



# Cross-cultural analysis of users' attitudes toward the use of mobile devices in second and foreign language learning in higher education: A case from Sweden and China



Olga Viberg<sup>a,\*</sup>, Åke Grönlund<sup>b</sup>

<sup>a</sup> Research School, Technology-Mediated Knowledge Processes, Dalarna University, 791 88 Falun, Örebro University Swedish Business School, SE-70182, Örebro University, Örebro, Sweden

<sup>b</sup> Örebro University, Örebro University Swedish Business School, SE-70182, Örebro University, Sweden

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## ABSTRACT

The present study examined the current state of students' attitudes toward mobile technology use in and for second and foreign language learning in higher education. Moreover, the study investigated if age, gender or cultural factors affect these attitudes. A total of 345 students from two in many aspects different countries, China (Yunnan University) and Sweden (Dalarna University) participated in this study. To access learners' perceptions toward mobile technology use, we employed Kearney's pedagogical framework to mobile learning from a socio-cultural perspective (Kearney, Schuck, Burden, & Aubusson, 2012). Hofstede's cultural dimensions were used to approach students' cultural views, as these dimensions represent some values – aspects of culture – that may affect attitudes toward technology and learning individually as well as in combination. The findings show the respondents' attitudes toward mobile learning are very positive with individualization being most positive (83%) followed by collaboration (74%), and authenticity (73%). The statistical analysis indicates that Hofstede's factors cannot explain the differences in mobile-assisted language learning (MALL) attitudes in the chosen sample. Among the personal factors, gender is identified to be a predictor to explain the differences in students' attitudes toward MALL. This study shows that technology itself seems to be the most important culture-shaping factor, more important than culture inherited from the physical environment, and more important than age.

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## 1. Introduction

*"The computer and the Internet were the first to reduce the distance of the human body from the screen, but the mobile phone has imposed new rhythm in this escalation, arriving to hybridize itself with the human body."*

Fortunati, 2012

Mobile technologies are increasingly attracting new users, providing growing capacity, and allowing more sophisticated use. This development influences cultural practices and enables new contexts for learning (Pachler, Bachmair, & Cook, 2010). The integration of such technologies into teaching and learning has been more gradual, as educators need to understand how they can be effectively used to support various kinds of learning (Kukulka-Hulme & Shield, 2008). There is however, no doubt that mobile technologies will be adopted in education as they have become so ingrained in people's lifestyles and everyday activities. In a constant process of development, higher education (HE) has to adapt to widespread adoption of popular technologies such as social media, social networking services, and mobile devices (Kukulka-Hulme, 2012). This will contribute to change the setting for education, and stakeholders need to consider how we grow together with this new

\* Corresponding author. Tel.: +46 703458683.

E-mail addresses: [ovi@du.se](mailto:ovi@du.se) (O. Viberg), [ake.gronlund@oru.se](mailto:ake.gronlund@oru.se) (Å. Grönlund).

technology (Cronjé, 2011). Along with Internet communication, mobile communication has over the past few years emerged in the field of education and is expected to serve as a bridge between the formal and informal learning approaches (Rau, Gao, & Wu, 2008).

Mobile learning is one of the dominating trends of educational applications for new technologies (Wu et al., 2012). While the definitions of mobile learning differ, it is obvious that not only technology but also people can be mobile. In the present study, mobile learning is defined as a “process of coming to know through conversations across multiple contexts among people and personal interactive technologies” (Sharples, Taylor, & Vavoula, 2007, p. 225). The supporting technology in this process includes any kind of handheld mobile devices such as cell phones, smartphones, personal digital assistants (PDAs), pads, pods etc. Laptops in this context are not included, even though they are clearly mobile to some extent (Viberg & Grönlund, 2012). The mobile technology is one that comes close to the human body and reduces the distance from the body (Fortunati, 2012). As individuals invest considerable time, effort and resources choosing, buying, customizing, and exploiting mobile technology, these mobile devices express part of owners’ values, identity and individuality through their choice and use (Traxler, 2010). They become an extension of the individual’s self. According to the report from the UNESCO’s *Mobile Learning Week Report*: “Mobiles are used to create identities, ideas, content. Massive social networking is possible via mobile phones” (UNESCO, 2011, p. 6).

This suggests new practices for learning drawing on, and adapted to, the intimate relation between individuals and mobile technology: “if leveraged properly, mobile devices can complement and add value to the existing learning styles and models” (Liaw, Hatala, & Huang, 2010, p. 446). In this study, we investigate specifically people’s view of mobile technology in learning with the expectation to find strong positive attitudes, as suggested by the above-cited research, and with the ambition to find out more specifically the details about the attitudes.

Various distinctive characteristics of mobile learning have been highlighted by several researchers. While, for example, Ogata and Yano (2005) present such features of mobile learning as permanency, accessibility, immediacy, interactivity, situating of instructional activities; others point out ubiquity, flexibility, multi-functionality, and nonlinearity that mobile devices offer for learning (Kress & Pachler, 2007). However, a number of limitations of mobile technology and its use should also be taken into consideration. Cheon and colleagues (Cheon, Lee, Crooks, & Song, 2012) summarize these limitations into three categories: users’ technical, psychological, and pedagogical limitations. Technical limitations include the small screens with low-resolution display, inadequate memory, lack of standardization, and comparability (Haag, 2011; Lowenthal, 2010; Wang, Wu, & Wang, 2009). Psychological limitations have been pointed out by Park (2011) and Wang and colleagues (Wang et al., 2009), among others. Even though there are growing possibilities to provide learning, even formal learning, through mobile devices, people do not change their habits in the same pace. Such change usually takes longer time. Pedagogical limitations include students’ lack of concentration and interruption of work when using mobile devices (Corbeil & Valdes-Corbeil, 2007; Park, 2011). These findings are not surprising as mobile devices, particularly smartphones, become more and more ubiquitous, and the boundaries between institutionalized (language) learning and leisure become more blurred. According to Stead (2012), “the expectations of [mobile] devices and what they can do are higher than they have ever been” (p. 78). Language learners are no exception; many of them are using such devices for all aspects of their lives, e.g. communication, leisure, school and work.

Whether the above -mentioned limitations should be seen as limitations or rather as an entirely new communication culture emanating from technology change may be argued. “Limitation” would be the correct term as seen from the perspective of traditional classroom teaching. A new communication paradigm would be more correct terminology considering the general change in ICT-based communication overall. While the choice of term mainly signals attitude of the investigator, it is obvious that it is necessary to investigate how the ubiquitous mobile devices can be employed by educators to enhance learning by integrating them with other technologies such as LMS or other backend systems.

Previous studies show that mobile learning is most prevalent in higher education institutions. According to Wu et al. (2012), 85 out of 164 (52%) of the reviewed studies about mobile learning have been implemented within the higher educational frames. Mobile technologies have provided many new opportunities to learn a foreign language, including advantages such as flexibility, small size, low cost and user-friendliness (Hsu, 2012). Although technology has developed rapidly, researchers are yet exploring how to use mobile technology to effectively support language learning (Huang, Huang, Huang, & Lin, 2012).

Mobile-assisted language learning (MALL) is considered one of the most relevant application areas (Kukulska-Hulme, 2009). A significant number of papers are devoted to second and foreign language mobile learning (Abdous, Camarena, & Facer, 2009; Chang & Hsu, 2011; de Jong, Specht, & Koper, 2010; Gromik, 2012; Kennedy & Levy, 2008; Li et al., 2010; Lu, 2008; Thornton & Houser, 2005 etc.). The studies exhibit mobile technology use in different aspects of language learning and results, though largely explorative, overall support the hypothesis that mobile technology can enhance learners’ second language acquisition (Viberg & Grönlund, 2012).

### 1.1. What factors predict learners’ use of mobile technology for learning?

Despite the rapid development of the mobile learning industry, there is still a lack of understanding of the factors driving mobile learning adoption by learners in higher education (Cheon et al. 2012; Liu, Hongxiu, & Carlsson, 2010; Sung & Mayer, 2012). A deeper understanding of the process of mobile learning adoption will help researchers and stakeholders work together to apply appropriate methods and implement suitable strategies for mobile learning. While “our understanding of technology use from the learners’ perspective is still quite limited” (Lai, Wang & Lei, 2012, p. 596), there are a number of studies investigating users’ attitudes toward the integration of mobile technology in their learning and teaching (Cheon et al., 2012; Liu et al. 2010; Stockwell, 2008).

Stockwell (2008) showed that one of the reasons for wanting to use mobiles was the language learners’ perception that they could complete the activities anywhere (on the trains, in other classes, between classes etc.) and at their free time. Among the reasons for not wanting to use mobile devices were cost (19 out of 46 learners responded negatively), the small screen, the problem with keypads, and the learning environment: the users wanted to study in a quiet context, which made public environments less attractive. Learners approached the technology “with a degree of expectation, with over two-thirds of the learners expressing an interest in using mobile phones for language learning in either short or long term” (p. 269). Other researchers (Liu et al., 2010) showed that perceived near-term/long-term usefulness and personal innovativeness significantly influence mLearning adoption intention; the perceived long-term usefulness significantly affects the perceived near-term usefulness. Finally, perceived innovativeness is a predictor for the perceived ease of use and long-term usefulness. Among other factors, which influence users’ intention to adopt mobile learning, perceived behavioral control, attitude and subjective norm are identified (Cheon et al., 2012).

Among the key factors that predict students' use of technology for learning are compatibility of technology and learning styles and needs, availability of encouragement and support from peers and teachers, and learners' attitudes toward technology (Lai et al., 2012). Studies have also found cultural values important for adoption of ICTs in general (Leidner & Kayworth, 2006; Sánchez-Franco, Martínez-López, & Martín-Velicia, 2009). Nevertheless, the cultural aspect is yet under-researched (Sánchez-Franco et al., 2009), in particular with respect to the mobile technology in learning.

The most common theoretical model when investigating factors that predict the adoption of mobile learning is the Technology Acceptance Model (TAM; Davis, 1989) in its different variations (Chang & Hsu, 2011; Huang et al., 2012; Liu et al., 2010; Sánchez-Franco et al., 2009) that attempted to adjust the model to various learning environments. Along with TAM, the Theory of Reasoned Action (Liang & Yeh, 2011) and the Theory of Planned Behavior (Cheon et al., 2012) are often employed when investigating users' attitudes toward the adoption of mobile technologies in their learning.

## 1.2. Culture and technology

It has often been suggested that various cultural factors lay behind different users' eagerness to accept and adopt new technologies. Rogers (1962) divide users based on the time to adoption, from the early innovators over early adopters, early majority, late majority, to laggards (Rogers 1962, p. 150). Others have investigated various factors behind this time distribution, including age, gender, technical skills, and others. While few of these factors appear to have more than temporal effect, these effects may last for quite a number of years. For example, while Internet use today is common among people far into their sixties – which it was not 15 years ago – it is likely that further increase in use above this age is likely to largely happen at the pace by which individuals grow older. Some have suggested that cultural factors are more important since they are supposed to have more longevity, transcending the development of individuals. This would make cultural factors highly interesting to study as many learning contexts today include a mix of students from various cultural backgrounds (Arenas-Gaitán, Ramíz-Correa, & Rondan-Cataluna, 2011), not only in distance tuition but also in campus course. Cultural differences are, however, notoriously difficult to investigate as many kinds of culture blend in complex ways. For example nationality, religion, history, political views, socio-economic conditions would be examples of potential cultures, which would come in different combinations in every individual. The present study focuses on users' attitudes of the use of mobile technology in institutionalized language learning. Beyond the actual attitudes we investigate factors predicting these attitudes. As a proxy for “culture” we use Hofstede's (Hofstede, 2001; Hofstede, Hofstede, & Minkov, 2010) categories defining what he claims to be national cultures. While these categories are contested as measures of specifically national cultures, they contain elements that also in other contexts have been suggested playing a role for people's behavior and attitudes toward education, such as “power distance” and “individualism vs. collectivism”. This means that even though they may not indicate the culture of entire nations they might predict attitudes toward learning and technology. Hofstede's model has been employed in various research fields and studies, but there has been considerable criticism (Baskerville, 2003; Bhimani et al., 2005; Harrison & McKinnon, 1999; McSweeney, 2002). Table 1 summarizes the criticism.

Regarding use of the model's use in higher education, the criticism can be summarized as follows (Signorini, Wiesemes, & Murphy, 2009):

- Equating “culture” to “nation” is incorrect.
- The model does not take into account the flexible and changing nature of culture and it is not able to reflect culture changes in the new global context of higher education.
- His data were collected in IBM offices in the 1960s and 1970s, not in internationally mixed higher education settings of the 21st century.

Taking this criticism into consideration, this study uses the Hofstede categories, as they do contain issues that should be of importance such as the student–teacher relation (“power distance”). We do not assume cultures to be national, but instead test for various factors that may affect attitudes, such as gender, age and relation to technology.

## 1.3. Hypotheses

The study investigates second and foreign language students' attitudes toward mobile learning in higher education. Regarding the potential background to these attitudes we investigate two contradictory hypotheses:

**Table 1**  
The four critiques addressed to Hofstede's model (Joannidés, Wichramasinghe, & Berland, 2012).

Critics	On the extensive use of the model		On the model itself	
	Harrison & McKinnon (1999)	Bhimani et al. (2005)	McSweeney (2002)	Baskerville (2003)
Empirical weaknesses	–	Only well-known cultural settings are studied (ethnocentrism).	IBM is not representative for the world.	Only nations are studied.
Theoretical weaknesses	The richness and specificities of a culture are not grasped; the model is predictive and self-referencing.	The specifics of culture are not understood.	The richness and specifics of a culture are not grasped; the model is self-predictive and self-referencing.	The richness and specifics of a culture are not grasped; the model is self-predictive and self-referencing.
Methodological weaknesses	–	Nomothetic methods are inappropriate in the understanding of cultural specifics.	Statistical measures do not inform on the contents of culture and impact on practices.	Questionnaires are inappropriate to understand culture.
Contributions to knowledge	Conclusions are homogenous and predictable.	Conclusions are homogenous and predictable.	Conclusions are neither robust nor reliable.	Conclusions are poor.

**H1:** Cultural differences impact the perceptions of, and attitudes toward, mobile technology for language learning among students.

**H2:** Cultural background does not significantly impact these perceptions and attitudes. To the contrary, technology use is more important for shaping culture.

The second hypothesis draws on the development regarding technology and Internet use over the past 15–20 years, namely that proposed differences stemming from gender, age, socio-economic status etc. affect use have been proven wrong. Today women use the internet as much as men, old as much as young – when controlling for factors that generally differentiate old from young, such as that 10-year-olds also ride bikes more commonly than 70-year-olds do, and that people in working life ages are generally more active than retired – people in developing countries are as interested in technology as those in the industrialized world, only they can afford less use. This hypothesis claims that attitudes are shaped by living conditions, and technology is one of those conditions. Hence, ubiquitous technology use will, over some time, change attitudes.

#### 1.4. Research aim and questions

This study investigates the following research questions:

**RQ 1:** What are the attitudes among students toward mobile technology use in and for language learning?

**RQ 2:** Do differences in age, gender, or cultural characteristics affect these attitudes, and, if so, how?

These questions are investigated by means of a questionnaire. Respondents are 345 second and foreign language students from Dalarna University in Sweden and Yunnan University in China. The Kearney, Schuck, Burden, & Aubusson (2012) socio-cultural mobile learning model is used for RQ 1, and Hofstede's (six) cultural dimensions are used to define cultural factors for RQ 2.

#### 1.5. Case background

The two countries involved in the study are both extensive users of mobile technology. Mobile phones have been penetrating the China user market rapidly in recent years and college students within this market have attracted a special commercial attention (Song & Yang, 2012). The mobile penetration rate is today 65%, which makes China the country where the development of the mobile phone has been the fastest, and the most energetic in the past few years (Wang & Cheng, 2012). China became the world's first country to reach a billion mobile subscribers in March last year, and analysts have predicted that rate will continue to rise (Jingting, China Daily, 2013).

Mobile subscribers in China are now using 330 million smartphones - a 150% increase over last year. Chinese research firm *iiMedia* recently released this smartphone data, which has not been widely distributed in English (Emerging Money, 2013).

Smartphones accounted for 68% of mobile phones in Sweden in 2012 (November 2012), compared to 49% in 2011. Telenor Sweden found that 84% of the survey's respondents had a phone with Internet access (New Media Trend Watch, 2013). According to a report from the *Statistics Sweden*, during the first quarter of 2012 six out of ten people used a smartphone to connect to the Internet. Smartphones were used to connect to the Internet by 84 percent of people aged 16–74 years (Statistics Sweden, 2011).

In our study a sample of second and foreign language students from Dalarna University in Sweden and Yunnan University in China was chosen. The comparison concerns the students' attitudes to the general nature of mobile technology use, i.e. concerning mobility, individualism, and adaptability etc. The comparison is not done with reference to any particular apps or mobile devices; the questions concerns mobile technology in general. This is important to note as focusing on specific apps would distort the study; clearly people can have a positive attitude to mobile technology in general but still be negative to specific apps which do not meet their expectations or standards.

Formal language learning in these educational institutions is provided in different forms. Most language courses at Dalarna University are offered as online courses with scheduled online seminars through the Adobe Connect software. Students meet, often in smaller groups (5–15 students) in a teacher-led synchronous online virtual environment often once a week or sometimes twice a week, depending on the offered course pace. Such meetings can also be conducted only for and by students without teacher-instructor presence both in the settings of Adobe Connect and also through chat. Moreover these students are encouraged to use asynchronous modes of communication, which often goes through e-mail conversations and the used LMS, *Fronter*. Hence learners interact with each other and the teacher only in the virtual learning context, never meeting each other in a physical environment. The Chinese language students are in a different situation. They meet regularly, several times a week, at campus for only teacher-led lectures and workshops, which are separated into writing, vocabulary and pronunciation classes. The learning groups are larger than the Swedish ones. The students whose major is English are offered ten-twelve hours of teaching a week. Those, who study two languages at the same time, are provided with 12 h for both of them (e.g., English/Spanish, English/Japanese). The institution does not provide online learning for the language students.

## 2. Theoretical framework and research model

The framework we use in this paper to describe mobile learning is Kearney and colleagues' socio-cultural model (Kearney et al., 2012). To describe culture we use, as mentioned, Hofstede's six-dimensional framework (Hofstede, Hofstede, & Minkov, 2010). This section briefly describes the two chosen theoretical frameworks.

### 2.1. A socio-cultural framework for mobile learning

A socio-cultural perspective suggests that learning is affected and modified by the tools used for learning, and at the same time the learning tools are transformed by the ways they are used for learning (Kearney et al., 2012). Learning is a situated, social endeavor, facilitated and developed through social exchanges between people (Vygotsky, 1978), and mediated through tool use (Wertsch, 1991). In contrast to formal learning, which is considered as being bounded in space and time, mobile learning offers opportunities to overcome these spatial-



temporal barriers by opening up other learning arenas such as virtual learning environments that are specifically created for mobile devices. The suggested framework was essentially used to criticize the pedagogy in a selection of mobile learning cases, which as often lacked appropriately developed pedagogical models.

The main focus of the suggested framework is not technology, but rather pedagogy when the technology is “under investigation only for what may be distinctive about the learning afforded by that technology” (Kearney et al., 2012, p. 2). The framework highlights and explains the three distinct features of mLearning; authenticity, collaboration and personalization, each with a number of sub-categories (Fig. 1). The framework is designed to incorporate the special features of mobile learning environments distinguishing them from traditional ones, namely the possibilities to enable learning in a multiplicity of more informal settings (physical and virtual) and under various temporal conditions.

### 2.1.1. Personalization

The personalization concept, which is strongly supported by socio-cultural theory (Vygotsky, 1978; Wertsch, 1991) and a number of motivation theories, deriving both from psychology and education, focuses on learner choice, agency, self-regulation, and customization (Kearney et al., 2012). Learners can enjoy higher degree of agency in appropriately designed mobile learning experiences. Activities are customized for learners to meet their different learning styles and learning techniques and they can be customized at both tool and activity levels.

### 2.1.2. Authenticity

Authentic tasks provide real world relevance and personal meaning to the learner. The framework suggests that authentic practices can be carried out in two alternative ways, either through a simulated learning environment, or through direct participation in the actual work of the focus community (Kearney et al., 2012). Thus, the concepts of situatedness and contextualization are two substantial elements that help to enlighten the authenticity notion of the applied model.

### 2.1.3. Collaboration

Social interaction, conversation and dialog are fundamental to learning from a socio-cultural point of view as individuals involving in negotiating meaning (Vygotsky, 1978).

## 2.2. Hofstede's six-dimensional model of national culture

In this study we use Hofstede's six cultural dimensions as a proxy for “culture”. We do not claim they are actually representing nationalities, and we do not claim nations are monoliths in terms of cultural traits. We use the dimensions as they represent some values – aspects of culture – that may affect attitudes toward technology and learning individually as well as in combination. The dimensions include power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, long- versus short-term orientation, and indulgence versus restraint. Culture is defined as the “collective programming of the mind that distinguishes the members of one group or category from others” (Hofstede et al., 2010, p.6). Culture is something that is learned, not innate; it derives from one's social environment rather than it genetically inherited (Hofstede et al., 2010). Table 2 shows the definition of each dimension and the index score on each dimension for Sweden and China.

Hofstede and Hofstede (2005) argue that in cultures with short power distance the quality of learning is largely determined by the students' excellence, while in long power distance cultures it is dependent on the teachers' excellence. Sweden would be an example of the former, China of the latter. According to Hofstede, ICT tools link individuals, so these tools are more smoothly and easily integrated in individualist societies than in collectivist ones (Hofstede et al., 2010, p. 123). In individualist cultures, the purpose of education is assumed to be learning *how* to learn, rather than *what* to learn, in collectivist countries the other way around.

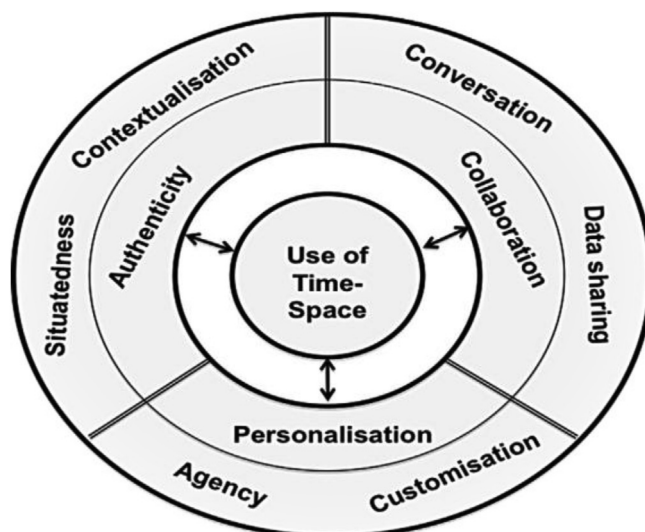


Fig. 1. The mLearning framework comprising three distinctive characteristics of mLearning, with sub-categories (Kearney et al., 2012).

**Table 2**  
Hofstede's cultural dimensions and the index scores for China and Sweden.

Dimension	Definitions (Hofstede et al., 2010)	Sweden	China
Power distance	The extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally	31	80 (i.e. large PD)
Individualism vs collectivism	Individualism - the ties between individuals are loose: everyone is expected to look after him- or herself and his or her immediate family only. Collectivism - people are from birth onward integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty.	71 (i.e. very individual)	20
Masculinity vs femininity	Masculine society is one where emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life. Feminine society - when emotional gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life.	5	66 (i.e. very masculine)
Uncertainty avoidance	The extent to which the members of a culture feel threatened by ambiguous and unknown situations.	29	30 (i.e. low preference for UAI)
Long-term versus short-term orientation	Long-term orientation - fostering of virtues oriented toward future rewards - in particular, perseverance and thrift. Short-term orientation - fostering of virtues related to the past and present - in particular, respect for tradition, preservation of "face", and fulfilling social obligations.	53	87 (i.e. very short-term oriented)
Indulgence versus restraint	Indulgence - a tendency to allow relatively free gratification of basic and natural human desires related to enjoying life and having fun. Restraint - a conviction that such gratification needs to be curbed and regulated by strict social norms.	78 (i.e. very indulgent)	24

Originally, the first four dimensions were formulated based on the extensive survey of the IBM corporation staff in 72 countries conducted by Geert Hofstede around 1970. The fifth dimension was later added by Hofstede and Bond (1988). The complete data for the dimensions long- versus short-term orientation and indulgence versus restraint was collected later through the World Value Survey (WVS) and presented by Hofstede and colleagues (Hofstede et al., 2010).

### 3. Method

Data was collected by means of a questionnaire, which contained three sections: one with personal data such as age and gender, one with questions specifying Hofstede's cultural categories, and one with questions defining Kearney's mobile learning theory (Kearney et al., 2012). The survey was distributed as an online survey for the Swedish participants while the Chinese respondents used a paper form, as the online form was not available to them due to Government restrictions on Internet use. Translation into Chinese was conducted by the two lecturers of Chinese as second language who work in Sweden, and one lecturer of English, who is a Chinese native speaker, at Yunnan University in China. This translation work was conducted in collaboration with the first author in order to ensure content reliability.

The survey included 35 statements about mobile learning adoption and Hofstede's cultural constructs which respondents evaluated individually on a 5-point Likert scale (Appendix). Eight questions defining mobile learning theory (personalization, authenticity, collaboration) were formulated by the authors of this paper. Nineteen questions defined Hofstede's six cultural dimensions (power distance, individualism vs. collectivism, uncertainty avoidance, masculinity vs. femininity, short vs. long-term orientation, indulgence vs. restraint). The statements for the first four dimensions were adapted from Thatcher et al. (Thatcher, Stepina, Srite, & Liu, 2003) who examine the patterns of the relationships between dimensions of culture; qualitative and quantitative work overload, and personal innovativeness with IT. The scales are incorporated from Hofstede's work but slightly rephrased in order to reflect cultural changes over the past years. The changes concern mainly language, not the core content of any item. The remaining two scales (long- versus short-term orientation and indulgence versus restraint) have been adopted from Hofstede et al. (2010).

For methodological reasons the groups were kept completely apart. There were no contacts between them. The purpose of the study was to investigate commonalities and differences between the groups; bringing them together by some common activities would affect their natural (learning) environments where they have been studied, as they might communicate about their views and adjust them to each other rather than responding from their original mindset.

### 4. Results

#### 4.1. Participants

A total of 345 respondents participated: 139 language students from Dalarna University in Sweden and 206 language students from Yunnan University in China. Most of the students, 319 out of 345, were either Chinese (60%) or Swedish (33%). The remaining 26 included a

**Table 3**  
Personalization.

Items	1/Strongly disagree (%)	2/Disagree (%)	3/Neutral (%)	4/Agree (%)	5/Strongly agree (%)
1. I (will) appreciate the opportunity to act independently when using mobile devices in my language learning.	0.3	1.4	16.5	54.5	27.2
2. It is important to use mobile devices in my language learning as they offer me control over the place (physical & virtual), the pace and time at which I learn.	1.4	8.1	18.3	49.6	22.6
3. It is important to make my own choices.	0.9	1.7	2.3	45.8	49.3
Personalization (average)	0.9	3.7	12.4	50	33

number of nationalities, such as Polish, English, German, etc. The representation sample from the Chinese university is homogeneous in terms of nationality and age: most of the Chinese respondents were under 25 years old, while the age of the Swedish respondents ranged from below 20 up to over 56 years old. In total, 256 out of 345 respondents (74%) were under 25 years. 79% were female and 21% - male.

In this section we present the results in the following order:

1. First we describe the respondents' attitudes toward mobile learning.
2. Then we investigate if personal factors may explain attitudes.
3. Then we investigate whether any cultural factor, as of the Hofstede definition, can explain any of the attitudes.
4. As a test of the Hofstede model we then investigate if the factor nationality influences any of the cultural factors as defined by Hofstede.
5. As a further test on whether cultural factors may be influenced by other things than nationality we investigate if any other personal factor, such as age or gender, influences the cultural factors.
6. Finally we discuss the correlations found.

All the statistical analysis was conducted using SPSS version 21. Descriptive analyses were used to examine the learners' backgrounds and attitudes toward the integration of mobile technologies in their language learning. To determine statistical significance, Spearman's Rho correlation tests and their associated  $p$ -values were used ( $p < 0.05$  was considered statistically significant). Mann–Whitney  $U$  tests were used to identify the correlations between learners' gender and attitudes toward mLearning and Hofstede's factors. Missing responses/data was taken into account when weighting the data.

#### 4.2. Perceptions of, and attitudes toward, MALL

Most respondents (99%) own a mobile device. Most common are smartphones (60%). Learners additionally use other mobile devices, such as different kinds of pads, pods, PDAs, and e-readers.

##### 4.2.1. Personalization

Personalization focuses on learner choice, agency, self-regulation, and customization (Kearney et al., 2012). A large majority of the respondents (83%) agreed or strongly agreed to the statement that they will, or already do, benefit from the use of mobiles in their learning (Table 3). Less than 5% disagreed. Agency, referring to an individual's capacity to act independently and ability to make free choices, is mainly reflected in the first and third statements (Table 3). In our study, 82% of the participants expressed positive attitudes toward the statement that they will or already do appreciate the opportunity to act on their own will when using mobile devices in their language learning. The vast majority, 69%, of the respondents already use mobile devices in their language learning. This suggests that most of the students have some experience of working and collaborating with mobile devices, and consequently, their attitudes reflect experience and are hence not hypothetical.

Customization is another personalization cornerstone. The importance of the mobiles' use in individuals' language learning, as these technologies offer control over the space (physical and virtual), the pace, and time at which a user learns (Item 2 in Table 3), was

**Table 4**  
Authenticity.

Items	1/Strongly disagree (%)	2/Disagree (%)	3/Neutral (%)	4/Agree (%)	5/Strongly agree (%)
1. I (will) enjoy using mobile devices in my language learning (teaching) because they can offer access to tasks, which are realistic, and they can offer problems encountered in the real world.	1.4	5.5	18.6	59.7	14.8
2. I (will) appreciate using mobile devices as they offer me opportunity to practice my language knowledge in social communities or in the ones, which are similar to real world.	1.7	5.2	21.7	56.8	14.5
3. I am (will be) able to generate my own learning environment (context) with the help of a mobile device when learning a new language.	0.9	4.3	20.6	59.7	14.5
Authenticity (average)	1.33	5	20.3	58.7	14.6

**Table 5**  
Collaboration.

Items	1/Strongly disagree (%)	2/Disagree (%)	3/Neutral (%)	4/Agree (%)	5/Strongly agree (%)
1. In my language learning it is important to communicate with others by using mobile devices in various ways, e.g. using text, video and audio with peers, teachers and other experts, and exchange information	2.3	4.9	14.8	61.2	16.8
2. It is important to use mobile devices in my language learning as they will offer me an opportunity to collaborate.	2.6	5.8	22.3	53.6	15.7
Collaboration (average)	2.5	5.4	18.6	57.4	16.2

acknowledged by 72% of the respondents, while less than 10% disagreed. These results suggest that 72% of the students believe that mobile technologies provide language learning activities, which can be customized and adjusted to their various learning styles and preferences. Nowadays this customization can be acquired through, for example, context-aware mobile applications, which offer information about location and time, among other factors.

#### 4.2.2. Authenticity

Authenticity is about “learner-perceived relations between the practices they are carrying out and the use values of these practices” (Barab, Squire, & Dueber, 2000, p. 38). Authenticity was perceived as valuable with 73% of students being positive or very positive to the three defining items taken together (Table 4). A majority, 75%, agreed that they do or will enjoy the opportunity to access realistic tasks (Item 1). 71% agreed that they (do or will) appreciate that mobiles give access to practice in social communities. A similar-size majority, 74%, supported the statement that they are or will be able to generate their own learning environment (context) (Item 3). The concept of *user-generated contexts* (Cook, 2010) stresses the learners’ role in shaping and re-shaping their own learning environment. Overall, authenticity was valued highly but not as high as personalization.

#### 4.2.3. Collaboration

Collaboration involves students’ attitudes toward the importance for mobile learners to communicate multi-modally with peers, teachers, and other experts, and exchange information through the use of mobile technologies in their language learning. Again the overall results were positive with, 74% of the respondents agreeing they can achieve a higher degree of collaboration by employing mobile devices (Table 5).

The importance of multimodal communication and information exchange in language learning that can be provided by mobiles (Table 5, item 1) was acknowledged by 78% of the students. The opportunity to collaborate provided by the mobile devices (item 2) was evaluated positively or very positively by 69%.

#### 4.3. Personal factors affecting MALL

Mann–Whitney *U* test has been used to identify if there is any dependence between the participants’ gender and their attitudes toward MALL as presented above. Table 6 shows that students’ gender is correlated with their perceptions toward all three mLearning factors and that the correlations are statistically significant; gender-personalization ( $Z = -3.308$ ), gender-authenticity ( $Z = -2.980$ ), and gender-collaboration ( $Z = -3.274$ ). It is the female students who are more positive toward the use of mobile devices in language learning.

The results of the Spearman’s Rho correlation test show that there is a statistically significant, however very weak, correlation between the participants’ age and their attitudes toward MALL in terms of personalization, authenticity, and collaboration.

#### 4.4. Cultural factors vs. attitudes toward MALL

Our next inquiry concerned research question 2, Are cultural characteristics, according to Hofstede’s cultural model, interrelated with learners’ attitudes and perceptions toward MALL, and, if so, how? To investigate this Spearman’s Rho’s correlation test were applied. As Table 7 demonstrates there were correlations between all cultural factors and the MALL factors, however the correlations were very weak.

#### 4.5. Nationality and Hofstede’s factors

The results of the Spearman’s Rho correlation test indicate that nationality and all the six cultural factors are related (Table 8) but with small correlations. This means that nationality cannot explain the differences in the cultural factors. What is more, some of the relations are unexpected given Hofstede’s earlier results. In our study the Chinese students score lower than the Swedish ones on power distance that

**Table 6**  
Correlation matrix. Gender, age and mLearning factors.

		Personalization	Authenticity	Collaboration
Gender, *Mann–Whitney <i>U</i> test	<i>Z</i>	–3.308	–2.980	–3.274
	Asymp. Sig. (2-tailed)	.001	.003	.001
Age, *Spearman’s Rho	Correlation Coefficient	.250**	.179**	.170**
	Sig. 2-tailed	.000	.001	.002



**Table 7**  
Correlation matrix. Cultural factors vs mLearning factors.

Spearman's Rho		Personalization	Authenticity	Collaboration
Power distance	Correlation coefficient	.280 <sup>a</sup>	.170 <sup>a</sup>	.226 <sup>a</sup>
	Sig. (2-tailed)	.000	.001	.000
Individualism vs. collectivism	Correlation coefficient	.289 <sup>a</sup>	.226 <sup>a</sup>	.245 <sup>a</sup>
	Sig. (2-tailed)	.000	.000	.000
Masculinity vs femininity	Correlation coefficient	.135 <sup>a</sup>	.241 <sup>a</sup>	.178 <sup>a</sup>
	Sig. (2-tailed)	.012	.000	.001
Uncertainty avoidance	Correlation coefficient	.167 <sup>a</sup>	.178 <sup>a</sup>	.183 <sup>a</sup>
	Sig. (2-tailed)	.002	.001	.001
Indulgence vs restraint	Correlation coefficient	.107 <sup>a</sup>	.148 <sup>a</sup>	.151 <sup>a</sup>
	Sig. (2-tailed)	.047	.006	.005
Long- vs short-term orientation	Correlation coefficient	.235 <sup>a</sup>	.153 <sup>a</sup>	.180 <sup>a</sup>
	Sig. (2-tailed)	.000	.004	.001

\*Correlation is significant at the .05 level (2-tailed).

<sup>a</sup> Correlation is significant at the .01 level (2-tailed).**Table 8**  
Correlation matrix. Nationality and cultural factors.

Spearman's Rho		Nationality	Comparison to Hofstede's earlier results
Power distance	Correlation coefficient	-.306**	A strong positive correlation would be expected
	Sig. (2-tailed)	.000	
Individualism vs. collectivism	Correlation coefficient	-.322**	A strong positive correlation would be expected
	Sig. (2-tailed)	.000	
Masculinity vs. femininity	Correlation coefficient	-.294**	A strong positive correlation would be expected
	Sig. (2-tailed)	.000	
Uncertainty avoidance	Correlation coefficient	-.125**	Should be a strong negative correlation according to Hofstede's earlier results
	Sig. (2-tailed)	.020	
Indulgence vs. restraint	Correlation coefficient	-.037**	Should be a strong negative correlation according to Hofstede's earlier results
	Sig. (2-tailed)	.496	
Long vs. short-term orientation	Correlation coefficient	-.227**	Should be a strong negative correlation according to Hofstede's earlier results
	Sig. (2-tailed)	.000	

they would not be expected to (see Table 2). Hofstede's earlier results would also suggest a strong positive correlation in Table 8 for the factor masculinity vs. femininity, and there would be a strong negative correlation for the factor indulgence vs. restraint. This means that Hofstede's correlation between nationality and cultural traits must be questioned.

#### 4.6. Gender and age of vs. cultural factors

Table 9 shows that there are statistically significant correlation between participants' gender and their attitudes toward power distance, PD ( $Z = -2.295$ ); between gender and attitudes toward individualism/collectivism, IC ( $Z = -3.506$ ); and between gender and long/short-term orientation, LSO ( $Z = -3.425$ ). The women have lower power distance, are more individualist, and are more long-term oriented. There are no significant correlations with the other cultural factors.

The results show that there are very weak correlations between the students' age and their attitudes in regard to all cultural factors except individualism vs. collectivism where older are more geared toward collectivism than younger (Table 9).

## 5. Discussion and conclusion

From the results presented above we can see positive attitudes toward all mobile learning factors:

The respondents' attitudes toward mobile learning are very positive with individualization being most positive (83%) followed by collaboration (74%), and authenticity (73%). This suggests that educators need to consider the relevant integration of mobile technologies in second and foreign language teaching and learning. Such integration requires not only language teachers' willingness to design mobile learning environments, but also a sound pedagogical basis. Pedagogies may differ in different cultural contexts, depending on various learning practices. Nevertheless, the pervasiveness of mobile technologies and their use in language learning, among others, will challenge and extend the existing learning theories. The rapid integration of mobile devices in individuals' everyday lives and the language learners' positive attitudes toward the integration of mobile technology in the institutionalized second language learning in higher education bring

**Table 9**  
Correlation matrix. Gender and age vs. Hofstede's cultural factors.

		PD	IC	UA	LSO	MF	IR
Gender, *Mann–Whitney <i>U</i> test	Z	-2.295	-3.506	-.806	-3.425	-.644	-.907
	Asymp. Sig. (2-tailed)	.022	.000	.420	.001	.520	.364
Age, *Spearman's Rho	Correlation Coefficient	.296 <sup>a</sup>	.424 <sup>a</sup>	.071 <sup>a</sup>	.183 <sup>a</sup>	.284 <sup>a</sup>	.077 <sup>a</sup>
	Sig. 2-tailed	.000	.000	.186	.001	.000	.153

UA - uncertainty avoidance; MF - masculinity vs femininity; IR - indulgence vs restraint.

<sup>a</sup> Correlation is significant at the .01 level (2-tailed).

up the issue of the interrelatedness of technology, theories of learning, and educational practices rooted in various cultural contexts. Change in any of these factors will affect the others. Even though teacher role is different in different learning cultures or educational practices, from the point of view of social constructivism and in view of the new communication paradigm we can re-consider this role. Regardless of cultural contexts, teachers and course designers will have to become more oriented toward facilitation of individuals' learning. In this facilitation, teachers or instructors designing formal learning practices should take into consideration informal learning settings, which become available through the use of mobile technology.

Regarding the issue whether any cultural factor, as of the Hofstede definition, can explain any of the attitudes we found that there are correlations but they are very weak. This means that Hofstede's factors cannot explain the differences in MALL attitudes. The findings are interesting because they show that there are overall very positive attitudes toward mobile learning, and these differences do not come from cultural factors, as defined by Hofstede. This is an important finding as it means that traditional pedagogical cultures often found in Asian countries will be challenged by the more constructivist pedagogy on which typically e- and mLearning is based.

We found strong positive correlations between gender and attitudes toward MALL. This means gender is a stronger predictor than Hofstede's cultural factors. Gender is the only factor that does make a difference for attitudes to MALL, but we cannot see from this investigation if this influence is permanent or temporary, as it has shown to be in other aspects of Internet use. As an example of a temporary influence, men were first to the Internet in the 1990s but in a few years women caught up. An example of a more permanent difference is that women and men typically do different things on the Internet.

As a test of the Hofstede model we investigated if the factor nationality influences any of the cultural factors as defined by Hofstede. We found that there are correlations but very weak ones. This means that nationality cannot explain the differences in Hofstede's cultural factors.

As a further test on whether cultural factors may be influenced by other things than nationality we investigated if any other personal factor, such as age or gender, influences the cultural factors. We found that gender influences power distance, individualism/collectivism and long/short-term orientation, while age influences only individualism/collectivism.

In conclusion, the hypothesis that cultural differences impact the perceptions of, and attitudes toward, mobile technology for language learning among students must be rejected. Instead, all in all this study shows that technology itself seems to be the most important culture-shaping factor, more important than culture inherited from the physical environment, and more important than age. According to our study women are slightly quicker to adopt these attitudes but as both men and women are very positive this seems to be only a difference by degree. Therefore we conclude that *cultural background does not significantly impact these perceptions and attitudes. To the contrary, technology use is more important for shaping culture.*

The paper contributes to the literature by relating use of mobile devices in education to cultural factors that are traditionally thought to be very influential for, if not directly guiding, education design. The finding that the attitudes related to technology culture (e.g. mobility, individualism, etc.) are more important for students' attitudes and behavior than attitudes related to (national, traditional, local) culture is an important contribution as it shows that existing local cultures are not insurmountable and that education design based on the features of mobile technologies is likely to be positively received in countries of different cultures.

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## Appendix Items by construct.<sup>1</sup>

Read the following statements and choose/mark one of the options below each statement:

**strongly disagree/disagree/neither agree nor disagree/agree/strongly agree.**

Power distance

1. Higher level managers should receive more benefits and privileges than lower level managers and working staff.
2. Managers should be careful not to ask the opinions of subordinates too often. Otherwise, managers might appear to be weak and incompetent.
3. Managers should make most decisions without consulting subordinates.

Individualism–collectivism

4. It is more important for a teacher to encourage loyalty and a sense of duty in learners than it is to encourage individual initiative.
5. Individual rewards are not as important as group welfare.
6. Group success is more important than individual success.

Uncertainty avoidance

7. Providing opportunities to be innovative is more important than requiring standardized work and learning procedures.

<sup>1</sup> In this appendix, the questions regarding respondents' background information are not included. Therefore the number of scales is 27 and not 35, as mentioned in the text. The constructs' headings are added in this text, but not in the original version that was distributed among the participants.

8. Rules and regulations are important because they inform learners what the educational institution expects of them.
9. People should avoid making changes.

#### Long- versus short-term orientation

10. Thrift (being careful with money and things) is a desirable trait for children.
11. I am very proud to be Chinese/Swedish.
12. Virtuous behavior toward others consists of treating others as one would like to be treated oneself.

#### Masculinity–femininity

13. It is more important for men to have a professional career than it is for women to have a professional career.
14. Women do not value recognition and promotion in their work as much as men do.
15. It is preferable to have a man in a high level position rather than a woman.
16. There are some jobs in which a man can always perform better than a woman.

#### Indulgence versus restraint (happiness, life control, importance of leisure)

17. Overall I can consider myself to be a very happy person.
18. Some people feel they have completely free choice over their lives, while other people feel that what they do has no real effect on what happens to them.
19. Leisure time is a very important part of my life.

#### Personalization

20. I (will) appreciate the opportunity to act independently when using mobile devices in my language learning (teaching).
21. It is important to use mobile devices in my language learning as they offer me control over the place (physical and virtual), the pace and time at which I learn.
22. It is important to me to make my own choices.

#### Authenticity

23. I (will) enjoy using mobile devices in my language learning (teaching) because they can offer access to tasks, which are realistic, and they can offer problems encountered in the real world.
24. I (will) appreciate using mobile devices as they offer me an opportunity to practice my language knowledge in social communities or in the ones, which are similar to real world.
25. I am (will be) able to generate my own learning environment (context) with the help of a mobile device when learning a language.

#### Collaboration

26. In my language learning it is important to communicate with others by using mobile devices in various ways e.g. using text, video and audio with peers, teachers and other experts, and exchange information.
27. It is important to use mobile devices in my language learning as they will offer me an opportunity to collaborate.

## References

- Abdous, M., Camarena, M. M., & Facer, B. R. (2009). MALL technology: use of academic podcasting in the foreign language classroom. *ReCALL*, 21(1), 76–95.
- Arenas-Gaitán, J., Ramíz-Correa, P. E., & Rondán-Cataluna, F. J. (2011). Cross cultural analysis of the use and perceptions of web-based learning systems. *Computers and Education*, 57(2), 1762–1774.
- Barab, S. A., Squire, K. D., & Dueber, W. (2000). A co-evolutionary model for supporting the emergence of authenticity. *Educational Technology Research and Development*, 48(2), 37–62.
- Baskerville, R. (2003). Hofstede never studied culture. *Accounting, Organizations and Society*, 28, 1–14.
- Bhimani, A., Gosselin, M., & Ncube, M. (2005). Strategy and activity based costing: a cross national study of process and outcome contingencies. *International Journal of Accounting, Auditing and Performance Evaluation*, 2, 187–205.
- Chang, C.-K., & Hsu, C.-K. (2011). A mobile-assisted synchronously collaborative translation-annotation system for English as a foreign language (EFL) reading comprehension. *Computer Assisted Language Learning*, 24(2), 155–180.
- Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers and Education*, 59(3), 1054–1064.
- Cook, J. (2010). Mobile learner generated context. Research on the internalization of the world of cultural products. In B. Bachmair (Ed.), *Medienbildung in neuen Kulturräumen. Die deutschsprachige and britische Diskussion* (pp. 113–126). Wiesbaden: VS Verlag für Sozialwissenschaften.
- Corbeil, J. R., & Valdes-Corbeil, M. E. (2007). Are you ready for mobile learning? *Educase Quarterly*, 30(2), 51–58.
- Cronjé, J. C. (2011). Using Hofstede's cultural dimensions to interpret cross-cultural blended teaching and learning. *Computers and Education*, 56(3), 596–603.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- de Jong, T., Specht, M., & Koper, R. (2010). A study of contextualised mobile information delivery for language learning. *Educational Technology & Society*, 13(3), 110–125.
- Fortunati, L. (2012). From west to east and beyond. Main tenets in the studies of the mobile phone. In R. W. Chu, L. Fortunati, P.-L. Law, & S. Yang (Eds.), *Mobile communication and greater China* (pp. 17–32). Milton Park: Routledge.
- Gromik, N., A. (2012). Cell phone video recording feature as a language learning tool: a case study. *Computers and Education*, 58(1), 223–230.
- Haag, J. (2011). From elearning to mlearning: the effectiveness of mobile course delivery. In *Paper presented at interservice/industry training, simulation, and education conference (I/ITSEC), Orlando, Florida, U.S.A.* Available from: [http://www.adlnet.gov/wp-content/uploads/2011/12/e\\_to\\_mLearning\\_paper.pdf](http://www.adlnet.gov/wp-content/uploads/2011/12/e_to_mLearning_paper.pdf). Retrieved 12.02.2013.

- Harrison, G., & McKinnon, J. (1999). Cross-cultural research in management control system design: a review of the current state. *Accounting, Organizations and Society*, 24(5), 483–506.
- Hofstede, G. (2001). *Cultural consequences: comparing values, behaviors, institutions, and organisations across nations*. London: Sage Publications Ltd.
- Hofstede, G., & Bond, M. H. (1988). The Confucius connection: from cultural roots to economic growth. *Organizational Dynamics*, 16(4), 4–21.
- Hofstede, G., & Hofstede, G. J. (2005). *Cultures and organisations: software of the mind* (2<sup>nd</sup> ed.). New York: McGrawHill.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organisations: software of the mind*. London: McGrawHill.
- Hsu, L. (2012). English as a foreign language learners' perception of mobile assisted language learning: a cross-national study. *Computer Assisted Language Learning*, 1, 1–17.
- Huang, Y.-M., Huang, Y.-M., Huang, S.-H., & Lin, Y.-T. (2012). A ubiquitous English vocabulary learning system: evidence of active/passive attitudes vs. usefulness/ease-of-use. *Computers and Education*, 58(1), 273–282.
- Joannidés, V., Wichramasinghe, D., & Berland, N. (2012). Critiques on Gray-Hofstede's model: what impact in cross-cultural accounting research?. In *Conference Proceedings Comptabilités et innovations, Grenoble, France (2012)*. Available from: <http://hal.archives-ouvertes.fr/hal-00690933/>. Retrieved 10.04.2013.
- Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012). Viewing mobile learning from a pedagogical perspective. *Research in Educational Technology*, 20(1), 1–17.
- Kennedy, C., & Levy, M. (2008). L'italiano al telefonino: using SMS to support beginners' language learning. *ReCALL*, 20(3), 315–330.
- Kress, G., & Pachler, N. (2007). Thinking about the 'm' in m-learning. In (Series Ed.) & N. Pachler (Vol. Ed.). *Occasional papers in work-based learning: vol. 1. Mobile learning – towards a research agenda* (pp. 7–32). London: WLE Centre.
- Kukulka-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL*, 21(2), 157–165.
- Kukulka-Hulme, A. (2012). How should the higher education workforce adapt to advancements in technology for teaching and learning? *Internet and Higher Education*, 15, 247–254.
- Kukulka-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: from content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271–289.
- Lai, C., Wang, Q., & Lei, J. (2012). What factors predict undergraduate students' use of technology for learning? A case from Hong Kong. *Computers and Education*, 59(2), 569–579.
- Leidner, D., & Kayworth, T. (2006). A review of culture in information systems research: towards a theory of information technology culture conflict. *MIS Quarterly*, 30(2), 357–399.
- Liang, T.-P., & Yeh, Y.-H. (2011). Effects of use contexts on the continuous use of mobile services: the case of mobile games. *Personal and Ubiquitous Computing*, 15(2), 187–196.
- Liaw, S.-S., Hatala, M., & Huang, H.-M. (2010). Investigating acceptance toward mobile learning to assist individual knowledge management: based on activity theory approach. *Computers and Education*, 54(2), 446–454.
- Li, M., Ogata, H., Hou, B., Hashimoto, S., Uosaki, N., Liu, Y., et al. (2010). Development of adaptive vocabulary learning via mobile phone email. In: The proceedings of the 6th IEEE international conference on wireless, mobile, and ubiquitous technologies in education. <http://dx.doi.org/10.1109/WWMUTE.2010.9>.
- Liu, Y., Hongxiu, L., & Carlsson, C. (2010). Factors driving the adoption of m-learning. An empirical study. *Computers and Education*, 55(3), 1211–1219.
- Lowenthal. (2010). Using mobile learning: determined impacting behavioral intention. *The American Journal of Distance Education*, 24(4), 195–206.
- Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning*, 24, 515–525.
- McSweeney, B. (2002). Hofstede's model of national cultural differences and the consequences: a triumph of faith—a failure of analysis. *Human Relations*, 55, 89–118.
- Ogata, H., & Yano, Y. (2005). Knowledge awareness for computer-assisted language learning using handhelds. *International Journal of Learning Technology*, 5(1), 435–449.
- Pachler, N., Bachmair, B., & Cook, J. (2010). *Mobile learning: structures, agency, practices*. London: Springer.
- Park, Y. (2011). A pedagogical framework for mobile learning: categorizing educational applications of mobile technologies into four types. *International Review of Research in Open and Distance Learning*, 12(2), 78–102.
- Rau, P. P.-L., Gao, Q., & Wu, L.-M. (2008). Using mobile communication technology in high school education: motivation, pressure, and learning performance. *Computers and Education*, 50(1), 1–22.
- Rogers, E. M. (1962). *Diffusion of innovations*. Glencoe: Free Press.
- Sánchez-Franco, M. J., Martínez-López, F. J., & Martín-Velicia, F. A. (2009). Exploring the impact of individualism and uncertainty avoidance in web-based electronic learning: an empirical analysis in European higher education. *Computers and Education*, 52(3), 588–598.
- Sharples, M., Taylor, J., & Vavoula, G. (2007). A theory of learning for the mobile age. In R. Andrews, & C. Haythornthwaite (Eds.), *The Sage handbook of e-learning research* (pp. 221–247). London: Sage.
- Signorini, P., Wiesemes, R., & Murphy, R. (2009). Developing alternative frameworks for exploring intercultural learning: a critique of Hofstede's cultural difference model. *Teaching in Higher Education*, 14(3), 253–264.
- Song, J., & Yang, S. (2012). College students' self-positioning and mobile phone consumption. In R. W. Chu, L. Fortunati, P.-L. Law, & S. Yang (Eds.), *Mobile communication and greater China* (pp. 161–175). Milton Park: Routledge.
- Stead, G. (2012). Towards open formats for mobile Learning. In Proceedings of the 11th international conference on mobile and contextualised learning (pp. 78–85). Available from: <http://ceur-ws.org/Vol-955/>. Retrieved 15.04.2013.
- Stockwell, G. (2008). Investigating learner preparedness for and usage patterns of mobile learning. *ReCALL*, 20(3), 253–270.
- Sung, E., & Mayer, R. E. (2012). Students' beliefs about mobile devices versus personal computers in South Korea and the United States. *Computers and Education*, 59(4), 1328–1338.
- Thatcher, J. B., Stepina, L. P., Srite, M., & Liu, Y. (2003). Culture, overload and personal innovativeness with information technology: extending the nomological net. *The Journal of Computer Information Systems*, 44(1), 74–81.
- Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Language Learning*, 21(3), 217–228.
- Traxler, J. (2010). Students and mobile devices. *Research in Learning Technology*, 18(2), 149–160.
- Viberg, O., & Grönlund, Å. (2012). Mobile assisted language learning: a literature review. In *Proceedings of the 11th international conference on mobile and contextualised learning* (pp. 9–16). Available from: <http://ceur-ws.org/Vol-955/>. Retrieved 15.04.2013.
- Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press.
- Wang, J., & Cheng, C.-T. (2012). The history of mobile phone in China. In R. W. Chu, L. Fortunati, P.-L. Law, & S. Yang (Eds.), *Mobile communication and greater China* (pp. 64–79). Milton Park: Routledge.
- Wang, Y., Wu, M., & Wang, H. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, 40(1), 92–118.
- Wertsch, J. V. (1991). *Voices of the mind: A sociocultural approach to mediated Action*. Cambridge: Harvard University Press.
- Wu, W.-H., Wu, Y.-C., Chen, C.-Y., Kao, H.-Y., Lin, C.-H., & Huang, S.-H. (2012). Review of trends from mobile learning studies: a meta-analysis. *Computers and Education*, 59(2), 817–827.

## Web references

- Emerging Money. (2013). *Smartphones: China's next great economic indicator*. Available from: <http://emergingmoney.com/china/hidary-smartphone-foxi-aapl-bidu-chu-goog/> Accessed 15.03.2013.
- UNESCO mobile learning Week report. 12–16 December 2011, HQ Paris. Available from: <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ICT/pdf/UNESCO%20MLW%20report%20final%2019jan.pdf> Retrieved 10.03.2013.
- Statistics Sweden. Use of computers and the Internet by private persons in 2011. Available from: [http://www.scb.se/Pages/PublishingCalendarViewInfo\\_\\_\\_259923.aspx?publobjid=14444](http://www.scb.se/Pages/PublishingCalendarViewInfo___259923.aspx?publobjid=14444). Retrieved 12.03.2013.
- Jingting, S. (2013). Mobile phone penetration rate likely to pass 120% in 2013. *China Daily*. Available from: [http://www.chinadaily.com.cn/china/2013-02/27/content\\_16262196.htm](http://www.chinadaily.com.cn/china/2013-02/27/content_16262196.htm). Retrieved 01.04.2013.
- New Media Trend Watch. Sweden. Mobile devices (2013) Available from: <http://www.newmediatrendwatch.com/markets-by-country/10-europe/85-sweden> Accessed 28.03.2013.