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Determinants of Blended Teaching-Learning Performance in New Normal Environment: Exploring the Role of Teachers' Technostress as Mediation

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This research desires to analyze the determinants of blended teaching-learning performance in the new typical environment by exploring the role of teachers' technostress as mediation. This study uses a quantitative approach. Quantitative research methods aim to test the hypotheses that have been set. This approach uses numerical results from measurements made using a questionnaire about the study's variables. Using the complete sampling technique, which involves selecting the whole population as the research sample, it consisted of senior high school teachers in South Sumatra. The researchers used 712 research data in this investigation. The research used the structural approach of the Equation Model (SEM) and the intelligent application of PLS for analysis. According to the outcomes of this investigation, understanding technical and pedagogical content has a considerable positive impact on blended learning and teaching performance and teachers' technostress. Teachers' self-efficacy has a considerable positive impact on combined learning-teaching performance and blended teaching-learning performance and is significantly mediated by teachers' technological stress. Teacher experience significantly impacts teachers' technostress and is mediated considerably by teachers' technostress. Administration and school support show a considerable positive impact on blended teaching and learning performance and teachers' technostress, which is significantly mediated by teachers' technostress. Teachers' technological stress has a large positive effect on combined teaching-learning performance.

Keywords: technological pedagogical content knowledge; teachers' technostress; blended teaching-learning performance; teachers' self-efficacy; teacher experience; administration school support.

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Детерминанты эффективности смешанного преподавания-обучения в новых условиях: исследование роли технострессa у преподавателей

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Цель данного исследования — проанализировать факторы, определяющие эффективность смешанного типа преподавания и обучения в новой типовой среде посредством изучения технострессa преподавателей. В данном исследовании используется количественный подход. Количественные методы исследования направлены на проверку выдвинутых гипотез. При таком подходе используются числовые показатели переменных, полученные по данным анкет. Был использован метод полной выборки, то есть было опрошено все население, в выборке участвовали учителя старших классов школ Южной Суматры, в результате было получено 712 анкет. В исследовании использовалось моделирование структурными уравнениями (SEM) и интеллектуальное приложение PLS для анализа данных. Согласно результатам исследования, понимание технического и педагогического содержания обучения оказывает положительное влияние на эффективность смешанного обучения и преподавания, а также на уровень технострессa учителей. Собственная эффективность преподавателей положительно влияет на эффективность и результативность процесса смешанного обучения и преподавания, существенно обусловлена наличием технострессa. На уровень технострессa влияет опыт, которым обладает преподаватель. Поддержка администрации и школы положительно сказываются на эффективности смешанного преподавания и обучения, уменьшают уровень технострессa учителей.

Ключевые слова: Технологический педагогический контент знаний; учительский технострессс; результативность смешанного преподавания-обучения; собственная эффективность преподавателей; преподавательский опыт; административная школьная поддержка.

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Introduction

Teachers hold various roles that must be carried out as a teacher. This part encompasses all activities undertaken by an individual or group to achieve the desired result. With the teacher's role, everything will work as it should.

The teacher's role in developing the quality of education is one of the steps that can be taken to improve and advance human resources. A *formal educational institution* is an educational institution that must be developed and fostered continuously. In this case, the teacher is essential in increasing student motivation in the teaching and learning process [1] [2]. The teacher is responsible for implementing the learning system so that it works well and has an essential role for students.

One way to develop the learning quality of teachers is by developing science and technology [3]. According to Wulandari (2018) [4], a teacher must understand and develop TPACK abilities, which eight PCK Shulman developed in 1986. According to Quddus (2019), [5] TPACK is knowledge for integrating technology into education. Shulman had already developed PCK in 1986. Pierson proposed incorporating technological knowledge into Shulman's PCK in 2001, which later evolved into the TPCK and was used as knowledge about technology integration in pursuits. In 2007, Mishra and Koehler proposed a new name for TPCK to become TPACK [6].

Mishra and Matthew J.J. Koehler founded TPACK in 2006 to accelerate the advancement of technology in society. Rapid technological advancements in society and a balance with technological change are the cornerstones of development [7]. According to Koehler (2009) [8], the foundation of TPACK is the integration of content or material with pedagogy and technology used in a setting. According to Suyamto (2020) [9], TPACK is the primary foundation for technology-enhanced teaching and necessitates understanding the constructive depiction of technology-enhanced concepts and technological methodologies. It is possible to overcome, assist, and alleviate challenges teachers and students face by using technology to teach a subject that is more challenging to understand.

Regarding the form of knowledge, the teacher's teaching experience also needs to assist students while learning [10]. Thus, it will ease the burden on experienced teachers to address student issues in the learning and teaching process relevant to the subject matter, and even teachers can inspire and foster student passion for learning. They can maximize the teacher's abilities [11]. Teachers need to be able to understand their abilities so that they can optimally channel their knowledge [12]. If a school aims to improve the quality of its education, it can do so not only by improving the quality of its teachers but also by providing administrative support. School administration is a series of processes consisting of controlling, managing, and managing various efforts to implement school goals.

Its original goals were to assess the performance of blended teaching and to learn in a school setting with the help of teachers and school administration. As a result, the title of this study was "Determinants of Blended Teaching-Learning Performance in the New Normal Environment: Exploring the Role of Teachers' Technostress as Mediation."

Theoritical review

Technological Pedagogical Content Knowledge (TPACK)

Technological Pedagogical Content Knowledge (TPACK) is an understanding that transcends the three categories of content, pedagogy, and technology. It is different from the knowledge that is discipline-specific or technological, as well as the pedagogical knowledge that teachers across disciplines possess [13]. Pedagogical Content Knowledge is a clear picture of how an educator teaches the subject matter, what is known about the students he teaches, what is known about the curriculum related to the subject, and what is used to teach the content of the material [14]. TPACK can be measured through the knowledge of pedagogical, content, technological, and technological content [15].

Teachers' Self-efficacy

According to Bandura (2010) [16], self-efficacy is the conviction that a person can plan out and carry out the tasks required to accomplish specific goals. Besides, Santrock (2012) [17] states that self-efficacy greatly influences behavior. A low-self-efficacy teacher

frequently gives up in trying circumstances. Meanwhile, a high-self-efficacy teacher will work harder to address current difficulties. Komarraju & Nadler (2013) [18] agreed, providing evidence that instructors' perceptions of their efficacy are critical in inspiring them to complete complex tasks to meet their objectives. Self-efficacy motivates us to set challenging targets and keep going when things get tough. According to Badura (2010) [16], teacher self-efficacy can be measured through the dimensions of magnitude, strength, and generality.

Teaching Experience

Teaching experience for a teacher is something precious. Teaching is not just a science of technology and art but also a skill. Teaching as a skill is the actualization of theoretical knowledge through the interaction of the learning and teaching processes. Teaching skills need to be owned and mastered by teachers in order to be able to carry out the interaction of the learning and teaching processes effectively and efficiently. Theoretical knowledge mastered by the teacher will be better if it is complemented by teaching experience [19]. According to Yin and Yun (2021) [20], teaching experience can be measured through social presence, setting the climate, teaching presence, selecting content, and cognitive presence.

Administration School Support

Facilities and infrastructure are essential educational tools to support education's success. Therefore, it is vital to have good education management, as it is said that a school can be successful or run smoothly if the management of facilities and infrastructure is good [21]. Administration school support can be measured through non-instructional support, nonpublic schools, and systemwide costs.

Teachers' Technostress

Due to the necessity of using ICT, technology stresses are prevalent in numerous fields, including computer science, ergonomics, education, business, and technostress. Previous research has demonstrated that technological stress negatively influences performance, health, and productivity [22]. Teachers' classroom roles are changing due to technological advancements and digitization procedures [23]. In this situation, teachers' attempts to implement technology into the teaching-learning process are all influenced by outside factors like educational policies, corporate management, communication, and collaboration with colleagues. They either need to be recognized for their efforts or fall short of expectations. They all show signs of technological stress [24]. Additionally, Efilti & Coklar (2019) [25] explains that the learning and teaching process, professional issues, technical issues, personal issues, and societal issues can all be used to quantify teachers' technological stress.

Blended Teaching-Learning Performance

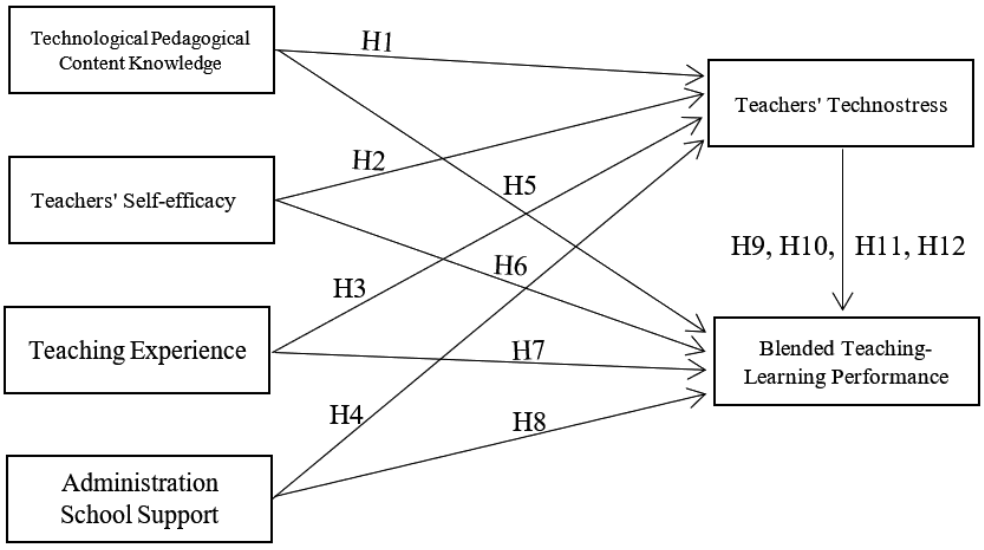
The combination of traditional teaching techniques, such as in-person and online instruction, is frequently referred to as "blended learning" [26; 27]. When it combines face-to-face instruction with computer technology, online and offline activities and materials, it is referred to as "blended learning" [28]. Izuddin (2012) [29] argues that blended learning is defined as a flexible method of instruction that uses the combination of traditional classroom instruction with online learning conducted through the usage of communication and information technology (ICT). According to [30], the elements of offering a straightforward explanation, developing fundamental skills, drawing conclusions, providing an additional explanation, and determining strategy and tactics are utilized to analyze the effectiveness of blended teaching and learning.

Research method

Research Design

Testing previously established hypotheses is the goal of quantitative research [31]. A quantitative methodology is used in this investigation. This approach uses numerical results

Thinking Framework



from measurements made using a questionnaire about the study's variables. They are employing a whole population sampling technique, which involves using the entire population as the research sample. The population utilized here consisted of senior high school teachers in South Sumatra. Researcher in this investigation used 712 participants. The structural approach of the Equation Model (SEM) and the intelligent application of PLS were used for analysis in this work [32].

Instrument Testing

Table 1

Instrument Testing

Instrument Test	Test used
Validity test	Convergent Validity AVE
Reliability Test	Cronbach Alpha Composite Reliability

R Square test

When evaluating the impacts of several independent latent variables on the latent dependent variable, the R-square for the dependent construct is utilized, which displays the magnitude of the influence.

Inner Model Analysis

When utilizing Smart PLS, the internal model analysis process involves testing the hypothesis in light of the t-statistical and probability values. The value of the t-statistic used to test the hypothesis, i.e., by applying statistical values, is 1.96 for an alpha of 5%, and the beta score is used to ascertain the direction of the influence of the link between variables. The following are the criteria for accepting or rejecting the hypothesis:

if t-statistic > 1,96 and p-values < 0,05, H is accepted;

if t-statistic < 1,96 and p-values > 0,05, H is rejected.

Results

Outer Model Analysis

Validity test

Convergent validity and AVE were used in this study's validity assessment. If the individual reflection measure correlates with the measured concept reaches more than 0,7, it is considered high (Dahri, 2017).

Table 2

Validity Test Results

Variable		Outer Loading	AVE	Information
Technological Pedagogical Content Knowledge (X1)	TPACK. 1	0.741	0.550	Valid
	TPACK. 2	0.729		Valid
	TPACK. 3	0.741		Valid
	TPACK. 4	0.756		Valid
	TPACK. 5	0.766		Valid
	TPACK. 6	0.749		Valid
	TPACK. 7	0.708		Valid
Teachers' Self-Efficacy (X2)	TSE.1	0.754	0.533	Valid
	TSE.10	0.705		Valid
	TSE.2	0.717		Valid
	TSE.3	0.727		Valid
	TSE.4	0.718		Valid
	TSE.5	0.724		Valid
	TSE.6	0.714		Valid
	TSE.7	0.729		Valid
	TSE.8	0.751		Valid
	TSE.9	0.756		Valid
Teacher Experience (X3)	TE. 1	0.778	0.533	Valid
	TE. 2	0.771		Valid
	TE. 3	0.763		Valid
	TE. 4	0.627		Valid
	TE. 5	0.701		Valid
Administration School Support (X4)	ASS. 1	0.534	0.523	Valid
	ASS. 2	0.711		Valid
	ASS. 3	0.761		Valid
	ASS. 4	0.723		Valid
	ASS. 5	0.675		Valid
	ASS. 6	0.767		Valid
	ASS. 7	0.750		Valid
	ASS. 8	0.815		Valid
	ASS.9	0.739		Valid
Blended Teaching-Learning Performance (Y)	BTLP. 1	0.711	0.513	Valid
	BTLP. 2	0.710		Valid
	BTLP. 3	0.714		Valid
	BTLP. 4	0.726		Valid
	BTLP. 5	0.713		Valid
	BTLP. 6	0.703		Valid
	BTLP. 7	0.732		Valid
	BTLP. 8	0.717		Valid
	BTLP. 9	0.717		Valid

Variable		Outer Loading	AVE	Information
Teachers' Technostress (Z)	TT. 1	0.767	0.590	Valid
	TT. 2	0.779		Valid
	TT. 3	0.789		Valid
	TT.4	0.780		Valid
	ST. 5	0.725		Valid

Reliability Test

Composite reliability quantifies a variable's true level of dependability. A composite reliability score greater than 0,7 indicates that the data is reliable.

The test results demonstrate that all items have a Cronbach's alpha value as well as a Composite reliability of > 0,7, which are considered reliable.

Test Convergent Validity after modification

After removing the indicators that didn't fulfill the requirements for the loading factor value, the findings of the PLS SEM model's measurement are shown in the following diagram. The study continues on to the discriminant validity test because, as can be observed in the diagram, the loading factor values for the indicators in every variable are not below 0,6.

R-Square Test

According to the data analysis completed with the help of the smartPLS application, the R-Square figures are obtained as depicted in the corresponding table.

According to the test results, the mixed teaching-learning performance (Y) has an R-Square score of 0,735, which demonstrates 73,5% of it is affected by the following factors: teacher experience (X3), teachers' self-efficacy (X2), teachers' technostress (Z), teachers' knowledge of technological pedagogical content (X1), administration school support (X4), and another 26,5% is impacted by factors excluded from this study. The findings indicate that the R-Square value for teachers' technological stress (Z) is 0,534. It further indicates that teachers' technological stress is impacted by teacher experience, teachers' technological pedagogical content competence, self-efficacy, school administration support, and other factors by 53,4% and 46,6%, respectively.

Hypothesis Test Results

The hypotheses can only be accepted or rejected if the t-statistic is more significant than the t-count. When utilizing probabilities to reject or accept a hypothesis, the hypothesis is accepted if the p score is higher than 0,05.

Table 5 shows that the p-value is 0,367 ($p < 0,05$), the t-statistic value is 0.903 ($t > 1,660$), and the beta score is 0,081, indicating H1 is accepted. In addition, the p-value is 0,000 ($p < 0,05$), the t-statistic is 3,576 ($t > 1,660$), and the beta score is 0,299, indicating that H2 is accepted. On the other hand, the results of testing the teachers' self-efficacy hy-

Table 3

Reliability Test Results

	Cronbach's Alpha	Composite Reliability
Administration School Support (X4)	0.884	0.907
Blended Teaching-Learning Performance (Y)	0.881	0.904
Teacher Experience (X3)	0.783	0.850
Teachers' Self-efficacy (X2)	0.903	0.919
Teachers' Technostress (Z)	0.826	0.878
Technological Pedagogical Content Knowledge (X1)	0.864	0.895

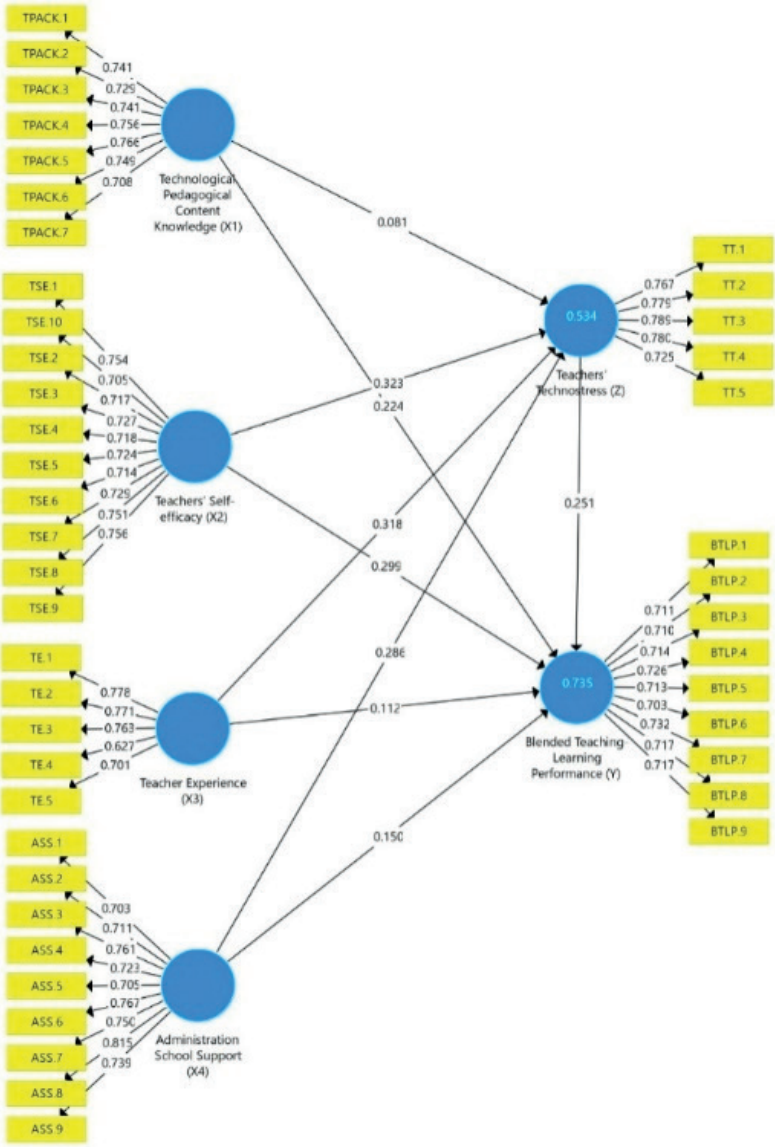


Fig. 1. Convergent Validity test after modification

Table 4

R-Square Test

	R Square	R Square Adjusted
Blended Teaching-Learning Performance (Y)	0.735	0.727
Teachers' Technostress (Z)	0.534	0.522

Table 5

Hypothesis Test Results

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Administration School Support (X4) -> Blended Teaching-Learning Performance (Y)	0.150	1927	0.055
Administration School Support (X4) -> Teachers' Technostress (Z)	0.286	2,903	0.004
Teacher Experience (X3) -> Blended Teaching-Learning Performance (Y)	0.112	1,293	0.197
Teacher Experience (X3) -> Teachers' Technostress (Z)	0.318	3,257	0.001
Teachers' Self-efficacy (X2) -> Blended Teaching-Learning Performance (Y)	0.299	3,576	0.000
Teachers' Self-efficacy (X2) -> Teachers' Technostress (Z)	0.323	3,414	0.001
Teachers' Technostress (Z) -> Blended Teaching-Learning Performance (Y)	0.251	3,960	0.000
Technological Pedagogical Content Knowledge (X1) -> Blended Teaching-Learning Performance (Y)	0.224	2,327	0.020
Technological Pedagogical Content Knowledge (X1) -> Teachers' Technostress (Z)	0.081	0.903	0.367
Administration School Support (X4) -> Teachers' Technostress (Z) -> Blended Teaching-Learning Performance (Y)	0.072	2.123	0.034
Teacher Experience (X3) -> Teachers' Technostress (Z) -> Blended Teaching-Learning Performance (Y)	0.080	2,626	0.009
Teachers' Self-efficacy (X2) -> Teachers' Technostress (Z) -> Blended Teaching-Learning Performance (Y)	0.081	2,513	0.012
Technological Pedagogical Content Knowledge (X1) -> Teachers' Technostress (Z) -> Blended Teaching-Learning Performance (Y)	0.020	0.856	0.392

pothesis on teachers' technostress obtained a p-value of 0,001 ($p < 0,05$), a t-statistic value of 3,414 ($t > 1,660$), and a beta score of 0,323, indicating H3 was received. The results of the teacher experience hypothesis test on blended teaching and learning performance obtained a p-value of 0,001 ($p < 0,05$), a t-statistic value of 3,257 ($t > 1,660$), and a beta score of 0,318, indicating H4 is accepted. Then, the results of testing the teacher experience hypothesis on teachers' technological stress obtained a p-value of 0,197 ($p < 0,05$), a t-statistic value of 1,293 ($t > 1,660$), and a beta score of 0,112, indicating H5 is accepted. The results of the administration-school support hypothesis test on blended teaching and learning performance obtained a p-value of 0,055 ($p > 0,05$), a t-statistic value of 1,927 ($t > 1,660$), and a beta score of 0,150, indicating that H6 is accepted. The results of the administration school support hypothesis test on teachers' technological stress obtained a p-value of 0,004 ($p < 0,05$), a t-statistic value of 2,903 ($t > 1,660$), and a beta score of 0,286, indicating that H7 is accepted. The results of testing the teachers' technostress hypothesis on blended teaching and learning performance obtained a p-value of 0,000 ($p< 0,05$), a t-statistic value of 3,960 ($t > 1,660$), and a beta score of 0,251, indicating H8 is accepted. The results of testing the hypothesis of technological pedagogical content knowledge mediated by teachers' technostress on the blended teaching-learning performance obtained a p-value of 0,392 ($p > 0,05$), a t-statistic value of 0,856 ($t < 1,660$), and a beta score of 0,020, indicating H9 was accepted. The results of testing the teachers' self-efficacy hypothesis mediated by teachers' technological stress on blended teaching-learning performance obtained a p-value of 0,012 ($p < 0,05$), a t-statistic value of 2,513 ($t > 1,660$), and a beta score of 0,081, showing that H10 is accepted. The results of testing the teacher experience hypothesis mediated by teachers' technological stress on blended teaching-learning perfor-

mance obtained a p-value of 0,009 ($p < 0,05$), the t-statistic value is 2,626 ($t > 1,660$), and the beta score is 0,080, indicating that H11 is accepted. The results of testing the administration school support hypothesis mediated by teachers' technological stress on blended teaching and learning performance obtained a p-value of 0,034 ($p < 0,05$), a t-statistic value of 2,123 ($t > 1,660$), and a beta score of 0,072, showing H12 accepted.

Discussion

TPACK helps teachers in the learning process to make it easier to understand and can improve students' analytical skills [34]. The application of learning technology is carried out using strategies that combine material, technology, and learning strategies. The teacher carries out the learning process by integrating technology, lesson content, and learning strategies. In terms of learning technology media, for example, searching the internet for images that are relevant to learning materials and learning strategies. Another example of the use of learning technology is showing videos related to objectives and learning materials using laptops and projectors. The outcomes of an earlier study also indicated that the better the teacher's pedagogical ability, the higher the learning achievement of students [35]. This means that prospective teachers must improve their pedagogical abilities to have a variety of teaching strategies that focus on students [36]. Prospective teacher students' pedagogical abilities are critical in developing and increasing student confidence [37]. As a result, prospective teachers' self-confidence in their knowledge and skills is required to increase their readiness to become teachers later [38].

In addition, based on this research, the better the teachers' self-efficacy, the more it will affect teacher technological stress. Self-efficacy is the state in which a person believes that they can control the results of their efforts. Self-efficacy will influence how individuals interact with stressful situations [39]. Individuals with a high level of self-efficacy will always believe that they can carry out a task well and can find reasonable solutions if they have obstacles in doing their work. Magistra et al. (2021) [40] revealed that self-efficacy did not significantly affect technostress and vice versa. In addition, Siddiqui et al. (2022) [41] also explained that self-efficacy influences technostress.

The basic education taken by a teacher is one of the things that determines the quality of competence possessed. The level of competence possessed by a teacher grows in direct proportion to their level of education, because the higher the education obtained, the broader the academic knowledge possessed by the teacher. Therefore, in the end, they can increase their competence as teaching staff, and the more provisions the teacher has to carry out their duties, the more knowledge and skills related to the ability to carry out learning they will have. It will make the teacher more capable in his work. Furthermore Law et al. (2019) [42] defines that the more educated a person is, the more likely he is to succeed in his career.

According to the study, the greater the teacher's experience, the less this affects the teacher's technostress. It means that the longer a person pursues the profession of teacher, the higher the level of professionalism will be, and vice versa. The teacher's extensive role in education plays a vital part in determining the quality of educational outcomes. A teacher must not only be capable but also thrive in the classroom. One of the elements assisting in the implementation of academic activities is work experience. The amount of professional experience a teacher has will affect the learning goals students must achieve to achieve the school's goals. The teacher's tenure in performing his duties as an educator in a specific academic unit in line with an assignment letter from a recognized institution is the teacher's work experience (it can be from the government or community groups providing education). Thus, the more experience the teacher has, the less stressful it will be, according to Gupta et al. (2018) [43].

According to this study's findings, the better the administration and school support, the better the blended teaching and learning performance will be. Education administration alludes to a method for achieving educational objectives. Planning, organizing, directing, monitoring, and evaluating are the first steps in the process.

Planning involves deciding what has to be accomplished, how it will be accomplished, how long it will take, how many people will be required, and how much it will cost. This plan is made before an action is implemented. The primary job of teachers is to manage the teaching and learning process in a school environment, and all teachers should understand what is happening in their work environment. The process of planning, organizing, directing, coordinating, financing, and assessing curriculum activities, student affairs, buildings and infrastructure, school staff, finance, and school-community connections must be carried out by teachers in a proactive manner. All of this must be properly administered. Finally, the teacher's performance will be valuable if all actions are completed as effectively as possible. Thus, a teacher's performance will be even greater if they carry out their administrative tasks as honestly and effectively as feasible to enhance the effectiveness of mixed teaching and learning.

Conclusion

The current data highlight the importance of several variables that can significantly influence blended teaching and learning performance, with teachers' technological stress as a mediating variable. Therefore, it is hoped that schools will have a particular stress management program for educators and education staff so that blended teaching and learning can be done correctly. Further research must identify the characteristics influencing blended teaching and learning success. It is because the study had its limitations in that it only included a small number of variables, including administration and school support, teachers' technostress, teacher experience, technological pedagogical subject competency, and teachers' self-efficacy.

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