

Teachers' Perception towards DELIMa Learning Platform for Mathematics Online Teaching and Learning in Sibuluhur District

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Abstract

This study aims to identify teachers' perceptions of the DELIMa platform towards the implementation of Teaching and Learning (T&L). This quantitative study in the form of a survey involved 136 Chinese primary school mathematics teachers using a simple random sampling technique. An online questionnaire was utilised as the data collection tool. Data collected were analysed descriptively and inferentially. The findings indicated that teachers were generally receptive and prepared to use the DELIMa Learning Platform to apply T&L online with a high mean value. Based on the age factor, the inference analysis findings indicated a substantial difference in the mean level of teachers' acceptance and preparation to adopt T&L online. Teachers should take this challenge by using DELIMa as one of the learning platforms in their teaching and learning process in order to get themselves accustomed to the fields of technology.

Keywords: Teachers' Acceptance Level, Teachers' Readiness, Mathematics Teacher, Learning Platform, DELIMa

Introduction

Due to the Industrial Revolution 4.0 shift, Malaysia's educational system has been altered in order to maintain its position as a global leader in the field of education (Al-Rahmi et al., 2019). One of the transformations that have occurred is the development of information and communications technology (ICT), so that a more meaningful T&L process can be sparked, as ICT serves as the primary platform. E-learning is a new technology that is not unheard of in today's classrooms and is no stranger to educators today. Another innovative approach in T&L is the use of ICT as a teaching tool. According to Chamidah et al (2020), technology must be a dependable tool for the current teaching process. For knowledge to be easily conveyed and mastered by pupils, exposure to certain virtual teaching approaches must be learnt.

Thus, one of the innovations in education is the Learning Management System (LMS) technology. This technology is used to manage online teaching and learning resources.

Training programmes, online activities, e-learning courses, and training rates are all managed, recorded, and reported on by a piece of software known as a learning management system (Abazi-Bexheti et al., 2018). This system is crucial because it monitors the online learning among students at universities, colleges and other institutions through the internet. A "learning management system" is a computer environment that enables users to access online learning resources for students, teachers, and system administrators (LMS). In essence, the LMS gives teachers a place to keep an eye on and support the management of students' learning. Digital learning tools are used in almost all educational settings, from primary schools to higher education institutions (Ismail, 2020).

The National Education System underwent a considerable shift towards a Digital Education System in the wake of the COVID-19 issue that plagued the country. To improve teaching and facilitation (T&L) to a level on par with the outside world and raise students' attention and interest in the T&L process, the terms in the world of education have also undergone innovation, starting with d-learning, e-learning, and now we are in the m-learning phase (Saidin & Husnin, 2021). In order to stem the spread of the COVID-19 epidemic, many industries have been shut down. The education sector was severely impacted when schools and educational institutions had to close and the learning had to be done online (Mohamed, 2020). Unconventional behaviour is required in light of this newly emerging norm (Krishnamurthy, 2020). The Malaysian Ministry of Education (KPM) has made the decision that all teaching and learning (PdP) will take place online and that all in-person PdP activities will be delayed. This decision will inadvertently force the process of teaching and learning at home (PdPR) using a variety of technological platforms. The Malaysian Ministry of Education chose the DELIMa platform as an alternative learning option because it complies with ISTE international standards, is user-friendly and easy to use, and most teachers are accustomed to using the android ecosystem because they frequently use Google services. This decision is in line with the seventh shift in the Malaysian Education Development Plan (PPPM) 2013–2025, which is to use ICT to improve our education.

Indeed, the implementation of online learning in education is in line with the approach that the Ministry of Education has outlined to support PAK-21 in line with the seventh shift in PPPM to further improve the quality for the nation's educational system.

Background

Digital Learning Platform

In the era of Industrial Revolution 4.0, using digital learning platforms is one of the methods to ensure that T&L is carried out with quality and effectiveness. A learning management system (LMS) and a digital learning platform have been created. However, it is not widely used by educators and students because they are more inclined to face-to-face T&L. These applications, systems, and platforms are fully utilised in this new norm because they can facilitate the online T&L process. Indirectly, the willingness and ability of teachers to implement T&L online have become an essential issue in ensuring the effectiveness of PdPR and the use of learning platforms. LMS is actively utilised in this new norm to facilitate the online T&L process. Numerous new applications have been created by software developers (Saad, 2017). This is to ensure that all daily management, including private usage, education, and management, can be made easier. The platforms Google Classroom, Microsoft Teams, Webex, Zoom, and other social media sites like WhatsApp, Telegram, and YouTube are frequently used to conduct synchronous online T&L. Based on statistics from the Google

Trends website (2020), the “Google Classroom” was listed as second most searched keyword globally among teachers during the pandemic.

Digital Educational Learning Initiative Malaysia (DELIMa)

DELIMa stands for Digital Educational Learning Initiative Malaysia, and the launch event was completed by the Director General of Education Malaysia, Dr. Habibah Abdul Rahim. It is a rebranding of the MOE Digital Learning (DL) platform developed by MoE after Frog VLE. DELIMa is a single platform that provides learning management system services and learning resources that educators and students can use to learn online. Similar to MOE Digital Learning, DELIMa continues to use the Google Sites page as the platform's basis site. Therefore, teachers and students can access the DELIMa platform using the MOE DL e-mail that has been supplied previously. The DELIMa system is supported by three main strategic partners: Google, Microsoft and Apple. As part of their corporate social responsibility, Apple Education, Microsoft Education and Google Education all offer various programmes for international education. They support this latest KPM initiative by providing specialised access to educational systems with applications that supply learning ideas and modules. In this instance, Google provides the G-Suite for Education package, which has established itself as one of the top cloud-based online learning ecosystems. This DELIMa platform is supported by a number of partners who provide DELIMa with their material. KPM works with a number of organisations to provide educational materials to teachers and students, including MDEC, Digi, UNICEF, ASTRO, and Perpustakaan Negara Malaysia (PNM).

Technology Integration in Teaching and Facilitation

Technology has changed education to become more dynamic in learning and teaching, impacting the relationship between teachers and students (Al-Rahmi et al., 2019). The use of technology can result in efficient teaching and learning, as well as draw in and keep the interest of students. With this, educators should deepen the content of lessons and explore teaching techniques, communication, and creativity in delivering knowledge by optimising the use of ICT in PdP (Rajoo et al., 2022). The concept of digital learning is seen as one of the rapid developments in the world of education, especially after the emergence of a new virus that has shocked the whole world, namely the novel coronavirus (Ismail, 2020). Online teaching has existed for several years (Foo et al., 2021) and is not something new among teachers and students. According to Subri et al (2021), the outbreak of the COVID-19 pandemic has made online learning a method that all teachers in Malaysia must use to ensure continuous learning. To encourage online learning, KPM presents a variety of apps and virtual learning platform. Online learning can make it is easier for educators to distribute assignments to students. This finding is in line with the study conducted by Hoq (2020), which states that online learning makes it easier for educators to update assignments to students from time to time. According to Hashim et al (2020), the PdP process using technology is more desirable because the delivery material is interactive, innovative, and exploratory plus it can be accessed everywhere.

Literature Review

Teacher Acceptance of the Use of DELIMa Platform in Mathematics T&L Education

In this era of globalisation, ICT plays an important role in human life as it brings revolution and transformation to the education sector. As agents of change, teachers need to be prepared to face and make changes in educational transformation efforts. Additionally,

teachers must be creative and innovative in order to stay up to date with modern technology advancements. Teachers need to integrate and cultivate ICT at every opportunity in T&L. By changing and influencing instructors' interests and abilities, ICT can be used in T&L sessions to transform T&L practices and enhance the quality of practice. In addition, the government also conducted various ICT-based competency training for teachers (KPM, 2013) in the context of producing teachers proficient in ICT and constantly updated with the latest developments. In the third wave of transformation of education (2021-2025), the Ministry of Education Malaysia is pioneering the delivery of learning using remote platforms, such as Google Classroom and Microsoft Office 365 for education and self-learning through ICT (Ministry of Education Malaysia, 2013). With this, teachers must be equipped with the required technological knowledge in order to deal with this.

Teachers' Readiness to Use the DELIMA Platform in Mathematics T&L

According to the Malaysian Education Transformation Bulletin No. 5 (2015), a teacher's role and quality are crucial to students' success. As such, it is important to enhance teachers' individual qualities from the perspectives of commitment and competence in order to advance the education system that has been put in place. With this, teachers need to have the awareness and make changes in improving knowledge and expertise, which is seen as increasingly challenging in facing the learning challenges of the 21st century. Students in the new millennium, known as generation Z, are more exposed to and have easier access to knowledge from a variety of sources, particularly online sources. In this new norm, teachers must be prepared to conduct T&L online because face-to-face T&L cannot be implemented during the MCO period. According to Lapada et al (2020), a study conducted on 2300 teachers in the Philippines on their readiness to implement distance learning during the COVID-19 pandemic showed that almost 99% of respondents answered "yes" when asked if they were willing to implement online distance learning. In addition, Ain's (2020) study also showed that Malay language teachers have a high level of willingness with a min of 3.96 to implement T&L at home during the Movement Control Order (MCO) period. Therefore, teachers need to equip themselves with the latest knowledge and know-how in usage. When teachers apply these in their T&L process, the knowledge and skills acquired will enable smoother and more effective learning e.

Online Teaching And Learning (T&L)

E-learning, or online T&L, is the use of ICT to speed up the T&L procedure. According to Ramli and Zulkifli (2022), online T&L uses various devices with Internet access that are implemented either synchronously or asynchronously. Online T&L is still expanding and has a significant impact on Malaysian education. In this pandemic era, the field of education has started to move towards online T&L that uses various existing applications (Kuppusamy & Norman, 2021). Online T&L has grown rapidly because of many advantages, such as flexibility, Internet accessibility, and cost-effectiveness (Al-Rahmi et al., 2019). With mobile connections and Internet access, teachers and students can conduct PdP sessions anytime. Students can also learn autonomously according to their own pace as well as their convenience. This norm indirectly impacts many teachers and students. Like it or not, we must adapt to the new norm and recognise the importance of online T&L. This is because online T&L is the cornerstone for developing information and communication technology (Mohamad et al., 2022).

Problem Statement

The new norms of education require educators to change from traditional to online teaching methods completely. According to Fullan in *The New Meaning of Educational Change*, there is a need for adaptive action in the education system when a disaster or epidemic occurs (Nasution et al., 2022). Information technology is the driving force in creating positive changes that can diversify PdP methods by teachers. According to Juwait and Siew (2022), the PdP method that teachers in schools usually carry out had to be changed or adapted according to the function of the ICT application. This may actively and creatively promote online learning and have a significant impact on students' commitment to the efficient transfer of knowledge.

In order to ensure that teachers can adapt to digital-based teaching methods, the Ministry of Education has launched a digital learning platform that is suitable and needed at a time when the nation is undergoing a digital transformation. Thus, MoE periodically works to enhance the online learning environment. The learning environment Virtual Learning Environment (VLE) frog and the 1BestriNet programme were two initial government initiatives (Kementerian Pendidikan Malaysia, 2013). The digital learning platform DELIMa was launched to replace VLE Frog to ensure the quality and effectiveness of online learning. DELIMa allows students and teachers to appreciate digital learning in line with the current Industrial Revolution 4.0. Teachers can use various programmes or services such as Google Classroom, Microsoft 365, Apple Learning Center, and applications such as Quizizz, Kahoot, and Ed-Puzzle to diversify teaching methods (Kaviza, 2020).

Nevertheless, Muhammad Izzat's study (2021) found that mathematics teachers lacked knowledge and skills in implementing PdP online and were not skilled in online education platforms. This was also supported by Ramli and Zulkifli (2022), who found using ICT was also burdensome, especially for older teachers who were not keeping up with the world's technological developments. Teachers' willingness and ability to use technology, especially in implementing online T&L, has become an issue that cannot be ignored. Teachers do not have sufficient skills to manage a virtual classroom or online learning effectively. They find it very challenging to embrace the use of digital learning tools like DELIMa as a technique of instruction in the classroom (Saidin & Husnin, 2021). This is consistent with a study by Sari et al (2022), which discovered that ICT-based learning could not be implemented due to instructors' insufficient ICT ability. This was reported when 57% of secondary school teachers in Malaysia were not proficient in using ICT for T&L sessions (Rani & Beutlin, 2020). In addition, Kaviza's (2020) study also shows that the students' level of willingness was modest because this learning media was still new and had not been fully explored.

In summary, teachers play the role of facilitator or guide in implementing T&L online and also influence the effectiveness of T&L. Goliong et al (2020) observed that only 24% of teachers in the Ranau district of Sabah fully implement online teaching and learning during PdPR, indicating that teachers' preparation for this mode of instruction was not at a targeted level. This low proportion was due to teachers finding it more challenging to mentor students online as opposed to in-person.

Although digital learning platforms and online PdP have been introduced for a long time, no emphasis has been placed on implementing online PdP and using these platforms in T&L. Teachers are more comfortable with the conventional teaching methods (Azizan, 2020). This is consistent with a research conducted by Kanojiya (2020) on teachers in Bangalore, India, which found that 86.9% of them preferred face-to-face instruction over online learning. However, the new norms of education require all teachers to be actively involved in implementing online learning through digital learning platforms. Therefore, the purpose of

this study was to determine the degree of teachers' acceptance and readiness of using the DELIMa platform in T&L of Mathematics.

Research Objectives

1. To determine the level of teachers' acceptance towards using the DELIMa learning platform to implement T&L of Mathematics.
2. To determine the teacher's readiness to use the DELIMa learning platform to implement T&L of Mathematics.
3. To investigate the significant difference in the level of teachers' acceptance towards using the DELIMa platform for the implementation of T&L of Mathematics based on the age factor.
4. To investigate the significant difference in teachers' level of readiness towards using the DELIMa platform for the implementation of T&L of Mathematics based on the age factor.

Research Question

1. What is the level of teachers' acceptance towards using the DELIMa learning platform to implement T&L of Mathematics?
2. What is the level of teacher's readiness for the use of the DELIMa learning platform for the implementation of T&L of Mathematics?
3. Is there a significant difference in the level of teachers' acceptance towards the use of the DELIMa platform for the implementation of T&L of Mathematics based on age?
4. Is there a significant difference in teachers' readiness to use the DELIMa platform to implement T&L of Mathematics based on age?

Research Hypothesis

To answer research questions 3 and 4, the research hypothesis has been formed for a significant test at the $p=0.05$ level, namely:

H_{01} : There is no difference in teachers' mean level of acceptance towards the use of the DELIMa platform for the implementation of T&L of Mathematics based on the age factor.

H_{02} : There is no difference in the mean level of teachers' readiness towards using the DELIMa platform to implement Mathematics T&L based on the age factor.

Methodology

A survey is used in this quantitative study. This can provide precise perceptions and general statements about implementing T&L online using the DELIMa platform. To ensure that every one of the populations has an equal and independent chance of being chosen as a sample, the sample selection process employed a random sampling technique. Out of 207 teachers in the Sibu region of Sarawak, 136 mathematic teachers from urban and rural schools were chosen for the study. The determination of the total number of samples required was done by referring to Krejcie and Morgan's Sample Size Determination (Table 1).

Table 1

Krejcie Morgan Morgan's (1970) Sample Size Determination table

<i>Table for Determining Sample Size of a Known Population</i>									
N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

Data Collection Method

Google Form-type questionnaire was used and distributed to all respondents. Data collection was through Google Forms to obtain data from teachers about the level of teacher acceptance and readiness towards using the DELIMa platform for implementing mathematics teaching and facilitation. Google Form questionnaires were distributed online to teachers through Telegram, Facebook, and WhatsApp applications. Through the distribution of this online questionnaire, the researcher successfully collected data from mathematics teachers from the Sibuland district. The data from the questionnaire were analysed using the Statistical Package for Social Sciences (SPSS).

Research Instrument

This study prepared a set of three questionnaires containing three parts. Part A is related to the teacher's background information, Part B was related to the attitude of mathematics teachers towards the use of the DELIMa learning platform for T&L during the era of the COVID-19 pandemic, part C contained the level of readiness of mathematics teachers towards the use of DELIMa learning platform for T&L during the era of the COVID-19 pandemic. This questionnaire was adapted from study by (Lapada et al., 2020; Che Azizan and Nasri, 2020). The questionnaire was modified according to the focus of the study, which was related to teachers' perceptions of using the DELIMa learning platform for T&L. Some questions were summarised and dropped because the questions did not fit the focus of the study. This questionnaire uses a 5-point Likert scale with 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree. A five-point Likert scale (Table 2) was used in all questions formed to measure the attitude and readiness of mathematics teachers towards using the DELIMa learning platform.

Table 2

5-point Likert Scale

Likert-Scale Description	Likert-Scale
Strongly Disagree	1
Disagree	2
Neutral / Uncertain	3
Agree	4
Strongly Agree	5

Pilot Study

To determine the reliability value of this research instrument, a pilot study involving 25 teachers from SJK (C) Serdang Baru 2, Petaling Perdana, Selangor, was carried out. This study was conducted using the value of the Cronbach's alpha - coefficient (Ghazali, 2005). The higher the value and level of validity and reliability of the instrument, the more accurate the data that will be obtained to produce a good and quality study. The overall Cronbach's alpha value obtained is 0.907, which shows that the questionnaire is applicable for this study.

Method of Data Analysis

In this study, the data obtained were analysed using Statistical Package For Social Sciences (SPSS) version 20.0. Using SPSS software can help reduce errors. This is in line with Pallant (2011) that SPSS can be used to avoid mistakes during the screening and data cleaning process. This is because, if there is a mistake in this process, it will affect the study data analysis. Data were analysed using descriptive methods and displayed in table form. Descriptive statistical analysis that includes percentage, frequency, mean, and standard deviation can summarise and conclude a study (Gravetter & Wallnau, 2016). Next, the study data were analysed statistically inferentially using one-way ANOVA and post hoc tests through SPSS software. Table 3 shows the interpretation of the mean score. In order to measure the teachers' attitude and level of readiness, this questionnaire uses an interpretation method that refers to Awang (2012).

Table 3

Interpretation of mean score (Awang, 2012)

Mean Score	Interpretation
1.00 – 2.49	High / Positive
2.50 – 3.79	Average / Neutral
3.80 – 5.00	Low / Negative

Findings**Descriptive Analysis****Research Question 1: What is the level of acceptance of teachers towards the use of the DELIMa platform to implement Mathematics T&L online**

Table 4 shows the findings about teachers' perceptions of using the DELIMa platform to implement Mathematics T&L online. Based on the mean value, respondents showed a positive perception of using the DELIMa platform to implement online Mathematics T&L, with an overall mean value of 4.011 (SP=0.896). The means of all 10 items were high. The mean value of item P1 'The DELIMa Platform is easy to use' is 3.949 (SP=0.897). The mean value for P2 'The DELIMa platform is a reasonable idea for Mathematics T&L' is 4.234 (SP=0.869). The

mean value for P3 item 'The application in the DELIMa platform (Google slide, Canva, WolframAlpha...) makes it simpler for me to create teaching resources for mathematics' is 3.985 (SP=0.825). The mean value for item P4 'Applications in the DELIMa platform (Edpuzzle, KPlicker, Thinkercard,...) become more effective, and interesting teaching aids for me' is 3.985 (SP=0.943). The mean value of item P5 'Application in the DELIMa platform (One Drive, Google Drive,...) makes it easier for me to manage and update teaching materials' is 3.919 (SP=0.886). The mean value for item P6 'Applications in the DELIMa platform (Google Classroom, Microsoft team...) makes it easier for me to send assignments to students', is 4.051 (SP=0.905). The mean value of item P7 'Applications in the DELIMa platform (Google form, Kahoot, Quizizz...) can be used as an online evaluation, and the assessment tool' is 4.059 (SP=0.892). The mean value for item P8 'The DELIMa Platform can improve the quality of Mathematics T&L' is 4.015 (SP=0.852). The mean value of item P9 'The DELIMa platform improves my information technology skills' is 4.007 (SP=0.899). The mean value for item P10 'Applications in the DELIMa platform are suitable to be used as a Mathematics T&L platform' is 4.066 (SP=0.937). Overall, mathematics teachers have a positive perception of the DELIMa platform.

Table 4

Analysis of Teachers' Perceptions towards the use of DELIMa platform to carry out online T&L Mathematics

Bil.	Teachers' perception of the use of the DELIMa platform to implement online Mathematics T&L	1	2	3	4	5	Mean Score	Standard Deviation	Interpretation
P1	The DELIMa platform is easy to use.	5	7	7	88	29	3.949	0.897	High / Positive
		4	5	5%	65	21%			
		%	%		%				
P2	The DELIMa platform is a reasonable idea for T&L Mathematics.	4	4	16	88	33	4.243	0.869	High / Positive
		3	3	12	65	24%			
		%	%	%	%				
P3	The DELIMa platform's applications (Google Slides, Canva, WolframAlpha, etc.) make it simpler for me to create teaching resources for mathematics.	4	4	16	78	34	3.985	0.852	High / Positive
		3	3	12	58	25%			
		%	%	%	%				
P4	Applications in the DELIMa platform (Edpuzzle, KPlicker, Thinkercard, etc.) applications have improved the effectiveness and interest of my teaching materials.	3	6	14	80	33	3.985	0.943	High / Positive
		2	4	10	59	24%			
		%	%	%	%				
P5	Applications in the DELIMa platform (One Drive, Google Drive, etc.) make it easier for me to manage and update teaching materials.	5	5	21	70	35	3.919	0.886	High / Positive
		4	4	16	52	26%			
		%	%	%	%				
P6	Applications in the DELIMa platform (Google Classroom, Microsoft Team...) make it easy for me to send assignments to students.	5	4	10	77	40	4.051	0.905	High / Positive
		4	3	7%	57	30%			
		%	%		%				
P7	Applications in the DELIMa platform (Google form, Kahoot, Quizizz...) can be used as an online assessment and assessment tool.	5	4	8	80	39	4.059	0.892	High / Positive
		4	3	6%	59	29%			
		%	%		%				
P8	The DELIMa platform can improve the quality of mathematics T&L.	3	5	15	77	36	4.015	0.852	High / Positive
		2	4	11	57	27%			
		%	%	%	%				
P9	The DELIMa platform improved my information and communication technology (ICT) skills.	5	4	12	79	36	4.007	0.899	High / Positive
		4	3	9%	59	27%			
		%	%		%				
P10		5	5	10	72	44	4.066	0.937	High / Positive

The application in the DELIMa platform is suitable to be used as a T&L Mathematics platform.	4	4	7%	53	33%			
	%	%		%				
	Overall (Mean / Standard Deviation)			4.01	0.896			High / Positive
				1				

Research Question 2: What is the level of readiness to use the DELIMa platform to implement online Mathematics T&L.

Based on Table 5, the findings show the readiness to use the DELIMa platform to implement online Mathematics T&L based on eight items. Overall, teachers were really eager to deploy the DELIMa platform to implement online Mathematics T&L. Item K1 'I am ready to optimise the DELIMa platform for the online Mathematics T&L' showed a high mean value (mean=4.015, SP=0.897). The item K2, 'I am ready to access the Basic Digital Textbook (BTDA) for online Mathematics T&L' showed a high mean value (mean=4.022, SP=0.869). K3 'I am ready to use the digital T&L application (Google Meet, Microsoft Team). to run Mathematics T&L online' showed a high mean value (mean=4.0, SP=0.852). Item K4 'I am ready to use digital tools (Classroom, Google Docs, Google Slides, Google Form, Jamboard, Google Earth,...) to conduct hybrid learning' had a high mean value (mean=4.015, SP=0.943). Item K5 'I am ready to use digital applications (Google Drive and One Drive) to manage Mathematics T&L information' showed a high mean value (mean=4.015, SP=0.866). Item K6 'I am willing to use application links (Edpuzzle, Quizizz, Kahoot, Padlet, Canva...) to attract students' interest in online Mathematics T&L' shows a high mean value (mean=4.059, SP=0.905). Item K7 'I am willing to use videos (Edu WebTV and ClkgooTube) to improve students' self-learning skills in Mathematics T&L' showed a moderate mean value (mean=3.779, SP=0.892). Item K8 'I am ready to take on the challenge of learning mathematics online via the DELIMa platform' showed a high mean value (mean=3.978, SP=0.852). In summary, the study's findings displayed that mathematics teachers in the Sibuluhur district are willing to use the DELIMa platform which is recommended by the Malaysian Ministry of Education to implement online Mathematics T&L.

Table 5

Analysis of Teachers' Readiness to use the DELIMa platform to carry out online T&L Mathematics

Bil.	The level of readiness to use the DELIMa platform to implement online Mathematics T&L.	The level of readiness to use the DELIMa platform to implement online Mathematics T&L.					Mean Score	Standard Deviation	Interpretation
		1	2	3	4	5			
K1	I am ready to optimize the DELIMa platform for online Mathematics T&L.	1	5	11	93	26	4.015	0.897	High / Positive
		1%	4%	8%	69%	19%			

K2	I am ready to access the Basic Digital Textbook (BTDA) for T&L Mathematics online.	2	6	13	81	34	4.022	0.869	High / Positive
		1%	4%	10%	60%	25%			
K3	I am ready to use digital T&L applications (Google Meet, Microsoft Team) in T&L Mathematics online.	1	4	17	86	28	4.000	0.852	High / Positive
		1%	3%	13%	64%	21%			
K4	I am ready to use digital tools (Classroom, Google Docs, Google Slides, Google Form, Jamboard, Google Earth,...) to conduct hybrid learning.	1	5	19	77	34	4.015	0.943	High / Positive
		1%	4%	14%	57%	25%			
K5	I am ready to use digital applications (Google Drive and One Drive) to manage T&L Mathematics information.	1	5	15	85	30	4.015	0.886	High / Positive
		1%	4%	11%	63%	22%			
K6	I am ready to use application links (Edpuzzle, Quizizz, Kahoot, Padlet, Canva...) to attract students for online Math T&L.	3	4	10	84	35	4.059	0.905	High / Positive
		2%	3%	7%	62%	26%			
K7	I am willing to use videos (Edu WebTV and ClkgooTube) to improve students' self-learning skills	4	10	20	80	22	3.779	0.892	Average
		3%	7%	15%	59%	16%			

	in Mathematics.								
K8	I am ready to take on the challenge of learning mathematics online via the DELIMa platform.	2	6	19	75	34	3.978	0.852	High / Positive
		1%	4%	14%	56%	25%			
Overall (Mean / Standard Deviation)							3.985	0.887	High / Positive

Inferential Analysis

Research Question 3: What are the significant differences in the mean level of teachers' acceptance of using the DELIMa platform to implement online Mathematics T&L based on the age factor

Based on Table 7, the results of this study found that there is a significant difference in the mean score of teachers' perceptions of the use of the DELIMa platform to implement online Mathematics T&L based on the age factor, $F(5,1327)=15.337; p<0.05$). The null hypothesis was rejected, and the results of the ANOVA test showed a significant difference in the mean scores of teachers' perceptions of the use of the DELIMa platform to implement online Mathematics T&L based on the age factor among mathematics teachers in the Sibuluhur district. Table 6 shows the perception of teachers aged 25 years and under ($m=4.463$; $SP=0.429$), teachers aged 26-30 years ($m=4.145$; $SP=0.733$), teachers aged 31-35 years ($m=4.083$; $SP=0.669$), teachers aged 36-40 years ($m=4.159$; $SP=0.390$), teachers aged 41-45 years ($m=3.802$; $SP=0.688$) and teachers aged 46 years and above ($m=3.753$; $SP=1.250$). The mean score of the level of acceptance of teachers aged 25 years and below is higher than other groups of teachers.

Based on Table 6b, the value of sig. $P=1.11 \times 10^{-14}$ is less than the set limit, which is $p<0.05$, thus the post hoc results (Table 8) must be taken into account and reported. Table 8 shows that there is a significant mean difference between the teacher's' age variable where it is less than the α value ($p<0.05$), that is (25 years and under - 41-45 years; 25 years and under - 45 years and over). For example, teachers who are 25 years old and below are significantly different from those who are between 41-45 years old on the DELIMa platform to implement online Mathematics T&L with a value of p (sig.) 0.040. Teachers aged 25 years and below are significantly different from teachers aged 45 years and above regarding using the DELIMa platform to implement Mathematics T&L online, with a value of p (sig.) 0.024.

Table 6

Descriptive Analysis of Teachers' Perception of the use of DELIMa platform to implement online Mathematics T&L Based on the Age Factor (N=136)

Teacher's perception Based on the Age Factor	N	Sum	Mean	Standard Deviation
≤25 years	80	357	4.463	0.429
26 – 30 years	310	1285	4.145	0.733
31 – 35 years	180	735	4.083	0.669
36 – 40 years	220	915	4.159	0.390
41 – 45 years	243	924	3.802	0.688
≥ 46 years	300	1126	3.753	1.250

Table 7

ANOVA Test for the Level of Teacher Acceptance of the Use of the DELIMa Platform to Implement Online Mathematics T&L Based on the Age Factor (N=136)

ANOVA					
Teacher's perception Based on the Age Factor	Sum Squares	of df	F	Nilai F	(Sig.)
Between Group	58.12274	5	11.62455	15.33679	<0.000
Within Group	1005.802	1327	0.757952		
Total	1063.925	1332			

Table 8

Turkey HSD Post Hoc Test For Teachers' perceptions of the use of the DELIMa platform to implement online Mathematics T&L Based on the Age Factor (N=136)

Dependent Variable: Teacher's Perception

	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	Under 21 years	26-30 years	.317	.309	.307	-.29	.93
		31-35 years	.379	.331	.254	-.28	1.03
		36-40 years	.303	.322	.348	-.33	.94
		41-45 years	.651*	.314	.040	.03	1.27
		45 years and above	.709*	.310	.024	.10	1.32
	26-30 years	Under 25 years	-.317	.309	.307	-.93	.29
		31-35 years	.062	.231	.789	-.40	.52
		36-40 years	-.014	.217	.949	-.44	.42
		41-45 years	.334	.205	.106	-.07	.74
		45 years and above	.392	.200	.052	.00	.79
31-35 years	Under 25 years	-.379	.331	.254	-1.03	.28	

		26-30 years	-.062	.231	.789	-.52	.40
		36-40 years	-.076	.248	.760	-.57	.41
		41-45 years	.272	.237	.253	-.20	.74
		45 years and above	.330	.232	.158	-.13	.79
	36-40 years	Under 25 years	-.303	.322	.348	-.94	.33
		26-30 years	.014	.217	.949	-.42	.44
		31-35 years	.076	.248	.760	-.41	.57
		41-45 years	.348	.224	.123	-.09	.79
		45 years and above	.406	.219	.066	-.03	.84
	41-45 years	Under 25 years	-.651*	.314	.040	-1.27	-.03
		26-30 years	-.334	.205	.106	-.74	.07
		31-35 years	-.272	.237	.253	-.74	.20
		36-40 years	-.348	.224	.123	-.79	.09
		45 years and above	.058	.207	.780	-.35	.47
	Above 45 years	Under 25 years	-.709*	.310	.024	-1.32	-.10
		26-30 years	-.392	.200	.052	-.79	.00
		31-35 years	-.330	.232	.158	-.79	.13
		36-40 years	-.406	.219	.066	-.84	.03
		41-45 years	-.058	.207	.780	-.47	.35

Research Question 4: What are the significant differences in mean of teachers' willingness to use the DELIMa platform to implement online Mathematics T&L based on age.

Based on Table 11, the results of this study found that there is a significant difference in the mean score of teachers' willingness to implement T&L online based on the age factor ($F(5,1082)=4.173; p<0.05$). The null hypothesis was rejected, and the results of the ANOVA test showed a significant difference in the willingness of teachers to use the DELIMa platform to implement T&L of Mathematics online based on the age factor. Table 9, shows the use of the DELIMa platform to implement T&L of Mathematics online for those aged 25 and under ($m=4.203$; $SP=0.545$), teachers aged 26-30 years ($m=4.012$; $SP=0.757$), teachers who aged 30-35 years ($m=4.090$; $SP=0.684$), teachers aged 36-40 years ($m=4.085$; $SP=0.410$), teachers aged 40-45 years ($m=3.852$; $SP=0.583$) and teachers who are 46 years old and above ($m=3.883$; $SP=0.639$).

Based on Table 7b, the value of sig. $P=0.000923$ is less than the set limit, $p<0.05$, thus the post hoc results (Table 12) must be considered and reported. Table 12 found no significant mean difference between the teachers' age variable where the P value is greater than the α value ($p<0.05$).

Table 9

Descriptive Analysis of Teachers' Readiness to Use the DELIMa Platform to Implement Online Mathematics T&L Based on Age Factors (N=136)

Teachers' readiness to use the DELIMa platform to implement the online Mathematics T&L Based on Age Factors	N	Sum	Mean	Standard Deviation
≤25 years	64	269	4.203	0.545
26 – 30 years	248	995	4.012	0.757
30 – 35 years	144	589	4.090	0.684
36 – 40 years	176	719	4.085	0.410
40 – 45 years	216	832	3.852	0.583
≥ 46 years	240	932	3.883	0.639

Table 10

ANOVA Test for the Level of Teachers' Readiness of the Use of the DELIMa Platform to Implement Online Mathematics T&L Based on the Age Factor (N=136)

ANOVA					
Level of Teachers' Readiness of the Use of the DELIMa Platform to Implement Online Mathematics T&L Based on the Age Factor	Sum of Squares	df	F	Nilai F	(Sig.)
Between group	12.90105	5	2.58021	4.173925	0.000923
Within group	668.8637	1082	0.618173		
Total	681.7647	1087			

Table 11

Turkey HSD Post Hoc Test For Teachers' Readiness of the use of the DELIMa platform to implement online Mathematics T&L Based on the Age Factor (N=136)

Dependent Variable: Readiness

	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	Under 21 years	26-30 years	.191	.258	.460	-.32	.70
		31-35 years	.113	.276	.684	-.43	.66
		36-40 years	.118	.268	.661	-.41	.65
		41-45 years	.351	.262	.182	-.17	.87
		45 years and above	.320	.259	.219	-.19	.83
26-30 years	Under 21 years	26-30 years	-.191	.258	.460	-.70	.32
		31-35 years	-.078	.193	.686	-.46	.30
		36-40 years	-.073	.181	.687	-.43	.29
		41-45 years	.160	.171	.351	-.18	.50

	45 years and above	.129	.167	.441	-.20	.46
31-35 years	Under 25 years	-.113	.276	.684	-.66	.43
	26-30 years	.078	.193	.686	-.30	.46
	36-40 years	.005	.207	.981	-.40	.41
	41-45 years	.238	.198	.230	-.15	.63
	45 years and above	.207	.194	.288	-.18	.59
36-40 years	Under 25 years	-.118	.268	.661	-.65	.41
	26-30 years	.073	.181	.687	-.29	.43
	31-35 years	-.005	.207	.981	-.41	.40
	41-45 years	.233	.187	.214	-.14	.60
	45 years and above	.202	.182	.271	-.16	.56
41-45 years	Under 25 years	-.351	.262	.182	-.87	.17
	26-30 years	-.160	.171	.351	-.50	.18
	31-35 years	-.238	.198	.230	-.63	.15
	36-40 years	-.233	.187	.214	-.60	.14
	45 ke atas	-.031	.172	.855	-.37	.31
Above 45 years	Under 25 years	-.320	.259	.219	-.83	.19
	26-30 years	-.129	.167	.441	-.46	.20
	31-35 years	-.207	.194	.288	-.59	.18
	36-40 years	-.202	.182	.271	-.56	.16
	41-45 years	.031	.172	.855	-.31	.37

Discussion

Overall, mathematics teachers have a positive attitude towards using the DELIMa platform to implement Mathematics T&L, indicating a high-level readiness and acceptance. This finding shows that mathematics teachers in urban and rural Chinese national schools in the Sibul district accept and agree with the effectiveness of this online platform. It is consistent with the study of Azura et al (2021), which revealed that employing online learning had a high level of efficacy. In addition, teachers are also willing to use this platform. This finding is consistent with the study by Desiro Saidin, and also consistent with the study by Balakrishnan et al (2022), who discovered that maths teachers have excellent levels of knowledge and proficiency using Google Classroom.

The analysis results found that the level of teachers' acceptance of using the DELIMa platform is higher than the level of teachers' readiness. This demonstrates that teachers are open to adopting the DELIMa platform's utilisation as well as shifting from teaching strategies that employ traditional approaches to strategies that have a 21st-century notion (Saidin & Husnin, 2021). This point is supported by Baharan (2019), whose study found that the level of readiness of Islamic Education teachers towards using FROG VLE is high.

The study also demonstrates that the age factor has a substantial impact on the level of beneficiaries and the level of instructors' implementation. Teachers who are over the age of 25 are more likely to accept and use the DELIMa platform in T&L of Mathematics. This finding is consistent with Ramli and Zulkifli's (2022) study which established that Islamic Education teachers with less than five years of experience are more prepared than other groups of teachers because they are novice teachers and are more exposed to PdP online through courses and workshops. Teachers who are 40–45 years old and over 45 years old tend to employ their prior knowledge more frequently since they are more accustomed to the face–

to–face teaching technique. Jekri and Han (2020) shared this opinion. In contrast to older or more experienced instructors, they claimed that most schools sent novice teachers to educational workshops. The teachers in this category were also better at using technology to enhance teaching and learning.

Conclusion

Finally, it can be said that the Sibul district's Chinese national type school mathematics teachers are prepared and eager to use the DELIMa platform to implement online Mathematics T&L. Teachers are actively utilising a range of tools and technology to perform online virtual T&L processes, stepping outside of their comfort zones of using traditional teaching approaches. This is due to the fact that the teachers have the awareness and willingness to adopt suitable and effective T&L strategies to successfully support students' learning.

This study findings have certain impact for those involved with the educational system. First and foremost, educators of this generation must constantly develop their knowledge and abilities, particularly in the field of ICT, to be relevant. T&L approaches have shifted to the virtual environment and without the familiarity of ICT, teachers will struggle to carry out their T&L. Secondly, the Ministry of Education, State Departments of Education, District Education Offices, and Schools need to introduce more courses and workshops which train teachers in carrying out T&L online. With such exposure it is hoped that the teachers will be more motivated and comfortable to use online T&L.

The results can be reinforced with a number of recommendations for additional researches. First, this study can be carried out qualitatively to produce detailed data. Researchers can also gather data, gain meaning, and understand through qualitative methods to make deeper analysis. Additionally, further research can examine the challenges teachers face in T&L and the use of the DELIMa learning platform. Aside from that, the study population can be also expanded. The population selection can involve primary and secondary school teachers in Malaysia to get an overall picture of teachers' perceptions of online T&L through the DELIMa learning platform.

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