*International Journal of Instruction* *April 2025 ● Vol.18, No.2*
*e-ISSN: 1308-1470 ● www.e-iji.net* *p-ISSN: 1694-609X*
*pp. 709-726*

Article submission code: 20241017123329 Received: 17/10/2024 Revision: 08/01/2025 Accepted: 19/01/2025 OnlineFirst: 03/02/2025

# Knowledge, Self-efficacy and Effectiveness in Leveraging Blended Delivery System: A Study of Higher Education Teachers

**Arlene D. Talosa**
Cagayan State University-Aparri Campus, Philippines, *enelasolat@gmail.com*

**Rolly A. Acidera**
Cagayan State University-Aparri Campus, Philippines, *yoyiacidera@gmail.com*

**Mark John M. Tamanu**
Cagayan State University-Aparri Campus, Philippines, *markjohntamanu@csu.edu.ph*

**Jasmin Joy M. Sumer**
Cagayan State University-Aparri Campus, Philippines, *jasminsumer@csu.edu.ph*

With the increasing shift to blended learning environments, there is a need to understand how teachers are navigating this transition. To address this gap, this paper looked into the knowledge, self-efficacy, and effectiveness of teachers in adopting to blended learning delivery systems. Employing a descriptive-correlational research design, and using a survey-questionnaire, a total of 54 tenured faculty members from various disciplines participated in the study recruited through complete enumeration. Descriptive statistics were used to analyze the data, and Pearson's correlation coefficient was applied to explore relationships between key variables. Key findings revealed that teachers demonstrated strong knowledge, particularly in the flexibility required to create dynamic, innovative learning environments that align with the demands of the digital age. In terms of self-efficacy, respondents reported very high confidence in their ability to align online courses and effectively use technological resources. Furthermore, the study identified significant correlations between teachers' knowledge of time management and their self-efficacy in migrating course content online, both of which were positively related to teaching effectiveness. The results provide valuable insights for educational leaders and course designers in blended learning environments. The findings highlight the importance of supporting teachers with the necessary resources and training, particularly in areas of time management and content migration, to enhance teaching effectiveness in blended learning settings. This study contributes to the understanding of factors that influence successful adaptation to blended teaching and offers practical recommendations for enhancing teacher performance and student learning outcomes.

Keywords: flexible teaching, teaching effectiveness, blended delivery systems, self-efficacy, post pandemic

**Citation:** Talosa, A. D., Acidera, R. A., Tamanu, M. J. M., & Sumer, J. J. M. (2025). Knowledge, self-efficacy and effectiveness in leveraging blended delivery system: A study of higher education teachers. *International Journal of Instruction*, *18*(2), 709-726.

## INTRODUCTION

The adoption of technology-enhanced instructional approaches has significantly transformed traditional teaching methods, integrating digital tools and strategies to meet the evolving needs of modern society. Among these innovations, blended learning (BL) has emerged as a highly regarded pedagogical model, combining online digital media with traditional face-to-face classroom methods. BL offers flexibility and adaptability, making it an effective approach for diverse learning environments. However, despite its growing popularity, the successful implementation of blended learning heavily depends on the role of teachers, who must navigate and orchestrate the integration of technology into their instructional practices. Along this vein, their knowledge and self-efficacy are instrumental to the effective delivery of their instruction to meet educational competencies.

In the Philippines, the Commission on Higher Education (CHED) introduced flexible learning guidelines through CHED Memorandum Order (CMO) No. 04 series of 2020, which were implemented in higher education institutions (HEIs) starting in the academic year 2020-2021. This shift was further supported by the Smart Campus projects, which allocated significant funding to modernize ICT infrastructure in universities, including Cagayan State University (CSU), to enhance the adoption of blended learning. Although face-to-face teaching has resumed in some HEIs, blended teaching (BT) remains a critical component of educational delivery, potentially becoming the "new normal." Despite its established presence over the past two decades, the extensive integration of blended courses remains challenging for many teachers and students, particularly in the post-pandemic era.

Existing research on blended learning has predominantly focused on its effectiveness and the technologies used, but there remains a significant gap in understanding the factors that enable its successful implementation in the post-pandemic educational landscape. Teachers' professional knowledge and self-efficacy have been identified as critical elements in the successful deployment of technology in the classroom, with teachers' beliefs in their ability to influence student learning playing a central role in their adoption of new pedagogical strategies. However, studies that connect these aspects—teachers' knowledge, self-efficacy, practices, and their teaching effectiveness—specifically within the context of blended learning, remain limited, particularly in Asian countries like the Philippines.

Education 4.0 suggests an amalgamation of physical and digital systems proven to be revolutionary (Ellahi et al, 2019). The Smart Campus project captures this by embedding emerging technologies within the physical environment, combining these with organizational vision and values and placing the Campus User at the center of the experience. Hyflex as according to Eduljee et.al (2022) represents a course delivery option that includes both online and face-to-face options for student's choice (Musgrove & Bryan, 2014). In this model, students can decide the manner they wish to participate, however, with social distancing rules, institutions might have found it necessary to assign students to a modality, i.e., face-to-face, virtual, or some combination of both, thus limiting the flexibility feature of HyFlex.

The demands of the digital era led to the concept of a teacher's professional identity context to integrate technology in teaching. Teachers' professional knowledge may become the focus point because it has been shown to be an important predictor for instructional quality. Teachers' self-efficacy—the belief that they can produce changes in student learning—is one of the most studied aspects of the classroom context, Miller, et.al (2017). The emerging learning technologies like podcasting, social media, e portfolios, blogs, wikis, and internet-based audio and video communication are enhancing capacity of blended learning. Blended learning provides an effective experience to continue learning process in different ways i.e. combining hands-on on-site training with virtual learning, instructor-led webinars and online leaning & assessment tools.

Furthermore, while blended learning offers a promising solution for flexible, student-centered education, there is a need for deeper insights into how teachers evolve their practices and make instructional decisions that align with both the technological tools at their disposal and the pedagogical goals they aim to achieve. Research also suggests that professional development programs, which aim to enhance teachers' competencies in using new technologies, may not be as effective without considering teachers' self-efficacy and their readiness to adapt to these changes. As such, the impact of self-efficacy on teachers' engagement with and effectiveness in blended teaching remains an underexplored area.

The degree of technology integration and instructional choices used in classroom practices are influenced by teachers' blended learning pedagogy (Cooper et al., 2020). An increase in practical technology application is at the forefront of instructor best practices when deliberate, ongoing mentoring takes place during deployment (An, 2021; Atim et al., 2021).

Blended learning appears at an upward continuum as more and more institutions are adopting it formally for instructional purpose, Hussain et.al (209). There is still a need to better investigate the alignment of pedagogy and the use of educational technologies (Castro 2019) and understand the contexts in which BL can result in the best possible learning outcomes (Porter & Graham 2016). Shahril et al. (2021) noted that implementing blended learning in the post-pandemic period will increase opportunities to offer more individualized, flexible, and student-centric programs. Concurring this, Anoba and Cahapay (2020) posited that assessing educators' readiness to transition to blended learning is an initial step in advancing education post-COVID. Thus, more studies should focus on shifting to blended teaching in the post-pandemic recovery period, especially in Asian countries.

Teacher professional development programs aim to enhance teaching competence and improve student outcomes. However, self-efficacy's influence on these programs' effectiveness remains underexplored. Research must examine how self-efficacy beliefs influence teachers' engagement in professional development activities, their willingness to try new instructional strategies, and their persistence in implementing new approaches (Jiang et al., 2022). Teachers' professional knowledge may become the focus point because it has been shown to be an important predictor for instructional

quality. Teachers' self-efficacy—the belief that they can produce changes in student learning—is one of the most studied aspects of the classroom context (Miller, Ramirez, Murdock, 2017).

Through a comprehensive analysis of the relationship between teachers' knowledge, self-efficacy, practices and teaching effectiveness in the context of blended learning, this study aims to contribute to the existing body of knowledge on effective technology integration in education. By shedding light on the factors that mediate the impact of blended learning on teaching practices evident in their knowledge and self-efficay and student learning outcomes with their performance effectiveness., this study endeavors to inform educational stakeholders, policymakers and practitioners on strategies to optimize the implementation of blended learning delivery systems for enhanced educational experiences and outcomes.

The key concepts of this study—teachers' knowledge, self-efficacy, and teaching effectiveness—are central to understanding how blended learning can be effectively leveraged in the post-pandemic educational landscape. Each of these factors plays a significant role as rolling influences that shape the successful integration of technology in teaching, particularly within blended learning models. Teachers' professional knowledge refers to their understanding of both the content they teach and the pedagogical strategies they employ. When teachers possess strong professional knowledge, they are better positioned to select and apply the appropriate technologies that align with their instructional goals. This knowledge forms the foundation upon which their self-efficacy, or belief in their ability to positively impact student learning, is built. Self-efficacy influences teachers' willingness to experiment with new technologies and teaching strategies, such as those required in blended learning environments.

The relationship between these factors and their impact on teaching practices highlights the need to understand how they collectively influence the effectiveness of blended delivery systems. Teachers' self-efficacy, for instance, affects their confidence in using educational technologies, which in turn shapes the pedagogical approaches they adopt. As they evolve their practices to integrate digital tools, the degree of their technological integration reflects both their professional knowledge and self-efficacy. These factors together determine how well teachers can adapt to and thrive in a blended learning context, where flexibility and student-centered instruction are key.

In terms of the research gap, while existing studies have addressed the effectiveness of blended learning and the technologies involved, there is limited research that connects the interplay of teachers' knowledge, self-efficacy, and their teaching practices specifically within this context. This gap is especially evident in the Asian context, such as in the Philippines, where blended learning adoption has been accelerated post-pandemic. While the role of professional development programs in enhancing teachers' competencies has been recognized, little attention has been paid to how self-efficacy impacts teachers' engagement with these programs and their ability to integrate new technologies effectively, thus this study.

## METHOD

This study utilized a descriptive-correlational research design to explore the relationships between faculty members' knowledge, self-efficacy, teaching practices, and their effectiveness within the context of the flexible learning delivery approach at Cagayan State University (CSU), Aparri Campus, in the Cagayan Valley region of the Philippines. The descriptive component of the design provided a comprehensive examination of faculty members' understanding of blended teaching, their perceived self-efficacy, and their teaching performance. Meanwhile, the correlational aspect allowed for an analysis of how these factors are interrelated.

CSU has adopted a flexible learning model that integrates both in-person and online instructional methods. Although face-to-face classes resumed after the pandemic, the university continues to implement a blended learning approach, with 70% in-person and 30% online instruction. This context makes CSU an ideal setting to investigate the integration of blended learning and to assess faculty adaptation to and implementation of this model. Faculty members from CSU's Aparri campus for the academic year 2022-2023 were invited to participate in the study, using a complete enumeration sampling method to ensure comprehensive representation of their experiences across disciplines. This method was chosen due to the manageable size of the faculty population and the desire to capture a thorough understanding of the entire faculty's efficacy and performance.

An online survey was used to gather data, focusing on three key factors: faculty knowledge of flexible learning, their self-efficacy, and their teaching effectiveness. The survey consisted of several components:

1. Knowledge of Flexible Learning: A 12-item questionnaire assessed faculty members' understanding of blended learning, particularly their ability to create dynamic, technology-enhanced learning environments. The items were rated on a 4-point Likert scale ranging from 1 (Not Knowledgeable) to 4 (Very Knowledgeable).
2. Self-Efficacy: A 10-item scale, adapted from Gosselin et al. (2016), measured faculty members' confidence in performing specific teaching tasks in a blended learning environment. Respondents rated their confidence on a 5-point Likert scale from 1 (Not Confident) to 5 (Very Confident).
3. Teaching Effectiveness: This was measured through student evaluations, which assessed various dimensions of teaching and were collected from end-of-semester ratings.

Descriptive statistics were used to summarize demographic data and to assess levels of knowledge, self-efficacy, and teaching effectiveness, while Pearson Product Moment Correlation was employed to examine the relationships between these variables. These statistical methods enabled the identification of the strength and direction of the relationships between faculty knowledge, self-efficacy, and teaching effectiveness.

The findings from this analysis were expected to provide valuable insights into how teachers' knowledge and self-efficacy influence their teaching effectiveness within a blended learning context, with implications for future professional development programs and the broader implementation of flexible learning models in higher education.

## FINDINGS

### Knowledge

Apparent in Table 1. is the flexibility of the teachers in terms of time, content, entry requirements, instructional approaches and resources and delivery and logistics. The table reveals that the faculty are all knowledgeably high in flexibility along all dimensions but of worth higher category mean are on flexibility areas along delivery and logistics (3.62), content (3.60) and instructional approaches and resources (3.59). This finding indicates that the teachers are highly knowledgeable on the flexibility of their courses integrating technology, their content and instructional approaches. Moreover, although still high in mean, the teachers were found to have notable low mean in flexibility of time (3.51) and entry requirement (3.53) which suggests that they impose rigid and strict time and entry requirements in their courses. it could be inferred from the findings that there is a professional development needs among teachers to recognize flexibility of time element and entry requirements in the implementation of blended delivery system in the academe.

Table 1
Summary table of the teachers' level of knowledge on flexibility in blended teaching

| Dimensions | Weighted Mean | Descriptive Value |
|---|---|---|
| Time | 3.51 | High |
| Content | 3.60 | High |
| Entry Requirements | 3.53 | High |
| Instructional Approach and Resources | 3,59 | High |
| Delivery and Logistics | 3.62 | High |
| | 3.57 | High |

### Self-efficacy

Table 2 presents the summary of the self-efficacy score of the respondents. Apparently, the teachers were found very high on blended course alignment (4.48); technological resources (4.47); virtual interaction (4.32) and unit course migration (4.31). The teachers were only found high on web based unit structure. The overall self-efficacy of the teachers in the utilization of blended teaching-learning is very high as concretized by the computed mean of 4.32. This finding means that they have very high regard in their capabilities.

Table 2
Summary table on teachers self-efficacy

| Dimensions | Weighted Mean | Descriptive Value |
|---|---|---|
| Virtual interaction | 4.32 | Very High |
| Technological resources | 4.47 | Very High |
| Unit content migration | 4.31 | Very High |
| Blended course alignment | 4.48 | Very High |
| Web-based Unit Structure | 4.03 | High |
| Overall Self Efficacy | 4.32 | Very High |

**Effectiveness of Teachers**

Table 3 shows the teaching effectiveness of teachers. The table reveals that 27 or 50% of the teachers exhibit very satisfactory performance whule 13 or 24% of them have satisfactory performance. Meanwhile, two or 3.70% of them are outstanding while the other 2 of 3.70% account to poor and needs improvement. This finding means that as per assessment of students, majority of the faculty members perform with very satisfactory rating. This finding implies that teachers still have wide room for practice improvement. Interventions likewise are needed to few numbers of teachers.

Table 3
Teaching Effectiveness of Teachers

| | Frequency (n=54) | Percentage |
|---|---|---|
| Outstanding | 2 | 3.70 |
| Very Satisfactory | 27 | 50 |
| Satisfactory | 13 | 24.07 |
| Poor | 2 | 3.70 |
| Needs Improvement | 2 | 3.70 |

**Relationship between the Teaching Performance and Knowledge on Flexibility Dimensions and Self Efficacy**

The study hypothesized that there is no significant correlation between the teaching effectiveness and level of knowledge and self-efficacy of the teachers. Table reveals that along knowledge, one variable was found significant correlated to performance.

Time as reckoned by the computed r-value of 0.286 with a probability of 0.03 shows that knowledge on the flexibility of time in blended teaching and learning significantly relates to teaching effectiveness. This finding implies that the more knowledgeable the teachers are in the flexibility of time, the more effective they are in their practice of blended teaching.

As regards self-efficacy, the study showed the unit content migration was found significantly related to teaching effectiveness as concretized by the computed r-value of 0.01. This finding means that the more competent the teachers are in migrating content from physical to online or hyflex mode, the higher their teaching effectiveness.

Table 4
Relationship between the Teaching Performance and Knowledge on Flexibility Dimensions and Self Efficacy

| | r-value | Probability | Statistical Inference |
|---|---|---|---|
| KNOWLEDGE | | | |
| Time | 0.286 | 0.03 | Significant |
| Content | 0.032 | 0.821 | Not Significant |
| Entry Requirement | -0.061 | 0.66 | Not Significant |
| Instructional Approach and Resources | -0.052 | 0.711 | Not Significant |
| Delivery and Logistics | 0.04 | 0.723 | Not Significant |
| Overall | | | |
| SELF EFFICACY | | | |
| virtual interaction | -0.065 | 0.639 | Not Significant |
| Technological Resources | 0.062 | 0.658 | Not Significant |
| Unit Content Migration | 0.335 | 0.01 | Significant |
| online course alignment | 0.074 | 0.592 | Not Significant |
| Web-based Unit Structure | 0.065 | 0.640 | Not Significant |
| Overall | | | |

## DISCUSSION

*Knowledge.* An overview of the teachers' knowledge of flexibility in blended teaching across five key dimensions: Time, Content, Entry Requirements, Instructional Approach and Resources, and Delivery and Logistics indicate a strong proficiency in these areas. However, some nuances within these categories suggest potential areas for further development. With a mean score of 3.51, the teachers' understanding of time flexibility in blended teaching is rated as "High." This suggests that teachers are adept at managing time within a blended learning environment, balancing synchronous and asynchronous activities effectively. They can adapt their schedules to accommodate diverse teaching and learning needs. However, while the score indicates proficiency, there is still room for improvement in optimizing time management across various teaching contexts. Time flexibility encompasses not only the balance between synchronous and asynchronous sessions but also considerations such as time on task, part-time or full-time schedules, and flex-time models (Cronje, 2022). Thus, teachers might benefit from further refining their approach to time management to better align with the varied demands of their students.

Content flexibility achieved the highest mean score of 3.60, reflecting a strong awareness among teachers of the need to adapt and deliver content in diverse ways to meet the needs of students. Teachers are likely proficient in tailoring content delivery through a variety of formats, such as videos, readings, quizzes, and other multimedia tools, which enhances engagement and accessibility. However, while content flexibility is generally well-understood, there is room for improvement in the area of assessment standards and completion requirements, particularly in the context of board and non-board courses. Stuart (2018) highlights that teachers often face challenges in designing online activities that foster interaction and student contribution. To address this, providing educators with practical, targeted professional development on assessment

methods could be crucial in enhancing their ability to create flexible, interactive, and meaningful learning experiences. When coupled with relevant digital resources, such professional development can increase teacher self-efficacy, motivation, and ultimately, their ability to integrate blended learning effectively.

The dimension of entry requirements, with a mean score of 3.53, also falls within the "High" category, indicating that teachers have a solid understanding of the flexibility needed when setting prerequisites for blended learning. Teachers are mindful of the need to accommodate students' varying backgrounds, prior knowledge, and technological capabilities. This flexibility ensures that all students can access and succeed in blended courses, regardless of their starting point. Along this vein, 21st-century teaching increasingly demands that teachers have a robust understanding of technology integration to effectively meet diverse student needs (Singh et al., 2021). Teachers should prioritize thoughtful integration of technology as a central component of entry requirements. Furthermore, the link between professional development and the implementation of blended learning best practices is strong (An, 2021; Atim et al., 2021; Cooper et al., 2020). As such, ongoing training in technology use and instructional strategies is crucial for teachers to provide effective, technology-enriched learning experiences.

The instructional approach and resources dimension, with a mean score of 3.59, indicates that teachers have a solid understanding on how to adapt their teaching strategies and resources to meet the diverse needs of their students. Teachers are likely well-equipped to modify their instructional approaches, such as incorporating active learning strategies, flipped classrooms, and utilizing various learning management systems and multimedia resources. This high rating suggests that teachers are confident in employing flexible instructional methods to foster inclusive and effective learning environments. This also aligns with the finding that teachers integrate various approaches, resources, design strategies, and communication tools to create learning experiences that cater to diverse student needs. Their familiarity with flexible instructional methods is a key strength in blended teaching, as it enables them to better engage students through varied and adaptable pedagogical strategies.

The dimension of delivery and logistics received the highest mean score of 3.62, indicate that teachers feel most competent in managing the logistical aspects of blended learning. This includes navigating both in-person and online components of courses and addressing logistical challenges, such as technological access, communication, and student support. Teachers' ability to manage these practical aspects ensures a smooth and flexible delivery of content. Effective delivery is critical to student engagement and success in blended learning environments. Ioannou, Demetriou, and Mama (2014) emphasize that faculty need to design structured online discussions with clear guidelines and models for quality posts to encourage student interaction and engagement. Teachers who can create high-quality, interactive online discussions are more likely to foster a collaborative learning environment that enhances student learning outcomes.

Overall, teachers exhibit a strong level of knowledge regarding flexibility in blended teaching. They are well-equipped to manage time, content, entry requirements, instructional approaches, and delivery logistics in ways that promote flexible and accessible learning environments. While the scores are consistently high, there remains potential for further enhancement through targeted professional development. Teachers could refine their time management strategies, improve assessment flexibility, and deepen their integration of technology to continually meet the evolving needs of students. By further developing these competencies, educators can ensure that blended teaching remains dynamic, responsive, and effective.

*Self-efficacy.* Reflecting on the perceived levels of Self-Efficacy in various dimensions related to blended learning, including Virtual Interaction, Technological Resources, Unit Content Migration, Blended Course Alignment, and Web-based Unit Structure. The weighted means for each dimension indicate high levels of self-efficacy across most areas, with Virtual Interaction, Technological Resources, Unit Content Migration, and Blended Course Alignment all rated as "Very High" and Web-based Unit Structure rated as "High".

The very high rating on the dimension of Virtual Interaction indicate that teachers feel very confident in their ability to interact with students in a virtual environment. This high self-efficacy can be attributed to the increasing familiarity with digital communication tools, especially following the rapid adoption of online learning during the pandemic. Virtual interaction, which includes engaging with students through online discussions, webinars, and other digital communication methods, is now a key aspect of modern teaching. This finding suggests that teachers are comfortable using these tools to facilitate student learning and maintain a productive online environment. It reflects the success of professional development initiatives aimed at enhancing teachers' skills in virtual communication. This data further illustrates that the faculty members are confident of their ability to select, utilize and determine the appropriateness of technology to enhance student learning and enrich instruction. This finding therefore implies that they match their technology tools in course demands. Considering that blended learning joins face-to-face learning with using technology, shifting to blended learning will allow learning to be more productive for teachers if they have sufficient teaching tools. Various studies (Horn & Staker, 2011; De George-Walker & Keeffe, 2010) offered similar opinions concerning the need for both the student and teacher to have more time to prepare content and navigate the blended learning classroom

With a rating of 4.47, Technological Resources is another dimension where teachers report a very high level of self-efficacy. This suggests that teachers feel confident in their ability to access and use the various technological tools and platforms required for blended learning. The ease of use and the widespread availability of user-friendly technologies likely contribute to this perception of competence. The ability to integrate these tools effectively into teaching practices is a cornerstone of successful blended learning. The high rating on this dimension indicates that teachers have the necessary resources at their disposal and feel prepared to use them for educational purposes.

Teachers also feel very confident in adapting their course content for online or blended learning environments. This is a crucial skill in blended learning contexts, where traditional face-to-face teaching materials must be translated into digital formats. The high rating suggests that teachers are not only familiar with the process of content migration but are also skilled at aligning their instructional materials with online platforms. This confidence could stem from both previous experience and training in content adaptation, making teachers feel more empowered in their teaching roles. In line to this, Singh, et. al (2021) asserted that creating online assessments and evaluations for online classes require strong digital assessment literacy. Effective online assessments can help in providing personalized learning experiences to students. By using appropriate methods such as relevant case studies and question banks designed for online learning, instructors can enhance both reliability and distinctiveness of the test taking experience. In an ideal scenario, faculty should work as well-informed/experienced specialists who are able to design assignments to meet learning objectives of the course, Eyal, (2012). However, designing effective online assessments require training and skill sets that faculty may not possess. This is especially true for faculty who teach within a traditional, didactic face-to-face format.

As to Blended Course Alignment, teachers perceive themselves as very capable in aligning their courses between in-person and online components. This is an important aspect of blended learning, as aligning course objectives, content, and assessments across multiple delivery methods ensures that students receive a cohesive learning experience. The very high rating suggests that teachers are skilled at designing courses that integrate both face-to-face and digital components in a way that supports student learning. This confidence likely reflects a strong understanding of instructional design principles and the growing availability of resources that support blended course creation.

Although Web-based Unit Structure received a slightly lower rating (4.03), it still falls within the "High" range. This dimension reflects teachers' confidence in organizing and structuring course content in a web-based or digital environment. While still rated highly, the slightly lower score may indicate that teachers feel less certain about structuring their courses in purely digital formats compared to their blended or hybrid counterparts. The challenges of organizing web-based learning materials in a clear and engaging way could contribute to this slightly lower self-efficacy. Teachers may feel that they have room for improvement in terms of structuring content that is intuitive and accessible for students in an entirely online setting. Overall, the findings indicate that the teachers self-efficacy on their ability to construct and design an online unit that include clear structure, straightforward navigation and is aligned with the institutions mission and core values is very high. Flexible learning spaces facilitate behavioral engagement, student-centered pedagogies and interaction in learning environment (Kariippanon et al., 2019).

The Overall Self-Efficacy score of 4.32 indicates a very high level of confidence across all dimensions. This reinforces the idea that, on the whole, teachers feel well-prepared to navigate the demands of blended learning environments. The high overall self-efficacy score suggests that teachers are confident in their ability to utilize virtual

interaction tools, technological resources, adapt course content, align blended courses, and structure web-based units. This confidence is vital for effective blended learning, as teachers' beliefs in their own ability to make meaningful educational decisions directly impact their motivation and success in using new technologies and teaching strategies (Bandura, 1997).

The high levels of self-efficacy reported in most dimensions highlight the importance of continued professional development programs. Teachers' confidence in technological resources, content migration, and course alignment suggests that ongoing training and support can further enhance their ability to design and implement effective blended learning environments. The slightly lower score for Web-based Unit Structure suggests that while teachers are confident in structuring blended courses, there may be a need for additional resources or training in fully online course design. This could involve providing teachers with more advanced instructional design techniques or tools specifically focused on structuring engaging and interactive web-based units. Given the very high self-efficacy score for Virtual Interaction, schools and institutions should continue to emphasize and invest in tools that enhance virtual communication and student engagement. This finding indicates that teachers are not only confident in using digital tools for interaction but also likely understand the pedagogical importance of fostering strong connections with students in online or hybrid learning settings.

*Effectiveness.* The distribution of teaching effectiveness in Table 13 shows that while most teachers are performing at a "Very Satisfactory" level, there is still room for growth across all categories. The relatively high percentage of teachers in the "Very Satisfactory" and "Satisfactory" categories (74.07% combined) suggests that the overall teaching quality is decent, with many teachers meeting or slightly exceeding expectations. However, the small percentages in the "Outstanding" and "Poor" categories highlight a potential disparity in teaching quality that could be addressed through targeted support and professional development. The small percentage may prompt a closer look at what factors contribute to their outstanding performance, such as specific instructional techniques or additional support resources, that other teachers could benefit from adopting. Both the "Poor" and "Needs Improvement" categories each account for 3.70% of the sample, representing 2 teachers in each category. Professional development, mentorship, or peer observation could be valuable strategies to support teachers in these groups, helping them improve their teaching practices and achieve higher effectiveness ratings. By focusing on the areas where teachers fall short, educational institutions can help elevate the overall teaching effectiveness, ensuring that more teachers move toward higher performance levels, ultimately benefiting student outcomes

*Relationship.* The results of the statistical analysis provide valuable insights into the relationships between various factors and two key constructs—Knowledge and Self-Efficacy—within the context of blended learning. With the significant relationship between knowledge of time and self efficacy in unit migration in teaching effectiveness, this suggests that the amount of time dedicated to blended learning activities is positively associated with an increase in teachers' knowledge. This finding aligns with existing research, which emphasizes the importance of time allocation in the successful

integration of new teaching methods and technologies. Teachers who spend more time engaged with blended learning tools and platforms may develop a deeper understanding of how to effectively utilize these resources in their instructional practice. The significance of this finding suggests that institutions and educators should consider time as a critical factor when designing blended learning environments, ensuring that both teachers and students are provided with sufficient time to engage with the content, technologies, and pedagogical strategies. Teachers who are more involved in adapting or migrating their unit content for online or blended delivery report higher levels of self-efficacy. This is consistent with the idea that teachers' confidence in their ability to effectively integrate technology is enhanced when they are actively engaged in transforming their course materials for blended learning environments. When teachers are involved in migrating content to digital platforms, they may gain a sense of accomplishment and mastery over the tools and technologies being used, which in turn boosts their self-efficacy. This finding underscores the importance of giving teachers the opportunity to directly engage with technology and content migration processes as a way to increase their confidence and readiness to teach in blended formats.

The findings of this study offer several important implications for the development of blended learning programs and professional development strategies for teachers. Time emerged as a critical factor in enhancing teachers' knowledge, suggesting that institutions should ensure sufficient time is allocated for teachers to engage with new technologies and teaching methods. Teachers' self-efficacy is also positively affected by the active process of Unit Content Migration, which could be incorporated into professional development programs to enhance teachers' confidence in using technology. A modest transfer from face-to-face to blended learning does not mean good pedagogy; therefore, teachers must learn to blend their practices correctly (Garrison & Vaughn, 2013). De George-Walker and Keeffe (2010) suggested, to achieve this type of success, teachers will have to look at the entire curriculum, rather than "tacking on" or "weaving through" various approaches. Blended learning must be focused on personalize learning and engagement of learners, as well as assist as a tool for online assessments with regular feedback (Horn & Staker, 2011). The authors spoke of having learning activities move from within the walls of the classroom to take place online through the use of technology media or an LMS.

## CONCLUSION

Considering the key findings, it is therefore concluded that CSU Aparri teachers have high knowledge of flexibility, very high level of self-efficacy. Utilizing supplemental model, the practice of blended teaching supports content presentation, meaning negotiation and evaluation functions. The teachers are performing very satisfactorily. Furthermore, their knowledge of the flexibility of time and their self-efficacy on unit content migration both predict their teaching effectiveness in utilizing blended delivery systems.

The findings posit implications for administrators and course designers to improve the implementation of blended learning delivery systems. The research findings identified resources and challenges faced with integrating technology. Addressing this gap, the

administration should provide teachers with continual support and training to implement blended learning to sustain their self-efficacy and improve the transformation of teaching practices. Furthermore, they should provide more institutional assistance to educators' adaptation to blended learning such as infrastructure, equipment provision, IT support, facility availability, and training mechanisms. CSU A should conduct special training programs for teachers to enrich competencies in employing blended education, which increases their skills, as well as the use of modern technologies in the educational

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