020DO - 1014505/jarle.v113(49)06. 15 Juni 2020; https://journals.aserspublishing.eu/jarle/article/view/5154

25. Soenyono S, Basrowi B. Form and Trend of Violence against Women and the Legal Protection Strategy. Int J Adv Sci Technol. 25 April 2020;29(05 SE-Articles):3165–74. http://sersc.org/journals/index.php/IJAST/article/view/11636

26. Marwanto IGGH, Basrowi B, Suwarno S. The Influence of Culture and Social Structure on Political Behavior in the Election of Mayor of Kediri Indonesia. Int J Adv Sci Technol. 15 April 2020;29(05 SE-Articles):1035–47. http://sersc.org/journals/index.php/IJAST/article/view/9759

27. Suwarno Basrowi, IGGHM. Technology of Qualitative Analysis to Understand Community Political Behaviors in Regional Head Election in Wates District, Kediri, Indonesia. Int J Adv Sci Technol. 23 April 2020;29(05 SE-Articles):2624–35. http://sersc.org/journals/index.php/IJAST/article/view/11159

28. Hadi R, Shafrani YS, Hilyatin DL, Riyadi S, Basrowi B. Digital zakat management, transparency in zakat reporting, and the zakat payroll system toward zakat management accountability and its implications on zakat growth acceleration. Int J Data Netw Sci. 2019;8(1):103–8.

29. Vygotsky LS. Mind in Society: The Development of Higher Psychological Processes. Cambridge: Harvard University Press; 1978.

30. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989;13(3):319-40.

31. Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. MIS Quarterly. 2003;27(3):425-78.

32. Rogers EM. Diffusion of Innovations. 5th ed. New York: Free Press; 2003.

33. Sweller J. Cognitive load during problem solving: Effects on learning. Cognitive Science. 1988;12(2):257-85.

34. Yusuf ZFA, Yusuf FA, Nuryanto UW, Basrowi B. Assessing organizational commitment and organizational citizenship behavior in ensuring the smoothness of the supply chain for medical hospital needs towards a green hospital : Evidence from Indonesia. Uncertain Supply Chain Manag. 2024;12(1):181–94.

35. Miar M, Rizani A, Pardede RL, Basrowi B. Analysis of the effects of capital expenditure and supply chain on economic growth and their implications on the community welfare of districts and cities in central Kalimantan province. Uncertain Supply Chain Manag. 2024;12(1):489–504.

36. Alexandro R, Basrowi B. Measuring the effectiveness of smart digital organizations on digital technology adoption : An em- pirical study of educational organizations in Indonesia. Int J Data Netw Sci. 2024;8(1):139–50.

37. Purwaningsih E, Muslikh M, Suhaeri S, Basrowi B. Utilizing blockchain technology in enhancing supply chain efficiency and export performance , and its implications on the financial performance of SMEs. Uncertain Supply Chain Manag. 2024;12(1):449–60.

38. Hamdan H, Basrowi B. Do community entrepreneurial development shape the sustainability of tourist villages? Hamdana*. Uncertain Supply Chain Manag. 2024;12(1):407–22.

39. Beatty BJ. Hybrid-Flexible Course Design: Implementing student-directed hybrid classes. EdTech Books; 2019.

40. Mishra P, Koehler MJ. Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record. 2006;108(6):1017-54.

41. Creswell JW, Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. 5th ed. Thousand Oaks: SAGE Publications; 2018.

42. Johnson RB, Christensen L. Educational research: Quantitative, qualitative, and mixed approaches. 6th ed. Thousand Oaks: SAGE Publications; 2017.

43. Fraenkel JR, Wallen NE, Hyun HH. How to design and evaluate research in education. 9th ed. New York: McGraw-Hill; 2015.

44. Cohen L, Manion L, Morrison K. Research methods in education. 8th ed. London: Routledge; 2018.

45. Likert R. A technique for the measurement of attitudes. Archiv **für** Psychologie. 1932;22(140):1-55.

46. Evans JR, Mathur A. The value of online surveys: A look back and a look ahead. Internet Research. 2018;28(4):854-87.

47. Garrison DR, Vaughan ND. Blended learning in higher education: Framework, principles, and guidelines. San Francisco: Jossey-Bass; 2008.

48. Owusu-Fordjour C, Koomson CK, Hanson D. The impact of COVID-19 on learning: The perspective of the Ghanaian student. Eur J Educ Stud. 2020;7(3):88–101. https://doi.org/10.46827/ejes.v7i3.3000

49. Junaidi A, Masdar A Zum, Basrowi B, Robiatun D, Situmorang JW, Lukas A, et al. Uncertain Supply Chain Management Enhancing sustainable soybean production in Indonesia : evaluating the environmental and economic benefits of MIGO technology for integrated supply chain sustainability. Uncertain Supply Chain Manag. 2024;12(1):221–34.

50. Alexandro R, Basrowi B. The influence of macroeconomic infrastructure on supply chain smoothness and national competitiveness and its implications on a country ' s economic growth : evidence from BRICS. Uncertain Supply Chain Manag. 2024;12(1):167–80.

51. Nuryanto UW, Basrowi B, Quraysin I. Big data and IoT adoption in shaping organizational citizenship behavior: The role of innovation organiza- tional predictor in the chemical manufacturing industry. Int J Data Netw Sci. 2019;8(1):103–8.

52. Junaidi A, Basrowi B, Sabtohadi J, Wibowo AM, Wiboho SS, Asgar A, et al. The role of public administration and social media educational socialization in influencing public satisfaction on population services : The mediating role of population literacy awareness. Int J Data Netw Sci. 2024;8(1):345–56.

53. Cutri RM, Mena J, Whiting EF. Faculty readiness for online crisis teaching: transitioning to online teaching during the COVID-19 pandemic. Eur J Teach Educ. 2020;43(4):523–41. https://doi.org/10.1080/02619768.2020.1815702

54. Raes A. Learning and instruction in hybrid classrooms: An investigation of students' engagement and the effect of different modes of instruction. Comput Educ. 2022;172:104269. https://doi.org/10.1016/j.compedu.2021.104269

55. Hodges C, Moore S, Lockee B, Trust T, Bond A. The difference between emergency remote teaching and online learning. Educause Rev. 2020;27(1):1–12.

56. Wiggins GP, McTighe J. Understanding by design. 2nd ed. Alexandria: ASCD; 2005.

57. Porter WW, Graham CR, Spring KA, Welch KR. Blended learning in higher education: Institutional adoption and implementation. Comput Educ. 2014;75:185–95. https://doi.org/10.1016/j.compedu.2014.02.011

58. Bower M, Dalgarno B, Kennedy GE, Lee MJW, Kenney J. Blended synchronous learning: A handbook for educators. Sydney: University of Sydney Press; 2015.

59. Gehlbach H, Robinson C, Finefter-Rosenbluh I, Benshoof C, Schneider J. Improving teacher–student relationships in the classroom: Experimental evidence on the effectiveness of empathy-building activities. Teach Coll Rec. 2016;118(4):1–38.

60. Fullan M, Langworthy M. A rich seam: How new pedagogies find deep learning. London: Pearson; 2014.

61. Senge PM. The fifth discipline: The art and practice of the learning organization. New York: Doubleday; 2006.

62. Dweck CS. Mindset: The new psychology of success. New York: Random House; 2006.

63. UNESCO. Reimagining our futures together: A new social contract for education. Paris: UNESCO Publishing; 2021.

64. W3C. Web Content Accessibility Guidelines (WCAG) 2.1. World Wide Web Consortium; 2018. Available from: https://www.w3.org/TR/WCAG21/

65. Likert R. A technique for the measurement of attitudes. Arch Psychol. 1932;22(140):1–55.

66. Evans JR, Mathur A. The value of online surveys: A look back and a look ahead. Internet Res. 2018;28(4):854–87. https://doi.org/10.1108/IntR-03-2018-0089

67. Garrison DR, Vaughan ND. Blended learning in higher education: Framework, principles, and guidelines. San Francisco: Jossey-Bass; 2008.

68. Owusu-Fordjour C, Koomson CK, Hanson D. The impact of COVID-19 on learning: The perspective of the Ghanaian student. Eur J Educ Stud. 2020;7(3):88–101. https://doi.org/10.46827/ejes.v7i3.3000

69. Cutri RM, Mena J, Whiting EF. Faculty readiness for online crisis teaching: transitioning to online teaching during the COVID-19 pandemic. Eur J Teach Educ. 2020;43(4):523–41. https://doi.org/10.1080/02619768.2020.1815702

70. Raes A. Learning and instruction in hybrid classrooms: An investigation of students' engagement and the effect of different modes of instruction. Comput Educ. 2022;172:104269. https://doi.org/10.1016/j.compedu.2021.104269

71. Hodges C, Moore S, Lockee B, Trust T, Bond A. The difference between emergency remote teaching and online learning. Educause Rev. 2020;27(1):1–12.

72. Porter WW, Graham CR, Spring KA, Welch KR. Blended learning in higher education: Institutional adoption and implementation. Comput Educ. 2014;75:185–95. https://doi.org/10.1016/j.compedu.2014.02.011

73. Bower M, Dalgarno B, Kennedy GE, Lee MJW, Kenney J. Blended synchronous learning: A handbook for educators. Sydney: University of Sydney Press; 2015.

74. Gehlbach H, Robinson C, Finefter-Rosenbluh I, Benshoof C, Schneider J. Improving teacher–student relationships in the classroom: Experimental evidence on the effectiveness of empathy-building activities. Teach Coll Rec. 2016;118(4):1–38.

75. Fullan M, Langworthy M. A rich seam: How new pedagogies find deep learning. London: Pearson; 2014.

76. Senge PM. The fifth discipline: The art and practice of the learning organization. New York: Doubleday; 2006.

77. Dweck CS. Mindset: The new psychology of success. New York: Random House; 2006.

78. UNESCO. Reimagining our futures together: A new social contract for education. Paris: UNESCO Publishing; 2021.

79. W3C. Web Content Accessibility Guidelines (WCAG) 2.1. World Wide Web Consortium; 2018. https://www.w3.org/TR/WCAG21

80. Martin F, Polly D, Ritzhaupt AD. A systematic review of research on faculty development for online teaching and learning. Online Learning Journal. 2020;24(4):227–51.

81. McBrien JL, Cheng R, Jones P. Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. International Review of Research in Open and Distributed Learning. 2009;10(3):1–17.

82. Bailey DR, Lee AR. Learning from experience in the COVID-19 era: Impacts of remote teaching on future online education. British Journal of Educational Technology. 2020;51(6):2219–33.

83. Muthuprasad T, Aiswarya S, Aditya KS, Jha GK. Students' perception and preference for online education in India during COVID-19 pandemic. Social Sciences & Humanities Open. 2021;3(1):100101.

84. Park Y, Shea P. A review of ten years of implementation and research in HyFlex learning: A future research agenda. Distance Education. 2022;43(2):245–68.

85. Goodwin B, Miller K. Evidence on flipped classrooms is still coming in. Educational Leadership. 2013;70(6):78–80.

86. Martin F, Sun T, Westine CD. A systematic review of research on online teaching and learning from 2009 to 2018. Computers & Education. 2020;159:104009.

87. Fatani TH. Student satisfaction with videoconferencing teaching quality during the COVID-19 pandemic. BMC Medical Education. 2020;20(1):396.

88. Tadesse S, Muluye W. The impact of COVID-19 pandemic on education system in developing countries: A review. Open Journal of Social Sciences. 2020;8(10):159–70.

89. Castillo R, Gamboa A. Faculty readiness for HyFlex instruction: Insights from Latin American higher education. Journal of Educational Technology Development and Exchange. 2024;17(1):45–62.

90. Moore MG. The theory of transactional distance. In: Keegan D, editor. Theoretical principles of distance education. London: Routledge; 1993. p. 22–38.

91. Anderson T. Modes of interaction in distance education: Recent developments and research questions. In: Handbook of Distance Education. 4th ed. New York: Routledge; 2018. p. 227–44.

92. Rovai AP. Building sense of community at a distance. International Review of Research in Open and Distance Learning. 2002;3(1):1–16.

93. Harper B, Chen C-H, Yen D. A mixed-methods study of teacher beliefs about technology integration in HyFlex learning environments. Australasian Journal of Educational Technology. 2024;40(2):92–111.

94. Fidalgo P, Thormann J, Kulyk O, Lencastre JA. Students' perceptions on distance education: A multinational study. International Journal of Educational Technology in Higher Education. 2020;17(1):18.

95. Johnson N, Veletsianos G, Seaman J. U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. Online Learning Journal. 2020;24(2):6–21

FINANCING

This research was conducted through the author's personal resources, without external financial support. The study was made possible with intake assistance and institutional facilitation provided by Pangasinan State University–Lingayen Campus, Philippines.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

AUTHORSHIP CONTRIBUTION

Conceptualization: Katherine V. Queroda.
Data curation: Katherine V. Queroda.
Formal analysis: Katherine V. Queroda.
Research: Katherine V. Queroda.
Methodology: Katherine V. Queroda.
Resources: Katherine V. Queroda.
Supervision: Phillip G. Queroda.
Validation: Phillip G. Queroda.
Display: Katherine V. Queroda.
Drafting - original draft: Katherine V. Queroda.