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Original Article

Demystifying Digital Resilience in Online Teaching: using the Technology Acceptance Model to Magnify Human Factors

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Abstract *- The rapid advancement of technology in the learning environment has accelerated the digitalization of education, necessitating academicians' embrace of digitalization in teaching and learning to meet the demand for educational activities. While it was anticipated that academicians would effectively accept the new changes, the transformation of online teaching practices spawned complexities. This study aims to comprehend the behaviour and attitude of academics toward online teaching based on a quantitative survey of 142 respondents (N = 142). The Technology Acceptance Model (TAM) is tested for gauging people's acceptance of technology in various settings. The TAM has been expanded in this study to assess the success of actual academics in adopting online teaching practices. The previous literature review identified self-efficacy, digital anxiety, and subjective norms as human factors in online teaching. Following identifying these variables, a conceptual model with emotional aspects was designed as a new contribution to this study. Understanding academics' digital adoption and highlighting their attitudes and behaviours regarding the acceptance of online teaching are essential goals of this research. This study is expected to provide academics with theoretical support when deciding on human factors to include in the TAM model. This study is novel in its conceptualization of the model that employs emotional aspects as an external construct to forecast academics' acceptance of online teaching. Results show that human factors play a vital role in academics to form attitudes and behaviour toward online teaching, which may be used as a guide for implementing online teaching.*

Keywords *- Digital learning, Digital resilience, Human factors, Online teaching, TAM.*

1. Introduction

The rapid development of digital technologies has profoundly altered all aspects of life, including education. The education sector is not an exception to the current wave of digital technology development. Universities worldwide are undergoing rapid transformations due to technological advancement, and social e-trends toward digitalization also significantly impact how education systems have designed their processes for learning and development, delivery, and continual improvement [1]. The ability of technology to facilitate interaction and communication has influenced educational activities, and digital learning has become a common practice [2]. On the other hand, digital learning has become a powerful teaching strategy that has quickly spread worldwide and is increasingly used by educators [3]. According to [4], implementing digital learning in universities may have practical ramifications. Thus, the development of digital education and the widespread application of digital education has placed great demands on technological innovation and flexibility in educational activities.

Consequently, higher education must embark on digital transformations that require creative methods to enhance learning experiences in line with technological advancements to drive long-term change. In order to create resilient institutions that can adapt to changing digital futures and ensure that students receive continuous education, higher education institutions worldwide must adapt and offer new innovative learning activities. Noting the significance of using technology in education, higher education institutions must update their curricula and employ new teaching techniques and methodologies [3]. Digital learning technology is expected to alter higher education drastically.

In attempting digital transformation, online teaching has become the dominant focus in shaping the direction [5].

Online teaching is a method of instruction that enhances and facilitates teaching and learning through the use of information and communication technologies and has brought about a new norm change in the global education system. In fact, online teaching has gained relevant platforms to support online learning as an opportunity to transform education [6]. However, it was revealed by [7] that universities struggle to provide academics with online teaching, and human factors are believed to be an immense limiting factor to the feasibility of online teaching. Academicians' perceptions of their readiness are believed to indicate their commitment [8]. In fact, one of the critical aspects of implementing online teaching is the human factors that capacitate academics to increase their commitment [9], and academic and emotional aspects contribute to the positive or negative acceptance of online learning [10].

The emotional impact of rapid technology adoption and acceptance has been extensively highlighted in numerous studies within the field of psychology [11]. Although education has made strides, there are still substantial challenges to address, especially in regard to online teaching and the neglect of academics' emotional aspects [12]. To address these gaps, this study focuses on emotional aspects as a new dimension to the academics' acceptance of online teaching. As emphasized by [2], several educational institutions struggle with digital learning due to their disregard for human factors in technology acceptance. Thus, this study is necessary to investigate and improve academics' preparedness and mastery by identifying their perception through human factors.

This study focuses mainly on human factors as a crucial factor in determining the acceptance of online teaching among academics in higher education, and the novel aspect of this study is the inclusion of a new relationship in the study model, which incorporates new variables (emotional aspects) into the study. This research's main objective is to understand human variables' impact on the acceptance of online teaching in Malaysian public higher institutions. The findings of this paper will be incorporated into a model that higher institutions can use as a guide for future digital transformation planning. Overall, this study will add to existing knowledge to provide higher education institutions with pedagogical support for online teaching and enhance the understanding of academics through an effective acceptance model.

2. Literature Reviews

Higher education institutions must now deal with digital transformation in all dimensions due to technological development and penetration. Digital learning can be viewed as a modern higher education ecosystem component [13]. It provides a dynamic environment that creates all opportunities for widely available digital technologies [13]. According to [1], universities may no longer be able to rely on conventional education systems to deal with the challenges posed by globalization. The education sector has been forced to implement digital transformation due to the unrelenting growth of technology and the increase in educational software and applications. The growth of technology has placed great demands on academics for the digital transformation of higher education [14]. Hence, from the perspective of higher education, digital transformation seems to have the potential to improve the educational process and alter how educational content and the learning process are presented. Thus, digital transformation has become necessary for universities to adopt the changes [1]. Digital transformation has become significant development that aids the evolution of universities in the impactful changes. Thus, a successful digital transformation strategy requires implementing a comprehensive modelling framework [15]. In addition, online learning has emerged due to the globalization-driven digital transformation strategy, aiming to deliver top-notch educational experiences [1]. This paradigm shift may result in changes in the teaching-learning process making possible options and a substitute for conventional education [16]. Thus, online teaching allowed for digital transformation and allowed academics to experiment with new teaching methods [17]. The importance of academics in adopting new technology cannot be overstated; unfortunately, their crucial role in accepting online learning has been overlooked [18]. According to [19], while incorporating technology in continuing education is essential, individuals may not be adequately prepared to navigate the digital process. This is especially true in online teaching, where maturity and HEIs strategies may reveal deficits.

2.1. Online Teaching in Higher Education Institutions

Higher education institutions are undergoing significant changes in their pedagogical support and administration in tandem with the rapid development of technology. Adopting online teaching has resulted in significant changes in education [20]. The transformation is made possible by the fact that academics are digital natives who have grown up in a world dominated by the internet, artificial intelligence, and virtual reality [21]. In order to meet the digital demands, academics needed to transform their digital competence and reform their teaching methods [5]. The benefit of online teaching is the ability to incorporate technology into education, providing academics with a wider range of instructional strategies and resources [22]. Thus, academics must have proficiency and knowledge of online teaching [16].

Online teaching refers to academics' capacity to apply 'regular' teaching to digital skills and resources [5]. Even though the idea of online teaching is not new, it is a novel teaching method for many academics [23]. It gives a good challenge and advantageous teaching strategy for implementing a new learning paradigm [20]. The online environment offers adaptability and a fresh approach to teaching strategies [16][24]. Online teaching is viewed as a more convenient, accessible, and affordable method that can be used whenever and wherever [24].

However, higher education was reportedly unprepared to use online teaching [16]. Adopting online teaching is full of dilemmas and contradictions [16]. Past studies have shown that online teaching is challenging for academics with insufficient knowledge and a lack of experience [5][16][23][25]. It is revealed by [16] that online teaching is more challenging than face-to-face teaching. It is impossible to overstate the importance of academics in online teaching success [24]. Thus, it can be assumed that academics were not prepared for an entirely online experience.

Consequently, to align with the digital transformation, it needs support from a few implementations, including humans, as holistic ways of change. Human factors are the answer to enable the transformation aligned with digital technologies [26]. It is emphasized by [2] that human factors are important predictors of digital learning success.

The learning environment changes and transformation depend on human factors [27]. However, there is still an apparent lack of research highlighting human factors as essential variables in gauging the acceptance of digital transformation in education institutions. Thus, this study was conducted to investigate the impacts of human factors and their significant relationship with TAM factors related to online teaching acceptance and to comprehend academics' perspectives of human dimensions as one pivotal factor in implementing online teaching. Human resistance can significantly disrupt digital transformation in educational institutions [9].

It is suggested that educational institutions must be more active in changing academics' teaching beliefs [14]. In order to paint a complete picture of the potential shift to digital education and provide educational institutions with support with a vision for digital maturity, it is crucial to understand human factors. With a novel contribution to designing human factors and the presence of emotional aspects as a new variable, this study aims to understand the human dimensions that influence academics' acceptance of online teaching.

In conclusion, online teaching is now a requirement rather than a choice [17]. However, there are many questions and contradictions surrounding the adoption of online teaching [25]. Online teaching and technologies in higher education have received little attention [21]. Although online teaching is not a new concept in education, academics require more assistance in adapting to this new teaching method [23]. Therefore, evaluating the online teaching implementation is beneficial by considering academics' views. Thus, this study uses the Technology Acceptance Model (TAM) model as a theoretical framework to investigate the acceptance of online teaching and its use among academics in higher education institutions. It is emphasized by [20] that creating a new model to evaluate and investigate key aspects that affect online teaching is necessary.

2.2. Technology Acceptance Model (TAM)

Researchers adapted TAM differently based on various factors such as their needs, research focus, contexts, and conceptualization [28]. TAM is known as a theory that predicts how people will react to technology [4]. The TAM model is an excellent theoretical framework for examining human behavioural intentions regarding technology use [18]. In fact, the model has received much attention and is a helpful tool for describing digital acceptance [29]. While TAM may be considered an older model, its reliability for conducting multi-variable research cannot be denied [22].

Furthermore, it continues to evolve in its understanding of how individuals adopt technology, making it a valuable tool for researchers in the field. Thus, by taking into account the theoretical underpinnings of the research and the academics' behavioural intentions concerning the acceptance of online teaching, this model was used to investigate that acceptance. In this study context, human factors were identified due to the need to examine the academicians' perception of online teaching.

TAM has emphasized that external factors may have a mediated impact on perceived usefulness (PU) and perceived ease of use (PU), influencing actual use (AU). This study examines three external factors derived from the previous study; self-efficacy (SE), subjective norms (SN), and digital anxiety (ANX), with one new proposed variable; emotional aspects (EMO), as a new contribution in this study.

2.2.1. Self-Efficacy (SE)

Self-efficacy is considered an essential factor in determining the acceptance of an online learning environment [30]. It is referred to as the ability of academics to use online tools and digital platforms to teach effectively [31]. It is revealed that a high level of SE in academics will determine the acceptance of digital technology in diverse online learning contexts [32][33][30]. In the meantime, it is believed that academics' perception of their ability to use technologies in their educational tasks, including teaching, will positively affect the acceptance of technology [32]. In fact, SE plays a crucial role in understanding individual responses to technology in any study on technology acceptance [34].

A previous study has confirmed that self-efficacy positively impacts PEU and PU [34][35]. It appears that the positive effects of online teaching are more ubiquitous when academics acknowledge that the technologies are practical and advantageous for them [31]. The acceptance and adoption of educational technology are thus thought to be positively influenced by academics' perceptions of their technological aptitude. However, academics' SE in higher education has been extensively debated [31][36]. In certain circumstances, SE is reported depending on individual and situational factors [37]. It is emphasized by [38] that SE of academic' teaching quality could be inconsistent results due to situation and

contextual factors. Thus, the usefulness of technology and how convenient people perceive it influences academics' acceptance. Therefore, based on the aforementioned justifications, the following hypotheses were developed:

H1: Self-efficacy positively and significantly influenced perceived ease of use.
H2: Self-efficacy positively and significantly influenced perceived usefulness.

2.2.2. Subjective Norms (SN)

Subjective norms refer to the social contexts that influence academicians toward accepting technology [39] [40]. It is defined as the opinion of others that influences a person's actions in implementing or accepting the use of technology [41]. Hence, the social environment in educational institutions may be viewed as a deciding factor in academicians' acceptance of technology. It is revealed by [37] that subjective norms were crucial in determining the use and acceptance of technology in higher education institutions. This factor was believed to have successfully influenced technology implementation and adoption [41].

According to a prior study, SN has been reported positively impacts perceived ease of use and usefulness [37]. Some studies of technology acceptance discovered that the belief that technology is simple to use and enhances job performance had been found to be highly reliant on the influence of other people. Thus, these beliefs mediate the subjective norms as an exogenous factor in technology acceptance [41]. However, no substantial evidence exists that subjective norms influence perceived ease of use and usefulness. The results could be inconsistent due to pressure to adopt the technology [42]. Thus, this study intends to examine the mentioned factor to explore the acceptance of online teaching. As a result of the preceding arguments, the following hypotheses were developed:

H3: Subjective norms positively and significantly influenced perceived ease of use.
H4: Subjective norms positively and significantly influenced perceived usefulness.

2.2.3. Digital Anxiety (ANX)

Digital anxiety refers to individual negative feelings or reactions towards technology use [30]. In previous studies on online learning, some researchers had added digital anxiety as the variable to determine the use of technologies [43]. Academics may lack confidence in online teaching due to digital anxiety typically brought on by a lack of technology readiness and experience [36]. The widespread use of online teaching has placed academics in an even more challenging position, which could result in teaching anxiety [44]. Thus, it is still significant to explore digital anxiety as technological issues and technical restraints impact online teaching effectiveness, leading to teaching anxiety.

It is the strongest predictor of technology acceptance that influences the use of technology, especially in higher education environments [33]. Academics' readiness and acceptance are influenced by how useful technology is and how convenient people perceive it to be [43]. In some circumstances, the backwardness of using technology and unresolved technical issues, on the other hand, can cause digital anxiety [45]. Thus, technology literacy is expected of academics in order to implement online teaching and manage digital platforms.

As a result, the lack of technology literacy is seen as having a significant impact on how some academics implement online teaching, which results in digital anxiety. Therefore, it makes sense that, theoretically, different levels of digital anxiety could arise depending on an individual familiarity and technology capabilities [33]. It is emphasized by [46] that digital anxiety may affect PU and PEU differently in line with personal fearless and uncertainties about technology. As a result, the following hypotheses were developed based on the arguments mentioned above:

H5: Digital anxiety positively and significantly influenced perceived ease of use.
H6: Digital anxiety positively and significantly influenced perceived usefulness.

2.2.4. Emotional Aspects (EMO)

The emotional aspects of academics were extremely important to the effectiveness of online teaching [44]. Emotional information can help identify the successes and failures of online learning, and user responses provide a clear overview of both positive and negative feedback about online learning [10]. Positive emotional aspects influence the positive impact of online teaching and vice versa [44]. It is fascinating to learn that people differ in their capacities, which results in a range of emotions that can elicit either positive or negative feelings.

Some academics struggle with online teaching because they are not technologically savvy enough [6]. Thus, online teaching may be challenging for particular academics due to the inability to use technology or lack of exposure to it. Consequently, online teaching was thought to be a highly emotional experience that was challenging and stressful for some academics [44]. Some people might rely on technology based on how others perceive its convenience rather than their feelings and beliefs [46]. However, the emotional aspects of online education have generated debate in the research communities, but the results are still fragmentary and ambiguous [29]. As a result, one of the goals of this research is to investigate the relationship between EMO and PEU and PU. Thus, the following hypotheses have been proposed:

H7: Emotional aspects positively and significantly influenced perceived ease of use.
H8: Emotional aspects positively and significantly influenced perceived usefulness.

2.2.5. Perceived Ease of Use (PEU)

In the original TAM framework, PEU is the independent variable that determines technology acceptance. Generally, PEU is described as individuals who positively believe that using a specific technology or system will be straightforward [29][46]. In online learning, PEU is defined as a person's attitude towards accepting new technologies influenced by their perception of the convenience of online learning [43][20]. PEU plays a significant role in TAM models that assess the use of particular technologies [47]. The effects of external factors and PEU typically show a significant relationship in studies evaluating technology acceptance, though some studies show a weaker but significant relationship [46].

The current research in online learning found that PEU positively affected the attitude toward using online learning [29][48][49]. Meanwhile, in other studies involving academics as samples, PEU positively impacts academics' attitudes toward digital technologies [20]. As a result, the study's findings indicate that ease of use significantly influences an individual's use of technology. It is revealed by [30] that individuals are influenced more by convenience rather than by technology's benefits. However, it has been argued that PEU was not affected individual attitudes toward using technology [4]. Some studies found that PEU proved insignificant to the attitude to online learning [43][4]. This evidence indicates a disagreement between the findings, prompting further investigation of PEU to academics toward online teaching. Thus, the following hypothesis was developed for further investigation:

H9: Perceived ease of use positively and significantly influenced attitude toward online teaching.

2.2.6. Perceived Usefulness (PU)

In TAM structures, PU is also an independent variable. PU indicates the extent to which individuals believe technology will improve their job performance [46][48]. In other words, it refers to the advantages or benefits of utilizing technology in one's affairs. PU implies that convenience technology offers more people to use it. Thus, one of the most efficient ways to keep users using technologies is through PU [29].

According to recent research on online learning, PU favoured people's attitudes towards using technologies [29]. PU significantly impacts attitudes towards using technologies, according to a study that included academics as a sample [20]. It is emphasized by [43] that academics who have used and become accustomed to online teaching will find it valuable and straightforward to implement. However, it has been well argued that PU may not necessarily influence attitudes towards technologies as it may be challenging for a particular individual that provides possible reasons to reject the technologies [47]. Thus, academics might not want to use new technology systems because of the difficulties in adopting them [50]. Therefore, to understand academic acceptance in the context of online teaching, the following hypotheses have been put forth:

H10**:** Perceived usefulness positively and significantly influenced attitude toward online teaching.

2.2.7. Attitude (ATT)

Further TAM framework explained that attitudes to using technology would determine the behavioural intention to accept technology. TAM is a great framework for quantitatively analyzing user attitudes towards technologies and their adoption and acceptance [51]. ATT indicates the user's perception of something and the connection between independent variables (PU and PEU).

The individual attitude will determine their intention to use the technology, which is influenced by the technology's usefulness as well as its perceived convenience [43]. Numerous researchers concur that how technology is used and integrated will influence academics to accept technology [50]. It is emphasized by [46] individuals' attitudes are affected by their beliefs, which in turn change whether or not they intend to use a particular technology. However, according to some researchers, the significant relationships between ATT and BI are not all that strong [52]. It has been persuasively argued that due to the sudden acceptance of online teaching during COVID-19, academics are currently experiencing unheard-of pressure, which may influence their attitude toward online teaching [29]. Thus, to address the controversy, this study takes the lead in investigating the impact of attitude on online teaching by developing the following hypotheses:

H11**:** Attitude toward online teaching positively and significantly influenced behavioural intention to use online teaching.

2.2.8. Behavioural Intention (BI)

Finally, it is clarified that behavioural intention will influence how technology is actually used, demonstrating its acceptance. BI demonstrates how users prefer the technology and reveal their ultimate acceptance. The main goal of BI is to determine whether users approve or disapprove of the actual use of technology [53]. Technology acceptance is the most crucial element in raising behavioural intention towards technology use [51]. However, insufficient evidence supports how academics use online teaching [43]. Therefore, the importance of human behaviour intention to use a particular technology cannot be overstated; technology adoption is always fraught with risk and uncertainty [47]. As a result, in the context of this study, it is necessary to conduct additional research by formulating the following hypotheses about how academics feel about online teaching:

H12**:** Behavioural intention to use online teaching positively and significantly influenced the actual use of online teaching.

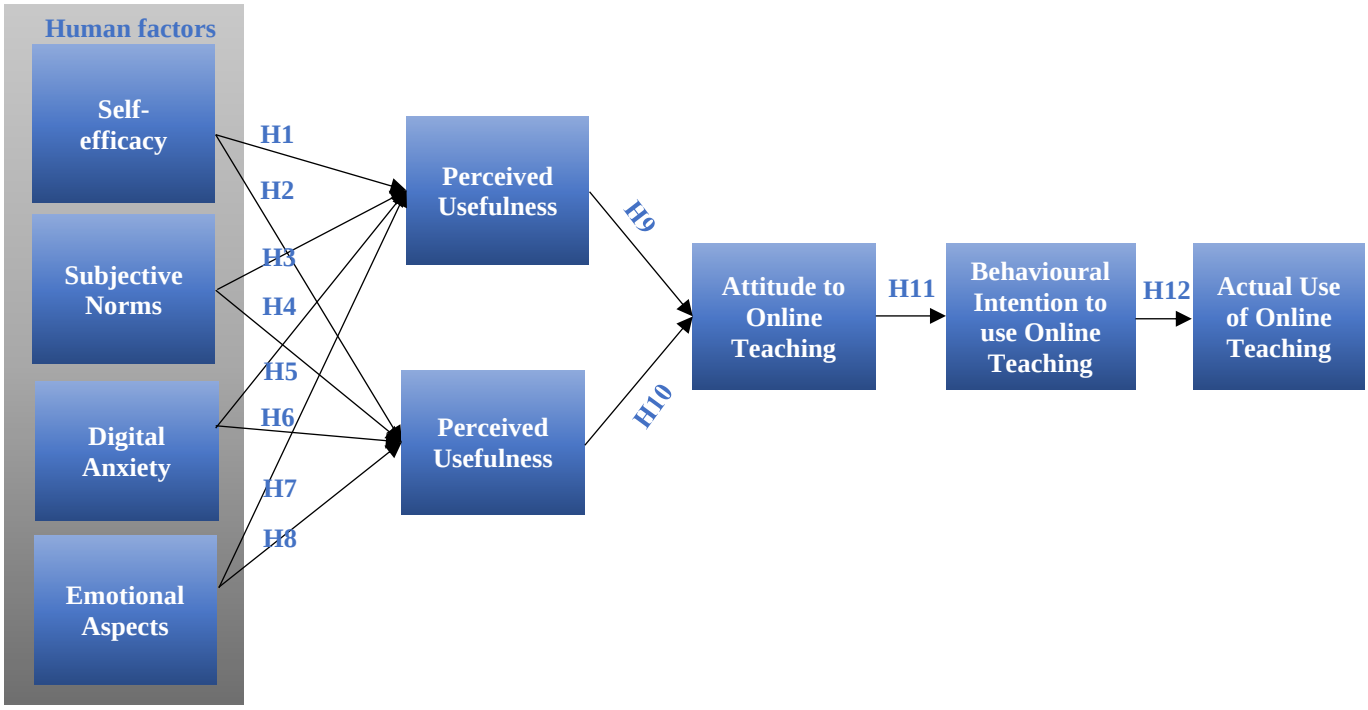

Fig. 1 The research framework

2.3. Conceptual Framework Development

As previously stated, the TAM model serves as the theoretical framework for investigating academics' acceptance of online teaching. An earlier empirical study of online learning that made use of a variety of resources served as the basis for the dimensions that have been added to the model. As a result, human-related dimensions are gathered to form a framework in the study, which is then supplemented with one new dimension as a new contribution to this field. Thus, this study emphasized human factors as exploratory variables (SE, SN, ANX, and EMO). EMO is added as a new variable and contributes to this study's novel findings. This research framework's development includes nine (9) variables, and 12 hypotheses were formulated and subsequently illustrated below (Figure 1).

3. Methodology

The study model was created using information from the prior study. In order to comprehend the current situations, studies on online learning and academics' perceptions of digital learning were extracted. Based on the previous study's findings, the TAM model was chosen as a suitable tool to use in this study. The hypotheses were then transformed into the research model based on observations and a literature review.

The participants of this study were academicians in Malaysian public universities. The information was gathered using an online survey using the purposive sampling technique. Purposive sampling is used in this instance because the researcher only wants respondents who can provide the information in order to meet the research goal (in this context of the study referred to academicians with experience in conducting online teaching) to answer the questionnaires. Thus, two filter questions were employed in the questionnaire to ensure that only eligible respondents answered the survey.

The data collection involved using an online survey because it was simple to run and accessible from various devices. The participants were given the link to a Google Form, and the questionnaire was kept active for four weeks to collect the responses. The respondents were contacted via email, and their responses were collected anonymously to ensure that they responded without fear or concern. The survey questionnaires are composed of two sections: the first consists of demographic information, and the second involves multiple items for each of the variables in the research model. Nine constructs were involved (self-efficacy, subjective norms, digital anxiety, perceived usefulness, perceived ease of use, attitude, behavioural intention, and actual use). All questions in the second section involving 39 questions were scored using ordinal scales on a 5-point Likert scale that measured by '1- Strongly Disagree', '2-Disagree', '3-Neutral', '4-Agree', and '5-Strongly Agree'.

SmartPLS software version 4.0 were used to analyze the data in this study. Using partial least squares (PLS) modelling of SmartPLS 4 version 4.0.7.8c, this study investigated the measurement and structural model [54] as the statistical tool because it does not necessitate the normality assumption and survey research is typically not normally distributed [68].

In order to determine the minimum sample size, the statistical power analyses of G*Power software were used to calculate the minimum sample size. Thus, the software was used to compute the effect size, and the results are displayed in Figure 2 as follows:

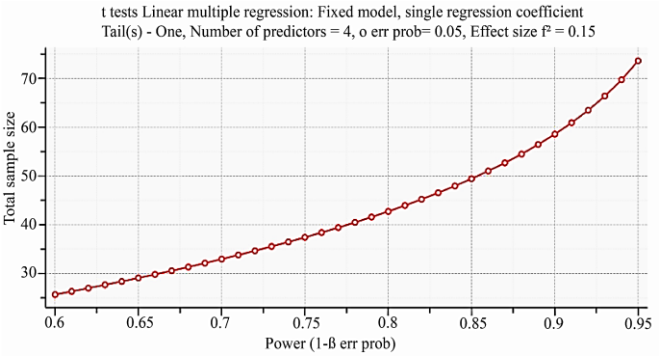

Fig. 2 Statistical Power Analyses

According to the calculation above (Figure 2), a minimum sample size of 74 qualified data was needed. In this study, a total of one hundred and sixty data (160) data were collected, three (3) missing data were found, and fifteen (15) data were discarded due to a Z score of ≥ 3.29 (well, these data are significant outliers). Finally, one hundred and forty-two (142) data sets were available for further data analysis. Accordingly, it can be concluded that the data collected for this study meet the requirement for a minimum sample size.

4. Results and Discussion

Nine constructs were revealed for assessing factor analysis: SE, SN, ANX, EMO, PEU, PU, ATT, and BI. The information presented in this study is based on measurement and structural models to determine the level of acceptance of online teaching as a whole. This study followed the suggestions of [68] to test the model developed using a 2-step approach, firstly a measurement model, then followed by a structural model.

4.1. Research Participants

The participants in this study involved academicians in Malaysian public universities who have experience conducting online teaching. The participants' demographic information is presented in Table 1 as follows:

Table 1 shows the frequencies of respondents' demographic profiles. As depicted in Table 1, this study included 142 respondents in total. Respondents were 69.0% (n=98) female, whereas males represented 31.0% (n=44). The respondents between 31 to 40 years old held the highest percentage of participation in this study at 46.5% (n=66), while those aged 41 to 50 years old and above were 51 years old at 38.7% (n=55) and 14.8% (n=21), respectively.

Table 1. Demographic profile

Characteristic		Frequency	%
Gender	Male	44	31.0
	Female	98	69.0
	Total	**142**	**100.0**
Age	31 – 40 years	66	46.5
	41 – 50 years	55	38.7
	> 51 years	21	14.8
	Total	**142**	**100.0**
Academic Rank	Professor	6	4.20
	Associate Professor	15	10.6
	Senior Lecturer	74	52.1
	Lecturer	47	33.1
	Total	**142**	**100.0**
Teaching experience	0–5 Years	19	13.4
	6–10 years	30	21.0
	10 years and above	93	65.6
	Total	**142**	**100.0**

The respondents who ranged in academic position from lecturer to professor were divided into the following fractions; lecturer 33.1% (n=47), senior lecturer 52.1% (n=74), associate professor 10.6% (n=15), and professor 4.20% (n=6). Finally, most participants with more than ten years of teaching experience comprised 65.6% (n=93).

Figure 3 presents a demographic infographic that offers a fast overview of their demographic segmentation to help better understand the group of respondents.

4.2. Measurement Model

First, the measurement model was tested in order to determine the instrument's validity and reliability. The loadings, composite reliability (CR), and average variance extracted (AVE) are the element to be assessed for the measurement model. The values for the loadings must be ≥0.5, the AVE must be ≥ 0.5, and the CR must be ≥ 0.7 [68]. Table 2 presents the loading values of each of the items, CR for internal consistency and AVE for convergent validity of the constructs:

As shown in Table 2, the AVE values are all higher than 0.5, and the CR values are all higher than 0.7, indicating that both measurements satisfy the threshold value. Meanwhile, the values for the factors loadings were all acceptable. However, only two loadings (SE3 and ATT5) are less than 0.708; still, the loadings can be kept when the minimum AVE of 0.5 is achieved [56][68]. Therefore, it can be said that all constructs satisfy the requirements for validity and reliability.

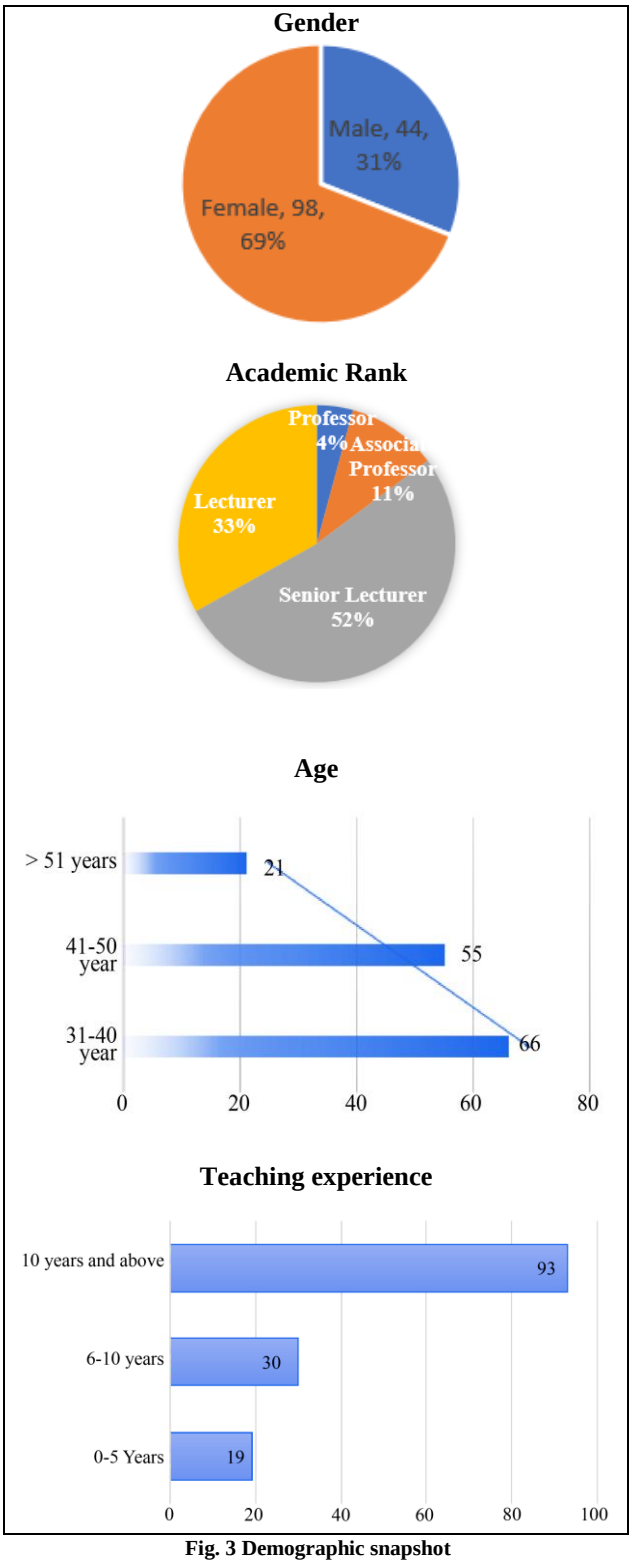

Fig. 3 Demographic snapshot

In addition, the construct validity could also be verified by using discriminant validity (HTMT). The HTMT measures how significantly one variable differs from another in the questionnaire.

Table 2. Measurement model

Construct	Item	Factor Loadings	CR	AVE
Self-efficacy	SE1	0.863	0.883	0.655
	SE2	0.867		
	SE3	0.683*		
	SE4	0.810		
Subjective norms	SN1	0.787	0.943	0.806
	SN2	0.935		
	SN3	0.947		
	SN4	0.912		
Anxiety	ANX1	0.806	0.900	0.692
	ANX2	0.796		
	ANX3	0.849		
	ANX4	0.875		
Perceive Usefulness	PU1	0.799	0.907	0.662
	PU2	0.865		
	PU3	0.827		
	PU4	0.733		
	PU5	0.838		
Perceive Ease of Use	PEU1	0.773	0.907	0.662
	PEU2	0.806		
	PEU3	0.772		
	PEU4	0.877		
	PEU5	0.835		
Attitude	ATT1	0.887	0.926	0.719
	ATT2	0.904		
	ATT3	0.872		
	ATT4	0.912		
	ATT5	0.632*		
Behavioural Intention	BI1	0.903	0.949	0.822
	BI2	0.879		
	BI3	0.922		
	BI4	0.922		
Actual use	AU1	0.955	0.968	0.884
	AU2	0.938		
	AU3	0.968		
	AU4	0.900		
Emotional Aspect	EMO1	0.861	0.914	0.728
	EMO2	0.848		
	EMO3	0.863		
	EMO4	0.840		

The HTMT confidence interval of value should be ≤0.85, and the stricter and lenient criterion should be ≤0.90 to indicate no problem with the constructs [57]. For each construct to be truly distinct, there must be differentiation across the constructs [56]. In this study, the HTMT values were all lower than the permissive criterion of 0.90, as shown in Table 3, demonstrating that the respondents were aware of the distinctions between the nine constructs. The outcomes thus show that the measurement items are reliable and valid.

Table 3. Discriminant validity

Constructs	1	2	3	4	5	6	7	8	9
1. Actual Use									
2. Digital Anxiety	0.355								
3. Attitude	0.803	0.446							
4. Behavioural intention	0.873	0.310	0.766						
5. Emotional aspects	0.685	0.460	0.753	0.614					
6. Perceived ease of use	0.667	0.493	0.854	0.578	0.756				
7. Perceived usefulness	0.785	0.436	0.897	0.769	0.774	0.807			
8. Self-efficacy	0.302	0.705	0.402	0.339	0.407	0.450	0.383		
9. Subjective norms	0.274	0.119	0.359	0.269	0.374	0.284	0.409	0.280	

Table 4. Structural model and hypotheses testing

Relationship	Std. Beta	Std. Error	t-value	p-value	Confidence Interval (BC)		Results
					LL	UL	
H1:SE -> PEU	0.054	0.076	0.707	0.240	-0.072	0.177	Not Supported
H2: SE -> PU	0.013	0.087	0.147	0.442	-0.115	0.159	Not Supported
H3: SN -> PEU	0.016	0.066	0.241	0.405	-0.093	0.120	Not Supported
H4: SN -> PU	0.161	0.078	2.057	0.020	0.025	0.284	Supported
H5: ANX -> PEU	0.170	0.079	2.140	0.016	0.029	0.290	Supported
H6: ANX -> PU	0.132	0.081	1.628	0.052	-0.018	0.250	Not Supported
H7: EMO -> PEU	0.572	0.063	9.073	0.000	0.469	0.676	Supported
H8: EMO -> PU	0.540	0.080	6.781	0.000	0.408	0.670	Supported
H9: PEU -> ATT	0.394	0.078	5.025	0.000	0.271	0.524	Supported
H10: PU -> ATT	0.524	0.074	7.108	0.000	0.391	0.634	Supported
H11: ATT -> BI	0.732	0.077	9.490	0.000	0.004	0.566	Supported
H12: BI -> AU	0.831	0.034	24.391	0.000	0.001	0.764	Supported

Note: t-value ≥1.645 and p-value <0.05

Table 5. PMI facts

Plus	Minus	Interesting
- Subjective norms influence academics' adoption of technology when they think it is beneficial. - Emotional aspects are considered essential aspects of online teaching. - Academics' digital anxiety is reduced when technology is simple to use.	- Subjective norms do not influence academics to use online teaching even if they believe the technology is easy to use. - Digital anxiety remains open even though academics believe technology is beneficial.	- Self-efficacy is no longer a requirement that must be quantified. - Academics' acceptance is the foundation for technology education acceptance. - Further research into online teaching is warranted.

4.3. Structural Model

The second step of analysis is to develop the structural model. Path analysis of structural equation modelling (SEM) was used to analyze the proposed hypotheses in the developed model. This assessment was measured by running bootstrapping function of SmartPLS at a 0.05 significance level. Thus, Table 4 presented the structural model assessment and confirmed the hypotheses.

This study employed SE, SN, AXN, and EMO as external variables. From the results (Table 4), SE was not significant to perceived ease of use (H1) and perceived usefulness (H2). However, most of the studies prove that SE influenced PEU [34][58][59][58] and PU [37][34]; this study proves otherwise. The ease of use and usefulness of online teaching did not influence the academics' acceptance of online teaching which indicated interesting discovery.

SN to PEU (H3) also indicated the contrary results of previous studies [37] [34] but in line with the relationship to PU (H4) in the studies by [37][34]. This indicated that the social context plays an important role to influenced academics' feeling that online teaching is useful.

In addition, the relationship of ANX to PEU (H5) significantly affects academics' perceived ease of use which contrasts with [60], indicating that academics' perceived ease of use is a significant barrier for them to conduct online teaching. Conversely, ANX did not significantly influence PU (H6), which indicated the academics' concern about the practical use of online teaching.

The new proposed relationship EMO to PEU (H7) and PEU (H8) revealed favourable results as expected. However, this finding cannot be compared to any earlier study because it is a novel proposed relationship.

In agreement with findings from earlier research, the rest of the proposed relationships: PEU → ATT (H9) [57], PU → ATT (H10) [60][57][61], ATT → BI (H11) [60][61], and BI → AU (H12) [62][63], were all supported.

4.4. PMI (Plus, Minus, Interesting) facts

PMI (Plus, Minus, Interesting) provides a simple framework for directing attention to the critical facts in the matter discussed. The PMI directs the attention to positives or pluses facts (P), negatives or minuses facts (M), and neutrals or interesting facts (I) [64]. The PMI strategy is used in this article to analyze and synthesize the study's findings while also fostering critical thinking. The following key findings from the study's results are summarized in Table 5:

The innovative PMI (Plus- Minus- Interesting) strategy promotes brainstorming and strengthens critical thinking [65]. The PMI strategy is considered quite interesting to use right after the analysis in this study as this approach helps summarize the results and highlight crucial information that can be used in future studies.

5. Conclusion

This study used TAM to analyze human factors that impact academicians' acceptance of online teaching. The results revealed that human factors, except for self-efficacy, favoured academicians' views on the acceptability of technology and online teaching. However, the influence of others (dimension of subjective norms), the academics' apprehension or fear when dealing with technology (dimension of digital anxiety), and the presence of emotions in online teaching (dimensions of emotional aspects) significantly affected the acceptance of online teaching among academics in higher education institutions.

When viewed theoretically on self-efficacy, the ability to teach in the online environment and the skills to conduct online classes do not influence the academicians to accept online teaching. The academics believed that adopting technology was influenced by individual aptitude, motivation, and experiences as a foundation for accepting technology is no longer relevant. It is emphasized by [31][36] that academics' self-efficacy in higher education has been extensively debated. This finding has indirectly shed light on the self-efficacy controversy in higher education. Considering living in the digital technology era with digital devices and technology that have surrounded academics, gaining digital knowledge and indirect technology experience has increased self-efficacy. Thus, self-efficacy is no longer a requirement that human factors need to measure.

Considering the theoretical framework this study has used, subjective norms denote the differences in technology acceptance in online teaching. The differences between individualism and collectivism were crucial factors in determining the success of technology acceptance [8]. Academics gradually become accustomed to online teaching as they use it and start to encourage and persuade their peers to do the same. As emphasized by [4], subjective norms are the key factors influencing people to adopt technology when they believe online learning is helpful. Therefore, academics can potentially promote online teaching when they sense the technology is beneficial. However, others' opinions on the ease of use of technology do not directly influence academics to accept online teaching.

In addition, digital anxiety positively influences academics when they feel technology is easy to use. As mentioned by [2], training and experiences will decrease technology anxiety and remove the barriers to rejection. It is reiterated by [36] that a lack of knowledge and preparation frequently causes digital anxiety, leading to the ineffectiveness of online teaching. However, digital anxiety remains an unresolved empirical issue that needs more study [66]. Thus, academics should be evaluated and consulted for feedback because their acceptance determines the acceptance of educational technology and the direction of further development.

As novel variables in this study, emotional aspects add a new dimension to academics' acceptance of online teaching. Emotional aspects that have never been tested in the TAM acceptance model demonstrate that the factor affected the academics' acceptance of online teaching. This research confirmed that emotional aspects significantly influence perceived usefulness and ease of use. These findings explain that the perceived usefulness and ease of use influenced academics' emotional acceptance of online teaching. Thus, it is suggested that academics' emotional responses to online teaching were influenced by their perceptions of its utility and simplicity.

Moreover, this study discovered that perceived usefulness and ease of use in online teaching greatly influence academicians' attitudes toward accepting online teaching. According to [67], academics' perceived usefulness and ease of use are still a reliable barometer of their attitudes towards

online teaching and behavioural intention for future practice. Online teaching or even any other educational technology can be accepted or rejected by academics depending on how useful and simple they believe it to be. Academics' acceptance of online teaching will be high if they are persuaded that it is advantageous and can boost productivity [20].

Theoretically, the acceptance of technology must be based on positive attitudes. It is emphasized by [67] that academics' attitude can influence their behaviour towards technology-related intentions. According to the context of this study, academics have a favourable attitude towards online teaching, encouraging their behaviour to accept it and maintain the intention to continue using it in the future. Based on the research on digital technologies acceptance in education, there are significant relationship exists between attitude and behaviour-based intentions to use technology and actual technology use [20].

This study has several limitations that should be investigated further. This study only looks at the effects of human factors; however, for academics to survive in the digital age, it is also necessary to look at other factors, including technology, environment, and resources. It is also necessary to broaden an individual's perspective and comprehend the phenomena and experiences of academics, which cannot be obtained through this study. Thus, it would be suggested that a grounded theory study could be conducted to investigate the academicians' experiences and construct new elements within the framework of this study.

Future research may also consider expanding further dimensions in human factors to understand the individual traits in accepting technology implementation in educational institutions. In addition, exploring the adoption of online teaching merits further investigation to respond to the varying academics' capabilities and to deal with various academic fields to arrive at satisfactory, significant, and pertinent conclusions of technology acceptance.

The study may be repeated, and the analysis and findings may be compared to comprehend the viewpoints of academics in other educational institutions. Finally, more research is urged to broaden the research's scope and include educational institutions at different levels to provide a more comprehensive context of academics' acceptance of educational technology.

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