Journal of Harbin Engineering University Vol 47 No. 3
ISSN: 1006-7043 March 2026

Enhancement or Transformation: Teacher Perceptions of Technology Integration During Pandemic-Driven Flexible Learning Using the SAMR Model

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Abstract

The COVID-19 pandemic accelerated the implementation of technology-enhanced flexible learning across higher education. While existing literature provides extensive accounts of emergency remote teaching, fewer studies examine how teachers conceptualized and perceived their own digital transformation during this period. This study explores teachers' perceived levels of educational technology integration during the pandemic using the SAMR (Substitution, Augmentation, Modification, Redefinition) model. The study also examines whether perceived transformation correlated with demographic profiles or competencies related to technology-enhanced flexible learning. A descriptive-evaluative design was employed using data gathered from an open online course involving 118 teachers from private higher education institutions in the Philippines. Results show that participants tended to classify their instructional adaptations within the Modification and Redefinition categories, indicating a perceived shift toward transformative practices rather than mere enhancement. However, statistical analyses found no significant relationships between SAMR levels and demographic profiles or competencies. These findings imply that contextual and situational pressures may have driven perceptions of transformation during the pandemic, rather than by pre-existing expertise or structural readiness. The study highlights the importance of understanding teacher perceptions as post-pandemic reforms move toward institutionalizing flexible learning and strengthening digital pedagogical capacity.

Keywords: SAMR model; flexible learning; technology integration; digital pedagogy; pandemic education; teacher perceptions; higher education

INTRODUCTION

The COVID-19 pandemic produced an unprecedented disruption in higher education, requiring institutions to transition from traditional face-to-face instruction to digital modalities rapidly. This transition unfolded under emergency conditions and limited preparation, resulting in what Hodges et al. (2020) describe as Emergency Remote Teaching—a temporary and reactive instructional response distinct from deliberately designed online learning. Within this context, higher education institutions (HEIs) worldwide adopted diverse modal configurations including open and distance learning, blended learning, fully online delivery, and hybrid forms of synchronous, asynchronous, and bi-chronous learning. These modalities required recalibrating course syllabi, learning outcomes, assessments, and practicum or internship arrangements, as well as developing basic digital support systems to maintain instructional continuity.

In the Philippine context, the Commission on Higher Education (CHED) mandated both public and private HEIs to implement flexible learning during the pandemic (CMO 4, s. 2020). This policy direction prompted curricular adjustments and required teachers to redesign instructional activities using digital platforms and tools. Although educational technologies enabled lecture capture, asynchronous modules, digital assessment, and multimedia-based student tasks, the presence of technology alone did not ensure pedagogical coherence or innovation. A central challenge for teachers was determining whether technology merely enhanced existing practices or enabled fundamentally new forms of instruction (Haleem et al., 2022). Students similarly encountered barriers associated with cognitive load, learning strategy shifts, and connectivity limitations, particularly in resource-constrained environments.

The Substitution–Augmentation–Modification–Redefinition (SAMR) model proposed by Puentedura (2006), illustrated in Figure 1, provides a valuable framework for analyzing how digital technologies mediate instructional redesign. At the lower tiers, technology either substitutes or augments traditional tasks (enhancement), such as

using an LMS instead of printed materials or administering assessments online. At higher tiers, technology modifies or redefines tasks (transformation), enabling learning activities that would be difficult or impractical in conventional classroom settings. This distinction offers analytical leverage for understanding how flexible learning was operationalized during the pandemic and whether digital adoption reflected enhancement or transformation.

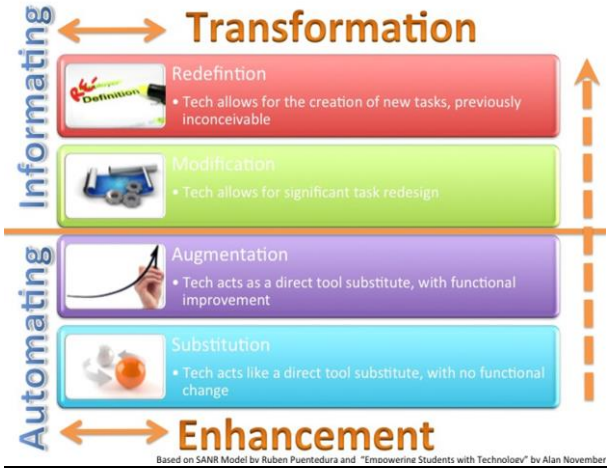

Figure 1. The SAMR Model

Existing research applying the SAMR model has analyzed technology integration in varied educational settings, including vocational training (Aprinaldi et al., 2018), mobile learning (Romrell et al., 2014), and language instruction (Alivi, 2019). A recent scoping review of 230 publications found widespread use of SAMR in digital pedagogy research. However, inconsistencies in classification highlight the relevance of context, teacher experience, and technological familiarity (Blundell et al., 2022). However, empirical work on how teachers perceived their level of technology integration during the pandemic remains limited, especially in developing countries where flexible learning was implemented amid infrastructural and pedagogical constraints.

This study addresses this gap by examining teachers' perceived levels of technology integration during the pandemic-driven implementation of flexible learning. Using the SAMR model, perceived instructional practices were classified to determine whether digital adoption reflected enhancement or transformation. The analysis focused on three areas: (1) levels of educational technology integration, (2) relationships between integration levels and teacher demographic profiles, and (3) relationships between integration levels and competencies in technology-enhanced flexible learning.

LITERATURE REVIEW

The pandemic accelerated the adoption of technology-mediated instruction and flexible learning in higher education. Early analyses conceptualized this transition as Emergency Remote Teaching (ERT), distinguishing it from intentionally designed online learning (Hodges et al., 2020). Although emergency digitalization enabled instructional continuity, it did not always produce pedagogically grounded innovation. In many cases, HEIs prioritized deploying learning management systems (LMS) and videoconferencing tools to sustain course delivery rather than redesigning learning tasks or assessment structures.

Flexible learning has since been associated with broader digital transformation agendas, wherein technology reshapes instructional delivery, assessment, interaction, and collaboration. Reviews show that HEIs adopted combinations of synchronous, asynchronous, and bi-chronous modalities to support learning continuity during the pandemic (Bozkurt & Sharma, 2020). However, scholars emphasize that technology adoption alone does not guarantee transformation; meaningful change depends on intentional instructional design that aligns tools with learning outcomes, cognitive processes, and performance-based assessments (Haleem et al., 2022). In the Philippines, CHED's flexible learning mandate (CMO 4, s. 2020) supported digital delivery. However, it did not directly address alignment issues across content, assessment, and engagement strategies.

Research on instructional design highlights that transformative digital learning requires deliberate integration of learning theories, task construction, and multimodal assessment (Romrell, Kidder, & Wood, 2014; Lidolf & Pasco, 2020). However, pandemic-era digital practice was constrained by contextual factors such as teacher preparedness, bandwidth limitations, and disparities in device access—challenges that are especially pronounced in the Global South. Systematic reviews note uneven levels of digital pedagogical competence among university faculty, with many teachers confident in using basic tools but less adept at designing student-centered, collaborative, and performance-based digital tasks (Akram et al., 2022; Howard, 2020). Teachers frequently relied on LMS quizzes and video lectures rather than authentic tasks that leverage technology to support higher-order learning.

In developing countries, digital adoption intersected with infrastructural gaps and uneven institutional capacity. Philippine literature

documents how hybrid and flexible learning models required not only enhanced teacher competencies but also the strengthening of institutional support systems, including helpdesk functions, content repositories, and technological infrastructures (Marcial & Habalo, 2017; Maypa, Marcial & Montemayor, 2023). These studies underscore that digital transitions involve coping strategies, workflow redesign, and adjustments in student engagement mechanisms.

The Substitution–Augmentation–Modification–Redefinition (SAMR) model (Puentedura, 2006) has become a widely adopted framework for evaluating levels of technology integration. Substitution and Augmentation represent task enhancement, while Modification and Redefinition represent transformation. Scoping reviews reveal growing use of SAMR in digital pedagogy research but also highlight inconsistencies in categorization and interpretation, suggesting that transformation is context-dependent and mediated by teacher experience and technological familiarity (Blundell, Lee & Nykvist, 2022). The debate persists over whether pandemic-era digital practices achieved genuine transformation or merely enhanced delivery. Some studies report increased experimentation with cloud-based collaboration and multimedia outputs (Suyo-Vega, Fernández-Bedoya & Meneses-La-Riva, 2024), while others argue that teachers often equate tool use with innovation, thereby overstating the extent of transformation (Hodges et al., 2020). This distinction mirrors emerging scholarship that differentiates between perceived and demonstrated transformation.

Digital transformation is also shaped by institutional capacity and equity conditions. Globally, faculty development units, quality assurance mechanisms, and data governance frameworks have become critical for sustaining digital pedagogy beyond emergency conditions (Ramanadhan et al., 2021). At the same time, digital stratification—in terms of access, infrastructure, and socio-economic conditions—affected participation and engagement in learning, particularly in developing country contexts (Nicholas, 2021). Philippine experiences illustrate how flexible learning reproduced existing inequities in device access, LMS usage, and synchronous attendance, revealing interdependencies between technological innovation and digital equity.

Synthesis of the literature reveals four prevailing trends in pandemic-era digital pedagogy. First, technology adoption accelerated rapidly but was not always accompanied by improvements in instructional design or assessment practices. Second, teacher competencies varied widely, particularly in aligning digital tools with learning outcomes and performance tasks. Third, transformation in digital instruction was often self-reported, producing a gap between perceived innovation and observable pedagogical change. Fourth, equity and institutional support emerged as decisive determinants of digital learning outcomes, especially in developing contexts characterized by infrastructural limitations and resource disparities.

Despite substantial scholarship on ERT, flexible learning, and digital pedagogy, empirical studies examining teacher perceptions of instructional transformation through frameworks such as SAMR remain limited, particularly in developing countries. Few studies investigate whether perceptions of transformation are associated with demographic variables, competencies, or contextual factors. Addressing these gaps is essential for informing post-pandemic digital strategies that move beyond survival-driven digitalization toward intentional, learning-centered, and institutionally supported pedagogical innovation.

METHODS

This study employed a descriptive research design to examine teachers' perceived levels of technology integration during the COVID-19 pandemic. Data were derived from an open online course titled *Portable Learning Management System: A Platform for Technology-Enhanced Flexible Learning in Schools with Challenging Internet Connectivity* (Marcial, 2021). The course ran for three months and consisted of 11 modules designed to develop competencies in technology-enhanced flexible learning. Course delivery combined synchronous and asynchronous activities and employed "bi-chronous" learning, flipped learning, and microlearning strategies through a learning management system.

Participation in the course was voluntary; therefore, convenience sampling was applied. A total of 118 practicing teachers from private higher education institutions (HEIs) in the Philippines completed the relevant module and were included in the analysis. One module, *Teaching and Learning Framework in Technology-Enhanced Flexible Learning*, required participants to identify a course they were teaching and select a corresponding class activity. They then reflected on how technology was integrated into the chosen activity and categorized the level of integration using the SAMR model (Substitution, Augmentation, Modification, Redefinition). Written justifications accompanied each classification. Participants also identified

corresponding learning objectives using Bloom's digital taxonomy. They listed the technologies used (e.g., LMS resources, conferencing platforms, discussion forums, video editing tools).

Data were treated as categorical variables. SAMR classifications were coded into four categories (Substitution, Augmentation, Modification, Redefinition). Descriptive statistics were generated to compare the distribution of integration levels. Inferential analyses were conducted to assess potential associations between SAMR levels and participant characteristics. Chi-square tests were used to examine relationships between integration levels and demographic or technological profile variables. At the same time, multiple regression analysis was used to determine whether participants' self-reported competencies in technology-enhanced flexible learning predicted their perceived levels of technology integration.

Ethical considerations were observed throughout the study. Participation in the training constituted informed consent for the use of anonymized data for research and reporting purposes. No personally identifiable information was collected, and data were analyzed in accordance with standard research ethics practices.

RESULTS AND DISCUSSION

Educational Technology Integration using SAMR Model

Table 1 shows that teachers' perceived levels of technology integration varied across the SAMR classifications. A total of 44 participants (37%) reported that their instructional adaptations during the pandemic reached the Redefinition level, which occupies the highest tier of the SAMR framework. This was followed by Modification (n = 35, 30%), Augmentation (n = 23, 19%), and Substitution (n = 16, 14%).

Table 1. Integration Level using SAMR

Integration Level	f (%)	Rank
*S*ubstitution	16 (14)	4
*A*ugmentation	23 (19)	3
*M*odification	35 (30)	2
*R*edefinition	44 (37)	1
	118 (100)	

The distribution of SAMR classifications indicates that most teachers perceived their technology integration during flexible learning as operating at the higher tiers of the framework, with 37% identifying their activities as Redefinition and 30% as Modification. These levels constitute what Puentedura (2006) refers to as the "transformational" zone of the SAMR model, where technology enables significant redesign or creation of learning tasks beyond what is conventionally possible in face-to-face instruction. In contrast, only 14% of participants situated their practices at the Substitution level, where technology merely replaces traditional tools without altering instructional purpose, and 19% at the Augmentation level, where functional improvements are present but tasks remain essentially unchanged.

This pattern suggests that teachers believed the pandemic-induced shift to flexible learning fostered opportunities for pedagogical innovation rather than simply technological substitution. One interpretation of this trend is that the forced migration to digital platforms compelled teachers to explore communication, assessment, and content-delivery tools that were previously peripheral to their instructional practice. For example, the use of video-based demonstrations, cloud-based collaboration, student-created multimedia outputs, and LMS-embedded assessments was commonly perceived as evidence of instructional redesign. Such findings are consistent with international reports arguing that the pandemic accelerated digital experimentation and expanded teachers' repertoires of technology-mediated practices (Bozkurt & Sharma, 2020).

However, the dominance of self-reported transformation must be interpreted cautiously. Emerging literature distinguishes between perceived transformation and demonstrated transformation, noting that many activities classified as Redefinition during emergency remote teaching may, under closer pedagogical evaluation, align more closely with Augmentation or Modification (Hodges et al., 2020; Blundell et al., 2022). The SAMR model itself centers on the transformation of tasks rather than the adoption of tools; therefore, teachers' familiarity with digital platforms may inflate perceptions of transformation even when instructional design changes are limited. This implies that future faculty development initiatives should not only focus on digital tool proficiency but also on instructional design, feedback mechanisms, and assessment alignment to ensure technology use supports learning rather than merely modernizing delivery. Yilmaz and Lal (2020) discuss how technology-enhanced strategies can expand faculty development by leveraging online tools for just-in-time instruction and performance analytics.

The results further suggest implications for institutional and policy directions in the post-pandemic landscape. First, the perceived prevalence of transformation indicates a favorable disposition toward technology integration among HEI faculty, which could serve as leverage for sustaining flexible learning beyond crisis conditions (Sartono et al., 2024). Second, the findings highlight the need for structured institutional support—including LMS infrastructure, digital content repositories, and technical assistance—to convert perceived pedagogical innovation into sustainable and evidence-based practice (Suyo-Vega et al., 2024). Finally, the results underscore the value of continued research into the relationship between teacher perception, digital competence, and student learning outcomes (Maypa et al., 2023). Triangulating self-assessments with classroom artifacts, student feedback, or observational data may offer a more nuanced understanding of technology-enhanced learning in low-connectivity, resource-constrained environments characteristic of many Philippine HEIs.

Relationships Between Integration Level and Profiles

Table 2 presents the chi-square tests used to determine whether teachers' perceived level of technology integration differed across demographic and technological profiles. Across all profile variables—including social media presence (FB Account, Twitter Account), digital engagement measures (Social Technologic Ladder, Internet Experience), and socio-demographic indicators (Sex, Civil Status, Highest Educational Attainment, School Type, and Region)—no statistically significant relationships were found ($p > .05$). This suggests that participants' SAMR classifications were relatively uniform, independent of their demographic backgrounds, geographic locations, or levels of technological exposure.

The absence of statistically significant associations indicates that teachers' self-reported levels of technology integration did not differ meaningfully by demographic characteristics or fundamental indicators of digital engagement. One interpretation of this trend is that the rapid shift to flexible learning during the pandemic served as a leveling force, compelling both highly and minimally digitally engaged teachers to adopt digital instructional practices regardless of prior exposure. This aligns with pandemic-era accounts describing a "flattening effect" in digital adoption, in which institutional mandates and situational urgency override individual differences in technological readiness (Bozkurt & Sharma, 2020).

Table 2. Test of Relationships Between Integration Level and Profiles

ariables	x^2 value	*p*-value	df	Remarks
FB Account	1.42	0.7	3	Not Significant
Twitter Account	1.79	0.62	3	Not Significant
Social Technologic al Ladder	22.47	0.21	18	Not Significant
Internet Experience	6.45	0.89	12	Not Significant
Sex	4.93	0.18	3	Not Significant
Civil Status	8.61	0.2	6	Not Significant
Highest Educational Attainment	2.35	0.89	6	Not Significant
School Type	1.88	0.6	3	Not Significant
Region	48.16	0.08	36	Not Significant

The finding that demographic attributes such as sex, civil status, and educational attainment did not influence perceived technology integration challenges, as earlier pre-pandemic literature suggests, suggests that digital adoption in education is often stratified by gender, age, or academic qualification (Ayyagari et al., 2011). The lack of regional differences suggests that the implementation of flexible learning, at least in terms of perceived pedagogical change, was not significantly shaped by geographic conditions, even though regional disparities in connectivity and technological infrastructure are well documented in the Philippine context. Similarly, indicators of digital lifestyle—such as Facebook and Twitter use or self-placement on a social-technological ladder—did not predict SAMR classification, suggesting that being digitally active does not necessarily translate into pedagogical innovation or transformation.

These results hold several implications for higher education policy and faculty development. First, uniformity in perceived integration suggests that capacity-building efforts need not target specific demographic subgroups; instead, they can be

designed as broad-based interventions (Ramanadhan et al., 2021). Second, the findings highlight that increasing teachers' general digital engagement (e.g., social media activity) may not directly translate into more sophisticated pedagogical use of technology. This underscores the importance of instructional design-focused training, rather than tool-focused training alone (Marcial & Habalo, 2017). Finally, the lack of association between Internet experience and SAMR levels raises questions about the depth of teachers' pedagogical adaptation. If teachers with limited digital exposure classified their activities as transformational at rates similar to those of digitally engaged peers, this may reflect inflation in self-assessment or limited conceptual differentiation between enhancement and transformation in the SAMR model (Blundell et al., 2022).

For post-pandemic sustainable digital transformation, institutions may benefit from incorporating more objective indicators of integration—such as classroom artifacts, peer review, or student performance data—to supplement self-report measures. Such triangulation would clarify whether the lack of stratification observed here reflects a genuine democratization of digital pedagogy or whether it masks inconsistencies in the interpretation of transformation within digital learning frameworks (Nicholas, 2021).

Relationships Between Integration Level and Competency in Technology-Enhanced Flexible Learning

Table 3 presents the chi-square results examining whether competencies associated with technology-enhanced flexible learning were related to teachers' perceived levels of SAMR integration. Across all competency domains—including educational philosophy, leadership, instructional design, assessment, resources management, synergy of technology and learning theories, and student interaction management—no statistically significant associations were found ($p > .05$). This indicates that self-reported competency levels did not influence differences in perceived integration levels in any specific dimension of flexible learning.

The absence of significant relationships suggests that teacher perceptions of technology integration may operate independently from their broader competencies in technology-enhanced flexible learning (Akram et al., 2022). One explanation for this pattern is that the SAMR classifications used in this study reflect task-specific instructional choices rather than holistic pedagogical capacity (Barends, 2022). That is, a teacher may be competent in instructional design, assessment, or leadership yet still classify a chosen activity at a lower SAMR level due to contextual constraints such as course type, learning objectives, or disciplinary demands. Conversely, a teacher may classify an activity as Modification or Redefinition even without strong foundational competencies if the activity itself involves multimedia or collaborative digital tasks.

The null findings also reinforce observations from pandemic-era research indicating that technology adoption during emergency remote teaching was highly pragmatic, situational, and tool-driven (Hodges et al., 2020). Teachers tended to select tools that enabled continuity rather than those that aligned with deeper instructional design principles. As a result, self-reported transformation in SAMR terms may not map onto broader digital pedagogy competencies. This decoupling between competencies and transformation aligns with the global literature, which shows that teachers can become proficient in using digital tools without achieving the levels of integration envisioned by learning design frameworks (Blundell et al., 2022; Romero-Hernández et al., 2021).

Table 3. Test of Relationships Between Integration Level and Competency in Technology-Enhanced Flexible Learning

Variables	x^2 value	*p*-value	df	Remarks
Educational Philosophy	17.17	0.14	12	Not Significant
Leadership	6.3	0.9	12	Not Significant
Synergy of Technology and Learning Theories	4.33	0.98	12	Not Significant
Teaching and Learning Framework	10.21	0.6	12	Not Significant
Curricular Transitioning	11.5	0.49	12	Not Significant

Tools and Platforms	13.88	0.31	12	Not Significant
Instructional Design	8.64	0.73	12	Not Significant
Resources Management	5.22	0.95	12	Not Significant
Assessment	5.27	0.95	12	Not Significant
Student Interaction Management	3	1	12	Not Significant
Data Privacy	10.07	0.61	12	Not Significant

In a Philippine higher education context, the findings imply that institutional capacity-building cannot rely solely on competency frameworks or training checklists to ensure pedagogical innovation. While competencies such as assessment design, data privacy compliance, or curricular transitioning are essential for robust, flexible learning ecosystems, they do not necessarily drive teachers toward transformative uses of technology. This suggests the need for targeted professional development that explicitly links competencies to instructional redesign models (e.g., SAMR, TPACK, or Bloom's digital taxonomy) and that foregrounds student-centered, performance-based learning outcomes. Lidolf and Pasco (2020) emphasized that effective professional development must connect technological competencies with instructional design frameworks and student-centered learning approaches, rather than focusing solely on tool familiarization.

Finally, the lack of association between competencies and perceived SAMR levels further supports the case for triangulating self-reported transformation with independent artifacts (e.g., syllabi, LMS logs, student outputs, or peer reviews). Such triangulation would help determine whether the transformation is genuinely pedagogical or predominantly perceptual (Howard, 2020). Post-pandemic efforts to sustain flexible learning may benefit from shifting evaluation strategies from teacher beliefs about transformation toward demonstrable changes in learning tasks, assessment forms, and student engagement.

Further, multiple regression analysis was conducted to determine whether demographic profiles and competencies in technology-enhanced flexible learning predicted teachers' perceived levels of technology integration, as defined by the SAMR model. The results showed that none of the demographic variables—including Facebook and Twitter use, social technographic ladder placement, internet experience, sex, civil status, educational attainment, school type, and region—were statistically significant predictors of integration level ($p > .05$). These findings support earlier results from the chi-square tests, indicating that teachers' perceptions of their technology integration practices were relatively consistent across demographic subgroups and not influenced by differences in digital lifestyle, educational background, or geographical location.

Regression analysis involving competency variables similarly revealed no significant predictors, with educational philosophy, leadership, synergy of technology and learning theories, teaching and learning framework, curricular transitioning, instructional design, resource management, assessment, student interaction management, and privacy all exhibiting nonsignificant coefficients ($p > .05$). Notably, only the "Tools and Platforms" competency approached statistical significance ($p = .05$), suggesting a marginal relationship between proficiency with technological tools and perceived integration. This trend implies that while broader pedagogical competencies did not translate into higher SAMR classifications, technical tool fluency may serve as a threshold condition enabling teachers to redesign learning tasks beyond substitution or Augmentation.

Collectively, these findings reinforce the notion that pandemic-driven technology adoption was pragmatic and tool-centric rather than pedagogy-centric. Teachers may have perceived themselves as engaging in transformational practices primarily because of their exposure to and use of digital platforms, rather than due to underlying shifts in instructional design, assessment alignment, or student engagement strategies. Hodges et al. (2020) argued that much of the pandemic-driven digital adoption was tool-centric and operational, lacking the instructional redesign typically associated with transformational online learning. The lack of demographic and competency predictors also implies that self-reported transformation during flexible learning was not strongly stratified by experience or expertise, suggesting a form of "emergency democratization" in technology integration during the pandemic. Emergency remote teaching forced widespread

adoption of digital technologies across diverse teaching contexts, leading many educators to integrate tools largely out of necessity rather than as a function of prior expertise or preparedness, thereby reducing variations in technology use attributable to experience or background (Sum et al., 2022). This highlights the need for post-pandemic faculty development to move beyond operational training on platforms and applications toward deeper pedagogical integration frameworks that emphasize learning outcomes, interaction patterns, and performance-based assessment. Furthermore, these findings underscore the importance of triangulating self-reported measures with instructional artifacts and student data to differentiate perceived transformation from demonstrated transformation.

CONCLUSION AND RECOMMENDATIONS

This study provides empirical insights into how teachers perceived their technology integration practices during the pandemic-induced transition to flexible learning. The dominance of Modification and Redefinition classifications suggests that teachers viewed crisis-driven digital adoption as a transformative endeavor rather than as a mere enhancement of traditional instruction. However, the absence of significant demographic and competency predictors challenges common assumptions that digital pedagogical transformation is stratified by digital experience, educational background, or proficiency in flexible-learning competencies. Instead, the findings indicate that emergency digitalization created an atypical adoption context, in which external pressures and institutional mandates compelled teachers at all skill levels to participate in digital teaching regardless of their prior readiness.

Three contributions emerge from these results. First, the findings complicate stage-based models of technology adoption by revealing that perceived pedagogical transformation can occur independently of established competency frameworks or prior digital exposure. Second, they raise questions about the validity of self-reported measures of transformation during emergency conditions, particularly when tool familiarity and platform use may be conflated with instructional redesign, assessment alignment, or student engagement. Third, they encourage a post-pandemic rethinking of flexible learning as a pedagogical paradigm, shifting the transformation from tool-centric and survival-driven to learning-centered, assessment-aligned, and institutionally governed.

The implications for higher education policy and practice are notable. Philippine HEIs seeking to institutionalize flexible learning must move beyond platform provisioning and compliance-based training toward faculty development approaches that emphasize instructional design, student performance, and pedagogical intentionality (e.g., learning analytics, content-repository support, and assessment redesign initiatives). Structured supports, such as instructional design units and post-pandemic digital transformation plans, may be necessary to translate perceived transformation into demonstrated transformation. Otherwise, flexible learning risks reverting to pre-pandemic modalities or stagnating at surface-level substitution and Augmentation.

Future professional development should prioritize (a) frameworks such as SAMR, TPACK, or Bloom's digital taxonomy to link competency with instructional redesign; (b) assessment-focused training to encourage performance-based digital outputs; and (c) evaluation mechanisms that integrate student engagement and feedback. HEIs may also benefit from documenting digital artifacts (e.g., syllabi, LMS logs, multimedia outputs) to establish a clearer evidence base for pedagogical transformation. At a policy level, post-pandemic transition plans should integrate flexible learning into strategic planning, accreditation, and quality assurance processes to ensure sustainability beyond the emergency phase. Research should also consider cross-institutional comparisons between HEI types and regulatory environments to better understand digital learning trajectories within the Philippine context.

Several limitations should be considered in interpreting the findings. First, the study relied on self-reported perceptions from an online training course, which may have inflated perceived levels of pedagogical transformation. For example, teachers may classify multimedia tasks as Redefinition even when instructional design remains unchanged. Second, the sample was restricted to teachers from private HEIs who voluntarily enrolled in a technology-oriented course, potentially biasing results toward digitally motivated participants. Third, the study analyzed a single instructional activity rather than multiple course components (e.g., assessments, feedback practices, or student outputs). Fourth, the pandemic context itself complicated distinctions between innovation and improvisation, making it challenging to separate emergency-driven tool use from intentional redesign. Finally, triangulation with student data, observational evidence, or independent artifact

review was not conducted, limiting claims regarding the depth and quality of transformation.

In light of these limitations, future research should incorporate triangulated data sources, including classroom artifacts and student outcomes, to more accurately assess the depth and sustainability of pedagogical transformation. Longitudinal designs may also illuminate whether emergency-driven experimentation leads to durable innovation or whether perceived transformation dissipates as crisis conditions recede. Given the unique challenges of the Global South, further inquiry is needed on how infrastructural disparities, regulatory conditions, and cultural factors shape technology-enhanced teaching and learning in Philippine HEIs.

ACKNOWLEDGEMENT

We express our sincere gratitude to the Philippine Commission on Higher Education for its funding support. We also extend our appreciation to the participants of the 7th National Conference on Open and Distance eLearning held on November 23–25, 2022, for their constructive comments and suggestions on earlier versions of this paper.

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