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Promoting Virtual Learning among Teacher: The Key to Encourage

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Abstract

Issues and worries of teachers are at the centre of many of the obstacles in the way of technological integration and virtual learning. This study tries to unravel what strategies can be implemented by teachers in implementing virtual learning among teachers. The purpose of this research was to gather consensus and professional opinion on effective methods for promoting online education. In this study, seven educators from different disciplines at Malaysian public universities participated in a Fuzzy Delphi process using a seven-point Likert scale to provide their input. Experts were asked to weigh in on a total of 7 questions. The data was analyzed using the Fuzzy Delphi approach. Triangular fuzzy numbering (triangular fuzzy number) was used to examine the data, and the 'defuzzication' procedure was used to identify the position (ranking) of each variable. According to the results, both the amount of response to and the level of expert consensus on the strategies in promoting virtual learning. The results of the expert consensus agreement are greater than 75%, the threshold value is less than 0.2, and the a-cut is greater than 0.5. The aspects of the priority criteria were ordered by priority and adjusted by adding and removing items based on recommendations from experts.

Keyword: Fuzzy Delphi, Virtual Learning, Expert Consensus, Strategies

Introduction

Acceptance in this educational field is related to a change of paradigm in an interconnected environment that allows digital learning (Mahlow & Hediger, 2019), which implies focusing the formative interest on the students and their learning experiences, which in turn has been stimulated by technological and social trends towards digitalization (Jnr & Doel, 2021). Therefore, the digitization of higher education is essential for the enhancement of the classroom environment, pedagogical resources, and the learning process as a whole (Gurung & Routledge, 2014) For its transformative potential to be fully realized, digital transformation necessitates not just new technologies but also new types of experts (Nadkarni & Prugl, 2021). As a result of adopting active approaches in the real setting of

university classrooms, the promise afforded by ICT becomes a real prospect of digital transformation (Torres et al., 2021).

To communicate with other users and have access to a wide variety of resources, a Virtual Learning Environment (VLE) must be a computer-based environment that is generally open system (Britain & Liber, 2004). Virtual learning environments (VLE), typically used in educational settings, have gained recognition as a powerful tool for improving the standard of education. In addition, cutting-edge innovations in ICT tools, such as virtual learning environments (VLE), have changed the very foundations of education (Barker & Gossman, 2013). Through the use of VLE, modern pedagogical methods like blended and online learning have become widespread. By supporting a virtual learning model that transcends both time and place, by offering a mechanism for the management of the learning experience, and by giving both instructors and students access to a digitally-enhanced classroom, it has altered the fundamental character of education (Sneha & Nagaraja, 2013). Positive effects on educators, students, and parents have resulted from the widespread adoption of virtual learning environments (VLEs), which provide greater learning flexibility by eliminating geographical and temporal constraints (Saadon & Dahlan, 2013). As an added bonus, it allows for both real-time and delayed communication between users (Awang et al., 2018: Awang et al., 2022).

The Frog VLE was implemented in Malaysia as part of the 1BestariNet project, which was launched by the Ministry of Education, Malaysia (MOE), to upgrade the country's educational information systems from their previous iteration, School Net (MOE, 2014). The Ministry of Education has set up about RM1.475 billion for the rollout of the Frog VLE (MOE, 2014). In the first two and a half years of the contract, the Ministry of Education (MOE) spent RM250.50 million on a VLE licence and an additional RM262.81 million on maintenance. The deal is set to expire in (MOF, Ministry of Finance, 2014). Despite these substantial expenditures, the most recent audit report shows that just 19.5% to 33.5% of institutions are making effective use of the Frog VLE. Analysis of Frog VLE use by educators from January 1st to March 31st, 2014 found usage to be between 0.57% and 4.69% within that time period (MOF, 2014; Xchanging, 2014). As the degree of usage is acknowledged as the key force that will decide the success of its implementation, poor utilisation of VLE is probably an early indicator of failure, also due to the rejection by its users, particularly the teachers.

Based on the data mentioned above, it shows that the virtual aspect of this game is a new one in the context of Malaysia. A large allocation is invested by the government in making this process a success. however, the implementation aspect clearly cannot be ascertained specifically whether the teacher implements or not. Therefore, this study tries to unravel what are the elements that can encourage teachers to implement this virtual learning.

Teachers and Virtual learning in Malaysia Context

The second phase of the Malaysian Education Blueprint 2013 - 2025 (MEB), covering the years 2016-2020, had begun. During MEB's second iteration, the emphasis on student development and educator excellence remained constant (Ministry of Education Malaysia, 2013). Educating students in a way that is consistent with the National Education Philosophy and produces graduates who are well-rounded in terms of their mental, emotional, and physical capabilities is no easy undertaking. It's true that some educators lack the authority to the Malaysian Ministry of Education's (MOE) vision for education. In keeping with the theme "Teachers are the Drivers of National Transformation," which was chosen for Teacher's Day in Malaysia in 2018, this event was held. Teachers are tasked with developing their students' full potential

so that they can succeed in all aspects of life (Hamid et al, 2018). In the Primary School Integrated Curriculum that was used from 1983 to 2010, the fundamental abilities of reading, writing, and arithmetic were emphasised more heavily. Accordingly, reasoning was included as a new skill in the Primary School Standard Curriculum starting in 2011. The Ministry of Education believed that the next generation of students would acquire the thinking, communication, dual-language, leadership, and successful teamwork skills necessary to compete on a global scale. Since 2017's Form 1 classes, the Secondary School Standard Curriculum has been working to bring these 21st century abilities into the classroom (Ministry of Education Malaysia, 2013).

In addition, today's employers are on the lookout for candidates that are not only skilled but also competitive, dedicated, creative, and computer aware. Studies have shown that using ICT can improve classroom instruction and help students make connections between classroom theory and real-world practise (Ertmer & Ottenbreit-Leftwich, 2010). Therefore, it is the responsibility of educators to help their kids become computer literate as early as possible. "A borderless world" is a metaphor for the pervasive influence of information and communication technologies on 21st-century living. In order to keep up with the rapid pace of technological change, the Malaysian Ministry of Education (MOE) has integrated ICT into all areas of the country's educational system, including its physical infrastructure, its curriculum, and its methods of teacher preparation. The Ministry of Education (MOE) had launched a number of IT initiatives, with computer distribution as the central activity (Ministry of Education Malaysia, 2013).

The Ministry of Education (MOE) and YTL Communications entered into a joint venture in 2011 to implement the 1BestariNet project, which is a part of the Malaysian Education Broadband (MEB), with the goal of producing students who are adept with information and communication technologies (ICT). With the goal of improving students' access to and proficiency with information and communication technology, this project provided wireless internet services using 4G technology to 10,000 educational institutions. Through the 1BestariNet initiative, schools' existing information and communications technology (ICT) infrastructures were bolstered with integrated solutions like the Virtual Learning Environment (VLE) programme, often known as m the "Frog Virtual Learning Environment" (Frog VLE) (Hamid et al., 2018).

With the completion of the second phase of implementation, the Frog VLE is set to be used for at least the next 13 years in accordance with the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013-2025 (Cheok & Wong, 2014; Kementerian Pendidikan Malaysia, 2019). But surprisingly, the low level of VLE usage, especially among teachers, has ended up being an unresolved issue (Bahagian Teknologi Pendidikan, 2017; Kementerian Kewangan Malaysia, 2014), despite the MOE's lofty ambition to digitalize Malaysian education. The Ministry of Education (MOE) of Malaysia has announced that beginning in June 2019, Google Classroom will replace the Frog VLE currently being used in the country's schools (Kementerian Pendidikan Malaysia, 2019). There is no clear explanation for this, but it could be because of a number of significant flaws in Frog VLE implementation that have produced opposition, notably among teachers (Cheok & Wong, 2016; Norazilawati, Noraini, Nik Azmi, & Rosnidar, 2013). Teachers' plans to keep using Frog VLE are somewhat low, according to a recent study by (Awang et al. 2018). Sadly, the survey also uncovered a worrying discovery, showing that low intention users are roughly more numerous (28.9%) than high intention users (15.1%). Several factors, including poor service and system quality (Bahagian Pendidikan Guru, 2016; Cheok & Wong, 2016) and severe workload borne by the teachers, likely contribute to this

lack of adoption in teaching and learning routines (Awang et al., 2018; Norazilawati et al., 2013). If the VLE is underutilized by faculty or fails to deliver anticipated benefits, it will be considered a failure despite the substantial resources invested in it (Ramayah et al., 2010). Thus, MOE should have ample evidence from prior evaluation studies to keep using the platform or stop using it. As a result, it is acceptable to abandon Frog VLE in favour of an alternative solution that doesn't require as much infrastructure investment. Based on this situation, the researcher feels that the need to foster interest among teachers to continue virtual learning is very necessary. Therefore, in the context of this study, the researcher will analyze the things that need to be implemented at the initial stage in fostering teachers' interest in implementing virtual learning.

Benefits of Virtual Learning among Teachers

The course provider, the teachers, and the students themselves all stand to gain from virtual education. In the beginning, virtual education aids institutions in reaching out to students who want to receive education from a distance. Therefore, it aids the school in attracting more students. Through the use of online lecturers and video conferences, the school is able to train a large number of students through the use of virtual courses. In some situations, this aids in lowering both the cost of personnel and the money spent on moving that personnel around the country. It's clear that using CALL and virtual classrooms can expand the range of approaches teachers can take in the classroom, improving the quality of education for students. Teachers typically need to attend multiple seminars and put in a lot of self-directed practice time before they feel comfortable with this new approach. In addition, teachers are under constant pressure to update their knowledge of the latest IT tools and apps in order to incorporate them into their classrooms.

Virtual learning is well-liked by today's pupils because of its adaptability, low price tag, and easy availability. The student's time and place of study can be more easily accommodated via asynchronous courses. Online courses typically save students between 20 and 25 percent on tuition, materials, and transportation costs as compared to traditional classes while researching available online programmes offered by various universities across the world. The flexibility of a virtual education also extends to the breadth of subjects and formats that can be pursued. In reality, students who are highly driven and able to consistently stay on track and check their learning goals will find virtual learning to be a highly effective alternative (Dung, 2020).

Study Aims

This article aims to suggest the most important aspects in sparking teachers' interest in implementing virtual learning based on expert agreement.

Methodology

In particular, the Fuzzy Delphi Technique is used in this research (FDM). This technique was selected because it represents a novel approach to soliciting expert consensus in making a final choice. The study's questionnaire was developed in two stages, the first of which involved a review of the relevant literature. The components of the questionnaire in this study were developed in two stages: in the first, the researcher reviews the relevant literature to determine which components are essential strategies in promoting virtual learning among teachers (see table 5). After gathering data, the researcher moves on to step two, where an

expert questionnaire is developed. Eleven specialists are polled on a variety of topics (starting with 7 points) using the Fuzzy Delphi (FDM) method.

Research Sampling

Purposive sampling is employed in this analysis. If a researcher wants to get everyone on the same page, this is the best approach. Hasson et al (2000) state that for FDM, deliberate sampling is the best approach. Meanwhile, this investigation included the input of eleven professionals. Table 2 lists the involved experts. These professionals have been hand-picked because of their extensive knowledge and track records in their respective industries. If the experts are consistent, then this study just needs five to ten specialists. According to Adler and Ziglio (1996), 10–15 experts are optimal for the Delphi approach, if there is some degree of consistency among them (homogeneous). Sforza and Ortolano (1984); Philip (2000) both suggest that a sample size of 7–12 experts is sufficient for FDM if the sample is homogeneous. Given the challenge of eliciting a response from an expert and the time constraints imposed by the method, the researcher relied on a total of 7 experts in this investigation. However, a sample size of 7 experts is adequate to acquire data and expert consensus.

Table 2
Expert list

Expert list	Field of expertise	Institution
1 Professors	Multimedia/ education	
1 Ass. Professor	Educational technology	Public University
3 Senior lecturers	Multimedia & IT	
2 Lecturer	ICT	Private university

Expert Criteria

Experts, as defined by Booker and Mc Namara (2004), are those who have acquired the necessary skills and knowledge via extensive study, practise, and experience. Professionals who have demonstrated their expertise in a given field are typically recognized as such due to their credentials, education, experience, professional affiliations, and the respect they have garnered from their peers (Nikolopoulus, 2004; Perera et al., 2012; Mustapha & Darusalam, 2017). Experts are defined as those who have extensive expertise and knowledge in a certain area (Cantrill et al., 1996; Mullen, 2003). The use of an expert panel is a crucial part of any Fuzzy Delphi analysis. If the experts aren't chosen correctly or based on the wrong criteria, questions of validity, validity, and reliability of the study and findings may be called into question (Mustapha & Darusalam, 2017). The quality, accuracy, and credibility of the results generated through the Delphi or Fuzzy Delphi technique are largely dependent on the selection of experts and the precision with which they are selected. Meaningful, accurate, and high-quality Delphi results, as stated by (Dalkey & Helmer, 1963), require that research problems and survey questions share continuity in terms of their significance and the expertise of the people who are asked to respond to them.

Instrumentation

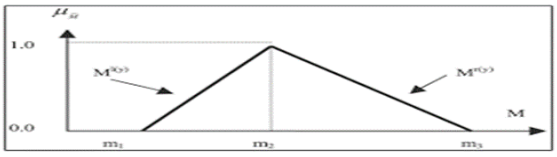
The researcher created the Fuzzy Delphi research instrument after reading the relevant literature. Researchers can use literature, pilot studies, and experience to construct questionnaire elements, as stated by (Skulmowski et al., 2007). Meanwhile, Mustapha and Darussalam (2017) state that study summaries, expert interviews, and focus group methods

can all be useful in developing questions for the Fuzzy Delphi method. In addition, a literature review pertinent to the study's scope should be used to develop the items and content elements, as recommended by (Okoli and Pawlowski, 2004). That's why they look to published works for OLL's building blocks. Then, a series of seven-point expert questions is formulated. The larger the number of scales, the more precise and reliable the data, hence a 7-point scale was used (Chen et al., 2011; Mustapha & Darusalam, 2017). Table 4 shows a scale value from 1 to 7 that was substituted for the Fuzzy value in the following seven-point language scale in order to facilitate responses from experts.

Table 3
Fuzzy scale

Item	Fuzzy Number
Strongly Disagree	(0.0. 0.0, 0.1)
Disagree	(0.0, 0.1, 0.3)
Somewhat Disagree	(0.0,0.3, 0.5)
Neither agree or disagree	(0.3, 0.5, 0.7)
Somewhat agree	(0.5, 0.7, 0.9)
Agree	(0.7, 0.9, 1.0)
Strongly agree	(0.9, 1.0, 1.0)

Table 4
Steps in implementing Fuzzy Delphi Method

1. Expert Selection: In this investigation, 7 professionals were consulted. In order to establish the significance of the evaluation criteria on the factors to be tested with linguistic variables, a number of experts were invited. and explanations of any problems that may arise with the product, etc.
2. Determining linguistic scale: Fuzzy-triangle-numbering is the procedure through which all linguistic variables are converted (triangular fuzzy numbers). Language variables are converted using fuzzy numbers in this stage (Hsieh, Lu and Tzeng, 2004). The values m1, m2, and m3 are represented by the following formula in a triangular fuzzy number: (m1, m2, m3). There is a minimum value, which is represented by m1, a tolerable value, which is m2, and an unreasonable value, which is m3. The translation of linguistic variables into fuzzy numbers is the focus of the Triangular Fuzzy Number's production of the Fuzzy Scale. For the Fuzzy scale, the number of gradations is always an odd number. You can see an example of this in Figure 1. 
3. The Determination of Linguistic Variables and Average Responses: When the researcher receives the specialist's response, he or she must then convert all likert scales to Fuzzy scales. Finding the average reaction to each fuzzy number is another name for this operation (Benitez, Martin & Roman, 2007).
4. The determination of threshold value "d": Finding the level of consensus among experts relies heavily on the threshold value, so it's necessary to pay close attention

	to it (Thomaidis, Nikitakos & Dounias, 2006). Using the formula, we can get the distances between any two fuzzy numbers m = (m1, m2, m3) and n = (m1, m2, m3). $d(\bar{m},\bar{n}) = \sqrt{\frac{1}{3}[(m1-n1)^2 + (m2-n2)^2 + (m3-n3)^2]}$
5.	Find the threshold aggregate alpha for fuzzy evaluation: Having reached consensus between experts, a fuzzy number is added to each item (Mustapha & Darusalam, 2017). Fuzzy values are calculated and determined using the following formula: The maximum allowable area, Amax, is equal to (1)4 (m1 + 2m2 + m3).
6.	Difuzzication process: In this procedure, Amax is calculated as follows: Amax = (1)4 (a1 + 2am + a3). When researchers employ Average Fuzzy Numbers, often known as the average response, the resulting score falls anywhere between zero and one (Ridhuan et al.2014). There are three different equations that can be used to describe this procedure: I A = 1/3 * (m1 + m2 + m3), (ii) A = 1/4 * (m1 + 2m2 + m3), and (iii) A = 1/6 * (m1 + 4m2 + m3). Where a-cut = (0 + 1) / 2 = 0.5, the median value for '0' and '1' is A. The item will be discarded if the resulting A value is lower than the -cut value = 0.5, which denotes a lack of expert consensus. The alpha cut value should be more than 0.5, as stated by Bojdanova (2006). Tang and Wu (2010), who argued that the -cut value should be greater than 0.5, lend credence to this idea.
7.	Ranking process: Defuzzication values based on consensus among experts are used in the positioning procedure, with the highest value going to the element in the most prominent location (Fortemps & Roubens, 1996)

After reviewing the relevant literature, the researcher proposes a set of actions or suggestions for teachers to follow in order to promote the virtual learning among teachers. Included in the strategies are the following:

Table 5
Strategies to promote virtual learning

	Strategies to promote virtual learning
1	Permit institutions of learning to assume additional duty in the areas of distance learning and technological integration.
2	Give teachers greater details about what's available to them through online courses.
3	Inspire teachers to use modern tools in conventional classes.
4	Create compelling incentives for teachers to take part in online courses.
5	Enhance distant educators' access to resources by boosting training and teaching aids
6	Develop a more cohesive group of teachers who are committed to online learning.
7	Prompt increased scholarly investigation into the benefits of distant learning

Findings

Here, the researcher will provide the study's findings based on the experts' agreement on the most important criteria for OLL's successful implementation, or guidelines. Eleven groups of experts in the respective domains were polled using Fuzzy Delphi questionnaires to compile the resulting data. These are the findings from the study

Table 6
Fuzzy Delphi Result

Results	Item1	Item2	Item3	Item4	Item5	Item6	Item7
Expert1	0.06598	0.00825	0.03299	0.03299	0.08248	0.00825	0.00825
Expert2	0.06598	0.00825	0.03299	0.02474	0.02474	0.22269	0.04949
Expert3	0.00825	0.12372	0.03299	0.02474	0.02474	0.00825	0.00825
Expert4	0.00825	0.04949	0.03299	0.03299	0.09073	0.06598	0.04949
Expert5	0.22269	0.00825	0.02474	0.02474	0.2062	0.00825	0.12372
Expert6	0.00825	0.04949	0.14021	0.03299	0.08248	0.06598	0.04949
Expert7	0.06598	0.04949	0.03299	0.02474	0.08248	0.06598	0.00825

Table 7
Consensus Result

Statistics	Item1	Item2	Item3	Item4	Item5	Item6	Item7
Value of the item	0.06363	0.04242	0.04713	0.02828	0.08484	0.06363	0.04242
Value of the construct							0.053199
Item < 0.2	6	7	7	7	6	6	7
% of item < 0.2	85%	100%	100%	100%	85%	85%	100%
Average of % consensus							93
Defuzzification	0.88571	0.91429	0.94286	0.95714	0.85714	0.88571	0.91429
Ranking	4	3	2	1	5	4	3
Status	Accept	Accept	Accept	Accept	Accept	Accept	Accept

According to the data (see table 6), the blacked threshold value is greater than 0.2 (> 0.2). This signifies that there are areas where the opinions of various experts are not in agreement and no consensus has been reached. However, a threshold value (d) 0.2 which is 0.123 is shown by the average of all items of academic dishonesty elements. When the threshold (d) value is less than 0.2 on average, there is substantial consensus between experts regarding the quality of the item in question (Cheng & Lin, 2002; Chang et al., 2011). Expert consensus is currently at 85%, which is higher than the required 75% threshold. Furthermore, any value of Alpha-Cut defuzzication (average of fuzzy response) is greater than -cut => 0.5. If the alpha cut value is less than 0.5, as recommended by (Tang & Wu, 2010; Bojdanova, 2006), then it should be disregarded. The results of this study demonstrate that there is widespread consensus amongst experts on the strategies in promoting virtual learning among teachers.

As can be seen in table 7, the items on which experts have reached a consensus have been ranked in order of importance.

Table 8
Final result of Strategies to promote virtual learning based on expert consensus

	Previous rank	New rank	Strategies to promote virtual learning
	1	4	Permit institutions of learning to assume additional duty in the areas of distance learning and technological integration.
	2	3	Give teachers greater details about what's available to them through online courses.
	3	2	Inspire teachers to use modern tools in conventional classes.
	4	1	Create compelling incentives for teachers to take part in online courses.
	5	5	Enhance distant educators' access to resources by boosting training and teaching aids
	6	4	Develop a more cohesive group of teachers who are committed to online learning.
	7	3	Prompt increased scholarly investigation into the benefits of distant learning

Conclusion

Today's world is rapidly evolving. Administrators at educational institutions need to understand what drives faculty members and what impediments to innovation must be overcome if they want to see widespread adoption of virtual learning and technological integration in education. Moreover, scholars have begun doing and publishing studies addressing the nuanced difficulties and far-reaching repercussions of such faculty initiatives across the higher education landscape. Not only do institutions need to create strategic plans tailored to their institutional goals, circumstances, resources, and needs based on the trends, motivations, challenges, and strategies presented here, but they also need to share their research findings with others so that many more can benefit. Instead of developing these plans in a vacuum at the university level, it is essential to involve stakeholders from across departments and colleges in the process. It is crucial that their effects on the development of theory and practise in remote education, as well as on the integration and application of technology, be thoroughly assessed.

Based on this scenario, the need to build a good and strong strategy needs to be implemented in empowering virtual learning among implementers, especially among teachers. This study is an initial proposal and exploration in proposing strategies to promote virtual learning among teachers. The results (refer to table 8), in a clear picture and the initiatives that need to be implemented. Therefore, it is hoped that the strategy we propose can provide a source of reference and initial guidance in encouraging virtual learning among teachers.

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