Students’ readiness for blended learning in a leading Malaysian private higher education institution

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Abstract

Purpose – Teaching and learning are being transformed by digital technology, where the present generation of students, termed millennials, are more adept with the increasingly digitalised world we live in. Following this, lecturers and institutions are adapting and adopting a blended learning model across disciplines, which now commands an entire domain of research and application. However, questions remain about how ready students are for a blended learning model of instruction. The purpose of this study is to investigate students’ readiness for blended learning in a leading Malaysian private higher education institution.

Design/methodology/approach – This study used a non-experimental quantitative research design. Data were gathered from a sample of 274 pre-university and undergraduate students using the blended learning readiness engagement questionnaire. Data was analysed using WINSTEPS Rasch model measurement software to determine the validity and reliability of the instrument. Descriptive statistics (mean and standard deviation) scores, (logit) value of the item and (logit) value of a person was used to examine students’ readiness for a blended learning model of instruction and specifically assess their readiness based on gender, age, ethnicity and field of study.

Findings – Findings indicate that students were ready for blended learning. Further analysis indicated there were differences in students’ readiness for blended learning based on gender, age, ethnicity and field of study.

Originality/value – This study provides insight into students’ readiness towards blended learning in a leading Malaysian private higher education institution, discusses implications for blended learning practices and offers recommendations for future research.

Keywords Blended learning, Readiness, Private higher education institution, Rasch model

Paper type Research paper

Introduction

Teaching and learning have undergone several innovations in recent years, some of these involve the adoption of educational technologies in many higher education institutions around the world (Keržić et al., 2019; Kintu et al., 2017; Tayebinik and Puteh, 2012). COVID-
19 has challenged higher education institutions to rethink and execute radical new approaches to teaching and learning. The widespread global pandemic has presented challenges that drastically changed the way higher education institutions operate today, necessitating the forced shift to e-learning and blended learning modes as opposed to traditional classes. As we head towards the new normal in the foreseeable future, students need to adapt to this change, both in ways of learning and the assessment process. Therefore, knowing students’ readiness for the “new normal” is a must.

Blended learning is now widely adopted across higher education institutions with some scholars referring to it as the “new norm” in course delivery (Adams et al., 2020; Dziuban et al., 2018; Evans et al., 2020). The term “blended learning” itself has broad and complex interpretations (Evans et al., 2020) and has always been ill-defined or defined in many ways (Graham, 2013). According to Graham (2013), blended learning is a fusion of face-to-face, real-time learning and the use of online digital resources. It provides students flexibility in time, space and effortless access to learning resources as they take charge of their learning (Ellaway and Masters, 2008). It can also cater to students’ needs to pursue further studies through distance learning and institutional goals in creating a unique learning experience for their students (Lim and Morris, 2009). Thus, Graham et al. (2014) proposed that “flexibility in definitions be the norm”. Therefore, in this article, we refer to blended learning as a fluid continuum of face-to-face and online and not to any particular mix or formula of modes or technologies.

Consequently, lecturers in higher education institutions begun implementing a blended learning model of instruction in the hope that its delivery methods would enhance students’ learning outcomes (Lim and Morris, 2009). However, there is a growing concern on its application on both students, lecturers and institutions. Some students lack computer literacy skills and motivation (Garrison and Anderson, 2003), some students struggle to adapt from traditional to virtual classrooms (Sanchez-Gordon and Luján-Mora, 2018), institutions may lack high-speed internet connections (Panyajamorn et al., 2018) and lecturers may find it difficult to operate the learning management system (Islam, 2014).

Furthermore, limited studies have assessed students’ readiness for blended learning, especially in the Malaysian context. Recent findings in a Malaysian public higher education institution suggest students were ready for blended learning but there were differences in their readiness based on gender, age, ethnicity, the field of study and level of education (Adams et al., 2018). Questions still remain on students’ readiness for a blended learning model of instruction in the private higher education context.

Therefore, the purpose of this study is to investigate students’ readiness for blended learning in a leading Malaysian private higher education institution. This research offers insights to Malaysian policymakers, scholars, course administrators and university lecturers on how they could support initiatives of the Malaysian Ministry of Higher Education under the Malaysian Education Blueprint 2015–2025 (Higher Education) in the use of Blended Learning as a staple pedagogical approach requiring up to 70% of a university course to use blended learning models by 2025. The study also contributes to the growing body of literature on students’ readiness for blended learning both globally (Anene et al., 2014; Chu and Tsai, 2009; George et al., 2014; Hussein, 2010; Rasouli et al., 2016; Mosadeq et al., 2011) and in Malaysia (Kaur, 2014; Adams et al., 2018). The following section provides a literature review on blended learning in higher education institutions and students’ readiness for blended learning. Subsequently, the research questions are discussed. This is followed by the methodology, results, discussion and finally, the conclusion.
Literature review

Blended learning in higher education

As defined earlier, blended learning integrates online teaching and learning with face-to-face instruction (Graham, 2013). Research on blended learning has increased over the past decade, with much of the work focussed in tertiary education contexts (Halverson et al., 2012) due to its transformative potential in education (Graham and Robison, 2007).

However, how blended learning is impacting the teaching and learning environment is a constant question in the minds of educators. Generally, research has found that blended learning results in an improvement in student success and satisfaction (Dziuban and Moskal, 2011; Means et al., 2013), as well as an improvement in students’ sense of community, compared to face-to-face courses (Rovai and Jordan, 2004).

Educators agree that blended learning promotes continuity in learning which translates into better grades amongst students, and successfully impacts overall gain in skills and knowledge (Adams et al., 2020; Lewin et al., 2009; Rowe et al., 2012). Online exercises were also found to enhance subsequent face-to-face discussions (De Leng et al., 2006). Consequently, blended learning may even emerge as a predominant model of the future and become far more common than e-learning or face-to-face instruction alone (Watson, 2008).

In line with these educational developments, one of the main initiatives of the Malaysian Ministry of Education under the Malaysian Education Blueprint 2015–2025 (Higher Education) is the use of blended learning as a conduit for transforming existing pedagogy. It boldly states that blended learning models will become a staple pedagogical approach in all higher learning institutions. Key initiatives include making online learning an integral component of higher education and lifelong learning, requiring up to 70% of programmes to use blended learning models (Ministry of Higher Education, 2015).

Lending their support to the Ministry’s initiatives, Malaysian higher education institutions are now required to integrate learning management systems (LMS) in their courses and face-to-face instruction, creating a “blended learning” environment for their students (Tayebinik and Puteh, 2012). The LMS software is a popular approach for planning, delivering and managing blended learning models of instruction in higher education institutions (Martinez and Jagannathan, 2012). LMS, such as Moodle and Blackboard provide tools to enable communications between lecturers and students online, track student activities, such as assignment submissions, discussion management, group work and other administrative tools (Pellas and Kazandis, 2015). Embi et al. (2011) reported that the most widely used LMS components in all Malaysian higher education institutions are communications, followed by course delivery, productivity, content development and administration.

However, the conventional LMS approach is limited by its focus on course delivery and management. Only a few LMS has added features that encouraged students’ involvement in a social media platform. One such LMS is Course Networking. Course Networking not only supports course management but it also generates new learning opportunities with social networking as the foundation for learning, to which the millennials, in particular, are accustomed. This leads to socially-mediated learning that is rewarding, engaging and entertaining (Jafari and Baylor, 2012).

The use of social media was recommended by educators and students alike to facilitate interactions (Salim et al., 2018). Social media platforms such as Facebook Live, YouTube, Messenger, etc. have increasingly been integrated into the higher education learning experience and have been shown to stimulate student’s engagement and collaborative work (Rigby et al., 2012). Studies show that frequent interaction and communication increase students’ motivation (De Leng et al., 2006; Rowe et al., 2012; Sun et al., 2008).
Initial research into blended learning focussed on defining the term and identifying the benefits and challenges it offers. As the research field matured, the focus of research moved to student learning outcomes, the interaction in these environments and student perceptions and experiences (Drysdale et al., 2013). Drysdale et al. (2013) suggested that research on the readiness for blended learning from the students’ point of view is a way to evaluate the success and effectiveness of blended learning. Baldwin-Evans (2006), in the same vein, supported the idea that, prior to even considering the full implementation of the blended learning model of instruction, assessing students’ readiness was of utmost importance.

**Students’ readiness for blended learning**

Students’ readiness is a powerful factor in implementing blended learning successfully (Rasouli et al., 2016; Mosadegh et al., 2011). Readiness can be studied by assessing students’ knowledge (George et al., 2014), technology skills (Seraji and Yarmohammadi, 2010; George et al., 2014; Rasouli et al., 2016), technology availability (Anene et al., 2014; Rasouli et al., 2016; Seraji, 2013), self-directed learning (Chu and Tsai, 2009; Kaur, 2014), computer and internet efficacy (Seraji, 2013; Kumar, 2017) and attitude (Hussein, 2010; George et al., 2014; El-Gayar et al., 2011; Kumar, 2017).

However, there are a few concerns as the venture into blended learning intensifies. The combination of both e-learning and the face-to-face learning environments may, in some circumstances result in student disengagement. Students might struggle in adapting to this initiative as they now must lead their own learning process (Vaughan, 2007). Some students who may lack internet access or have WI-FI problems in their homes may find it difficult to adjust to the online course structure (Tayebinik and Puteh, 2012).

While there are concerns about student readiness for blended learning, the benefits and advantages may outweigh these concerns (Heidi and Neo, 2015; Doiron and Asselin, 2011; Azizan, 2010). Findings by Lopez-Perez et al. (2011) showed that tertiary level students seemed to prefer some kind of online learning as a complement to traditional modes of classroom teaching. A study amongst Southeast Asian students showed that they were favourable for blended learning because of the opportunity to prepare their answers to the questions given by the lecturer prior to the actual face-to-face class time (Park, 2000). This is compatible with the insight that most Asian students tend to be nonverbal in class and rarely volunteer or initiate discussions (Ngo and Lee, 2007; Marambe et al., 2012).

While blended learning creates flexible learning for students, the aspects which enable them to experience maximum benefits still need to be studied to determine students’ blended learning experience (Shahnaz and Hussain, 2016). For example, Yukselturk and Bulut (2007) focussed on gender, age, motivational beliefs and self-regulated learning. Rhee et al. (2007) focussed on technological readiness. Abbas et al. (2011) explored the roles of technical infrastructure, organisational factors (organisational rules and culture) and social readiness factors (governmental rules and administrative instructions).

While much is now known about blended learning, there is still a lack of research and rich descriptions of students’ readiness towards this new learning environment in Malaysia. To date, only one notable study by Adams et al. (2018) was found. Their findings suggest students were ready for blended learning and had the required technological skills, but there were differences in their readiness based on gender, age, ethnicity, the field of study and level of education. Park (2009) suggested that higher education institutions need to assess their students’ readiness for blended learning for them to successfully embrace the blended learning environment.

Harris et al. (2009) further reiterated this importance by highlighting the perspectives of students as the most vital component. By reviewing the literature, students’ readiness for
blended learning can be categorised into six main factors, namely, technology skills; technology usage; technology availability; self-directed learning; computer and internet efficacy and students’ attitude towards blended learning. Therefore, this study aims to investigate students’ readiness for a blended learning model of instruction, and specifically assess their readiness based on gender, age, ethnicity and field of study.

**Research questions**
Following the discussion on blended learning in higher education institutions, and students’ readiness for blended learning, two research questions guide this paper:

*RQ1.* What is the students’ readiness for blended learning in a leading Malaysian private higher education institution?

*RQ2.* What is the students’ readiness for blended learning based on gender, age, ethnicity and field of study in a leading Malaysian private higher education institution?

**Methodology**

**Instrumentation**
This study used a cross-sectional quantitative survey method. The *Blended Learning Readiness Engagement Questionnaire (BLREQ)®* was developed to gauge students’ readiness for blended learning in a private higher education institution in Kuala Lumpur, Malaysia. The BLREQ contained four basic demographic questions (i.e. age, gender, ethnicity and field of study), and 41 items in six dimensions, which addressed various aspects of students’ readiness for blended learning.

The six dimensions, along with the respective number of items in the questionnaire are as follows: technology skills (11 items), technology usage (8 items), technology availability (4 items), self-directed learning (6 items), computer and internet efficacy (8 items) and attitude (4 items). The questionnaire was developed with close-ended questions to get the relevant data or information pertaining to the study. According to Curley *et al.* (2002), the close-ended questions will force participants to a quick response, produce the score quickly and will expedite the evaluation later. A 4-point Likert-type scale ranging from strongly disagree (1) to strongly agree (4) was provided as response options for all the items.

**Participants**
There were 289 students selected from various fields of study from a private higher education institution in Kuala Lumpur, Malaysia. Convenience sampling technique was used, where students were administered an online survey via the university’s student mailing list. The study was conducted in May 2019. In regard to ethical consideration, the students’ consent to take part in this study was sought first before they filled in the questionnaire. At the front cover of the questionnaire, it was stated that the students are given the choice either to take part in the survey or otherwise. Participation was strictly voluntary and anonymous. Thus, by completing the questionnaire, the students have given their consent.

All collected data was input into a Microsoft Excel file, checked by a Rasch measurement model software named WINSTEPS version 3.73, for data validation and cleaning. There was no respondent who provided outlier responses (either all maximum ratings or minimum ratings). Next, data cleaning was performed to identify respondents’ consistency in answering and is there is no aberrant response (Widhiarso and Sumintono, 2016). We
detected few misfit responses as their outfit mean-square value was more than 1.5; thus, 15 students’ response was omitted as their responses differed from the rest (misfit person). Finally, 274 students’ response was analysed. There was no missing data. The demographic profile of the students is indicated in Table 1.

*Validity and reliability of the instrument*

We first reviewed the six dimensions with its items in terms of the suitability and comprehensibility for the Malaysian context. The panel consists of three lecturers in the field of distance learning and e-learning from three local universities, two researchers in the current study and 10 undergraduate and postgraduate students. The panel agreed that the six dimensions along with its items are found relevant to the Malaysian university context with minor changes made on several items. For example, to avoid double-barreled expressions, the panel suggested replacing the term “and” with “or” in the items.

WINSTEPS version 3.73 was used to determine the validity and reliability of the instrument. Through its calibration of item difficulties and person abilities, the WINSTEPS software mathematically transformed raw ordinal data (Likert-type data), based on the frequency of response which appeared as probability, to become logit (log odd unit) via the logarithm function (Boone et al., 2014; Sumintono and Widhiarso, 2014). A two-facet (person and item) rating scale model was constructed for 41 blended learning readiness items and 274 respondents using the Rasch Model approach to identify responses based on students’ demographic profile (i.e. gender, age, ethnicity and field of study). The items were centred at zero, which allowed the person to “float” and calibrate their blended learning readiness level.

Table 2 displays the internal reliability scores of the instrument. These scores refer to the fit statistics or the reliability indices reported in logit measures that determine the overall quality of the BLREQ and the psychometric properties of the instrument.

The Person Reliability index (0.93) indicates that the consistency of person responses was “very good” (Sumintono and Widhiarso, 2014). The same logic of interpretation applies to the Item Reliability measures of 0.99, which is also classified as “very good” (Sumintono

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>83</td>
<td>30.29</td>
</tr>
<tr>
<td>Female</td>
<td>191</td>
<td>69.71</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 20 years</td>
<td>168</td>
<td>61.31</td>
</tr>
<tr>
<td>20–29 years old</td>
<td>103</td>
<td>37.59</td>
</tr>
<tr>
<td>More than 29 years</td>
<td>3</td>
<td>1.10</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>10</td>
<td>3.65</td>
</tr>
<tr>
<td>Chinese</td>
<td>221</td>
<td>80.66</td>
</tr>
<tr>
<td>Indian</td>
<td>8</td>
<td>2.92</td>
</tr>
<tr>
<td>Sabah-Sarawak</td>
<td>7</td>
<td>2.55</td>
</tr>
<tr>
<td>International students</td>
<td>28</td>
<td>10.22</td>
</tr>
<tr>
<td>Field of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social sciences</td>
<td>199</td>
<td>72.62</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>68</td>
<td>24.82</td>
</tr>
<tr>
<td>Engineering</td>
<td>7</td>
<td>2.56</td>
</tr>
</tbody>
</table>

Table 1. Demographic data of students (N = 274)
and Widhiarso, 2014). This suggests that the reliability of both items and the person is very high. The value of the Cronbach Alpha coefficient (0.95), according to the Rasch Model computation, described the interaction between the 274 persons and the 41 items also in the criteria as “very good”. This score suggests that there was a high level of interaction between the persons and items. An instrument having “very good” psychometric internal consistency is considered a highly reliable instrument (Bond and Fox, 2015). As such, the BLREQ may be regarded as a reliable instrument for use with different groups of respondents.

The BLREQ instrument had a good unidimensionality measure (44.7%), where the index of raw variance was above the standard of 40% (Fisher, 2007). This means that the instrument can effectively measure students’ blended learning readiness. Furthermore, the outfit mean-square statistics for both person and item is close to 1.0, this supported with a significant level of chi-square score shows that the data fits the model (Engelhard, 2013; Boone et al., 2014). Additionally, rating scale analysis (Appendix) informed that the four rating scale given to students, from strongly agree to strongly disagree, was easily understood with a threshold rating scale of 1.4 to 5.0 (Fisher, 2007).

**Person and item separation index**

Person Separation index is an estimate of how well the BLREQ can distinguish between “person abilities” in terms of the latent trait. The bigger the separation index, the more likely the respondents are reliable that respond correctly to the items. On the other hand, the item separation index indicates how widespread the items are in defining both the easy and difficult items (Boone et al., 2014). The wider the spread, the better the fit which has to be equal or more than three (Fisher, 2007). In this study, the Person Separation index (3.77) and the Item Separation index (8.76), as shown in Table 2, clearly indicate the BLREQ’s good spread across the range of respondents and items. These criteria endorse the BLREQ as a fit and reliable instrument for identifying students’ readiness for blended learning.

**Data analysis using the Rasch measurement model**

In particular, the rating scale Rasch Model is suitable for measuring the latent trait, which assesses human opinion/perception/attitude (Engelhard, 2013; Bond and Fox, 2015). Using Rasch analysis, the result can explain item difficulty level with precise measurement (item calibration), detect item fit and measuring respondent’s knowledge creation level (Linacre, 2012).

<table>
<thead>
<tr>
<th>Psychometric properties</th>
<th>Person</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>274</td>
<td>41</td>
</tr>
<tr>
<td>Outfit mean square</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>SD</td>
<td>0.49</td>
<td>0.59</td>
</tr>
<tr>
<td>Separation</td>
<td>3.77</td>
<td>8.76</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.93</td>
<td>0.99</td>
</tr>
<tr>
<td>Alpha Cronbach</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Chi-square (χ²)</td>
<td>16,523**</td>
<td></td>
</tr>
<tr>
<td>Raw variance explain by measure</td>
<td>44.7%</td>
<td></td>
</tr>
</tbody>
</table>

*Note: **p < 0.01*
Furthermore, the respondent’s analysis using this measurement model provides a better and more accurate result that will be helpful to obtain its consistency response to the questionnaire (person fit statistics). The logarithm function is used to produce measurements with the same equal-interval scale. Then a measurement model was calibrated by the process of conjoint-measurement to determine the relationship between the item difficulty level and personability using the same unit-scale called logit (logarithm odd unit).

WINSTEPS version 3.73 was used to examine students’ readiness for a blended learning model of instruction, and specifically assess their readiness based on gender, age, ethnicity and field of study using descriptive statistics (mean and standard deviation) scores, (logit) value of the item and (logit) value of a person. The mean score was in the form of a logit scale rather than a Likert-scale, which was transformed from the raw data score. Therefore, if the person logit is positive, the person’s perceived readiness for blended learning is higher than the average required for 41 items. If the person logit is negative, the person’s perceived readiness for blended learning is less than the required average for 41 items. Higher logit scores indicate a higher level of students’ readiness for blended learning.

**Results**

*RQ1.* What is the students’ readiness for blended learning in a leading Malaysian private higher education institution?

Firstly, students’ readiness for blended learning was analysed. Findings in Table 3 show the mean measure (logit) value of the person was 1.85 logit. This indicates all students were ready for a blended learning model of instruction. A standard deviation of 1.42 indicates a very wide dispersion of students’ blended learning readiness levels. As for the mean measure (logit) value of the item, the mean is 0.00 logit and the standard deviation is 1.11. This suggests a wide dispersion of measures across the logit scale in item difficulty level.

Table 4 classifies the items according to their item difficulty level or (logit) value of the item. The classification of the items into four difficulty levels was done by dividing the distribution of the item logit score based on mean and standard deviation values. There were 8 items (20%) in the very difficult category (LVI > 1.11 logit); 11 items (27%) in the difficult category (+0.11 \geq LVI \geq 0.00); 15 items (36%) in the easy category (0.00 \geq LVI \geq -1.11); and 7 items (17%) in the very easy category (LVI < -1.11 logit) as rated by the students.

Overall, students rated the technology skills dimension in the easy and very easy category, where 9 out of 11 items fell into these two categories. This shows students do not face much problem in terms of technology skills. This is hardly surprising as the majority of the students are millennials.

<table>
<thead>
<tr>
<th>Descriptive statistics</th>
<th>Person</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>274</td>
<td>41</td>
</tr>
<tr>
<td><strong>Measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.85</td>
<td>0.00</td>
</tr>
<tr>
<td>SD</td>
<td>1.42</td>
<td>1.11</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.09</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Table 3. Results of students’ readiness for blended learning
As for the dimensions of technology usage and technology available, there is a more even spread of items between the categories of very difficult and very easy. Interestingly, for the technology usage dimension, two items were rated as very difficult by the students (RTU2, *I often use e-mail to communicate*; and RTU7, *I often use learning management systems e.g. Blackboard, Moodle, Course Networking*). These two items are closely related to blended learning; however, they are not used very often by the students. Items RTU1 (*I often use the internet to find information*), RTU5 (*I often use instant messaging e.g. WhatsApp, Viber, WeChat, Line, Telegram*) and RTU8 (*I often use mobile technologies e.g. Smartphone, Tablet, to communicate*) were rated in the very easy category which shows the preferred form of finding information, learning and communication by the students.

In the technology availability dimension, Item RTA3 (*I have speakers for courses with video presentations*) was rated very difficult by the students. This indicates limited exposure or experience of using external speakers in their learning. It is worth noting that students rated item RTA1 (*I have a computer/laptop with an internet connection*) in the very easy category which shows they have the equipment and internet connectivity for blended learning.

The next two dimensions of self-directed learning and computer and internet efficacy were rated mostly in the very difficult and difficult categories by the students. In total, 4 out of 6 items fell into these categories for the self-directed learning dimension meanwhile 5 out of 8 items fell into these categories for the computer and internet efficacy dimension. As for the self-directed learning dimension, Items RSDL3 (*I do not need direct lectures to understand materials*) and RSDL5 (*I am not distracted by other online activities when learning online e.g. Facebook, Gaming, Internet surfing*) indicate two interesting findings from the students. The response shows that students still prefer traditional face to face lectures as they do get distracted with online activities when learning online.

In the computer and internet efficacy dimension, students indicated their major challenges while interacting in their university’s blended and online learning environment where items RCIE2 (*I feel confident in expressing myself e.g. emotions and humour in my university’s learning management systems e.g. Blackboard, Moodle, Course Networking*) and item RCIE3 (*I feel confident in posting questions in online discussions*) were rated as very difficult by the students.

Finally, for the attitude dimension, students seem to have an overall negative attitude towards blended learning in the university. Students rated item RAT3 (*I find using Blended Learning technologies simple*) in the very difficult category which shows they are probably

<table>
<thead>
<tr>
<th>Construct/dimension</th>
<th>Very difficult</th>
<th>Difficult</th>
<th>Easy</th>
<th>Very easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology skills</td>
<td></td>
<td>RTS7, RTS10</td>
<td>RTS8, RTS11, RTS9, RTS2, RTS6, RTS5, RTS4</td>
<td>RTS1, RTS3, RTS4</td>
</tr>
<tr>
<td>Technology usage</td>
<td>RTU2, RTU7</td>
<td>RTU6</td>
<td>RTU4, RTU3</td>
<td>RTU1, RTU5, RTU8</td>
</tr>
<tr>
<td>Technology availability</td>
<td>RTA3</td>
<td></td>
<td>RTA2, RTA4, RSDL6, RSDL2</td>
<td>RSDL5, RSDL7</td>
</tr>
<tr>
<td>Self-directed learning</td>
<td>RSDL5, RSDL3</td>
<td>RSDL1, RSDL4</td>
<td>RSDL6, RSDL2</td>
<td>RSDL5, RSDL7</td>
</tr>
<tr>
<td>Computer and internet efficacy</td>
<td>RCIE3, RCIE2</td>
<td>RCIE4, RCIE5, RCIE6</td>
<td>RCIE7, RCIE8, RCIE9</td>
<td>–</td>
</tr>
<tr>
<td>Attitude</td>
<td>RAT3</td>
<td>RAT2, RAT4, RAT1</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Table 4. Blended learning readiness engagement item calibration
not familiar with the various blended learning technologies, its usability and functionality for their learning.

**Figure 1** is an item–person map of the study, where 274 respondents answered to 41 The *Blended Learning Readiness Engagement Questionnaire (BLREQ)* items. On the right side of the map shown is each item’s level of difficulty, ranging from “very easy” to agree by the respondents in the bottom right (logit score $-2.05$ of item RTU1) to “very difficult” to agree on the top right (logit score $+2.38$ of item RSDL5). The items in the instrument work well and are capable of separating respondents’ blended learning readiness, with the unidimensionality of the raw variance index is 44.7% as shown in Table 2.

The left-hand side shows the distribution of students’ responses according to their logit score, ranging from very ready of blended learning on the top-left (logit score $> +5.52$) to the not ready low level of blended learning in the bottom left (logit score $<-1.47$). The respondent’s distribution of the person logit score is divided into four categories based on mean and standard deviation values, from very ready of blended learning at the top-left to not ready level at the bottom-left (as shown in Figures 2 and 3).

**RQ2.** What is the students’ readiness for blended learning based on gender, age, ethnicity and field of study in a leading Malaysian private higher education institution?

Findings for RQ2 are shown in Table 5. Students’ readiness for blended learning according to their demographics such as gender, age, ethnicity and field of study were categorised into four levels of readiness (very ready to not ready) using (logit) value of a person.

Analysis of students’ gender found only 21 out of 83 male students (25%) and 29 out of 191 female students (15%) were very ready for blended learning. Most male students, 34
students (41%) and female students, 85 students (45%) were only moderately ready for blended learning. Figure 2 shows those female and male students nearly the same in the category of very ready and ready level, but more than half of them were in the moderate and not ready for blended learning style.

Meanwhile, Figure 3 below indicating that relatively the same number of groups of students based on their age group to blended learning readiness. A closer look at the students’ age category found only 26 out of 168 students (15%) below 20 years old were very ready for blended learning. Students 20 to 29 years old fared a little better with 24 out of 103 students (23%) were very ready. In total, 67 students (40%) below 20 years old and 51 students (50%) between 20 to 29 years old were only moderately ready for blended learning.

In terms of students’ ethnicity, interesting results were found as well. Students from Sabah and Sarawak, Malay, Indian and International students, 36 out of 53 students (68%) were found to be more ready for blended learning as compared to Chinese students, 107 out of 221 students (48%) who were mostly moderately ready.

Finally, analysis of student’s field of the study found only 35 out of 199 students (18%) from social sciences, 12 out of 68 students (18%) from natural sciences were very ready for blended learning. Almost half the students from social sciences, 86 students (43%) were only

<table>
<thead>
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<th>Item - MAP - Person</th>
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<th>&lt;more&gt;</th>
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<td>6</td>
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<td>MMM</td>
</tr>
<tr>
<td>5</td>
<td>FF</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>MMM</td>
</tr>
<tr>
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<td>MMM</td>
</tr>
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<td>FFFFFF</td>
<td>MMM</td>
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</tr>
<tr>
<td>-2</td>
<td>FFFFFF</td>
<td>MMM</td>
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</table>

**Figure 2.** Rasch Wright person logit map of BLREQ based on gender.
Figure 3. Rasch Wright person logit map of BLREQ based on age

Table 5. Students blended learning readiness according to demographics
moderately ready for blended learning. Similar findings were found for students from natural sciences, with 30 students (44%) moderately ready.

Discussion
This study aimed to investigate students’ readiness for a blended learning model of instruction, and specifically assess their readiness based on gender, age, ethnicity and field of study. Firstly, the results of this study showed that students at this particular private higher education institution had the required technical skills and were mostly ready for a blended learning model of instruction. This finding is consistent with one other study by Adams et al. (2018) in a public higher education institution. The findings are hardly surprising as these students are millennials, of which they have been surrounded by technology all their lives and are used to and expect, relevant, engaging and interactive learning experiences.

Secondly, in the areas of technology usage, students find it difficult to use e-mails and the learning management system. These two items are closely related to blended learning, but they are not used very often by students. Students instead prefer instant messaging applications and mobile technologies as their preferred form for learning. Shraim and Khlaif (2010) in their findings reported 75% of students in their study were lacking in ICT and learning-based system skills due to insufficient exposure and experience. It is, therefore, pertinent that, as the use of blended learning applies high usage of learning management system, competence on its usage is necessary to avoid failure in applying e-learning and blended learning for learning effectiveness (Kintu et al., 2017; Mironova et al., 2016).

Thirdly, in terms of the technology available, it is worth highlighting that most students have the equipment such as computers or laptops and internet connectivity for blended learning. Students prefer blended classes compared to traditional classes if they have access to course materials online (Drysdale et al., 2013). Students need access to technological tools, software and the internet, which enables them to be interested in engaging in the blended learning model of instruction. This view was supported by Aboderin (2015), who revealed that the barriers affecting the implementation of blended learning in developing countries were internet connectivity, computer and software equipment. Universities should draw elaborate plans to enhance students’ readiness in terms of technology availability (Adams et al., 2018).

Interestingly, students rated self-directed learning as very difficult. This finding corroborates with the results of another study, where students rated average for self-directed learning (Rasouli et al., 2016). Although blended learning provides flexibility in time, space and effortless access to learning resources for students in their learning (Ellaway and Masters, 2008), Chu and Tsai (2009) describe self-directed learning as a process in which students make attempts to plan, manage and direct their learning online activities with their lecturers. The response shows that students still prefer guided traditional face to face lectures, as compared to a blended learning model of instruction. Lecturers play an important role in nurturing self-directed learners. As most of the students in this study are pre-university students undertaking foundation and diploma courses, it is imperative lecturers ensure students are competent to learn by themselves. Students need to be guided by what they have to learn and where to find the learning materials before they could start learning by themselves.

The results of this study also indicate students rated computer and internet efficacy skills as difficult for them. The main challenge stems from expressing their thoughts in the university’s learning management system and their confidence in posting questions in
online discussions. This finding matches the finding from a study by Lau and Shaikh (2012) who found that students’ computer and internet efficacy had a significant difference in students’ e-learning readiness. However, it is worth noting that, technology-enhanced learning has the potential to improve student’s internet efficacy skills and reflective thinking (Rowe et al., 2012).

Finally, for the attitude dimension, results show students seem to have an overall negative attitude towards blended learning in the university. This finding is consistent with a report by Oxford Group (2013), in which learners had a negative attitude to blended learning. As most of the students in this study are pre-university students, we assume they are probably unfamiliar with the various blended learning technologies, its usability and functionality for their learning. Students’ attitude towards blended learning can influence their decisions to continue online learning (Barreto et al., 2017) and are significant factors to student’s satisfaction and motivation (Kintu and Zhu, 2016). Lecturers could, perhaps, match their course instructional design with students’ competence in learning technologies while preparing them to advance to higher levels.

The findings of (logit) value of a person on students’ gender showed male students were more ready for blended learning than female students. This finding matches a study by Naresh et al. (2016), who also found male students were readier than women for technology in learning. It’s worth highlighting that many female students were only moderately ready for blended learning. This could possibly mean male students have more confidence in using technology for learning (Yau and Cheng, 2012) and were more excited to participate in online activities as compared to female students (Win and Wynn, 2015).

Findings on students’ age category revealed students in their 20s or older were more ready for blended learning as compared to students below 20 years old who were mostly moderately ready. This finding is similar to Adams et al. (2018) study who also found mature students were more independent and adaptable to blended learning as compared to other age groups, such as those below 20 years. However, other studies also found students’ readiness for blended learning is unhampered by age differences (Coldwell et al., 2008; Kintu et al., 2017). We, however, note that Coldwell et al. (2008) dealt with middle-aged students, those above 45 years old whereas this study dealt with students, the majority of whom were below and in their 20s.

In terms of students’ ethnicity, findings show students from Sabah and Sarawak, Malay, Indian and International students were found to be more ready for blended learning as compared to Chinese students who were mostly moderately ready. This is a new finding that can be used to supplement past studies that have also reported international students and other ethnicities were more ready for a blended learning model of instruction, whereas Chinese students were the least likely of all the ethnicities (Adams et al., 2018; Lau and Shaikh, 2012). In contrast, there exists another study that claims that students’ ethnicity did not have any influence on their e-learning readiness (Islam et al., 2011).

Finally, findings on the student’s field of the study show that almost half the students from social sciences and natural sciences were only moderately ready for blended learning. This finding is inconsistent with other studies (Rasouli et al., 2016; Lau and Shaikh, 2012) which reported that courses or fields of study did not have any influence on students’ readiness for blended learning. In contrast, Adams et al. (2018) reported that fields of study did have a significant difference in students’ readiness for blended learning. Social science students recommended blended learning as one of the alternatives to the traditional approach to instruction.
Conclusion

Overall findings of this study revealed students were ready for blended learning. However, further analysis indicates students were only moderately ready for blended learning based on their gender, age and field of study. In terms of students’ ethnicity, students from Sabah and Sarawak, Malay, Indian and International students were found to be more ready for blended learning as compared to Chinese students.

The implementation of blended learning in the teaching and learning process would “redefine higher education institutions as being learning-centred and facilitate a higher learning experience” (Garrison and Kanuka, 2004, p. 104). However, the readiness of students must be taken into consideration first. We might be heading towards implementation failure without first identifying student readiness, competence and needs (Adams et al., 2018, 2020; Kintu et al., 2017). Lecturers must know how to design courses that promote online learning while maintaining control. They are responsible for guiding learners from their preferred and comfortable learning styles to a greater self-directed style. Learning activities and facilitation strategies need to be devised according to students’ competence in learning technologies.

This study has several limitations as well. Firstly, the study concentrated only on one private higher education institution in Kuala Lumpur, Malaysia, hence a limited sample size. Therefore, future studies could be expanded to other public and private higher education institutions, considering lecturers’ perspectives as well. Secondly, the current study is limited to a quantitative cross-sectional research design, where data were collected from 274 pre-university students, the majority of whom were fresh out of school. As such, future studies could involve a larger sample size to include more undergraduate or postgraduate students to ensure data are representative and generalisable. Furthermore, the addition of qualitative data such as interviews is needed to further explore and explain findings.

Future research on blended learning could also look specifically into students’ engagement and how pedagogy and course designs affect their participation in a blended learning model of instruction (Adams et al., 2018). Furthermore, investigating what specific blended learning strategies are most effective for different fields of studies would add significantly to the body of knowledge.

From this research, we conclude that institutional policy and adoption practices are closely tied together with regard to the implementation of blended learning. As blended learning continues to grow in popularity, so must support systems and training programmes be developed and are in place to ease the transitional process of students and instructors from traditional methods to a blended learning model of instruction (Rasouli et al., 2016).

References


About the authors

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Table A1.
Statistics of rating scale analysis

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency (%)</th>
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<th>Rasch-Andrich threshold measure (%)</th>
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</tr>
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<tbody>
<tr>
<td>1 = strongly disagree</td>
<td>1%</td>
<td>165</td>
<td>None</td>
<td>–</td>
</tr>
<tr>
<td>2 = disagree</td>
<td>17%</td>
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<td>0.08</td>
</tr>
<tr>
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<tr>
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