Open Peer Review on Qeios

The Relationship Between Attitudes Toward Classroom Learning and Attitudes Toward Digital Classroom Learning

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Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.

Abstract

There are many examples of activities that can be performed in a digital environment, and several variables may affect browsing patterns in the digital environment. This environment may be experienced as a separate environment to the physical one.

Currently, the majority of people study in physical classrooms. Recently, however, it had also became possible to teach and study in “the digital classroom” (i.e., online learning environments) using computers and the Internet. This study examines the question of whether or not there are differences in the way these two types of classrooms are experienced.

This study examined the relationships between attitudes toward classroom learning and attitudes toward digital classroom learning using self-report questionnaires that examined the attitudes of study participants.

This study found that students prefer remote learning. In addition, the study found a negative relationship between attitudes toward classroom learning and attitudes toward digital classroom learning. This finding indicates that the two types of classrooms are not experienced as one environment, but rather, as two separate environments.

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Keywords: Classroom Learning, Digital Classroom Learning, Digital environment, Online learning environment.

Introduction

There are many examples of activities that can be performed in a digital environment. For instance, private organizations and governments make use of digital environments in order to provide better service in an expedited manner to many and diverse populations (Askim et al., 2011). One example is online gambling (Mickelsson, 2013). Other new technologies, such as self-service technologies (SST), also demonstrate how various activities can be performed using digital environments and computers – shopping, for example, can be done using self-service systems (Åkesson et al., 2014). Furthermore, it is possible to utilize virtual and computerized environments in order to learn many different things (Sacks et al., 2013).

Another example for a digital environment is the use of the Internet and social networks in recent years (Bolton et al., 2013), which may also have moral consequences – such as listening to music, using software and watching movies, but not paying for them (Wang et al., 2013). Such uses of the digital environment may have many implications for people with disabilities, and the use of this technology may greatly enhance the lives of such people (Rosner & Perlman, 2018). Additionally, the Internet may serve as a source of a great deal of data and extensive knowledge sometimes published by its users. Governments may restrict this knowledge and the dissemination of these data, and conceal information that it holds despite the insights emerging from the unraveling theory (Milgrom, 1981; Grossman & Hart. 1980; Grossman, 1981). It may also be argued that data and knowledge disseminated over the Internet may affect the response of the masses during the outbreak of a pandemic, for example.

The importance of the digital environment is also demonstrated when it is used as a metaphor for researchers to explain reality (see for example Fields et al., 2018). Thus, due to the much greater exposure of the users to the digital environment in recent years, they are able to understand this metaphor in a better way (see appendix).

Several variables may affect browsing patterns in the digital environment. For example, a previous study examined the question of whether user personalities influence Internet browsing patterns (Amichai-Hamburger, 2002) and revealed that, indeed, personality is a highly-relevant factor in determining behavior on the Internet. Gender differences in browsing patterns have also been examined (Hamburger & Ben-Artzi, 2000). Causes of users' frustrations while browsing the Internet had also examined (Lazar et al., 2003). It had also been found that experience has an effect on browsing patterns (Lazar et al., 2003) and novice users with low education and little computer skills seemed to be at the greatest risk of failing to benefit from web services. In addition, performance speeds (Hargittai, 2002) and cognitive resources (Fisk et al., 2018) while browsing the Internet were also measured, the findings show that user navigation of hypermedia systems exacts a large cost in cognitive load and frequently produces disorientation.

The Technology Acceptance Model (TAM) had been used to clarify how an individual's view of a technology (including the digital environment) is affected by its characteristics, such as its "perceived ease of use" and "perceived usefulness" (Davis, 1989; Davis et al.,1989). However, it should be also noted that the digital environment may be experienced as a separate environment to the physical environment. Measures of risk perception, for example, or of social and moral behavior (Wang et al., 2013) may differ in the two separate environments. As a recent example, studying most typically occurs in physical classrooms, but recently, it had also become possible to teach and study in "the digital classroom", using a computer and the Internet. The question of whether or not there are differences in the way these two types of

classrooms are experienced was examined in this study. Previous studies have found differences in different measures following the transition between the physical and digital environments. Thus, differences were found in various measures following the transition from reading text on paper to reading text in a computerized environment (Ackerman & Goldsmith, 2011; Eshet-Alkalai & Geri, 2007). In addition, changes were found in several measures following the transition from classroom learning without the use of three-dimensional technology to learning that includes the use of three-dimensional technology (Sacks et al., 2013). Another study, however, found similarities between browsing in a computerized environment and wayfinding in the physical environment (Kim & Hirtle, 1995).

Following on from the above, one may expect to find differences between various measures when these are measured in the physical classroom and the digital classroom. However, one may also think that various measures may be interrelated when measured in the physical classroom and in the digital classroom. Thus, for instance, one may expect no connection to be found between attitudes toward learning as measured in the physical classroom and attitudes toward learning as measured in the digital classroom. This is because knowledge cannot be used in a new environment if it was acquired in another environment – that is to say, knowledge cannot be transferred to the new environment. For example, if one is used to studying in one environment, it will be difficult for them to study in a new environment.

According to the above, a connection may be found between attitudes toward classroom learning and attitudes toward digital classroom learning, but it is possible that such a connection will not be found.

This study examined the relationships between attitudes toward learning physical classroom learning and attitudes toward digital classroom learning. The study used self-report questionnaires that examined the attitudes of the study participants.

Method

Participants

Forty-seven participants took part in the study, 22 out of whom were women. The participants' ages ranged from 16 to 50 (mean = 25.76, SD = 6.12). The participants' number of years of education ranged from 10 to 17 (mean = 14.25, SD = 1.67).

Instruments

The study was based on the following research instruments, including questionnaires:

1. A demographic questionnaire, which included questions about age, sex, and number of years of education.
2. A classroom learning attitude questionnaire. This questionnaire presented a variety of situations from various fields and participants were asked to rate their position toward particular statements presented regarding learning on a 5-point Likert scale (see Appendix). The questions were based on previously existing questionnaires.
3. A questionnaire on attitudes toward learning in the digital and physical classroom, based on a questionnaire that

examines attitudes toward computer and Internet use (Rosner & Perlman, 2018).

Procedure

Participants were undergraduate and graduate students at universities and colleges in Israel, as well as non-students, who volunteered to complete the questionnaire. The electronic questionnaire was sent to participants by e-mail.

Results

The relationships between the participants' attitudes were examined. Thus, relationships were examined between average attitudes toward classroom learning, and average attitudes toward learning in a digital environment. The reliability (Cronbach's Alpha) for the measure that examined attitudes toward classroom learning was 0.931. Cronbach's Alpha for the measure that examined attitudes toward learning in a digital environment was 0.918. Table 1 shows the relationships between the assorted variables.

Table 1. *The Relationships Between the Variables*

Variables	1	2	3	4
1. Attitudes toward classroom learning				
2. Attitudes toward digital classroom learning	-.520**			
3. Years of education	-.094	.022		
4. Age	.229	-.112	.242	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A regression analysis was performed that examined the relationships between the measures. The regression model is significant and explains 20.1% of the variance (adjusted R-squared=.201), F (4, 37) =3.331, p<.05. Table 2 presents the values of the regression analysis. The findings show a negative relation between attitudes toward classroom learning and attitudes toward digital classroom learning. No relation was found between the number of years of education and digital classroom learning.

Table 2. *The Relationship Between Attitudes Toward Digital Classroom Learning (Dependent Variable) and Attitudes Toward Physical Classroom Learning, the Number of Years of Education, Age and Sex*

Variables	B	Std. Error	Beta	T	Sig.
Attitudes toward classroom learning	-.618	.183	-.509	-3.372	.002
Years of education	.019	.053	.056	.360	.721
Age	-.023	.028	-.124	-.828	.413
Sex	.102	.260	.062	.394	.696

In addition, it was found that students prefer remote learning over classroom learning. Thus, the mean response for the questionnaire that examined remote learning was found to be 3.12 (SD =.823). The mean response for the questionnaire that examined classroom learning was 2.11 (SD =.805). $p < .001$, $t = -4625$.

Discussion

Studying often occurs in a physical classroom, but it is also possible to teach and study in the “digital classroom” – remote learning and teaching using computers. For example, in the “flipped learning” model, students view a video clip of a lecture via the Internet before carrying out student-centered activities such as projects, inquiry-based learning, and collaborative problem-solving in a physical classroom (Cho et al., 2015). As another example, it is now possible for people to take massive open online courses (MOOCs) that are planned and applied by well-known instructors (Cho et. al., 2015). In an online course, students directly interact with an instructor, classmates, and learning resources via the Internet (Cho et. al., 2015). However, there are differences between the two forms of learning (digital and non-digital) and necessary adjustments may need to be made. This study found that students prefer remote learning. In addition, the study found a negative relationship between attitudes toward classroom learning and attitudes toward learning in the digital classroom. This finding suggests that the two types of classrooms are not experienced as one environment, but rather, as two separate environments. Similarly, there may be additional differences in additional situations following the transition between the physical and digital environments.

In contrast to these findings, when one learns and performs a certain action in one environment, one may be able to remember and transfer knowledge to a new and different environment. In the first stage, after practicing and learning and after the knowledge has been acquired in a particular environment (or domain), it is possible that the activity and knowledge may be transferable to a different and new environment (Barnett & Ceci, 2002). Indeed, cognitive processes that occur while browsing the Internet can be compared to cognitive processes that occur while wayfinding in physical environments. As in wayfinding, a user performs several tasks simultaneously and employs cognitive load while browsing the Internet (Kim & Hirtle, 1995). It appears, then, that the two environments are experienced as the same environment, and knowledge can be remembered and transferred between the two environments.

Nevertheless, there is evidence from laboratory experiments that in many situations, an activity learned in one environment cannot be performed as quickly and easily in a different and new environment (Perlman et al., 2010). As suggested by Hoffman et al. (2017), An activity performed in a particular context in a particular environment is locked into

that specific context and cannot be performed as quickly and easily in a new context and environment (Hoffman et al., 2017; Perlman et al., 2016). This study found evidence that an activity performed in a particular context in a particular environment, i.e. the classroom, is locked to that context.

In the transition between different environments – between the classroom and the digital classroom, for example – there may be differences between attitudes toward learning after switching between environments, as the study above shows. In this context, a sequence of actions is performed as a single and separate unit and not as separate increments of knowledge, in the sense that the memories of the parts or increments of this unit cannot be used in a different and new context when learning a new series of actions (Perlman, et al., 2010). According to this approach, knowledge in one environment (e.g., in the physical environment), is not preserved in increments or "chunks" – It is preserved as a single unit. Therefore, stored parts or increments thereof cannot be used when transitioning into to a new environment (e.g., the digital environment). An interesting metaphor that illustrates this is the transfer of knowledge from a sender to a recipient on the Internet. On the Internet, knowledge is transmitted in separate packets and by separate routes, and not as one unit in one route. This allows for flexibility that probably does not exist when a person transitions between environments, for example between a physical environment and a digital environment, e.g., between a physical classroom and the digital classroom.

An example of another area where one may think that differences could arise between different measures and attitudes toward the environment, and examine whether such differences could be found, is the transition from reading a text on paper to reading a text in the digital environment (Ackerman & Goldsmith, 2011). Thus, for example it was found several of measures yielded better results when reading from paper (Griffith et al., 2001). In addition, another study found that when young people read from a digital display, some measures yielded better results as compared to reading from paper, but the same measures yielded better results when older readers read from paper as compared to a digital display (Eshet-Alkalai & Geri, 2007).

In conclusion, The Technology Acceptance Model (TAM) has been used to clarify how technology (and the digital environment) is perceived, but the negative relationship found in this study between attitudes toward classroom learning and attitudes toward digital classroom learning also implies that the digital environment is perceived as one environment by the computer user, and that it may also be experienced and perceived as separate and distinct from the physical environment.

Appendix

The following statements describe remote learning. They should be rated on a scale of 1 to 5, where 1 = Do not agree at all with the statement and 5 = Largely agree with the statement.

Remote learning is effective
Remote learning improves my technological development
Remote learning saves me travel time to the academic institution
The recorded lessons are of great help
In remote learning, the lessons are organized
It is pleasant to study at home
Remote learning develops independence
I am attentive in remote learning
I connect in time for remote learning classes
My time management is good with remote learning
In remote learning, I am satisfied with my interaction with the lecturer
In remote learning, I am happy with my interaction with other students
In remote learning, the lecturer is attentive to any question
I attend remote learning classes
In remote learning, I feel part of the class
In remote learning, I summarize the material learned in class
I have motivation to learn by remote learning
Remote learning is focused
The material learned in remote learning is clearly conveyed
I am satisfied with remote learning

The following statements describe classroom learning. They should be rated on a scale of 1 to 5, where 1 = Do not agree at all with the statement and 5 = Largely agree with the statement.

Classroom learning is effective
Classroom learning enhances my personal development
I have no problem with traveling to the academic institution
Classroom study helps me understand the material being taught
In classroom learning, the lessons are organized
It is pleasant to study in a classroom
Classroom learning develops independence
I am attentive in a classroom
I arrive on time for classroom lessons
My time management is good in classroom learning
In classroom learning, I am happy with my interaction with the lecturer
In classroom learning, I am happy with my interaction with other students
In classroom learning, the lecturer is attentive to any question
I attend classroom lessons
In classroom learning, I feel like a part of the class
In classroom learning, I summarize the material learned in class
I have a motivation to study in the classroom
Classroom learning is focused
The material taught in the classroom is conveyed clearly
I am satisfied with the learning in the classroom

Digital environment as a metaphor to explain reality:

Virtual reality is used as a metaphor in an attempt to explain objective reality (Perlman, 2023). According to this metaphor, the experience of space and time arises from the activity of a data structure within a database, but it is only an experience and not the objective reality. According to this metaphor, 1 (in the drawing below) is a data structure (Virtual Machine) and 2 is an experience of space and time. The data structures may be experienced as neurons.

According to the accepted theory, however, 1 is neurons in space and time and 2 is an experience of space and time. The activity of the neurons causes the experience of space and time.

There are several practical implications of this metaphor if we take into account known phenomena that are consistent with the metaphor. For example, before designing computational models and laboratory experiments, in an attempt to understand various cognitive phenomena, it is possible to take into account the probabilistic behavior of particles. It is also possible to take into account that information may pass in no time between synchronized particles. The results of laboratory experiments may be affected by these phenomena. For example, response time to a stimulus may be affected by the probabilistic behavior of particles. It is also possible to explain a person's telepathy or knowing when he is being looked at, even when he does not see the viewer, if you take into account that information may pass in no time between synchronized particles.

Statements and Declarations

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Funding

No funds, grants, or other support was received. The authors have no relevant financial or non-financial interests to disclose.

Conflict of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

Ethical statements

There is an approval from a research ethics committee of Hadassah Academic College.

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