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A Framework for Mobile Learning Acceptance Amongst Formal Part-Time Learners: From the Andragogy Perspective

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ABSTRACT Mobile learning is posited to be an effective learning tool for various learners. However, limited studies have been conducted to explore formal part-time learners' behavior towards mobile learning. Therefore, this study investigated the level of acceptance of mobile learning by formal part-time learners in Malaysia. A theoretical model was developed based on the unified theory of acceptance and use of technology (UTAUT) and formal part-time learners' attributes such as self-directed learning, prior mobile learning experience, learning readiness, and orientation to learning. The developed model and hypotheses were examined using a questionnaire, and measurement and structural models were analysed using SmartPLS (v 3.2.7). The participants of the study comprised 394 formal part-time learners enrolled in five public universities in Malaysia. Finding confirmed the significant influence of self-directed learning, learning readiness, effort expectancy, performance expectancy, social influence, and facilitating conditions in predicting the mobile learning behavioral intention and usage behavior. These findings can be considered by practitioners to enhance behavioral intention towards m-learning usage. The attributes of formal part-time learners toward the usage of m-learning in public universities were properly underlined in this study. This study's main contribution would be to aid in the exploration of formal part-time learners' characteristics, which would aid m-learning practitioners in developing the necessary applications and strategies.

INDEX TERMS Acceptance, andragogy, formal part-time learners, mobile learning, UTAUT.

I. INTRODUCTION

Owing to globalisation, the majority of current learners are associated with the ability to learn at their own pace. The cultivation of a 21st-century learner mindset has designed a contemplation of a learning environment moderated by mobile technology [1]. Learners equipped with multiple settings of multimedia presentation may trigger their participation during learning sessions [2]. Therefore, mobile learning (m-learning) is suggested owing to its nature of allowing compromises, as the current population and activities are heavily aided by mobile device usage. Furthermore, m-learning can be supported by other advanced technologies, such as big data, wireless, and portability, as a means for performance enhancement. With the inclusion of formal part-time learners, one's overall involvement with the technology is highly attributed to its use for keeping their engagement despite life constraints. M-learning offers various benefits

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that underscore its positioning for usage in the formal part-time learners' environment because it is also expected to offer an interactive multimedia presentation alongside other collaborative functions [3]. Moreover, formal part-time learners are afforded the option of learning at their own time and location via wireless Internet and the use of mobile devices [4].

M-learning provides an immediate option for overcoming physical classroom barriers and meeting expectations satisfactorily [5]. This technology is effortlessly ready as a tool for facilitating learners' best learning experience, although such availability cannot ensure an optimised use by formal part-time learners. Some members of this particular community may avoid using m-learning technology because of its limited functions, particularly with the synchronisation between m-learning and formal part-time learners' study pattern apparently absent and unknown. Moreover, formal part-time learners are linked with the challenge of delicately balancing their social life and academic learning [6]. Therefore, the integration of instructional principles and m-learning features calls for further study to enhance theoretical and practical assimilation [3].

The application of m-learning may significantly improve learners' learning experience [7], [8]. Thus, an emphasis is placed upon identifying elements that lead to its successful implementation in achieving its objectives, as well as ensuring its effectiveness in meeting learners' needs [9]. Three reasons have been found to motivate this selection, with the first being the minimal focus on investigating the situation amongst formal part-time learners [9]. A high dropout rate is also noted amongst formal part-time learners in institutions [10], and minimal empirical research has been conducted on the framework of their attributes for the intention to use m-learning [1]. Although some studies have been conducted to investigate m-learning, only a few empirical investigations have been performed to explore formal part-time learners' concerns and needs. Thus, the current study is disputing the claim and upholding it as an important contribution to practitioners with regard to the formulation of standard legal frameworks.

M-learning adoption has been proposed because it brings about actual technological implementation. This undertaking is subsequent to [11], which posited that such an acceptance could be used to predict learners' acceptance of m-learning and its usage. Another study has also suggested [10] that formal part-time learners' acceptance of m-learning can be measured by predicting the relationship amongst related attributes. The combination of principles and pre-existing tools can be incorporated to enhance learners' performance [12]. Therefore, the current study attempts to clarify such debates by investigating formal part-time learners' characteristics and suggested attributes for the accepted framework of m-learning. To understand the factors impacting their acceptance and adoption for m-learning, four principles of adult learners are highlighted owing to their identification as indispensable elements for this group of learners [13].

An examination of the preceding issue enables the contribution of a new form of acceptance framework that can be utilized by practitioners in developing and using applications. Given that formal part-time learners' attributes towards m-learning are identified, the appropriate learning experience can be consequently designed. Therefore, this study aims to elicit a clear comprehension of the factors that impact formal part-time learners to accept m-learning, which is undertaken by an examination of the issue from the andragogical perspective. The remainder of this paper is divided into seven sections. Section II presents a literature review in the m-learning context. Section III outlines the research model and hypotheses formulated according to the research design. Section IV describes the methodology selected to achieve the goals. Section V discusses the analytical process that the data obtained will be subjected to and the resulting outcomes. Section VI presents the discussions. Lastly, Section VII concludes this research.

II. LITERATURE REVIEW

This section discusses theories that will be used to measure m-learning acceptance amongst formal part-time learners. In this section, m-learning acceptance and formal part-time learners in Malaysia are described. Meanwhile, the unified theory of acceptance and use of technology (UTAUT) and its attributes are presented. The andragogy theory and principles of adult learners are described for formal part-time learners.

A. M-LEARNING ACCEPTANCE IN MALAYSIA

On the basis of the available literature, numerous researchers have differentiated m-learning definitions according to their respective perspectives. [14] categorised it as a modern technology that keeps people engaged in interactions, with only a few issues related to physical proximity and spatial immobility. Meanwhile, [15] stated that using m-learning aids students and teachers to perform any task in a short time across multiple contexts. Therefore, m-learning can be described as any learning activity on mobile devices that can be undertaken without time and location restrictions simply by utilising various types of mobile devices, such as tablets and smartphones [16].

According to [17], the number of smartphone users in Malaysia slightly increased from 2015 to 2020. By 2025, the number is predicted to increase from 30.41 million in 2020 to 33.46 million. This new trend in mobile use has an effect on education, particularly higher education, where numerous areas, such as mobile gaming, Malaysia's multiple native languages, technical and vocational education, and special education, are being studied [18]. These issues continue to emerge because the Malaysian Ministry of Higher Education (MOHE) promotes mobile devices as teaching and learning tools by offering free mobile devices and data plans. Consequently, higher education students will benefit from a markedly favourable learning environment. From 2013 to 2025, MOHE will use globalised online

mapping to integrate m-learning to higher education institutions [19].

Although acceptance can be defined as an exploration of users' behavioural patterns [5], it extends beyond the adoption phase to include the continuous use of technology [20]. Technology for learning and teaching should be tested for its acceptance at each consecutive phase to ensure that its efficiency can be optimized. This type of testing is not limited to evaluating results and performance after its use and also includes learners' attitudes and intentions that will eventually influence the actual use of the technology [21]. Therefore, both characteristics should be considered during any interaction with mobile technology to identify any features that may have been overlooked. Given that acceptance is an individual act based on person-to-person perceptions, learners' perceptions influencing their behavior should be identified to ensure the materialization of the tools' advantages [15], [22].

Note that limited research has been conducted in differentiating the use of mobile technology between its purpose and the learners' context [23]. An integration between learners' characteristics and requirements is apparently absent, which may result in incomplete tool acceptance by learners and disrupt its implementation for their study [22]. Therefore, [23] suggested the investigation of the relationship between learners' acceptance and mobile learning by identifying factors that motivate their use of the technology. Moreover, matters that arise during engagement with the technology must be recognized, thereby helping learners learn to the best of their abilities. If tools fail to meet learners' requirements, then the implementation of the technology may be delayed, hindered, underutilized or disrupted. This situation can be used to confirm the impacting factors for m-learning learner adoption and the extent to which the technology is beneficial [24]. If learners accept m-learning, then they will use it during their learning practices and enhance their learning performance.

B. FORMAL PART-TIME LEARNERS IN MALAYSIA

When adults decide to further their studies whilst simultaneously engaging with their work, they are known as part-time learners. This undertaking may require them to physically and regularly meet their peers [15], with the majority of these learners in the age range of 20–58 years old [10], [25]. At this age, they have to entertain and balance multiple commitments whilst sustaining high motivation to learn owing to various factors, such as attaining high positions in their work, moving to a different field, work demands necessitating them to further study, or for increased pay [26]. Moreover, aiming for high qualifications will help them develop specific skills, particularly by attaining tertiary qualifications to further their careers [27]. Thus, formal education is needed for verifying their skills and enhancing their careers owing to the aforementioned factors.

C. UNIFIED THEROY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT)

Numerous researchers have spent their time developing and testing various acceptance models for predicting the acceptance of technology. The most frequently used acceptance model is UTAUT [11]. UTAUT offers a robust approach to understand technology acceptance [22]. It combines eight prominent models describing technology acceptance: technology acceptance model (TAM), theory of planned behavior (TPB), innovation diffusion theory (IDT), social cognitive theory (SCT), theory of reasoned action (TRA), motivation model (MM), model of PC utilization (MPCU) and the combination of TAM and TPB. Therefore, UTAUT is known as the foremost theory for an evaluation in different angles and the field of technology acceptance, specifically with its citation in an impressive number of articles [28]. This unified theory has led the acceptance studies on learners' behavioral intention for m-learning implementation, with the majority of the prior outcomes showing the acceptance model to be highly influenced. UTAUT also depicts a flexible framework that investigates acceptance by extending it with various attributes to test the acceptance relevancy [23]. The current study adopted and integrated UTAUT with the highlighted issues to achieve the research purpose, thereby warranting a reflection on the limitations on formal part-time learners' issues. UTAUT's four attributes have shown a significant result in acceptance behavior, which consists of performance expectancy, effort expectancy, learning readiness and orientation to learning. Performance expectancy is seen when users theorize that utilizing m-learning will aid in successful task completion and one that is performed well. Effort expectancy is when learners feel ease and effortlessness when using mobile technology. Social influence can be described as the importance of other people's beliefs on individuals' utilization of m-learning. By contrast, facilitating condition entails the extent of learners' belief in the presence of an organizational and technical structure for m-learning usage support [11]. The key relationships in this model are moderated by four moderators: gender, age, experiences, and voluntariness. Table 1 presents the definitions of the four attributes of UTAUT:

D. ANDRAGOGY

The use of adult learning theory is warranted to understand formal part-time learners' learning needs [26]. Andragogy is an adult learning art and science involving any adult learning activities and is also known as a process model because it pertains to a continuous process by providing information and resources to help adults in their learning. Formulated by [13], andragogy suggests that the four principles of adult learners can be used to represent formal part-time learners' attributes[13] emphasized the manner of triggering learners' participation by designing an adequate learning experience for formal part-time learners, thereby enabling the proposal

TABLE 1. UTAUT attributes.

Attributes	Definitions	Reference
Performance Expectancy (PE)	The extent to which learners believe that using the m-learning system will help them improve their academic performance	[11]
Effort expectancy (EE)	The degree of ease associated with the use of the m-learning system	
Social influence (SI)	The degree to which learners perceive that other important people believe that learners should use the m-learning system	
Facilitating condition (FC)	The extent to which learners believe that institutions and technical infrastructure exist to support the use of the m-learning system	

of a suitable learning method. The four principles of self-directed, prior experience, learning readiness, and orientation to learning are particularly important in the education field because adult learners constantly perceive themselves as either adult or child learners. Particular research on adults may identify the difference between learning methods for them compared with those used with children. Therefore, [29] suggested a new theory by using the andragogy principles to understand formal part-time learners' cognitive control and the complexity of adult learning styles to reduce generational differences. Table 2 presents the definition of the four principles of adult learners.

TABLE 2. Principles of adult learners.

Attributes	Definitions	References
Self-directed (SD)	Learners' initiative, with or without assistance from others, in determining their learning requirements, strategies in implementing learning goals, identifying resources and evaluating results	[30]
Prior Mobile Learning Experience (PrEx)	Learners accumulate an expanding reservoir of experiences that become a valuable resource in their future learning	[31]
Learning Readiness (LR)	Readiness of learners and how likely people will seek knowledge and change their behaviour to improve their ability to learn and accomplish tasks	[31]
Orientation to Learning (OL)	The perspective of time that changes from one of postponing the application of knowledge to immediacy of the application and, accordingly, their orientation towards learning that may shift from one of subject-centredness to one of problem-centredness	[30]

III. RESARCH MODEL AND HYPOTHESES

This section refers to the UTAUT model and principle of adult learner as an underpinning theory in measuring acceptance. For the acceptance model, numerous researchers have spent their time developing and testing various acceptance models for predicting technology acceptance.

Research hypotheses form the foundation of this study to determine the relationship between the acceptance of m-learning amongst formal part-time learners. Attributes that will be used are four main determinants from UTAUT, and another four principles of adult learners from the andragogy theory will be measured and tested (see Figure 1). Thus, an appropriate research hypothesis will be formulated for analysis and structural measurement. A total of 13 hypotheses were constructed in explaining m-learning acceptance through its particular relationship and whether it influences m-learning acceptance. Hypothesis development was referred to the theories and literature analysis.

H1 (Self-Directed has a Positive Influence on Performance Expectancy): M-learning is a tool that encourages formal part-time learners to accomplish their anticipated performance [13], [23], [32]. At present, various resources can be used for learning, thereby influencing the way of life and decision-making processes. Thus, this situation underscores the key role of self-directed learning [32]. Even though adults have the freedom to manage their time and studies, educators' help remains relevant [33] in assisting these adults to gain the benefits of a job performance well done. Therefore, m-learning as a tool will be able to keep them active and encourage them to participate, comprehend the materials, and experience all instructional elements during the learning session [34]

H2 (Self-Directed has a Positive Influence on Effort Expectancy): Formal part-time learners have the ability to be involved in any learning activities and evaluate their performance [29]. Self-directed is described as their beliefs towards effort expectancy when learners comfortably use the m-learning technology to assist them in peer-collaborative purposes. Self-directed also becomes a resource for identifying and planning their needs, as well as to give or receive help amongst their peers. As adults shift from self-concept to self-directed, their learning style also becomes determined and using m-learning is easily managed [27].

H3 (Prior Mobile Learning Experience has a Positive Influence on Performance Expectancy): Experience is the main factor that integrates mobile technology into teaching and learning, which occurs by creating opportunities for reflection [35]. In this context, prior mobile learning experiences are described as formal part-time learners' beliefs towards performance expectancy when their experiences become the basis for future learning purposes [28], [36]. They may find the new technology features useful and improve their performance, thereby enabling them to solve professional problems or real-life situations. Therefore, m-learning enables learners and lecturers to share their perspectives and work together to come out with the results of discussions assimilating both views.

H4 (Learning Readiness has a Positive Influence on Performance Expectancy): Learning readiness has a positive impact on performance expectancy, determining formal part-time learners' readiness to adopt m-learning [28]. The readiness described as their beliefs towards performance expectancy

when their readiness is progressively angled towards the development processes of social roles. Thus, m-learning that is supportive enables them to have opinions, overcome obstacles, make choices and utilize previous knowledge when they want to make decisions or obtain goals in tasks [11]. Hence, an investigation of formal part-time learners' readiness should be conducted to enhance their performance [1].

H5 (Orientation to Learning has a Positive Influence on Performance Expectancy): Learning abilities are continuously developed according to people's learning orientation because it may motivate them with a problem-centered outlook and encourage them to seek a solution. Formal part-time learners prefer an active learning landscape, in which m-learning provides a platform that can take the form of a problem to be solved or of questions or paradox requiring a solution [37]. In this context, formal part-time learners believe when learning is positioned progressively towards their social role's developmental processes, in which they learn to perform tasks or enhance their situation to the extent of looking for a performance-centered orientation to learning [38].

H6 (Self-Directed has a Positive Influence on Behavioral Intention): Self-directed is described as beliefs toward behavioral intention when m-learning facilitates self-directed and formal learning activities. Given that learners use m-learning as their virtual learning platform and in accessing online information, it helps them complete tasks [23]. Technology enables them to explore their learning modules from any level because they are able to do so at their own pace and convenience [32].

H7 (Prior Mobile Learning Experience has a Positive Influence on Behavioral Intention): For adult learners, experiences in mobile usage become the basis of connecting their previous resources with current knowledge. For digital natives, m-learning can be used as a platform to express ideas and sharing, particularly when they use mobile devices frequently and have a strong behavioral intention for m-learning utilization when it results in positive experiences [36]. Some activities that can be experienced through m-learning include motivation slots, reflection of the learning process, and knowledge sharing. This approach enables adult learners to realize the potential advantages of using m-learning in terms of compatibility and effective usage [7].

H8 (Learning Readiness has a Positive Influence on Behavioral Intention): [28] stated that the main factor influencing learners' readiness is the extent to which m-learning is easy to use or otherwise. Andragogy's education goal is to provide learners with the freedom to identify their needs and interest. Therefore, whether or not formal part-time learners' readiness significantly contributes to m-learning utilization should be determined [29].

H9 (Performance Expectancy has a Positive Influence on Behavioral Intention): The majority of the previous results have shown a strong relationship between performance expectancy and behavioral intention [10], [11], [28], [39]. Therefore, the application of performance expectancy in the m-learning context will promote a positive climate owing to immediate access and convenient use [40]. The mission is to create an iteration exercise by using m-learning and considering the requirements of a practical and informational society. However, previous studies have also shown minimal research on the scope of formal part-time learners compared with online member engagement in the setting of virtual, higher education, or professional landscapes for its interpretation purposes [22].

H10 (Effort Expectancy has a Positive Influence on Behavioral Intention): Effort expectancy has been demonstrated to be a valid predictor of behavioral intention in numerous prior studies [8], [22], [41]. However, this result has contrasted with other studies [23], [42]. Nevertheless, learners perceive the need to exert additional effort for mastering their m-learning skills and showcase their growth. Given that effort expectancy results in immense effort for learners' participation and combined work as compensation, it is expected to be one of the determinants for the behavioural intention in adopting m-learning as a learning tool.

H11 (Social Influence has a Positive Influence on Behavioural Intention): Positive opinion and feedback are affected by effective communication and the use of m-learning transmission, thereby leading to the influence rate of intention to use m-learning. This particular social factor becomes the focal internalisation of reference by the group and is believed to be beneficial [11]. [11] revealed that social influence directly impacts behavioural intention on which learning presence in the m-learning environment is dependent. Given its positive effect on behavioral intention, adopting m-learning appears to be an important attribute of learners' behavioral intent.

H12: Facilitating condition has a positive influence on behavioral intention. Findings from previous studies have indicated that facilitating conditions positively influence usage intention [43]. This finding contradicts [28], which found that facilitating conditions do not exhibit any considerable influence on intention. Thus, this attribute is highly recommended regarding its influence on behavioral intention because more objective data on formal part-time learners' participation in m-learning activities design is considered.

H13 (Behavioural Intention has a Positive Influence on Usage Behavior): The intention has predicted the actual use of m-learning [21], [22], with the majority of studies have shown a positive influence of behavioral intention towards the use of the technology [11], [24], [44]. In the m-learning context, behavior is highlighted as a key element influencing m-learning implementation by learners [21]. This situation is due to behavior coming first as people's intention to accept before they make further decisions whether or not to use it.

IV. METHODOLOGY

This section on methodology presents the steps taken to investigate the sample framework, as well as the instrument design and data collection processes.

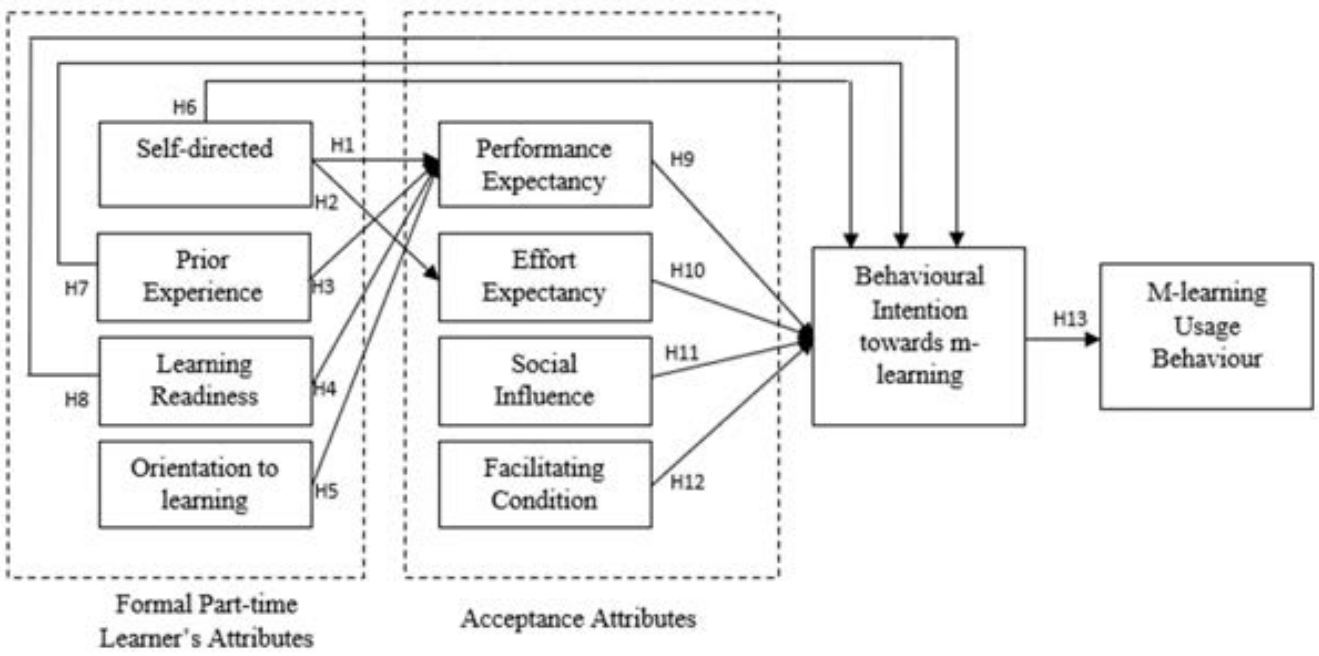

FIGURE 1. Theoretical Framework: m-learning acceptance framework for formal part-time learner.

A. PARTICIPANTS AND DATA COLLECTION

The participants of the study comprised 394 formal part-time learners enrolled in five public universities in Klang Valley to represent the entire population of formal part-time learners in Malaysia. This study adopted the G*Power statistical tool to determine the sample size. Figure 2 shows the result of the calculation for the sample size using G*Power 3.1.9.4. A single tail was used to concentrate the 0.05 probability. The entire 5% of the alpha level was concentrated in a single tail (i.e., either the left or right tail).

Note that the type of power analysis performed to determine the sample size was that of an 'a priori' analysis. Thereafter, the number of tails, value of the chosen significance level (α) and powers (i.e., 0.15, 0.05 and 0.95, respectively) were provided. The only input requested was the effect size or the difference between the null and hypothetical means divided by the standard deviation.

By pressing the 'Calculate' button in the main window, the desired sample size was produced together with other statistics (in descending order): non-centrality parameter, δ, critical point, t (i.e., number of standard deviations from the null mean where observation becomes statistically significant), number of degrees-of-freedom and actual power of the test. Additionally, a graphical representation of the test was shown, with the sampling distribution denoted by a dotted blue line, population distribution represented by a solid red line, a red shaded area delineating the probability of a type 1 error, blue area delineating the probability of a type 2 error and a pair of green lines indicating the critical point t. The new output parameters were shown using the 'Calculate' button.

Lastly, the minimum sample size was determined to be 74. Thus, no fewer than 74 formal part-time learners had to participate in this survey to generate a statistically significant result with a power of 0.95.

The five universities were selected owing to their capability in managing the life-long learning center of excellence purposely for continuing education. Thus, they have become the institutions for formal part-time learners to pursue their studies. The centers offered flexible programs for working learners aged between 20 and 56 years old, enabling them to attend a weekend or night class and join a course that enhances their individual knowledge and personal self-development. Additionally, part-time programs were designed and developed by the institutions to enhance and recognize the skills and knowledge possessed by the working community for their career advancement.

Questionnaires were distributed to five life-long learning centers in Klang Valley and disseminated to the students during class sessions. Out of the 438 questionnaires returned by the participants, 44 were excluded from analysis because of having blank or invalid responses. Hence, 394 questionnaires were analyzed.

B. QUESTIONNAIRE AND MEASUREMENTS

A set of a questionnaire consisting of three sections was developed as a means for answering the research questions. It has a cover letter serving as an 'informed consent' section, an appreciation note detailing the need for respondents' sincere cooperation to answer, instructions prior to the questions, and an assurance of the confidentiality of the

respondents' identities. Section A consisted of 17 questions requiring the respondents to provide various demographic data, such as their personal background, career background, and prior learning experiences. Section B consisted of items representing variables under the acceptance of m-learning scales: performance expectancy, effort expectancy, social influences, facilitating condition, behavioral intention, and usage behavior. Section C comprised items representing variables under the Formal Part-time Learning Behaviour scales: self-directed, Prior Mobile Learning Experience, learning readiness, and orientation to learning. The last question was designed as an open-ended question asking for the respondents' feedback on their best and preferred method of learning processes using their mobile devices (Table 3: Instrument).

The research instrument for Section B (i.e., acceptance of mobile learning) was designed and adopted for each research available in the literature [11]. Consisting of 18 items, the measurement's adoption was attributable to its specific focus on learners' acceptance of implementing m-learning as their learning medium. Section C (i.e. formal part-time learners' behaviour) was adopted from various studies [7] (e.g. [6], [31], [45], [46]).

The research instruments for Section C consisted of 12 items and focused specifically on part-time learners' behavior that generalized the principles of adult learners. Sections B and C and the open-ended questions were validated and subjected to restructuring and redesign to ensure their compliance for the purpose of the acceptance and adoption of formal part-time learners towards m-learning. Minor alterations were likewise made to reaffirm the items' fit with the context of the study. Furthermore, items of both sections were measured using a five-point Likert scale, ranging from 1 ('strongly disagree) to 5 ('strongly agree); this scale is the most frequently used in acceptance studies [1], [15], [47], [48]. The survey also included one open-ended question.

This survey was developed by the researcher to obtain open-ended comments on how learners can learn best using mobile devices. The open-ended question (i.e. *How can you learn best by using your mobile device?*) aims to encourage the participants to discuss their intention toward m-learning usage and suggest the best way to use mobile devices for additional support in their learning activities.

Questionnaire verification was undertaken by performing a pre-test with five part-time adult learners to reaffirm that the questionnaire did not suffer from semantic issues. Further enhancements were made upon noting the ambiguity of some questions based on the feedback obtained, specifically on their clarity, instrument length, content completion, and structuring. The instrument's content validity was ensured by obtaining expert opinions and consultation from esteemed individuals in the field of m-learning and adult learning, in which their comments, review and refinement were duly requested. Minor alterations of wordings were made as a result of pre-testing and the experts' content validation, without the addition or removal of any items.

TABLE 3. Items used in estimating the acceptance of m-Learning by formal part-time learners.

Items	Resource
Performance Expectancy	
PE1 *I find mobile learning applications useful in my learning*	
PE2 *Using mobile learning applications enables me to accomplish learning activities more quickly*	
PE3 *Using mobile learning applications increases my learning productivity*	
Effort Expectancy	
EE1 *My interaction with mobile learning applications would be clear and understandable*	
EE2 *Learning how to use mobile learning applications would be easy for me*	
EE3 *I would find mobile learning applications easy to use*	
Social Influence	[56] and [43]
SI1 *The people around me use mobile learning applications for learning purposes*	
SI2 *My peers recommended that I should use mobile learning applications*	
SI3 *Society has a high opinion for mobile learning applications in academic usage*	
Facilitating Condition	
FC1 *My mobile device fulfils the minimum requirement of mobile learning applications*	
FC2 *I have the resource necessary to use mobile learning applications*	
FC3 *I have the knowledge necessary to use mobile learning applications*	
Behavioural Intention	
BI1 *I would like to recommend mobile learning applications to other people*	
BI2 *I tend to use mobile learning applications*	
BI3 *I plan to use mobile learning applications frequently*	
Use Behaviour	[1]
UB1 *Mobile learning applications satisfies my educational needs*	
UB2 *I am satisfied with performance of mobile learning applications*	
UB3 Mobile learning applications give me self-confidence	
Self-directed	
SD1 *I prefer to plan my own learning*	[31]
SD2 *I set goals for myself in order to direct my activities*	
SD3 *Using mobile learning applications will lead to my exploration*	
Prior Mobile Learning Experience	
PrEx1 *I took a short time to learn mobile technology use*	[57]
PrEx2 *I learn to explore ideas confidently with other people*	
PrEx3 *It was easy to use m-Learning applications*	
Learning Readiness	
LR1 *I would be in favour of utilising mobile learning applications in my coursework*	[45]
LR2 *I would believe that a mobile device could be a useful education tool in my coursework*	
LR3 *I want to know more about mobile learning applications*	
Orientation to Learning	
OL1 *I try to apply ideas from the course in other courses*	[58]
OL2 *I prefer course material that really challenges me so that I can learn new thing*	
OL3 *I pull together information from different sources such as lectures, readings and discussion*	

V. DATA ANALYSIS AND RESULTS

This section details and discusses the steps taken to analyze the data obtained. Partial least square–structural equation

modeling (PLS–SEM) was used on the basis of the research goal of predicting m-learning usage behavior by extending UTAUT structural theory. Education-related studies have mostly used PLS–SEM for measuring m-learning adoption and testing the intention attribute for its influence on the dependent variable [23], [28], [49], [50]. PLS was preferred in this study owing to three reasons, with the first being its utilization was possible for any sample size, whether small or large, without considering normality distribution. Moreover, the other reasons were its use for predicting attributes and its capacity to involve numerous attributes.

A. DEMOGRAPHIC INFORMATION

The majority of the respondents were female (66.3%). A total of 34% were under 25 years old, 45.2% were 26–35 years old, 17% were 36–46 years old, and the remaining 3.8% were above 46 years old. Furthermore, 68.1% of the respondents were adult undergraduate (UG) students, and the remaining respondents were adult postgraduate (PG) students. A total of 67.5% of the respondents are currently engaged in m-learning, whilst the remainder is not. Moreover, 55.6% of the respondents chose high readiness to further use m-learning for their studies, whilst 41.1% were moderate, 2% were not ready to use it, and 1.3% refused to use m-learning as their learning tool. The results of the demographic analysis are presented in Table 4.

TABLE 4. Demographic analysis results.

		Characteristics	Frequency	Percentage%
Gender	1	Male	133	33.8
	2	Female	261	66.3
Program	1	Diploma	54	13.7
	2	Degree	214	54.4
	3	Master	78	19.8
	4	PhD	48	12.2
Age	1	25 and below	134	34.0
	2	26–35	178	45.2
	3	36–46	67	17.0
	4	46 and above	15	3.8
Readiness	1	High	219	55.6
	2	Moderate	162	41.1
	3	Not ready	8	2.0
	4	Don't think so	5	1.3
Frequently Use	1	5 hours and less	113	28.7
	2	6–9 hours	181	46.0
	3	10–14 hours	67	17.0
	4	Over 15 hours	33	8.4

B. RESEARCH INSTRUMENT'S RELIABILITY AND VALIDITY

This section will discuss the evaluation of instruments' reliability undertaken using Cronbach's alpha value and composite reliability (CR). A validity test assessing convergent and discriminant validities were undertaken as per the reflective measurement model. The SmartPLS 3.0 package was utilized to analyze the pilot data with the sample (n = 87). The value >=0.7 is the normally accepted value for Cronbach's alpha and CR to be considered a priority [51]. Under convergent validity, the value of average variance extracted (AVE) is measured with the accepted value of >=0.5 and factor loading of >=0.708 recommended [52].

TABLE 5. Convergent validity – construct reliability and validity and factor loading between indices.

	Indicators	Factor loadings	Cronbach's Alpha	rho_A	Composite Reliability; >0.70	AVE >0.50
Behavioural Intention	BI_1	0.907	0.91	0.92	0.949	0.861
	BI_2	0.939				
	BI_3	0.937				
Effort Expectancy	EE_1	0.851	0.87	0.87	0.922	0.797
	EE_2	0.917				
	EE_3	0.91				
Facilitating Condition	FC_1	0.898	0.90	0.91	0.941	0.842
	FC_2	0.959				
	FC_3	0.895				
Learning Readiness	LR_1	0.897	0.87	0.87	0.925	0.804
	LR_2	0.918				
	LR_3	0.875				
Orientation to Learning	OL_1	0.878	0.81	0.82	0.892	0.734
	OL_2	0.821				
	OL_3	0.87				
Performance Expectancy	PE_1	0.906	0.89	0.89	0.934	0.824
	PE_2	0.905				
	PE_3	0.912				
Prior Mobile Learning Experience	PrEx_1	0.821	0.77	0.88	0.867	0.686
	PrEx_2	0.734				
	PrEx_3	0.919				
Self-directed	SD_1	0.866	0.81	0.83	0.887	0.724
	SD_2	0.859				
	SD_3	0.828				
Social Influen	SI_1	0.896	0.85	0.85	0.910	0.771
	SI_2	0.861				
	SI_3	0.877				
Usage Behavio	UB_1	0.937	0.91	0.92	0.948	0.859
	UB_2	0.936				
	UB_3	0.908				

Table 5 presents the results obtained during the pilot study, in which 87 formal part-time learners answered the questionnaire with all loadings shown to exceed the advocated value of 0.708 [52] and are consequently retained. Moreover, all ten constructs met the threshold values for AVE, with all AVEs ranged from 0.686 to 0.861 and exceeding the recommended 0.5 value [52]. Therefore, convergent validity was satisfactorily met owing to both criteria being fulfilled, in which the reliability and convergent validity requirements were satisfied. These findings reaffirmed the adequacy of the measurement model's convergent validity.

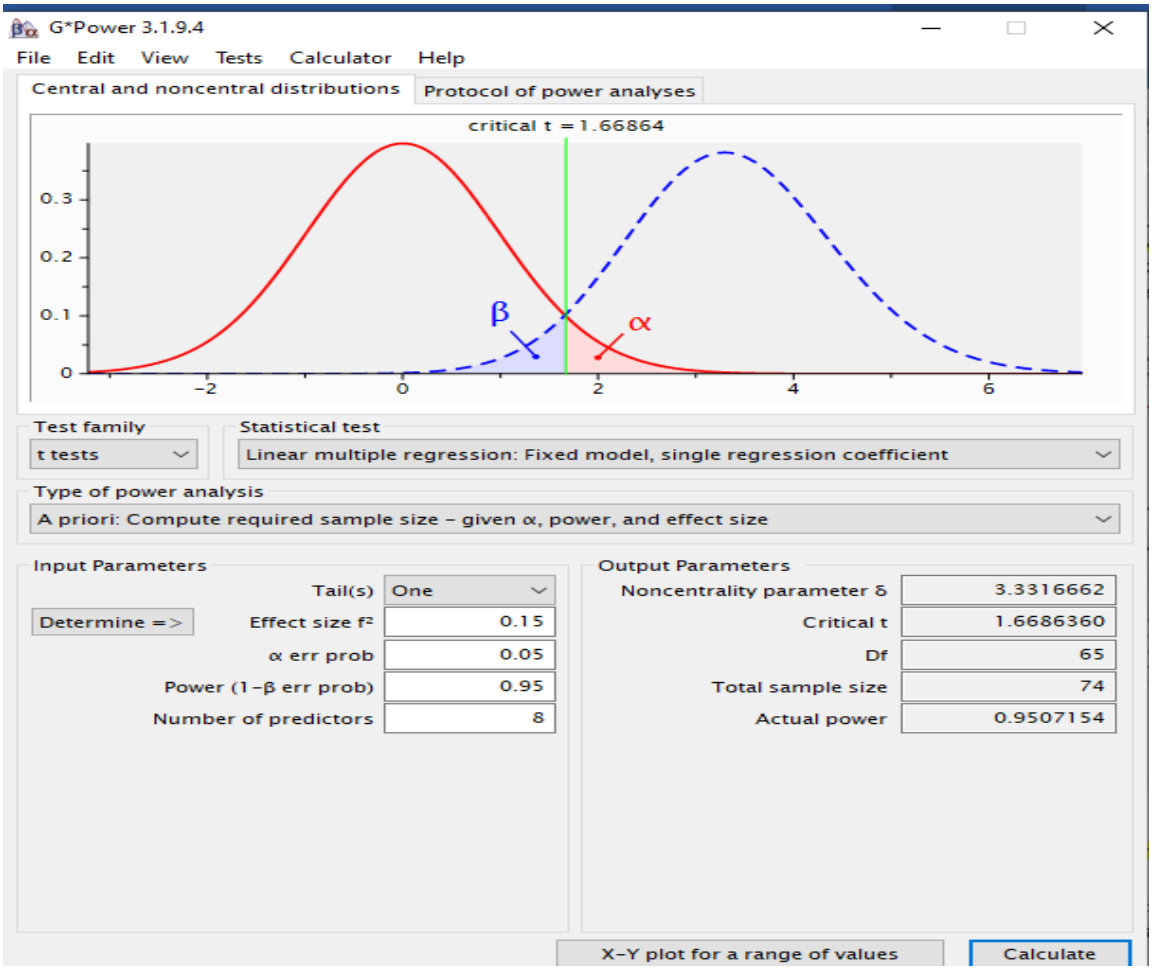

FIGURE 2. Result of the calculation for the sample size using G*Power 3.1.9.4.

TABLE 6. Discriminant validity using fornell locker criterion.

	Behavioral Intention	Effort Expectancy	Facilitating Condition	Learning Readiness	Orientation to Learning	Performance Expectancy	Prior Experience	Self-directed	Social Influence	Usage Behaviour
Behavioral Intention	0.928									
Effort Expectancy	0.718	0.893								
Facilitating Condition	0.735	0.772	0.917							
Learning Readiness	0.72	0.613	0.635	0.897						
Orientation to Learning	0.561	0.503	0.606	0.564	0.857					
Performance Expectancy	0.797	0.774	0.688	0.68	0.518	0.908				
Prior Experience	0.637	0.551	0.753	0.573	0.616	0.56	0.828			
Self-directed	0.531	0.519	0.573	0.627	0.458	0.626	0.503	0.851		
Social Influence	0.736	0.619	0.601	0.494	0.357	0.65	0.432	0.446	0.878	
Usage Behaviour	0.703	0.497	0.613	0.636	0.345	0.631	0.449	0.477	0.615	0.927

Output from the analysis also revealed the discriminant validity using fornell locker criterion purposely to test the different traits when the highest attribute over another [42]. Table 6 below indicates that all constructs exhibit sufficient discriminant validity, where the square root of AVE (diagonal) is larger than the correlations (off-diagonal) for all reflective constructs. Thus, the pattern of loadings and cross-loadings support internal consistency and discriminant validity.

Table 7 below depicts the discriminant analysis of comparing the cross-loadings between the constructs. As shown in the table, all indicators of some constructs are loaded

TABLE 7. Cross loading.

	Behavioural Intention	Effort Expectancy	Facilitating Condition	Learning Readiness	Orientation to Learning	Performance Expectancy	Prior Experience	Self-directed	Social Influence	Usage Behaviour
BI_1	0.907	0.613	0.653	0.563	0.44	0.67	0.55	0.417	0.687	0.664
BI_2	0.939	0.7	0.716	0.704	0.539	0.767	0.621	0.54	0.695	0.629
BI_3	0.937	0.684	0.677	0.733	0.577	0.778	0.6	0.517	0.667	0.665
EE_1	0.651	0.851	0.612	0.4	0.415	0.659	0.445	0.452	0.584	0.391
EE_2	0.644	0.917	0.735	0.594	0.49	0.683	0.554	0.426	0.533	0.467
EE_3	0.628	0.91	0.722	0.646	0.443	0.729	0.477	0.51	0.54	0.472
FC_1	0.718	0.711	0.898	0.563	0.57	0.614	0.649	0.483	0.644	0.534
FC_2	0.692	0.727	0.959	0.576	0.579	0.657	0.716	0.529	0.548	0.618
FC_3	0.602	0.686	0.895	0.613	0.513	0.624	0.714	0.574	0.445	0.532
LR_1	0.634	0.634	0.625	0.897	0.454	0.628	0.568	0.626	0.496	0.637
LR_2	0.599	0.537	0.563	0.918	0.481	0.612	0.455	0.568	0.377	0.625
LR_3	0.701	0.478	0.519	0.875	0.578	0.588	0.516	0.495	0.453	0.453
OL_1	0.559	0.514	0.565	0.533	0.878	0.453	0.523	0.397	0.378	0.39
OL_2	0.394	0.344	0.482	0.391	0.821	0.415	0.514	0.333	0.318	0.269
OL_3	0.482	0.429	0.509	0.518	0.87	0.461	0.545	0.442	0.224	0.227
PE_1	0.729	0.691	0.618	0.55	0.481	0.906	0.454	0.508	0.579	0.507
PE_2	0.726	0.748	0.649	0.672	0.426	0.905	0.516	0.624	0.612	0.622
PE_3	0.715	0.666	0.606	0.624	0.505	0.912	0.553	0.568	0.578	0.584
PrEx_1	0.412	0.448	0.592	0.353	0.433	0.411	0.821	0.387	0.261	0.226
PrEx_2	0.396	0.324	0.465	0.431	0.427	0.301	0.734	0.35	0.352	0.378
PrEx_3	0.694	0.553	0.757	0.596	0.625	0.605	0.919	0.488	0.438	0.477
SD_1	0.416	0.425	0.461	0.458	0.288	0.498	0.402	0.866	0.406	0.337
SD_2	0.321	0.312	0.315	0.375	0.285	0.44	0.355	0.859	0.317	0.276
SD_3	0.559	0.534	0.615	0.69	0.533	0.614	0.491	0.828	0.396	0.54
SI_1	0.632	0.502	0.583	0.369	0.407	0.567	0.408	0.399	0.896	0.594
SI_2	0.621	0.596	0.525	0.458	0.221	0.557	0.324	0.319	0.861	0.529
SI_3	0.682	0.535	0.479	0.471	0.31	0.587	0.403	0.451	0.877	0.5
UB_1	0.707	0.512	0.621	0.607	0.338	0.574	0.483	0.452	0.603	0.937
UB_2	0.624	0.481	0.59	0.566	0.317	0.611	0.407	0.467	0.551	0.936
UB_3	0.618	0.382	0.486	0.595	0.303	0.57	0.351	0.406	0.552	0.908

TABLE 8. Hypothesis.

Parameters	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P-values	Results
H1 Self-directed -> Performance Expectancy	0.239	0.241	0.055	4.333***	0	Accepted
H2 Self-directed -> Effort Expectancy	0.583	0.585	0.037	15.884***	0	Accepted
H3 Prior Experience -> Performance Expectancy	0.005	0.001	0.052	0.096	0.462	Reject
H4 Learning Readiness -> Performance Expectancy	0.551	0.547	0.063	8.687***	0	Accepted
H5 Orientation to Learning -> Performance Expectancy	0.048	0.051	0.066	0.728	0.233	Reject
H6 Self-directed -> Behaviour Intention	0.105	0.109	0.055	1.922*	0.027	Accepted
H7 Prior Experience -> Behaviour Intention	−0.006	−0.005	0.03	0.211	0.416	Reject
H8 Learning Readiness -> Behaviour Intention	0.171	0.177	0.082	2.097*	0.018	Accepted
H9 Performance Expectancy -> Behaviour Intention	0.123	0.125	0.06	2.07*	0.019	Accepted
H10 Effort Expectancy -> Behaviour Intention	0.225	0.223	0.067	3.372***	0	Accepted
H11 Social Influence -> Behaviour Intention	0.148	0.151	0.049	2.999**	0.001	Accepted
H12 Facilitating Condition -> Behaviour Intention	0.223	0.215	0.098	2.273*	0.012	Accepted
H13 Behaviour Intention -> Usage Behaviour	0.819	0.82	0.022	37.508***	0	Accepted

high while low on other constructs. This indicates that discriminant validity is achieved as the constructs are distinctly different from each other [52].

C. STRUCTURAL MODEL

Hypothesis testing was performed by assessing the structural model and model fit with the use of different indices. The process would determine hypothesis acceptance or rejection by defining the path coefficient, t-value, p-value, and mediating effects.

This research developed the structural model assessment as a means for relationship testing between the exogenous variables (i.e., performance expectancy, effort expectancy, social influence, facilitating condition, self-directed, prior mobile experience, learning readiness, and orientation to learning) and endogenous variables (i.e. behavioral intention and usage behavior).

Table 8 shows that the t-value amongst the factors influencing behavioural intention of self-directed ($\beta = 0.105$, $t = 1.922$, $p < 0.01$), learning readiness ($\beta = 0.171$,

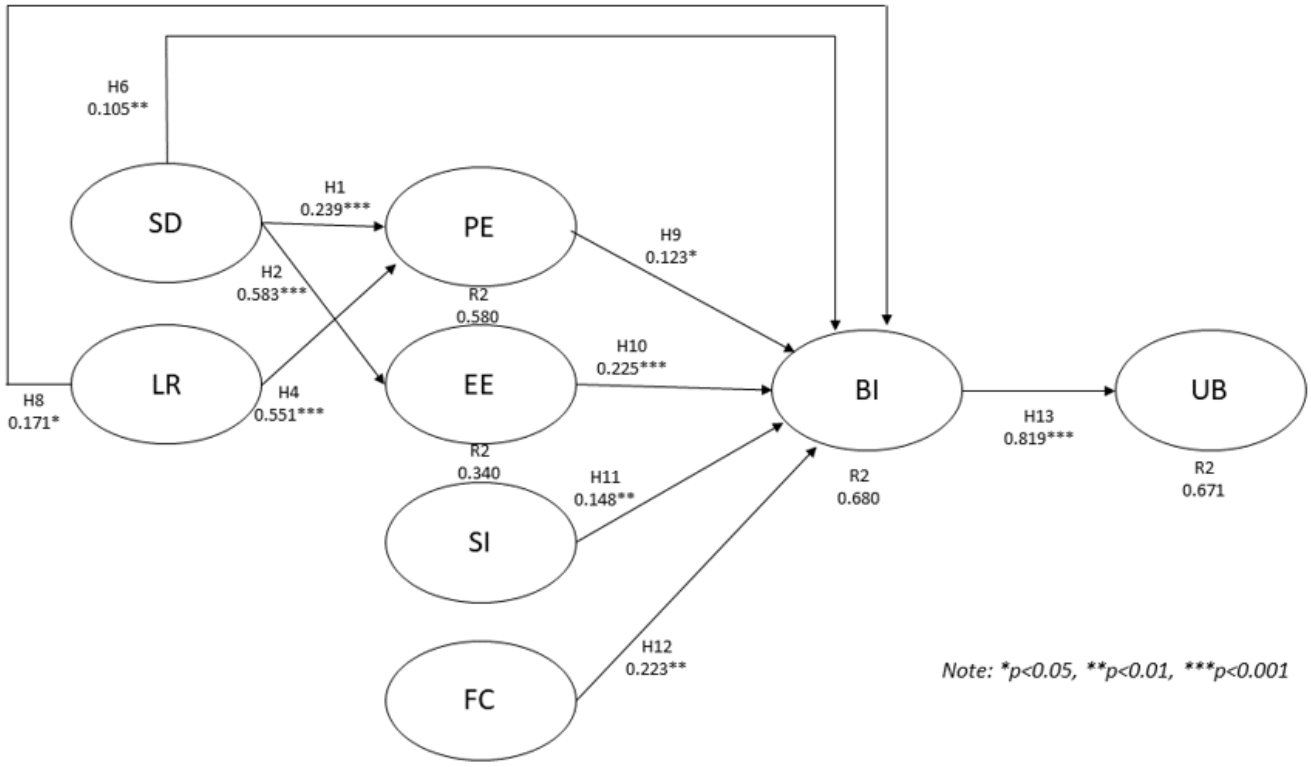

FIGURE 3. Result of the structural model.

$t = 2.097$, $p < 0.01$), performance expectancy ($\beta = 0.123$, $t = 2.07$, $p < 0.01$), effort expectancy ($\beta = 0.225$, $t = 3.372$, $p < 0.01$), social influence ($\beta = 0.148$, $t = 2.999$, $p < 0.01$) and facilitating condition ($\beta = 0.223$, $t = 2.273$, $p < 0.01$) showed significant effects. Thus, H6, H8, H9, H10, H11 and H12 are accepted. Amongst the factors influencing performance expectancy, learning readiness ($\beta = 0.551$, $t = 8.687$, $p < 0.01$) and self-directed ($\beta = 0.239$, $t = 4.333$, $p < 0.01$) were consistent with H4 and H1, showing a significant path. By contrast, self-directed ($\beta = 0.583$, $t = 15.884$, $p < 0.01$) showed the greatest effect towards effort expectancy. Thus, H2 is accepted. However, prior mobile learning experience ($\beta = 0.005$, $t = 0.096$, $p > 0.05$) for H3 and prior mobile learning experience ($\beta = -0.006$, $t = 0.211$, $p > 0.05$) for H7 were rejected because there were no significant effects towards behavioural intention and performance expectancy. Similarly, orientation to learning ($\beta = 0.048$, $t = 0.728$, $p > 0.05$ indicated no significant effect in this context, whilst behavioural intention ($\beta = 0.819$, $p < 0.01$) appeared to pose the greatest effect towards usage behaviour. Therefore, all paths, except H3, H5 and H7, are supported. The positive influence's t-values for the measurement and structural model estimation are shown in Figure 3.

Based on the mediation analysis result as depicted in Table 9 below, it can be concluded that H1, H2, H3, H4, H7, H10, H11, H12 are significant at a t-value > 1.96 and p-value < 0.05. The bootstrapping analysis shows that the indirect effect, $\beta = 0.184$, $\beta = 0.183$, $\beta = 0.068$, $\beta = 0.196$, $\beta = 0.101$, $\beta = 0.161$, $\beta = 0.218$ and $\beta = 0.121$ are significant with t-values of 3.303, 2.331, 2.039, 3.235, 2.083, 4.192, 4.482 and 2.939, respectively. The indirect effects 95% Boot CI Bias Corrected [LL = 0.068, UL = 0.287], [LL = 0.041, UL = 0.335], [LL = 0.005, UL = 0.137], [LL = 0.067, UL = 0.303], [LL = 0.002, UL = 0.193], [LL = 0.084, UL = 0.234], [LL = 0.112, UL = 0.302], [LL = 0.038, UL = 0.2], do not overlap 0 in between, indicating there is mediation.

To drive formal part-time learners' acceptance towards m-learning, the four elements of UTAUT should be emphasized, as well as the two attributes of adult learners' characteristics suggested in the acceptance framework (i.e., self-directed and learning readiness). The findings indicated that formal part-time learners display a high likelihood of accepting m-learning if its implementation will buttress their learning experience. Additionally, these learners' decision to accept m-learning is heavily impacted by the medium's capacity for allowing their sense of achievement regarding personal fulfillment and pleasant experience, particularly in technology usage. Features used to support learning should synchronize with formal part-time learners' requirements and needs. It should be able to enable them to manage learning processes despite limitations posed by curriculum design and resources obtained via their teachers [23]. Overall, the results contrasted with those of previous

TABLE 9. Hypothesis testing mediation.

Hypotheses	Relationships	Std. Beta	Std. Error	t-value	Confidence Interval (BC)		Decisions
					LL	UL	
Ha_1	Self-directed -> Performance Expectancy -> Behavioural Intention	0.161	0.038	4.192**	0.084	0.234	Supported
Ha_2	Self-directed -> Effort Expectancy -> Behavioural Intention	0.005	0.008	0.632**	−0.007	0.024	Not Supported
Hb_1	Prior Experience -> Performance Expectancy -> Behavioural Intention	0.001	0.008	0.082**	−0.017	0.015	Not Supported
Hc_1	Learning Readiness -> Performance Expectancy -> Behavioural Intention	0.068	0.033	2.039**	0.005	0.137	Supported
Hd_1	Orientation to Learning -> Performance Expectancy -> Behavioural Intention	0.006	0.009	0.633**	-0.009	0.030	Not Supported
Ha_3	Self-directed -> Behavioural Intention -> Usage Behaviour	0.218	0.049	4.482**	0.112	0.302	Supported
Hb_2	Prior Experience -> Behavioural Intention -> Usage Behaviour	-0.005	0.024	0.189**	-0.058	0.039	Not Supported
Hc_2	Learning Readiness -> Behavioural Intention -> Usage Behaviour	0.196	0.061	3.235**	0.067	0.303	Supported
He_1	Performance Expectancy -> Behavioural Intention -> Usage Behaviour	0.101	0.049	2.083**	0.002	0.193	Supported
Hf_1	Effort Expectancy -> Behavioural Intention -> Usage Behaviour	0.184	0.056	3.303**	0.068	0.287	Supported
Hg_1	Social Influence -> Behavioural Intention -> Usage Behaviour	0.121	0.041	2.939**	0.038	0.200	Supported
Hh_1	Facilitating Condition -> Behavioural Intention -> Usage Behaviour	0.183	0.078	2.331**	0.041	0.335	Supported

studies [35] and [37], which rejected the hypothesis of prior experience and orientation to learning.

D. DATA ANALYSIS FOR OPEN-ENDED QUESTION

Responses to the open-ended question were categorized into six themes: infrastructure, accessibility, mobility, good skill, information availability, and peers. These theme were based on the keywords of participants' answers. Of the 394 participants who completed this questionnaire, 23.6% indicated information availability, such as up-to-date information and sharing information in multiple types of medium (e.g., YouTube, blogs, websites), is the factor that influences them to learn best whilst using their mobile devices. Accessibility that enables easy access and user-friendly application showed that 21.3% considered learners to learn best. A minority of the participants (3.4%) answered that the peer's factor influenced them to learn best, whilst others (13.5%) did not respond.

VI. CONCLUSION AND IMPLICATIONS

The findings indicated that formal part-time learners' and acceptance attributes posed a significant impact on their behavioral intention to use m-learning. Factors of adult learners' principles were considered whilst examining the attributes of acceptance, in which the survey was conducted amongst 394 respondents from five public universities in Malaysia. Statistical analysis was conducted to assess the presence of any significant difference amongst formal part-time learners attributes toward m-learning acceptance. The results revealed that 96.7% of the respondents had high intentions to use m-learning, whilst the remainder refused to use m-learning in assisting their learning This study sufficiently highlighted the formal part-time learners' attributes towards the use of m- learning in public universities. The main contribution of this research would aid in exploring formal part-time learners' attributes, which would support m-learning practitioners in designing the required applications. In practical contexts, this study offered practitioners potential m-learning related exercises.

Therefore, the two implications proposed would be beneficial for facilitating and achieving these goals.

A. EDUCATIONAL PRACTICE

The proposed adoption framework of acceptance elucidated a set of attributes impacting formal part-time learners' use of m-learning. Therefore, institutional decision-makers may mold these factors to further position learners' participation and use of m-learning. To integrate formal part-time learners' attributes into acceptance attributes in measuring m-learning usage behaviour, predictions for behavioral intention towards m-learning could be obtained using various variables. Hence, the results may aid academicians and developers alike by providing beneficial insights for their decision-making processes, particularly the particular class of features to be aimed at improving m-learning acceptance.

Attributes impacting m-learning acceptance should be enumerated satisfactorily to enable formal part-time learners to be guided in participating and utilizing m-learning activities. The significant results for self-directed [23] and

learning readiness [28] relationships with behavioral intention and performance expectancy, as well as effort expectancy, successfully emphasized that formal part-time learners' are expected to use m-learning as a tool in receiving relevant study achievements. Thus, educators and developers should strategize with learners' learning experience. In this respect, suitable m-learning functions to facilitate m-learning usage could be consulted. As their familiarity with the mobile environments progressively improved, their courses could be assimilated with significantly advanced m-learning strategies (e.g. searching, organising, sharing and collaborating), such as providing m-learning with a structured and organised orientation and interactive, self-directed function [53]. The belief is that a structured m-learning with a clear learning guide will benefit all academic practitioners [34]. Thus, educators and developers may think of applying optional functions into m-learning to first establish the sense of learners' acceptance that enables them to learn at their own pace.

Another noteworthy fact is that despite experience and problem-based learning being the main characteristics of adult behavior, a contrasting effect is considered in the scope of formal part-time learners' behavior. As indicated in the UTAUT model, the experience was the moderator instead of being the main determinant of behavioral intention. It proves that prior mobile learning experience did not influence the usage of m-learning, although having an experience may help them to make the decision to use m-learning [11]. Moreover, [54] showed the outcome of their study to the fact that mobile users, regardless of their years of experience, are technologically knowledgeable and ready to use m-learning systems in their classrooms, despite the fact that no significant differences were found.

Data obtained using the open-ended responses indicated persistent learners' worries about content accessibility and readability. This situation can be facilitated by high-speed Internet access and information readiness for retrieval at any time. Thus, learners are assisted in managing their hectic lifestyle and are still learning at their own pace.

Additionally, findings underscoring the significance of self-directed learning and learners' readiness suggest that practitioners to utilize the capacity of the m-learning function to improve learners' perception of m-learning. The provision of various opportunities for learning the multitude of mobile technology functions should be applied for the purpose of learning. Additionally, m-learning platforms should be provided with multiple sources so that they can be retrieved in numerous ways.

B. THEORETICAL IMPLICATIONS

In this study, the andragogical effect of m-learning through the acceptance framework may be appropriately leveraged. Researchers may find suitable attributes for integrating m-learning with formal part-time learners' learning preferences and subsequently and ingeniously match the unique attributes of m-learning to the specific andragogy challenges. Doing so will minimize the useless and flawed m-learning outcomes [26]. Meanwhile, self-directed has become the most frequently utilized strategy in m-learning, deserving considerable attention for the pairing between acceptance and formal part-time learners' attributes. Thus, an andragogical design orchestrated with m-learning acceptance will empower educational practitioners, with the acceptance attributes itself showing a significant relationship with behavioral intention. Additionally, the andragogical approach has suggested a new method of analysis and understanding of m-learning acceptance and usage within this context [26]. Therefore, the result is supportive of the UTAUT theory [19], whereas facilitating conditions towards behavioural intention also shows a significant relationship as well. This is highly recommended information indicating that even though mobile technology is solely developed for communication and social interaction, learners may continue to look forward to its capacity to serve as a beneficial tool for learning purposes [8].

From the results, formal part-time learners' behavior can be enhanced as follows: (1) providing adequate and reliable resources that synchronize with the learners' needs, (2) providing a selection of m-learning functions supported by m-learning applications, and (3) inviting them to participate during the planning and evaluation processes. Such suggestions are due to findings suggesting that formal part-time learners utilize mobile technology to obtain and exchange knowledge associated with their learning.

VII. LIMITATIONS AND FUTURE DIRECTIONS

This study was hindered by limitations because data were collected using a survey in five public universities only in Klang Valley. Consequently, the results were insufficient to be considered representative of the climate of formal part-time learners in private institutions in Malaysia. Therefore, future researchers should focus on a comparison between formal part-time learners in public and private institutions, which would reveal an appropriate balance between populations and the possibilities of further acceptance and use of m-learning.

The demographic information skewed towards a younger age group, with 79.2% of them below 35 years old. Although statistics from [55] underscored that numerous part-time learners in Malaysia are between 26 and 35 years, it cannot be considered a representative claim. Therefore, it cannot be subjected to generalization for other locations or different age groups. Future studies and endeavors are advocated to assess different age groups to elicit the potential difference for m-learning acceptance.

Although this survey was conducted in public universities, the current study may be disadvantaged by bias secondary to the context of Malaysia. Therefore, outcomes may be non-implementable for other emerging countries owing to cross-culture and technology infrastructure. This situation calls for future studies advocated to undertake cross-national research by emphasizing on formal part-time learners of different countries, thereby ensuring the strength and validity of the

acceptance framework. Moreover, exploring the older age groups of formal part-time learner groups can be conducted to determine the potential differences in m-learning acceptance.

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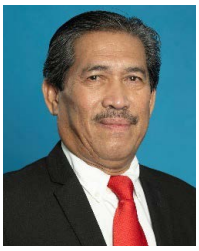

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