Cultural Aspects Influencing the Application of E-Learning: A Literature Review

I Permatasari, D I Sensuse, H B Santoso
Faculty of Computer Science, Universitas Indonesia, Depok, West Java, Indonesia

Abstract. This research was carried out to identify the influence of cultural aspects on the user experience in applying e-Learning in education. The approach applied in this study is limited to the e-Learning assessment system, which focuses on human-computer interactions but ignores the unique characteristic of the users. Culture is one of the influences that shapes the human pattern of thinking in response to action which results in a reaction. Therefore, investigating the users’ characteristic requires a unification in terms of cultural factors and dimensions (aspects) which are the focus of the findings in this literature review. This paper has found 15 cultural dimensions with six of them that are cultural concepts adopted from Hofstede’s theory, while the other nine are non-Hofstede or compiled theories. The other factor brought up by several researchers in the literature study is the socio-economic factor, but to be considered as a supporting factor (external factor) as it indirectly influences the user experience, and it’s the limitation from this literature. In addition to the cultural aspects, the research was also able to construct a framework to measure the usability of e-Learning application based on the user experience.

1. Introduction
The massive penetration of the internet around the world after its discovery in 1993 [1] has enhanced performances in various areas, for instance in education, governance, and business, which are now known as e-Learning, e-Government, and e-Business/e-Commerce. This study specifically focuses on the area of education (e-Learning or distance learning). The incorporation of technology in education functions as a supporting tool to enhance participation and minimize limitations of space and time for teachers as well for students [2]. E-Learning is an online platform that delivers educational lessons and methods utilizing information technology and serves the purposes for studying, teaching, training, or gaining knowledge unbound by place and time [3].

In e-Learning, humans are essential players both as teachers and as learners: to teach and be taught. Since humans have unique characteristics or personalities, one factor that may affect the decision to use which technology is the culture of the people using the technology. According to [2], [4], [5] cultural diversity and economic power intercept the application of e-Learning. Hence, these authors have conducted studies by harnessing literature review to reveal cultural aspects within the user experience in e-Learning application.
2. Literature Review

There are various definitions of culture: culture is an art, customs in a society, philosophy, anthropology, or tradition within an organization, community, and nation [6]. Hofstede defines culture as follows [6], [7] “a collective phenomenon, because it is shared with people who live or lived within the same social environment. Culture consists of unwritten rules of a social game. It is the collective programming of the mind that distinguishes the member of one group or a category of people from others”. On the other hand, [6] augments culture can be invented through the act of communication which is viewed as the foundation to acknowledge a culture that involves values, beliefs, and external perspectives.

The interpretation of a study in Anthropology that is linked to humans as users of technology provides two meanings of culture as written in a book by Conrad Kottak entitled Cultural Anthropology: Appreciating Cultural Diversity, 2015: 1) A British anthropologist, Sir Edward Tylor refers to culture as an interconnection of human acts and minds that submit to thoughts and agreed laws; thus, this can be taken into account for a scientific study; 2) Tylor’s description of culture adds a point from an anthropological view which is a related subject and is broadly recognized: “Culture … is a complex whole which includes knowledge, beliefs, arts, morals, laws, customs, and any other capabilities and habits acquired by man as a member of a society”. Tylor has given his thoughts, emphasizing on the attributes—which people are attached to- that are not obtained through biological inheritance but by the surrounding and the nurturing within a particular society where they are in contact with a certain cultural tradition exposure [8].

Culture is held accountable to the reception and the utilization of technology within an organization. It is reflected through the habits of system’s users [9]. The research conducted by [10] hypothesized to look for further explanation on distinctive reactions in the use of technology among students. The findings are interrelated cultures, levels of education, advancement of technology, attitude in the use of technology which then are grouped into user demography categories [10]. Culture is perceived as a change in human behavior [9], [11]. It is generally known that culture itself cannot be sufficiently defined merely as human behavior [6], [9], [10]. The definition of culture is better described by cumulative knowledge, experience, belief, hierarchy, geographical, characters, relationship, etc. [6].

Pointing at all the prompted definitions on culture, it can be underlined that a diversity in culture is invented by an individual through behavior, attitude, habit, as well as environmental factors. Thus, in this study, culture is recognized as all forms derived from thinking and individual behavior patterns in using the e-Learning application.

3. Method

The systematic review chosen by the authors in this research benefits from the Preferred Reporting Items for Systematic Review and Meta-Analyses or known as PRISMA [12]. The steps undertaken by the authors in compliance with the PRISMA manual are as follows:

3.1. Feasibility Criteria

The authors included all types of study references that are linked to cultural aspects in using the e-Learning system spanning from 2007 to 2017. The selection of the past decade time range intends to acquire the most current perspectives about cultural aspects inside the e-Learning implementation. The major inclusive criteria are the presence of the cultural aspects and e-Learning (including other naming’s) terminologies in the abstract. Furthermore, the writers also analyze the conformity of articles by sorting the availability of the review process prior to their publishing. In addition, the writers of this study only opt to select English published articles.

3.2. Information Resources

The search for information resources concentrated on 34 research databases available within the institution in which the writers are currently registered as members. Six research databases were selected from the 34 data. These six online databases were selected as they offer more journals on topics of the information system/computer science, namely SpringerLink, Scopus, IEEE Xplore, Science Direct,
ACM, and Emerald Insight. The six sites will then be taken as resource sites to collect articles for the research purposes. The search for articles was finalized on February 28, 2018.

3.3. The Search
The search for articles or academic papers was carried out using keywords, such as culture, e-Learning, and also user experience in order to narrow down the search scope. The writing was facilitated by advanced search tab which was provided in the databases. The keywords were then combined by an operator ‘AND’, while the field of search was limited to paper abstracts.

In searching in Scopus, the researchers are required to include an additional search process since the research database only resulted in an index list (list of journal information). Hence, the writers must log on and locate journals utilizing Google search if the Scopus does not provide the directions or inform the link of any particular target journal. Another step for the online database search is to filter the title of the journal or known as DOI (Digital Object Identifier) journal.

In searching articles, the researchers use several terminologies of e-Learning which may include e-Learning, elearning, electronic learning, virtual learning, and online learning. Understanding varied terminologies is substantially important since online database responds differently to the entered keyword such as “e-Learning” or “elearning” that will display different results.

3.4. Source Selection
To sort out the articles from the sea of database, several steps were taken. Firstly, the articles were filtered using keywords to look for titles and abstracts. Step number two, the articles were classified based on their accessibility: whether they are accessible or inaccessible. This includes separating articles of non-English papers, papers requiring fees, unavailability of repository (this is only for Scopus indexed), and possible duplicate articles.

Upon gathering the prospective articles, the articles were screened based on the substance or subject of the topic discussion. Finally, the pre-selected articles were analyzed by scrutinizing the texts. This last step also involves examining the articles for vocabularies of cultural aspects in the e-Learning platforms.

3.5. Data Collection Process
In collecting data on specific topics of cultural aspects or factors, the articles were thoroughly read. The writers not only probed into the cultural aspects but also investigated the reference lists of the articles that may have induced the formulation of those factors.

3.6. Risk of Bias
The probability of risk of bias in this literature study is very low since there is no subjective or personal factor in the ‘user experience’ registered in applying e-Learning. This has been benchmarked and summarized in the definitions of culture as explained in Chapter II of the paper.

4. Result
This chapter discusses the articles or literatures that have been analyzed and elaborates the discussion outcomes. In the end, the writers were able to interpret their point of views built upon their findings and deliberations.

4.1. Research selection
The database derived from SpringerLink, Scopus, IEEE Xplore, Science Direct, ACM, Digital Library, and Emerald Insight resulted in 277 selected articles. An initial sorting-out of the articles was carried out to filter the paper titles and the abstracts that are suitable for the purpose of this systematic review and that are easily accessible.

There were 239 academic papers that were eliminated from the review since these papers were either non-English papers, required fees, had similar titles (possible duplication), were unrelated to e-Learning,
or irrelevant to user experience or not related to culture in technology. As a result, 38 articles were chosen for intensive and full reading. However, only 8 articles matched the criteria for this research in studying the cultural aspects of using e-Learning. The writers have collected 15 cultural dimensions as well as 5 cultural factors which are grouped based on the reference journal into one single dimension. The flow chart depicts the research selection process:

![Flow chart of research selection process]

**Figure 1.** The flow of research selection

### 4.2. Research characteristic

There are two centered characteristics in reviewing the 8 articles. The first one is to explain the cultural aspects that are involved in implementing e-Learning. The second one is studying the factors that are grouped into one dimension of the users’ culture. The two approaches focus on the general aspects in technology but also put emphasis on the cultural distinctions of the users based on their countries or national origins (cross culture).

### 4.3. Risk of bias

The concern for risk of bias is non-existent in this study as the two designated distinct characteristics are non-biased. The focus is not only on the users’ culture as a cross culture aspect, but attention is also given to the users’ culture in general or in a particular scope that affects the implementation of e-Learning.

### 4.4. Result and synthesis of research

The writers have confirmed 15 cultural dimensions and 5 factors which are put together into one single dimension that was derived from the 8 articles. The list of cultural concept is presented in Table 1.
Table 1. List of Cultural Concept in E-Learning Implementation and Definition

| No | Author            | Concept                | Dimension                      | Definition                                                                 | Reference |
|----|-------------------|------------------------|--------------------------------|---------------------------------------------------------------------------|-----------|
| 1  | [9], [10], [13]–[15] | Individualism vs. collectivism | Linked to the unity of individual into a major group | Hofstede                                                                 |
| 2  | [9], [10], [14], [15] | Power distance          | Linked to the options of solutions to the ground problem of human inequality | Hofstede                                                                 |
| 3  | [5], [13], [14]   | Masculinity vs. Femininity | Linked to separation of emotional roles between male and female | Hofstede                                                                 |
| 4  | [9], [10], [14], [15] | Uncertainty avoidance   | Linked to the degree of stress in a community in the presence of an uncertain future Connected to long/short term directions, that people have own focused choice that determines efforts: the future, present and past. | Hofstede                                                                 |
| 5  | [15]              | Confucian dynamism      | Connected to issue of self-image concerned by user: self-face, other-face, and mutual-face. Study on learners’ cognitive characteristics, for example their prompt-knowledge, skills and tactics, and to what extent these are an appropriate ground in order to partake in the learning environment | Hofstede                                                                 |
| 6  | [15]              | Face concern            | Related to a definition of target group and the contents provided for this target group | NA                                                                        |
| 7  | [16]              | Cognitive               | Sociability means how far a learning environment contributes to interpersonal contacts and how far participants consider it as social agent. Social dimension also covers the aspects of tutoring/feedback and it is related to issues how far an agent of a learning environment is capable in dealing with group phenomena ensuring beneficial collaborative work. Related to the technical necessities within the e-Learning platform, for example reliability, bandwidth options, scalability and interoperability | NA        |
| 8  | [16]              | Epistemic               | Related to a definition of target group and the contents provided for this target group | NA                                                                        |
| 9  | [16]              | Social                  | Sociability means how far a learning environment contributes to interpersonal contacts and how far participants consider it as social agent. Social dimension also covers the aspects of tutoring/feedback and it is related to issues how far an agent of a learning environment is capable in dealing with group phenomena ensuring beneficial collaborative work. Related to the technical necessities within the e-Learning platform, for example reliability, bandwidth options, scalability and interoperability | NA        |
| 10 | [16]              | Technical               | Associated with learners’ and instructors’ personality traits and external motivation | NA                                                                        |
| 11 | [11]              | Personal                | Associated with e-Learning surroundings | NA                                                                        |
| 12 | [11]              | Environmental           | Associated with e-Learning surroundings | NA                                                                        |
| 13 | [11]              | System                  | Related to infrastructure, system, course, information, institution and service qualities | NA                                                                        |
| 14 | [16], [17]        | 14.1 socio-economicb 14.2 pedagogical 14.3 human (learner) | Related to socio-cultural interpretations, for example socio-economic, pedagogical, human being (learner) ideas. | NA                                                                        |
| 15 | [17]              | 15.1 application 15.2 infrastructure | Related to software and hardware, such as application, infrastructure (virtual and physical items). | NA                                                                        |

Cultural values in groups or individuals have different concepts. The factors on cultural value is similar to the highlighted points and variances among the sorted categories: nation, gender, language,
social, role, etc., whereas the cultural dimension is an adjectival use when people incorporate their values into practice, distinction, conception, an object, or an ideology [18].

An interesting finding in the literature study is the existence of the socio-economic factor which is not in the list of the cultural aspects in Table 1. Even though this factor is not listed as a cultural aspect in the user experience in e-Learning, the socio-economic power serves as a supporting factor in installing the technology implementation. The socio-economic factor is considered as an external factor that does not have immediate or direct link to the user experience in his/her engagement to the application. According to the study by Hong, et al. [3], the cost factor is regarded as an effect aspect from applying e-Learning. If applying e-Learning succeeds, it would affect the socio-economic aspect of the user since e-Learning would cut costs in educational activities by way of efficient time and space as learning becomes closer [3]. Reversely, Sims, Powell, and Vidgen [2] argued that an economic power factor becomes an important support in preparing the infrastructures of e-Learning system as well as preparing the technology surrounding areas where physical installations will take place.

Erii and Helling [16] indicated that in an infrastructure evaluation, the economic factor may be ignored since it only follows and submits to socio-culture background effects. Thus, the writers disregarded the socio-economic factor (economic power, cost) as it is not directly correlated to culture nor to the user experience in applying e-Learning.

5. Discussion and Conclusion

5.1. Discussion

The findings in Table 1 reveal the Hofstede theory of dimensions predominates several past studies by [9], [10], [13]–[15]. This is suspected that the Hofstede dimensions are measured by VSM 2013 and apply the most recent theory. The Hofstede dimensions in this study are more likely to be applied in assessing cross culture aspects involved in the e-Learning platform across countries. However, in different articles, the researchers tend to point at general views without considering the different terrains or areas in particular.

The Hofstede’s cultural dimensions have been applied more extensively that their terminology and scope now cover the organization aspects. Referring to the study by [19], there are 12 dimensions extracted from Hofstede’s cultural dimensions with 6 of them emphasizing on human aspects and the other 6 on the organization aspects. The following are Hofstede’s cultural dimensions: power distance; uncertainty avoidance; individualism vs collectivism; masculinity vs femininity; long-term vs short-term orientation; indulgence vs restraint; process-oriented vs results oriented; job-oriented vs employee oriented; professional vs parochial; open system vs closed system; tight vs lose control; and pragmatic vs normative.

If the theory is compared to the findings from this study and its definitions in Table 1, apparently some parts of the resources have not been brought up to the most recent versions of the theory, but there are parts that have been adjusted to the needs of the research: for example, the use of 6 dimensions which solely have direct correlation to humans. However, the findings only made use of 5 aspects from Hofstede’s cultural dimensions by the time the research was completed.

The changes of Hofstede terminologies from the past to recent versions have gained attention to confirm a compatibility of referred versions. An example is taken from the findings of Zhang’s study [15], in which the publication was not too old, but Zhang used the 2001 Hofstede version; meanwhile, Hofstede’s most updated version was issued for public in 2011. This condition was well-adjusted by [15] that he opted a topic in e-Learning through a virtual class technology. The face concern dimension is weighed as essential due to the presence of face to face interaction during a virtual class session [15]. The dimension is discerned to form a relationship which initiates trust between users and later becomes a pillar to sharing knowledge processes during the e-Learning occurrence. The face concern is a potential medium for people to come up with a decision, while communication is ongoing as part of user experience and based on user image. Three (3) concerns that need to be addressed by users are self-face, other-face, and mutual-face. Zhang mentioned that users with self-face orientation will give a majority
of their attention to personal appearance and interest, whereas a user who is other-face oriented tends to spend his/her focus on others’ needs [15]. In contrast, a mutual face-oriented user could possibly be discovered during the virtual class process that the user shares focus on both himself and the counterpart within the e-Learning platform.

There are 9 other dimensions which are not built on Hofstede’s dimensions. The cognitive dimension is an aspect that highlights the user’s ability and cognitive level. The user’s ability differs from the surroundings he or she is entitled to and is situated at the time the knowledge is received. Unsuitable conditions can lead to misunderstanding the messages and the objectives of implementation. In addition, the epistemic dimension considers the content aspect as substantial to acknowledge between facts and conformities. The content aspect can shape the user’s perception and acceptance towards the e-Learning system.

Social dimension is mirrored in interactional aspects, linked to learner’s commitment and feedback. Technical, system, and technology dimensions contain the same meaning and the outlook on how user experience towards e-Learning application; this experience is mainly influenced by the capability in operating the technology. The better the technology runs, the more satisfaction of the user experience in exploring the application. Technology includes hardware and software.

Personal dimension is an aspect linked to intention and clarity. This aspect brings motivation to the user to either continue the use of application or not. Next is the environmental dimension which includes the environment within the e-Learning application. This aspect can drive the energy of other users for example the instructor’s communication skills: an instructor chooses to apply a fun way of communication which helps flexibility of conversations and dialogs. The success of building and maintaining a conducive environment for users should draw the attention of users to focus on e-Learning. Lastly, the socio-culture perspective-based dimension according to [17] is characterized as a non-technology dimension. This dimension is translated into several supporting factors such as the socio-economic factor which is a social economic power both for users and for suppliers of e-Learning technology; the pedagogical factor is an ability and knowledge of users; and the human (learner) factor relies on the application users.

5.2. Limitation and Conclusion
The findings in Table 1 have revealed that the Hofstede theory of dimensions concludes that cultural concepts are brought by the user experience in utilizing the e-Learning application. The result findings indicated that in applying e-Learning, cultural aspects are necessary and require attention when humans interact with their own kind. The variations of findings are still predominantly constructed by Hofstede’s arguments (Hofstede cultural dimensions).

The other factor brought up by several researchers in the literature study is the socio-economic factor. Nevertheless, this factor is yet to be considered as a main factor rather than as a supporting factor (external factor) as it indirectly influences the user experience. The discussion on the socio-economic factor towards e-Learning that was discussed earlier has become the research limitation.

During the research, the writers have found 15 cultural dimensions with six of them that are cultural concepts adopted from Hofstede’s theory, while the other nine are non-Hofstede or compiled theories (Table 1), such as Power Distance, Individualism, Collectivism, Masculinity, Femininity, Uncertainty Avoidance, Confucian Dynamism, Face Concern, etc. Each dimension has its own view according to the user experience and the objects of research from selected references/articles.

In the future, the writers intend to conduct an evaluation on the findings whether they sufficiently represent cultural factors in applying e-Learning. During the reading and internalizing of the texts, the writers have come across a thought that cultural aspects of every individual vary. Therefore, it is probable that cultural aspects become more specific and are better represented if the area of the object is broadened from e-Learning application to technology. Thus, the desired results can stretch over areas of one particular character of people from national, urban-rural, local, and other levels.
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