

Technology-Supported Instruction In General Mathematics: Its Intuitive Implications Among Marginalized Filipino Students Amidst The Post-Pandemic Period

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Abstract

In the wake of the post-pandemic landscape, this study delves into the nuanced terrain of technology-supported instruction in the realm of general mathematics, specifically discerning its intuitive ramifications within the context of marginalized Filipino students. Employing a judicious mixed-method research paradigm, this inquiry embarks on an exploration of the multifaceted impact rendered by technology on diverse facets including academic attainment, cognitive engagement, and pedagogical agency. Encompassing a synergistic amalgamation of quantitative surveys and qualitative interviews, the study unveils a holistic narrative that underscores technology's transformative potential to bridge educational disparities, amplify cognitive discourse, and cultivate pedagogical convergence. Consequently, the findings engender a cogent compass, offering discerning insights to inform the praxis of educators, policymakers, and stakeholders aspiring to orchestrate a dynamically inclusive and technologically enriched scholastic milieu for marginalized Filipino learners.

Keyword: Teaching Strategies, Technology-infused Instruction, General Mathematics, Post-pandemic Pedagogical Shifts and Challenges

I. Introduction

In recent times, the world has experienced an unprecedented shift in education due to the outbreak of the pandemic. With traditional classrooms becoming less feasible, there has been an increasing reliance on technology to continue education remotely. Within the Filipino educational landscape, certain groups of learners, particularly the marginalized students, face significant obstacles that hinder their learning experiences. These challenges may range from limited access to educational resources and connectivity issues to socio-economic disparities. This current empirical investigation recognizes the need to address these disparities and assesses how technology-infused instruction can potentially alleviate the learning difficulties faced by marginalized Filipino learners. By focusing on the intuitive implications of integrating technology in math education, the study seeks to shed light on how these learners can benefit from innovative teaching approaches, thereby fostering inclusivity and enhancing their educational outcomes.

The rationale behind this inquiry is driven by the opportunity to foster a constructive influence on the education of marginalized Filipino learners amidst these challenging circumstances. As the pandemic persistently disrupts conventional teaching approaches, there arises a pressing need to swiftly adapt and explore alternative strategies that ensure uninterrupted and effective learning experiences. Through an exploration of the intuitive implications of technology-supported instruction in general mathematics, this investigation aims to equip educators, policymakers, and stakeholders with insights to foster a more inclusive and just learning environment. By delving into a profound comprehension of how technology can function as an instrument to empower marginalized learners, this scholarly endeavor contributes to the ongoing discourse surrounding the

enhancement of educational practices within the Philippines and beyond.

Hence, the current study aims to explore the use of technology-supported instruction in the context of general mathematics during the pandemic. By examining how technology can assist in teaching math in this challenging period, valuable insights can be gained into its potential to bridge the gap created by disrupted traditional learning methods. More significantly, it has the potential to provide insights into effectively tackling the challenges encountered by marginalized Filipino learners when participating in this mode of instruction. These insights could serve as valuable guidance to mitigate potential hindrances to their learning progress and academic accomplishments in the subject.

2. Literature Review

2.1 Technological Imperatives in Mathematics Education amidst the pandemic

The advent of the "New Normal" has ushered in a transformative phase for education, especially in the realm of mathematics (Jandrić et al., 2022). The integration of technology into traditional pedagogical methods has become an imperative, redefining the landscape of mathematics education. Interactive simulations, multimedia content, and data-driven assessments are at the forefront of this evolution. These tools not only make learning engaging and dynamic but also provide educators with insights into individual student progress and areas that require additional attention (Attard & Holmes, 2022). As schools and institutions adapt to the changing educational paradigm, harnessing these technological imperatives becomes crucial to ensuring a seamless and effective learning experience for students, regardless of physical constraints.

While technological advancements bring promising prospects, the digital divide has emerged as a significant challenge. Unequal access to technology and varying levels of digital literacy among students have created a divide that could potentially hinder the realization of technological imperatives (Jamil & Almunawar, 2021). Addressing this challenge presents both an ethical and educational opportunity. Schools and policymakers are tasked with ensuring that all students have access to the necessary tools and resources. The New Normal demands a proactive approach to bridge this divide, enabling every student to reap the benefits of technology-driven mathematics education (Bozkurt et al., 2020). This dual challenge of embracing technology while ensuring inclusivity underscores the critical need to create an equitable educational ecosystem.

The adoption of technological imperatives in mathematics education necessitates a shift in pedagogical strategies and a redefinition of the teacher's role. Educators are no longer just transmitters of information; they become facilitators of learning experiences (Mohebi, 2021). Interactive simulations and multimedia content empower teachers to create engaging lessons that cater to diverse learning styles. Data-driven assessments provide educators with insights to personalize instruction and offer timely interventions. However, this transformation also requires teachers to embrace digital literacy themselves (Ryan et al., 2019). Professional development and training become integral to empower educators with the skills needed to effectively integrate technology into their teaching practices. The New Normal thus prompts a reimagining of the teacher-student dynamic, where technology is a tool that enhances both teaching and learning processes (Rapanta et al., 2021).

2.2 Effects of Technological-driven Instruction in Managing the Mathematics Lessons

The educational inequalities and access disparities is one of the negative effects brought about by a technology-driven instruction in managing the lessons in mathematics among the marginalized Filipino (Salayo et al., 2020). It sheds light on the stark challenges faced by learners within the Philippines' diverse socio-economic landscape. As technology takes center stage in education, the inequalities that have long persisted are becoming even more pronounced. Many Filipino students, particularly those from marginalized backgrounds, lack the necessary tools and resources to fully participate in technology-driven mathematics instruction (Kishore & Shah, 2019). While some students can seamlessly transition to online platforms and benefit from interactive simulations and multimedia content, others are left grappling with limited access to devices and unreliable internet connections.

These access disparities create a profound divide in educational opportunities. Students who have access to technology can engage with dynamic learning materials, collaborate with peers virtually, and receive timely feedback (Moldavan et al., 2021). Conversely, students without these resources face significant barriers that hinder their learning experiences. This divide goes beyond mere technological tools; it influences a student's ability to comprehend mathematical concepts, interact with educators, and actively participate in the learning process (Capone & Lepore, 2022). Consequently, as the educational landscape evolves, the urgent need to address these inequalities becomes more pressing. Policymakers, educators, and stakeholders must collaborate to implement strategies that provide marginalized Filipino students with equal access to technology-driven mathematics education. By doing so, the nation can take meaningful steps towards bridging the digital gap and ensuring that

all students, regardless of their socio-economic backgrounds, have an equitable chance to thrive in the "New Normal" (Dakay et al., 2023).

Also, technology integration has some effects on the learning outcomes among marginalized Filipino students. In a time marked by the "New Normal," where educational paradigms have shifted significantly, technology presents both opportunities and challenges for students (Adipat, 2021). The integration of interactive simulations, multimedia resources, and data-driven assessments holds the potential to bridge gaps in traditional instruction methods and cater to diverse learning styles, thereby potentially improving learning outcomes. While technology can open doors to more engaging learning experiences, its successful implementation hinges on various factors, including access to digital devices and reliable internet connectivity (Adnan & Anwar, 2020). Moreover, the learning outcomes achieved through technology depend on the alignment of technology-enhanced materials with the specific needs of marginalized learners. Tailoring instructional content to reflect cultural nuances and catering to varying learning paces becomes imperative for optimal impact. By exploring how technology impacts the learning outcomes of marginalized Filipino students, this topic provides insight into the potential for technology to level the educational playing field while simultaneously underlining the importance of addressing access disparities and ensuring equitable learning experiences for all students (Abisado et al., 2020).

Previous scientific investigations pointed out some effects of a technology-driven instruction on the psychological well-being and inclusivity (Wang et al., 2021). They highlight a critical aspect of education often overlooked in the era of technological advancement. As technology becomes an integral part of learning, it impacts not only cognitive development but also the emotional and psychological well-being of

students, particularly those who belong to marginalized backgrounds. The concept of psychological well-being encompasses feelings of belonging, self-confidence, and emotional stability, all of which are closely intertwined with the learning process (Lailatul Widha et al., 2021).

In the context of marginalized Filipino students, the integration of technology can lead to both positive and negative psychological implications (Karakaya et al., 2021). On the one hand, interactive simulations and multimedia content might enhance engagement and self-efficacy, fostering a sense of achievement and belonging among students. On the other hand, the digital divide, where some students lack access to technology, can lead to feelings of exclusion and inadequacy (Saha et al., 2021). This dynamic raises concerns about psychological distress, anxiety, and frustration among marginalized learners who find themselves left behind in an increasingly technology-driven educational landscape.

It further highlights the importance of creating an inclusive environment that caters to the psychological needs of all students. To ensure psychological well-being, educators and policymakers must not only focus on technological integration but also address access disparities, digital literacy, and emotional support (Odgers & Jensen, 2020). By recognizing the significance of psychological well-being and inclusivity within technology-driven education, stakeholders can develop strategies that empower marginalized Filipino students to engage positively with technology while fostering an environment where they feel valued, capable, and emotionally secure.

2.3 Post-Pandemic Pedagogical Shifts and Challenges

Globally, the sudden shift to remote and hybrid learning necessitated a rapid adaptation of teaching methods to virtual environments (Lee et

al., 2022). Educators worldwide had to navigate the complexities of digital platforms, online assessments, and maintaining student engagement from a distance. This transformation has not only elevated the role of technology but also highlighted the imperative of pedagogical innovation that addresses the new realities of education.

The post-pandemic era has precipitated significant shifts and challenges in pedagogical approaches both worldwide and within the Philippine educational landscape (Charters & Murphy, 2021). Within the Philippines, the post-pandemic pedagogical landscape mirrored global trends, but it was also uniquely shaped by the country's specific circumstances. The Department of Education's adoption of blended learning models, combining digital resources and printed modules, underscored the need for flexibility and inclusivity. The Philippine experience shed light on the challenges of unequal access to technology, particularly in remote and underserved areas. Additionally, the pivot to technology-driven instruction revealed varying levels of digital literacy among students and educators (Mosteanu, 2021). While technology offers promising avenues for personalized and interactive learning experiences, these challenges necessitate strategic interventions to ensure equitable access and effective implementation, especially within the realm of mathematics education.

Amidst the transition to post-pandemic pedagogical shifts within mathematics education, Filipino teachers encountered a multitude of challenges in adapting to the new landscape. The abrupt shift to remote and blended learning models exacerbated the pre-existing digital divide, particularly in rural and marginalized areas where reliable internet connectivity was lacking (Iglesias-Pradas et al., 2021). Many educators found themselves navigating online platforms and technology tools without

comprehensive training, demanding rapid adaptation to an unfamiliar teaching environment. As a result, maintaining consistent and engaging mathematics instruction, especially among high school students, became a formidable task (Cobo-Rendón et al., 2022). Furthermore, the virtual shift prompted a reevaluation of assessment methods, as traditional in-person evaluations no longer aligned seamlessly with virtual environments. These challenges underscore the urgency of developing strategies that not only harness technology's potential but also consider the nuanced realities faced by Filipino teachers. Such strategies must empower educators to effectively facilitate mathematics learning while addressing the specific obstacles posed by the evolving educational landscape (Anderson et al., 2020).

In navigating the post-pandemic pedagogical landscape, this literature review showcases the intricate interplay between global trends and local realities. The pandemic's impact on education underscored the importance of adaptability, resilience, and the integration of technology in instruction (Wallezky et al., 2023). As educators worldwide grappled with new challenges, including remote engagement and digital divide, the Philippine context illuminated the necessity of context-specific solutions that bridge technology integration with effective pedagogical strategies. By examining both global and local responses to post-pandemic pedagogical shifts, this review lays the foundation for exploring the optimization of technology-supported instruction in the general mathematics course, encapsulating the complexities and opportunities of education in the new normal.

2.4 Strategies for Optimizing Technology-Supported Mathematics Instruction

The post-pandemic landscape has brought about a paradigm shift in education, necessitating innovative strategies to optimize technology-

supported mathematics instruction. One strategy that has gained prominence on a global scale is the flipped classroom approach. This technique involves pre-recording instructional content, enabling students to engage with materials at their own pace before engaging in interactive discussions and collaborative activities during class sessions (Hew et al., 2020). Among Filipino high school students, this strategy can foster greater engagement and comprehension by providing them with the flexibility to learn independently and participate actively during synchronous sessions. This approach aligns well with the evolving needs of post-pandemic education, offering a dynamic blend of self-directed learning and interactive engagement.

Another powerful strategy is the integration of adaptive learning platforms. These platforms utilize data-driven algorithms to tailor learning experiences to individual student progress and learning styles. In the Philippines, where students may have varying levels of mathematical proficiency due to disruptions caused by the pandemic, adaptive learning platforms hold great potential (De Villa & Manalo, 2020). By addressing individual learning gaps, these platforms provide targeted support that fosters improved comprehension and skill development. Filipino high school students can benefit from personalized learning experiences that meet their specific needs, enabling them to advance in mathematics at their own pace.

Gamification is a strategy that resonates with high school students worldwide, and its relevance in the Philippine context is no exception (Sumalinog, 2022). By incorporating game-like elements, such as challenges, rewards, and interactive simulations, educators can infuse mathematics instruction with excitement and engagement. Among Filipino high school students, who are often adept at technology and digital interfaces, gamification can transform mathematics learning into a captivating journey.

Educational games and gamified assessments can instill a sense of curiosity and exploration, making mathematics enjoyable and fostering a positive attitude towards the subject (Rincon-Flores & Santos-Guevara, 2021).

Blended learning models, particularly relevant in the Philippine setting, offer a harmonious blend of online resources and printed materials. Given the digital divide and varying access to technology across the country, this strategy ensures inclusivity and equitable learning experiences for Filipino high school students (Tupas & Linas-Laguda, 2020). By combining virtual content with offline materials, educators cater to diverse learning needs and provide flexibility in accessing educational resources. This approach not only adapts to the local context but also emphasizes the importance of accommodating different learning styles and levels of digital familiarity.

Thus, the strategies for optimizing technology-supported mathematics instruction hold immense promise in both global and Philippine scenarios, particularly among Filipino high school students. Flipped classrooms, adaptive learning platforms, gamification, and blended learning models present versatile approaches that can enhance engagement, comprehension, and accessibility. By tailoring these strategies to the local context and leveraging technology's potential, educators can equip Filipino high school students with the skills and confidence needed to thrive in mathematics education post-pandemic.

3. Methodology

Adhering to office protocols, letters were dispatched to the Office of the Schools Division Superintendent and concerned principals, seeking approval for the study and survey's execution. Informed consents were also given to the respondents to get their voluntary intent in joining the survey. To achieve the study's objectives, a descriptive-survey research design

was employed for data collection and analysis. A descriptive-survey research design is a method that collects and analyzes data to describe or summarize the characteristics or behaviors of a population, group, or phenomenon (Asenahabi, 2019). It does not involve manipulation of variables, focusing solely on observing and reporting existing conditions. Amid the constraints on prospective respondent mobility in the new normal context, only 23 teachers from the 11 identified public senior high schools within the Department of Education Mandaue City Division confirmed their participation. Nevertheless, they disclosed that after completing the survey questionnaires, many of their colleagues and friends held similar viewpoints, which added greater significance to the survey process. Beyond technical evaluation, the Ethical Committee stipulated meticulous conduct of the

study, incorporating essential provisions of the data privacy act. Informed consent was obtained from participants prior to survey administration. For statistical inference and data analysis, quantitative data were processed using frequency count, Likert scale, and weighted mean, while qualitative information was subjected to thematic content analysis.

4. Results & Discussions

Within the context of this study's results and discussions, an in-depth examination of the collected data unveils nuanced insights that contribute to a comprehensive understanding of the implications and impacts of technology-supported instruction in general mathematics among marginalized Filipino learners amidst the post-pandemic period.

Table 1. Perceived Impact of Technology-Supported Instruction on Learning and Teaching Dynamics

No	Indicators	Mean	Verbal Description
1	Increases learners' academic achievement (e.g., grades)	2.79	Agree
2	Is a valuable instructional tool	2.96	Agree
3	It makes teachers feel more competent as educators	2.92	Agree
4	It allows teachers to be learning facilitators instead of information providers	2.87	Agree
5	The unrealistic demand calls for a considerable amount of time spent on technological problems	2.70	Agree
6	Is an effective tool for learners of all abilities	3.00	Agree
7	Students will benefit from integrating technology if teachers select the technology to be implemented	2.83	Agree
8	Motivates learners to get more involved in learning activities	3.09	Agree
9	Promotes the development of learners' interpersonal skills (e.g., ability to relate or work with others)	3.00	Agree
10	Is effective only when extensive technological resources are available	2.87	Agree
11	Is problematic because some learners know more about technological devices and gadgets than many teachers do	2.74	Agree

12	Is only successful if technology is part of the learners' home environment	2.74	Agree
13	Encourages student critical thinking and understanding	3.05	Agree
Average Weighted Mean		2.91	Agree

Legend: 4-Strongly Agree; 3-Agree; 2-Disagree; 1-Strongly Disagree

Table 1 shows that the indicators with high agreement levels, such as "Increases learners' academic achievement" and "Is a valuable instructional tool," reflect the potential of technology to positively influence academic outcomes and enhance the learning experience. This resonates well with the thesis's aim to explore how technology-supported instruction can serve as a bridge for marginalized learners to overcome educational challenges, particularly in a post-pandemic context where remote learning plays a pivotal role.

These data highlight the pivotal role of educators in selecting and implementing technology, as indicated by the agreement level in "Students will benefit from integrating technology if teachers select the technology to be implemented." This aligns with the thesis's focus on the intuitive implications of technology integration, emphasizing that well-chosen technology can enhance the educational experience for marginalized learners.

Additionally, the high agreement level in "Motivates learners to get more involved in learning activities" indicates technology's potential to foster increased engagement and participation. Considering marginalized Filipino learners, who might face disparities in resources

and engagement, this finding holds promising implications for addressing these disparities through technology-supported instruction.

The agreement level in "Encourages student critical thinking and understanding" highlights technology's potential to promote higher-order thinking skills among learners. This resonates with the thesis's exploration of technology's intuitive implications, suggesting that technology can not only facilitate learning but also encourage deeper understanding and analytical thinking among marginalized Filipino learners during the post-pandemic period.

Hence, the data from Table 1 collectively underscores the positive impacts of technology-supported instruction on both teaching and learning dynamics, aligning well with the thesis's exploration of the intuitive implications of such instruction among marginalized Filipino learners during the post-pandemic period. The findings emphasize the importance of mindful technology integration by educators and highlight the potential of technology to enhance engagement, critical thinking, and overall academic achievement, particularly within the context of marginalized learners.

Table 2. Educator Perspective on the Benefits and Challenges of Technology-Supported Instruction

No	Indicators	Mean	Verbal Description
1	I feel confident learning new technologically-aided instruction skills	3.22	Agree
2	I find it easier to teach by using technology	3.13	Agree

3	I am aware of the great opportunities that technologically -aided instruction offers for effective teaching.	3.09	Agree
4	I think that technologies supported teaching makes learning more effective.	3.05	Agree
5	The use of technologies helps teachers to improve teaching with more updated materials.	3.00	Agree
6	I think the use of technologies improves the quality of teaching.	3.05	Agree
7	I think the use of technologies helps to prepare teaching resources and materials	2.92	Agree
8	The use of technologies enables the students to be more active and engaging in the lesson	3.09	Agree
9	I have more time to cater to students' needs if technologies are used in teaching	2.74	Agree
10	I can still have effective teaching without the use of technology.	2.48	Disagree
11	I think the use of technologies in teaching is a waste of time	2.35	Disagree
12	I am confident that my students learn best without the help of technology	2.44	Disagree
13	Classroom management is out of control if technologies are used in teaching	2.48	Disagree
14	Students' pay less attention when technologies are used in teaching	2.44	Disagree
15	Students' makes no effort for their lesson if technologies are used in teaching	2.48	Disagree
Average Weighted Mean		2.85	Agree

Legend: 4-Strongly Agree; 3-Agree; 2-Disagree; 1-Strongly Disagree

As can be gleaned from Table 2, the high agreement levels observed in indicators like "I feel confident learning new technologically-aided instruction skills," "I find it easier to teach by using technology," and "I am aware of the great opportunities that technologically-aided instruction offers for effective teaching" indicate educators' positive reception of technology integration. These sentiments mirror the thesis's exploration of the intuitive implications of technology-supported instruction, suggesting that educators perceive technology as a means to enhance their teaching skills, making the learning process more accessible and effective for marginalized learners.

Moreover, the agreement levels in indicators such as "The use of technologies helps teachers to improve teaching with more updated materials" and "The use of technologies enables the students to be more active and engaging in the lesson" support the notion that technology can enrich the quality of teaching and promote learner engagement. These findings align with the thesis's focus on intuitive implications among marginalized Filipino learners, indicating that technology can facilitate a more dynamic and interactive learning environment, especially vital during the post-pandemic period.

On the other hand, the indicators with disagreement levels, including "I can still have effective teaching without the use of technology,"

"I think the use of technologies in teaching is a waste of time," and "I am confident that my students learn best without the help of technology," suggest some educators' reservations about the benefits of technology integration. While the overall weighted mean indicates agreement, these disagreements highlight potential challenges that the thesis could further explore. This could involve investigating educators' concerns about technology's impact on student engagement, classroom management, and overall learning outcomes among marginalized learners.

Thus, the empirical results from Table 2 provide a nuanced view of educators' perceptions regarding technology-supported instruction's benefits and challenges. These findings correspond well with the thesis's focus on intuitive implications among marginalized learners. Educators' confidence in technology's ability to enhance teaching skills, engage learners, and provide valuable teaching resources offers promising implications for the thesis's exploration of how technology integration can positively impact marginalized Filipino learners' experiences in general mathematics during the post-pandemic period.

Table 3. Insights on the Impacts of Technology-Supported Instruction on Students

No	Indicators	Mean	Verbal Description
1	Technologies allow students to be more creative and imaginative	3.05	Agree
2	The use of technologies helps students to find related knowledge and information for learning.	3.05	Agree
3	The use of technologies encourages students to communicate more with their classmates.	3.00	Agree
4	The use of technologies increases students' confidence to participate actively in the class.	3.05	Agree
5	I think students learn more effectively with the use of technology.	2.96	Agree
6	I think the use of technologies helps to broaden students' knowledge paradigm	3.09	Agree
7	I think the use of technologies helps to improve students' ability, specifically in mathematical problem-solving.	3.05	Agree
8	The students are more behaved and under control with the use of technologies.	3.00	Agree
9	The use of technologies enables students to express their ideas and thoughts better.	3.05	Agree
10	The use of technologies promotes active and engaging lessons for students' best learning experience.	3.09	Agree
	Average Weighted Mean	3.04	Agree

Legend: 4-Strongly Agree; 3-Agree; 2-Disagree; 1-Strongly Disagree

The agreement levels observed in indicators such as "Technologies allow students to be more creative and imaginative" and "The use of technologies increases students' confidence to

participate actively in the class" affirm the positive impact of technology on learner engagement and self-expression. This resonates with the thesis's exploration of intuitive

implications, suggesting that technology-supported instruction can empower marginalized learners to become more active and expressive participants in the learning process, fostering creativity and confidence.

Furthermore, the agreement levels in indicators such as "The use of technologies helps students to find related knowledge and information for learning" and "I think the use of technologies helps to improve students' ability, specifically in mathematical problem-solving" underscore technology's role in enhancing students' ability to access information and improve specific skills. These findings align well with the thesis's investigation into technology's intuitive implications, implying that technology can play a pivotal role in equipping marginalized Filipino learners with the tools they need to excel in the subject of general mathematics.

The overall weighted mean of 3.04 emphasizes the collective agreement among respondents, indicating that technology-supported instruction holds significant promise in enhancing various facets of student learning experiences. This aligned agreement level resonates with the thesis's focus on intuitive implications, suggesting that technology has the potential to create a holistic and engaging learning environment that addresses the specific needs of marginalized learners.

In summary, the results from Table 3 resonate strongly with the thesis's overarching goal of uncovering technology's intuitive implications among marginalized Filipino learners in the context of general mathematics. The agreement levels in various indicators support the thesis's exploration of technology's potential to foster creativity, confidence, and skill development, enhancing the overall learning experience and enabling marginalized learners to thrive in a post-pandemic educational landscape.

5. Conclusion and Recommendation

The collective findings strongly advocate for the integration of technology in general mathematics education for marginalized Filipino learners, particularly during the post-pandemic era. Educators' positive perceptions of technology as a valuable instructional tool, coupled with their recognition of its ability to enhance teaching quality and student engagement, reflect technology's potential to bridge educational disparities and create a more inclusive and effective learning environment. Additionally, the positive impacts on students' creativity, knowledge acquisition, confidence, and interactive learning experiences resonate well with the thesis's focus on intuitive implications, suggesting that technology-supported instruction can empower marginalized learners to thrive in a mathematically challenging environment.

However, the educators' concerns regarding technology's possible negative impacts emphasize the need for targeted training and support to address these challenges, ensuring a smooth integration of technology into teaching practices. The slight disagreements about technology's necessity for effective teaching underscore the importance of a balanced approach that integrates technology where it enhances pedagogy, while also considering traditional teaching methods where they prove effective.

Based on these insights, it is recommended that educational institutions, policymakers, and stakeholders prioritize comprehensive technology integration strategies tailored to the needs of marginalized learners. This can involve structured training programs for educators, ensuring access to adequate technological resources, and fostering a supportive environment that encourages technology adoption. Furthermore, continual research can shed light on effective practices and address potential concerns, contributing to the ongoing

discourse on improving educational practices and outcomes for marginalized learners in the Philippines, aligning seamlessly with the national overarching goal.

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REFERENCES

- [1] Abisado, M. B., Unico, M. G., Umoso, D. G., Manuel, F. E., & Barroso, S. S. (2020). A flexible learning framework implementing asynchronous course delivery for Philippine local colleges and universities. *International Journal*, 9(1.3).
- [2] Adipat, S. (2021). Developing technological pedagogical content knowledge (TPACK) through technology-enhanced content and language-integrated learning (T-CLIL) instruction. *Education and Information Technologies*, 26(5), 6461-6477.
- [3] Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. *Online Submission*, 2(1), 45-51.
- [4] Anderson, J., English, L., Fitzallen, N., & Symons, D. (2020). The contribution of mathematics education researchers to the current STEM education agenda. In *Research in mathematics education in Australasia 2016–2019* (pp. 27-57). Singapore: Springer Singapore.
- [5] Asenahabi, B. M. (2019). Basics of research design: A guide to selecting appropriate research design. *International Journal of Contemporary Applied Researches*, 6(5), 76-89.
- [6] Attard, C., & Holmes, K. (2022). An exploration of teacher and student perceptions of blended learning in four secondary mathematics classrooms. *Mathematics Education Research Journal*, 34(4), 719-740.
- [7] Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126.
- [8] Capone, R., & Lepore, M. (2022). From distance learning to integrated digital learning: A fuzzy cognitive analysis focused on engagement, motivation, and participation during COVID-19 pandemic. *Technology, Knowledge and Learning*, 27(4), 1259-1289.
- [9] Charters, M., & Murphy, C. (2021). Taking art school online in response to COVID 19: From rapid response to realising potential. *International Journal of Art & Design Education*, 40(4), 723-735.
- [10] Cobo-Rendón, R., Bruna Jofre, C., Lobos, K., Cisternas San Martin, N., & Guzman, E. (2022, July). Return to university classrooms with Blended Learning: a possible post-pandemic COVID-19 scenario. In *Frontiers in Education* (Vol. 7). Frontiers Media SA.
- [11] Dakay, S. C., Mamac, L. A. A., Tejedor, M. P., Padillo, G. G., Espina, R. C., Manguilimotan, R. P., ... & Baxodirovna, J. O. E. (2023). Learning styles and preliminary performances of junior high school students in mathematics under the new

- normal. *Journal of Positive Psychology and Wellbeing*, 1254-1267.
- [12] De Villa, J. A., & Manalo, F. K. B. (2020). Secondary teachers' preparation, challenges, and coping mechanism in the pre-implementation of distance learning in the new normal. *IOER International Multidisciplinary Research Journal*, 2(3), 144-154
- [13] Hew, K. F., Jia, C., Gonda, D. E., & Bai, S. (2020). Transitioning to the “new normal” of learning in unpredictable times: pedagogical practices and learning performance in fully online flipped classrooms. *International Journal of Educational Technology in Higher Education*, 17, 1-22.
- [14] Iglesias-Pradas, S., Hernández-García, Á., Chaparro-Peláez, J., & Prieto, J. L. (2021). Emergency remote teaching and students' academic performance in higher education during the COVID-19 pandemic: A case study. *Computers in human behavior*, 119, 106713.
- [15] Jamil, M. I. M., & Almunawar, M. N. (2021). Importance of Digital Literacy and Hindrance Brought About by Digital Divide. In *Encyclopedia of Information Science and Technology*, Fifth Edition (pp. 1683-1698). IGI Global.
- [16] Jandrić, P., Martínez, A. F., Reitz, C., Jackson, L., Grauslund, D., Hayes, D., ... & Hayes, S. (2022). Teaching in the age of Covid-19—The new normal. *Postdigital Science and Education*, 4(3), 877-1015.
- [17] Karakaya, F., Adigüzel, M., Üçüncü, G., Çimen, O., & Yilmaz, M. (2021). Teachers' views towards the effects of Covid-19 pandemic in the education process in Turkey. *Participatory Educational Research*, 8(2), 17-30.
- [18] Kishore, D., & Shah, D. (2019). Using technology to facilitate educational attainment: Reviewing the past and looking to the future. *Background Paper*, 23, 2019-09.
- [19] Lailatul Widha, W., Hayatul Khairul Rahmat, R., & A Said Hasan Basri, B. (2021). A review of mindfulness therapy to improve psychological well-being during the COVID-19 pandemic. *A Review of Mindfulness Therapy to Improve Psychological Well-being During the Covid-19 Pandemic*, 4(1), 383-390.
- [20] Lee, H., Woo, D., & Yu, S. (2022). Virtual reality metaverse system supplementing remote education methods: Based on aircraft maintenance simulation. *Applied Sciences*, 12(5), 2667.
- [21] Mohebi, L. (2021). Theoretical models of integration of interactive learning technologies into teaching: A systematic literature review. *International Journal of Learning, Teaching and Educational Research*, 20(12), 232-254.
- [22] Moldavan, A. M., Capraro, R. M., & Capraro, M. M. (2021). Navigating (and disrupting) the digital divide: Urban teachers' perspectives on secondary mathematics instruction during COVID-19. *The Urban Review*, 1-26.
- [23] Moşteanu, N. R. (2021). Teaching and learning techniques for the online environment. how to maintain students' attention and achieve learning outcomes in a virtual environment using new technology. *International Journal of Innovative Research and Scientific Studies*, 4(4), 278-290.
- [24] Odgers, C. L., & Jensen, M. R. (2020). Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions. *Journal of*

- Child Psychology and Psychiatry, 61(3), 336-348.
- [25] Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2021). Balancing technology, pedagogy and the new normal: Post-pandemic challenges for higher education. *Postdigital Science and Education*, 3(3), 715-742.
- [26] Rincon-Flores, E. G., & Santos-Guevara, B. N. (2021). Gamification during Covid-19: Promoting active learning and motivation in higher education. *Australasian Journal of Educational Technology*, 37(5), 43-60.
- [27] Ryan, T., Gašević, D., & Henderson, M. (2019). Identifying the impact of feedback over time and at scale: Opportunities for learning analytics. In *The impact of feedback in higher education: Improving assessment outcomes for learners* (pp. 207-223). Cham: Springer International Publishing.
- [28] Saha, A., Dutta, A., & Sifat, R. I. (2021). The mental impact of digital divide due to COVID-19 pandemic induced emergency online learning at undergraduate level: Evidence from undergraduate students from Dhaka City. *Journal of Affective Disorders*, 294, 170-179.
- [29] Salayo, J., Fesalbon, J. E. R., Valerio, L. C., & Litao, R. A. (2020). Senior high school teachers' and students' engagements during the emergency remote teaching (ERT): Perceptions on readiness, attitude, and competence. *Studies in Humanities and Education*, 1(1).
- [30] Singh, J., Steele, K., & Singh, L. (2021). Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post vaccine, & post-pandemic world. *Journal of Educational Technology Systems*, 50(2), 140-171.
- [31] Sumalinog, G. G. (2022). Barriers of online education in the new normal: Teachers' perspectives. *International Journal of Learning, Teaching and Educational Research*, 21(1), 33-50.
- [32] Tupas, F. P., & Linas-Laguda, M. (2020). Blended Learning—An Approach in Philippine Basic Education Curriculum in New Normal: A Review of. *Universal Journal of Educational Research*, 8(11), 5505-5512.
- [33] Wallezky, L., Carrubbo, L., Badr, N. G., Dragoicea, M., Toli, A. M., & Badawi, S. (2023). Reconfiguring the service system for resilience: Lessons learned in the Higher Education context. *Journal of Business & Industrial Marketing*.
- [34] Wang, X., Zhang, R., Wang, Z., & Li, T. (2021). How does digital competence preserve university students' psychological well-being during the pandemic? An investigation from self-determined theory. *Frontiers in Psychology*, 12, 652594.