AN INVESTIGATION OF UNIVERSITY STUDENTS’ PERCEPTIONS AND ACCEPTANCE OF MOBILE TECHNOLOGY USE IN LEARNING ENGLISH AS A SECOND LANGUAGE IN CHINA

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Abstract
Due to the tremendous advancement of mobile technologies, mobile assisted English language learning (MAELL) has become an increasingly emergent research area. English is taught as a key subject in the national curriculum from primary education until the second year of university in China. Proficiency of English has great value for individuals and on a societal level. Moving beyond the ‘mobile age’ and ‘digital native’ rhetoric, the objective of this present paper is to investigate university students’ perceptions and acceptance of mobile technology use in second language learning in higher education. The study also aims to investigate whether cultural factors affect these perceptions. The research is conducted in a Chinese comprehensive university in Harbin, adopting a quantitative research design. Data will be obtained by means of questionnaires distributed to approximately 739 undergraduates. To access students' perceptions of mobile technology use in language learning, I have employed and extended Venkatesh, Morris, Davis and Davis's Unified Theory of Acceptance and Use of Technology (UTAUT), which is a synthesis of eight well-established technology acceptance models and has been validated in empirical settings as having superior explanatory power over other single models. Hofstede’s cultural dimensions have also been drawn upon to understand learners’ cultural perceptions. These dimensions represent some relevance to the mindset of learners which is likely to affect to some degree students’ attitude towards mobile learning or English as a second language learning to some degree. This theoretical position places learners at the centre of their English learning and decision-making regarding technology use. It directs the investigation into contextually mediated perceptions and practices of English learning in the mobile age. The findings illustrate the general trend of undergraduates’ positive perceptions of mobile-assisted English language learning in China, as well as specific attributes that may affect their contextually mediated perceptions from a cultural perspective. The findings show that the participants’ attitude towards mobile learning are very positive, especially regarding ‘performance expectancy’ and ‘social influence’. The statistical analysis also suggests that Hofstede’s cultural characteristics could partially explain the diversified learners’ perceptions of mobile learning. This paper provides a theoretical framework that challenges the current existing beliefs about technology acceptance models by extending culture as a key moderating construct, leading to a comprehensive understanding of university students’ perceptions and behaviours concerning mobile-assisted language learning in China.

The paper concludes by suggesting ways or approaches to maximise the learning potential of mobile technologies for English learners in higher education (HE) in China.

Keywords: Mobile learning, second language learning.

1 INTRODUCTION
With the tremendous development of mobile technologies, it has made them an inseparable part of people’s daily lives. Mobile technologies in this study essentially refers to mobile devices and other forms of technology. Typical mobile devices include laptops, personal digital assistants, tablets and mobile phones, which can be used as both storages for learning resources from online and a multifunction ‘treasure chest’ for learning. Other forms of technologies indicate the virtually inexhaustible resources online. Mobile technologies are a pervasive feature of daily life with potential for learning and teaching. Researchers [3] have confirmed that mobile technologies provide several benefits and affordances, including mobility, flexibility, continuity of use and learning, personalisation, socialisation, active participation and collaboration, self-reflection, chances of inspiration and contextual authenticity. Language learning as a distinctive subject is no exception and has been greatly influenced by this emergent trend. Therefore, mobile-assisted language learning (MALL) refers to ‘the use of mobile technologies in language learning, especially in situations where device portability offers specific advantages ([2]: p. 3701). As an emerging research area, MALL provides
learners with authentic, rich, collaborative, real-time learning experience [37]. Apart from the pedagogical advantages that MALL offers, insight into students’ attitude and perceptions regarding MALL [18] are crucial for students’ actual use of mobile technologies for learning and implementation in HE as a whole. At the present, there is quite a lot of literatures investigating the acceptance of MALL ([12], [15], [21], [24]). However, few researchers have been focused on the contextual factors that impact students’ perceptions of mobile technology use in language learning, such as cultural characteristics and personal characteristics. In addition, there has been a lack of focus on developing countries [36].

In the context of HE in China, English is learned as a second language in China and the mastery of English has been recognised as a national or personal asset [14]. China has been experiencing an ‘unprecedented English fever’ in the recent decades. The current generation of learners are regarded as ‘digital learners’ who have been influenced by the information and communications technologies (ICTs) to the extent of being considered as digital [23]. Therefore, it is imperative to explore their perceptions of mobile-assisted English learning in order to explore the ultimate ways to promote MALL. Moreover, the Chinese education system has been greatly influenced by the traditional culture or ‘Confucian thinking’ [41], leading to the creation of a ‘culture of learning’ by students [25], which values an obedient teacher-student relationship, emphasises on collective benefits over individual initiatives, and is exam-oriented with learning by rote. Against this backdrop, the purpose of this paper is to explore university students’ perceptions and acceptance of MAELL (Mobile-Assisted English Language Learning) in HE. In addition, the study also aims to investigate whether cultural factors affect these attitudes.

2 THEORETICAL BACKGROUND

2.1 UTAUT

Research on individual acceptance and use of information technology has been one of the most fruitful and mature streams of technology research [39]. The unified theory of acceptance and use of technology (UTAUT) is a synthesis of eight well-known acceptance models. Such synthesis and integration may work better in explaining on users’ intentions and acceptance than any individual model [19]. UTAUT has been validated in empirical settings and this has boosted its superior explanatory power over previous acceptance models [6]. Nonetheless, despite the fact that it is gaining popularity in the educational context, little published research has been implemented in the field of MALL [11]. Therefore, such a literature gap and the diverse results of causal relationships in UTAUT studies based on different empirical settings call for a further development of the research model in MALL acceptance.

2.2 Culture and technology

Culture exerts a subtle but significant influence on people’s social behaviour [7]. Cultural factors to some extent determine users’ willingness to accept or adopt technologies for learning in the long term [29]. That is to say, the degree of successful implementation of mobile learning potentially stems from the impact of cultural factors. Therefore, in the MALL field, cultural norms not only significantly affect mobile learning [15], but also a fundamental aspect for language learning. To date, the most popular national cultural model is from Hofstede’s taxonomy [13] which is used in this study as a proxy for ‘culture’. This taxonomy indeed contains elements that potentially play a part in people’s attitude towards education. Moreover, it is highly relevant to some issues in the Chinese educational field, such as student-teacher relationship, which can be attributed to power distance. The traditional culture of Confucius advocates collective benefits instead of individual value. Mobile technologies can promote individualised and personalised learning, thus creating a different and conflicting cultures. Moreover, the ‘technological fever’ and educational cultural artefacts in China (teacher-centred pedagogy and an exam-oriented system) are likely to make the individual use of mobile technologies more diverse, which consequently transcend the development of individuals and exert a deep-rooted and long-term influence on their acceptance and successful implementation. Therefore, the culture of learning will be added as a latent variable to define an updated MALL acceptance model with Chinese characteristics.
2.3 Research framework and hypotheses

This study will extend the UTAUT [40] to include attitude, culture of learning and personal characteristics [34]. Comparing with the original model, this study will exclude age, voluntariness of use and experience. Age will be excluded because the participants are in the same age range (18-22 years old). The voluntariness of use will be assumed as a condition. Students are exposed to similar English learning experience.

Table 1: The key variables and hypotheses.

<table>
<thead>
<tr>
<th>Key Variables</th>
<th>Definitions</th>
<th>Rationale</th>
<th>Hypotheses</th>
</tr>
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<tbody>
<tr>
<td>Performance expectancy (PE)</td>
<td>The extent to which it is considered that the application of mobile technologies is useful for improving learning performance.</td>
<td>Performance expectancy has the strongest correlation with behaviour intention [40].</td>
<td>H1 PE positively relates to BI.</td>
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<tr>
<td>Effort expectancy (EE)</td>
<td>The level of ease concerning the use of mobile technologies for learning.</td>
<td>Effort expectancy is a determinant in the context of mobile learning [42].</td>
<td>H2 EE is positively and directly related to BI.</td>
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<tr>
<td>Subjective norms (SN)</td>
<td>The degree of the impact of others in terms of whether or not others should consider using new mobile technologies.</td>
<td>Subjective norms (replace social influence) and behavioural intentions are positively related in several empirical studies (e.g. [20], [28]).</td>
<td>H3 SNs are positively linked to BI.</td>
</tr>
<tr>
<td>Facilitating conditions (FC)</td>
<td>The organisational and technical support for the adoption of mobile technologies</td>
<td>Facilitating conditions positively affect learners’ use behaviour but have no significant facilitating power over behavioural intention [40].</td>
<td>H4 FCs have a positive relationship to use behaviour.</td>
</tr>
<tr>
<td>Behavioural intention (BI)</td>
<td>Learners’ intentions to use mobile technologies for learning purposes.</td>
<td>It has been theoretically determined that it has a strong link with learners’ actual use of technologies [40].</td>
<td>H5 BI is positively linked to UB.</td>
</tr>
<tr>
<td>Attitude towards learning behaviour (AL)</td>
<td>An individual’s positive and negative emotions that affect their target behaviour [26]</td>
<td>A few published papers have found a significant association between the four key constructs and learners’ attitude ([1], [20], [27]).</td>
<td>H6 PE is positively linked to AL; H7 EE is positively linked to AL; H8 SN is positively linked to AL; H9 AL is positively related to BI.</td>
</tr>
<tr>
<td>Personal characteristics (PC)</td>
<td>Personal characteristics include desires, needs, interests and personal perceptions. Culture refers to an individual’s belief systems which can shape their cognition of the world [9].</td>
<td>Personal characteristics have a significant impact on the adoption of technologies [15]. Culture leads to the differences in the attitude towards certain constructs with different interpretations and other typical behaviours [10].</td>
<td>H10 PCs as important factors will significantly affect AL; H11 CL, as a determinant variable, will significantly AL; H12 Gender will significantly AL.</td>
</tr>
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</table>

3 METHODOLOGY

3.1 Research model

The objective is to describe the general trend in factors affecting their use of mobile technologies. Therefore, questionnaires were used to collect students’ demographic information, testify the acceptance model and to explore cultural factors for learning. The data collected was analysed by the Statistical Package for the Social Sciences (SPSS 25) for descriptive statistics, correlation and regression analysis.
3.2 Settings and participants

The participants in this study was composed of 739 university students from one comprehensive university, Harbin University of Commerce. They were aged between 18 and 22 years old. All the students participated on a voluntary basis. The penetration of the ownership of smart phones exceeded 98%, with around 94% of students owning at least two mobile devices. That is to say, the almost complete saturation of ownership of mobile devices provided a solid foundation for the further analysis of MAELL and the patterns used.

3.3 Instrument and procedures

The questionnaire was designed according to the existing literatures: ([5], [12], [20], [29], [36], [38]). It was reviewed based on the feedback from a professor and peer colleagues who played the role of ‘critical friends’ [4]. The questionnaire was first translated into Chinese and it was then validated using the process of ‘back translation’ by an external translator with a professional certificate of English-Chinese translation. The original and the back-translated English versions were compared. Items 27 and 30 were changed accordingly to make the meaning clearer. The study followed a multi-sectional design. Section one aimed at obtaining the personal background information. Section two explored the students’ general use of mobile technologies for English learning. Section three mainly investigated the factors that affect students’ use of mobile technologies for English learning. The questionnaire mainly uses multiple-choice questions and Likert-scale questions. The questions were designed based on validated surveys from previous literatures and modified for English language learning and the purposes of this research. With the consent of the university, the questionnaires were sent out online via wjx.cn. This was an effective way of distributing questionnaires as it could reach a wide range of students and guarantee the voluntariness of the participation. Students had the choice to get involved in the study. Further to this, anonymity and confidentiality were guaranteed.

4 RESULTS

Descriptive statistics were applied to understand the trend of MAELL and students’ perception and acceptance of MAELL. The internal consistency (Cronbach’s α) and factor analysis (Kaiser-Meyer-Olkin test – KMO - and Bartlett’s test) to measure the sampling adequacy [8] are conducted to test the validity and reliability. The internal reliability (Cronbach’s α) of all the variables ranges from 0.86 to 0.95, thus being adequate as high internal consistency [35]. The sample was regarded as adequate on the condition that KMO value exceeded 0.5 and Bartlett’s test value was significant (p<0.05). This data indicates the scale in the survey is reliable and factorable for further analysis. In order to examine the goodness of fit and corroborate the hypothesised model, I have performed structural equation modelling (SEM). It is suggested that SEM is an ideal analytical method when attitude is considered in the model [22]. The interpretation of the results will follow two steps. The first step includes descriptive statistics to understand the students’ general usage of mobile technologies for English learning and their perceptions as well as acceptance of MAELL. The second step is to verify the validity of the hypotheses using the path model.

4.1 Descriptive statistics

4.1.1 Descriptive statistics of use behaviour

The results show that the ownership of mobile technologies exceeds 98% at least owning one type of mobile devices. Smart phones are the most preferred type of mobile technology for students to learn English (82%), followed by laptop computers and tablet computers (24% and 14% respectively). In terms of MAELL, the majority of students prefer to use mobile applications for English learning. The second most popular mobile technologies for learning English are translation tools and search engines. Surprisingly, the social networks and instant messaging services are not as popular as it might be expected as the most frequently used mobile technologies in students’ daily lives. Additionally, a few students mentioned they had using other mobile technologies for learning English, such as foreign TV companies including Netflix and Hulu. Moreover, two thirds of students use mobile technologies for vocabulary learning, which they may use for incidental vocabulary learning. The next most popular purpose is resource consumption (40%). Moreover, quite a significant portion of students (36%) use mobile technologies for examinations or tests.
may be closely related to the exam-oriented educational system in China. However, only 3% of students are learning English in order to make new friends to practise English.

### 4.1.2 Descriptive statistics of perception and acceptance

Students generally believe that almost all the variables have some impact to different degrees on their perceptions and acceptance of MAELL, with average mean of 3.75. Among all the variables, students mostly support Facilitating Conditions (FC) and Performance Expectancy (PE) (mean=3.90 and 3.84). This indicates students believe using mobile technologies is useful for English learning and there is sufficient support from the university and infrastructure for such use. On the other hand, students (to a lesser extent) think cultural factors as a whole exert some influence on MAELL (mean=3.50). More specifically, among the different scales of descriptive statistics for each item and its bivariate correlations, all the correlations among the individual items are positive and significant, sufficiently proving the validity and reliability of this survey. Moreover, students have a positive perception and acceptance of MAELL. For example, more than two thirds of students agree that using mobile devices for learning is a good idea (AL1: M=3.87; SD=0.83; 66%), leading to their preference for using it (AL3: M=3.79, SD=0.90; 62%) because of its entertainment (AL2: M=3.81; SD=0.903; 62%). In terms of the social factors, students are likely to agree that other people affect their use of mobile technologies for learning (SN1: M=3.67; SD=0.878), especially peers’ opinions have influenced their potential usage of mobile devices (SN3: M=3.75; SD=0.884). Additionally, students agree that cultural factors have some impact on their perceptions (CL; M=3.49; SD=0.83) to the degree. In terms of the effects of personal characteristics, students show a clear tendency to agree that the master of English is very important (PC3: M=4.05; SD=0.891). Students also agree that they are quite motivated in learning English (PC2: M=3.72; SD=0.92).

### 4.2 Path model

The interpretation of the path model to verify the hypotheses is based on a significant level of $\alpha = 0.05$ or a high level of significant level of $\alpha = 0.001$. The table 2 below aims to describe a synthesis of the proposed hypotheses of this study.

According to the data in Table 2, the result confirms five of the original hypotheses in the UTAUT, which include: H1: $PE \rightarrow BI$ ($\beta = 0.095; p = 0.006$); H2: $EE \rightarrow BI$ ($\beta = 0.193; p < 0.001$); H3: $SN \rightarrow BI$ ($\beta = 0.200; p < 0.001$); H4: $FC \rightarrow UB$ ($\beta = 0.242; p < 0.001$); H5: $BI \rightarrow UB$ ($\beta = 0.691; p < 0.001$). Moreover, the proposed model contributes to new findings. Firstly, H9: $AL \rightarrow BI$ ($\beta = 0.457; p < 0.001$) has been confirmed in this study. Secondly, the result has confirmed that performance expectancy ($\beta = 0.157; p < 0.001$), effort expectancy ($\beta = 0.268; p < 0.001$) and subjective norms ($\beta = 0.240; p < 0.001$) have all positively contributed to attitude towards learning behaviour, supporting respectively, hypotheses H6, H7 and H8. Thirdly, the results indicate a positive and significant influence of personal characteristics ($\beta = 0.273; p < 0.001$) and gender ($\beta = 0.034; p < 0.001$) on attitude towards learning behaviour, hence, supporting respectively, proposed hypotheses H10 and H12. However, the hypothesis H11 (CL $\rightarrow$ AL, with $\beta = 0.045; p = 0.080$) do not show a very significant positive influence on attitude towards learning behaviour. In other words, it suggests culture of learning only has a marginal positive influence on attitude towards using mobile technologies for learning. Furthermore, regarding the magnitude of the effects (see Figure 1 below), the data shows that behavioural intention has the strongest direct effect on use behaviour, followed by the effect of attitude on behavioural intention. It is worth noting that gender to some extents has some impact on the attitude towards using mobile technologies for learning English ($\beta = 0.034; p < 0.05$). Moreover, considering the key constructs of the UTAUT (including PE, EE, SN AND FC), the effect of EE is strongest, followed by SN. Regarding the other latent variables including gender, PC and CL, PC exerts the largest influence and CL is only a marginal factor.
Table 2. Path analysis results.

<table>
<thead>
<tr>
<th>Path coefficients</th>
<th>Attitude towards learning behaviour (R square = 0.801; p&lt;0.001)</th>
<th>Behavioural intention (R square = 0.793; p&lt;0.001)</th>
<th>Use behaviour (R square = 0.807; p&lt;0.001)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Beta</td>
<td>Sig.</td>
</tr>
<tr>
<td>Performance expectancy (PE)</td>
<td>0.147</td>
<td>0.157</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Effort expectancy (EE)</td>
<td>0.261</td>
<td>0.268</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Subjective norms (SN)</td>
<td>0.223</td>
<td>0.240</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Facilitating Conditions (FC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The culture of learning (CL)</td>
<td>0.043</td>
<td>0.045</td>
<td>0.080</td>
</tr>
<tr>
<td>Personal characteristics (PC)</td>
<td>0.289</td>
<td>0.273</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender</td>
<td>0.059</td>
<td>0.034</td>
<td>0.042</td>
</tr>
<tr>
<td>Attitude towards learning behaviour (AL)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Behavioural intention (BI)</td>
<td>-</td>
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<td>-</td>
</tr>
</tbody>
</table>

Figure 1. Final acceptance model predicting usage of mobile assisted English language learning.

5 DISCUSSION

The aim of this study is to extend and validate empirically the UTAUT model by including cultural factors and personal characteristics as latent variables that may affect students' attitude towards MAELL, potentially leading to behavioural intention and use behaviour. As suggested, the UTAUT accounted for approximately 70% of the variance in usage intention [52]. Overall, it is confirmed that the proposed model, extended by including attitudes, culture of learning and personal characteristics, applied in one of the largest developing countries, increased the explained variance to over 90%. This, on the one hand, may partially result from the tremendous advancement of mobile technologies, where the penetration of mobile devices may be close to saturation. This can be supported by the finding that the participants mostly support with statements on facilitating conditions by stating that
they have very easy access to mobile devices and WiFi or data. Also, such easy access and sufficient
knowledge of mobile technologies have positive and significant impact on students’ actual use of
mobile devices for English learning. This, on the other hand, confirms the need to include attitude,
personal characteristics and cultural factors in the UTAUT model to enhance the explanatory power in
the case of MAELL.

Firstly, the findings are consistent with some causal relationships in the original UTAUT model [40].
For example, performance expectancy, effort expectancy and subject norms all have a positive and
significant influence on behavioural intention, which is consistent with several studies ([16], [17], [20],
[30], [31], [33]). Among these three constructs, the effects of subjective norms are strongest. This
shows that students’ intention to use mobile technologies is positively influenced by social factors,
including the influence from their peers and teachers. This may potentially be attributed to the
traditional collective culture where people are bound to work toward consensus and avoid conflict.
Moreover, behaviour intention and facilitating conditions positively link to students’ technology use.
Students’ usage intention shows the strongest impact among other variables on technology use.

Secondly, the findings contribute to the new knowledge in the mobile learning field. The current study
confirms with other studies ([12], [20], [36]) that attitude is the most significant factor influencing the
behavioural intention. The inclusion of attitude may lead to improving the explanatory capability of the
proposed research model. Next, this study confirms that performance expectancy, effort expectancy,
subjective norms and personal characteristics all have direct, positive and significant effects on
students’ attitude towards MAELL. Among these variables, the effects of personal characteristics on
attitude are the most obvious, which reflect that students’ individual factors are positively and closely
linked to students’ attitude towards English learning. Effort expectancy and subjective norms have the
second and third strongest effect on attitude toward mobile technology use for learning. This
indicates that the efforts required from students are likely to determine their overall attitude towards
using mobile technologies for learning. In other words, if the mobile technologies are too complicated
to use and require excessive effort, learners may lose interest in adopting them [32]. The outstanding
effects of subjective norms on attitude show that social factors (e.g. influence of peers) are a crucial
influence on the attitude. Moreover, surprisingly, cultural factors only have marginal effect on students’
attitude towards mobile technology use for learning, as it was supposed to play a significant role in
determining students’ perceptions and acceptance as discussed in the Introduction section. This
finding to some extent resonates with Viberg and Gronlund’s study [29] in which they find that cultural
factors cannot fully explain the differences in MALL in the Chinese context. Both female and male
students hold positive attitude towards MAELL, but the data shows that female students are slightly
more open to adopt these attitudes than male students.

6 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This study has several limitations. It uses the self-reporting measures to acquire data, which can be
regarded as subjective to bias. Additionally, the total number of participants is limited and
homogenous, being from one university. Moreover, although this study takes into consideration of the
moderating variables including gender, personal characteristics and culture of learning it only
discusses their direct effects on attitudes, without further analysing their moderating effects from the
key dependent variables on the independent variables through more complex statistical procedures.
Lastly, the measurements in the survey are not adjusted to consider the response styles [43], which
may have further affected the analysis of the variables and their causal relationships. Based on these
limitations, it is proposed that the following directions should be taken into considerations. First, more
objectively and quantifiable research should be conducted to include students from different
universities and areas in the MAELL study, to get a broader understanding of acceptance in HE in
China. Secondly, future research can make use of complex statistical procedures to understand the
moderating effects of the key moderators. Lastly, despite the fact that this study follows the current
literatures in MALL that have still not yet responded to adjusting the response style, this calls for an
attempt to adopt updated methods considering response styles in future research, to avoid any bias.
Alternatively, the quantitative study should be followed by a qualitative study to corroborate the
quantitative findings and gain in-depth knowledge of students’ perceptions and actual adoption of
MAELL.
7 CONCLUSIONS

This study, extending the current understanding of mobile learning based on UTAUT, English as second language learning, focusing on individual differences and cultural factors according to Hofstede’s cultural dimensions, aims at establishing a unified view of the mobile technology acceptance of English language learning in China. The findings reflect various aspects that determine students’ use of mobile technologies for learning purposes. Specifically, this study shows that attitude is the strongest determinant for behaviour intentions, which potentially further links to actual use of mobile technologies for learning purposes. In turn, attitudes are equally influenced by students’ personal traits of language learning and the level of efforts required to use mobile devices for learning. Therefore, the endeavour to promote MAELL in HE in China should focus on improving the positive attitude towards the use of mobile technologies for learning by ensuring social and effort-related factors are addressed. In the meantime, in terms of students’ affective variables in English learning, efforts should be put on the improvement of students’ motivation, interest and positive attitude towards English learning, which may as a result lead to learners’ potential use of technologies for learning purposes. Lastly, the influence of ‘mobile’ culture may to some extent be more sweeping than traditional culture. Therefore, it is concluded that educational design should consider also consider the features of ‘mobile culture’ for the utmost learning outcome.

REFERENCES


