Qeios

Research Article

The Negative Relationships Between Attitudes Toward Traditional Classroom Learning and Attitudes Toward Digital Classroom Learning

Amotz Perlman[1]

1. Department of Management, Hadassah Academic College, Jerusalem, Israel

In recent years, the Internet has increasingly been used to improve learning. Thus, an important consideration is how the transition between traditional classroom learning and digital learning methods affects educational outcomes. Another question is whether learning with digital tools is perceived as equivalent to classroom learning.

The purpose of this study is to examine the relationship between attitudes towards learning in a digital classroom (where learners and teachers are assisted by digital tools) and attitudes towards learning in a traditional classroom (without digital assistance). Accordingly, a questionnaire that examines attitudes was used.

A negative relationship was found between learners' attitudes towards learning in a digital classroom and their attitudes towards learning in a traditional classroom without digital means. This finding indicates that learners perceive the learning environment as different when digital means are used compared to when they are not. Moreover, it appears that the transition between environments is challenging for the learners. There may even be a sense of discomfort when moving to study in a new environment. Accordingly, for students accustomed to studying in a classroom without digital tools, transitioning to a new environment can be challenging, as indicated by the negative relationship observed.

Introduction

In recent years, governmental organizations, non-governmental organizations, and private entities have provided a variety of services using digital means, particularly through the Internet. Examples of these services, which are provided to diverse populations across various fields, can be found[1]. Thus, it is evident that governments and private organizations are increasingly utilizing digital service platforms to provide better services in one place[1]. In addition, it is possible to find other examples of services provided by private organizations to various clients using the network[2]. An interesting example that has been reported in recent years is the use of the Internet for gambling[3].

In recent years, the Internet and social networks have transformed how individuals, particularly those with special needs, interact and access resources[4]. For individuals with disabilities, these digital platforms offer unprecedented opportunities to improve quality of life, enabling enhanced communication and social engagement[5]. However, this digital accessibility raises important ethical questions, such as the moral considerations surrounding free service usage and the underlying economic models of online platforms[6].

The importance of exposure to and use of the digital environment is demonstrated when scientists employ this environment as a metaphor to explain reality. The extensive use of the digital environment in recent years, along with increased exposure to it, allows users to understand this metaphor better than before. However, one must, of course, be careful not to use this metaphor in a simplistic way[7].

An interesting question is whether users with different personalities use and behave differently in the digital environment and navigate the internet in distinct ways. Indeed, variation was found in the surfing patterns of different users depending on their personality[8]. Another variable that affects the pattern of use in the digital environment—specifically, the network usage pattern—is the user's gender[9]. Thus, women's internet usage patterns may differ from those of men. Additionally, various factors may influence the level of frustration experienced while using the Internet[10]. The patterns of Internet use and the ability to use it effectively may also be related to greater experience with computers, a higher level of education, and more years of Internet usage[10]. In addition, various studies have measured the speed of execution[11] and the amount of cognitive resources used[12] while

users are using the Internet. It was found that this activity may not always be simple and quick, at least for some users.

In recent years, the use of technology for learning has become widespread. This includes several examples of how learning can occur through computer games. For example, an article reported that a computer game was recently used for teaching and learning mathematics[13]. Similarly, another article reported on learning mathematics using a computer game[14]. Accordingly, in recent years, the Internet has increasingly been used to improve learning.

Thus, an important consideration is how the transition between traditional classroom learning and digital learning methods affects educational outcomes. Another question is also whether learning with digital tools is perceived as equivalent to classroom learning. The study reviewed the literature dealing with online learning environments[15], the literature dealing with online teaching and learning practices[16], and the advantages and disadvantages of online learning[17]. It was found that students did not demonstrate a clear preference for either distance learning or traditional classroom learning. Aragon et al.[18] also found no significant difference in course success rates between the two types of learning modalities. Müller and Mildenberger[19] also found that a combination of remote and classroom learning neither impaired nor improved the quality of learning compared to classroom-only instruction.

According to what was reported above, it can be expected that there will be differences between various indicators measured in the digital classroom (when the learners and teachers are assisted by digital means) and the indicators measured in a non-digital classroom. But relationships may also exist between indices of the digital class and those of the non-digital class. For example, we expect to find relationships between students' attitudes towards digital classroom learning and their attitudes towards traditional in-person learning.

The purpose of this study is to compare attitudes towards learning in two classroom settings: one where learners and teachers are assisted by digital tools, and another where they are not. Attitudes were assessed using a specifically designed questionnaire.

Method

Participants

In Group 1, a total of fifty-two participants took part in the study. The age of the participants ranged from 16 to 56 (mean = 25.76, SD = 11.01). Twenty-seven participants had an academic education, six had education beyond high school (specifically certificate studies), and nineteen had only a high school education. Twenty-four women participated in the study.

In Group 2, a total of fifty-four participants took part in the study. The age of the participants ranged from 20 to 54 (mean = 29.92, SD = 9.58). The average level of education was 3.40 (SD = 1.20), based on a 5-point scale where 1 = less than 12 years of schooling, 2 = high school, 3 = certificate studies, 4 = bachelor's degree, and 5 = master's degree." Thirty-three women participated in this study.

In Group 3, a total of forty-six participants took part in the study. Five participants were less than twenty years old (ages 15-19), twenty-four participants were between twenty and twenty-four years old (ages 20-24), twelve participants were between twenty-five and twenty-nine years old (ages 25-29), and five participants were more than thirty years old (ages 30-47). Twenty-five women participated in this study.

Instruments

The study utilized two main research tools: questionnaires. The first was a demographic questionnaire that included questions about age, sex, and years of schooling (for both Group 1 and Group 2). The second questionnaire assessed attitudes towards learning in the classroom. It presented a variety of learning-related situations, asking participants to rate their attitudes on a 5-point Likert scale (see appendix). The questions were derived from previously existing questionnaires, particularly one that examines attitudes toward computer and network use[5]. This questionnaire was adapted to explore attitudes toward learning in both digital and non-digital classroom environments.

Procedure

The volunteers in the study included undergraduate and graduate students from universities and colleges in Israel, as well as non-students who volunteered to complete the questionnaire. The participants received the electronic questionnaire by e-mail.

Results

In Group 1, the relationships among the participants' attitudes were examined. Thus, the relationships between average attitudes towards learning in the classroom and in the digital environment were examined. The reliability of the index examining attitudes towards learning in the classroom, measured by Cronbach's Alpha, was 0.939. The reliability of the index measuring attitudes towards learning in the digital environment, as indicated by Cronbach's Alpha, was 0.940. Table 1 illustrates the relationships among the various variables.

Variables	1	2	3	4
1. Attitudes towards classroom learning				
2. Attitudes towards learning in the digital classroom	-.349[*]			
3. Years of education	.133	-.246		
4. Age	-.113	.308[*]	-.545[**]	

Table 1. The relationships between the variables

**. *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 to examine the relationships between the indices. The regression model is significant and explains 16.3% of the variance (adjusted R^2 =.163), $F(4, 47) = 3.485$, $p < .05$. Table 2 presents the values from the regression analysis. The findings indicate a negative relationship between attitudes toward learning in traditional classrooms and attitudes toward learning in digital classrooms. No relationship was found between years of schooling and attitudes toward learning in the digital classroom.

Variables	B	Std. Error	Beta	T	Sig.
Attitudes towards classroom learning	-.416	.160	-.342	-2.603	.012
Years of education	-.075	.138	-.084	-.545	.588
Age	.014	.012	.184	1.175	.246
Sex	-.298	.224	-.178	-1.333	.189

Table 2. The relationship between attitudes towards learning in the traditional classroom and attitudes towards learning in the digital classroom (dependent variable), as well as the number of years of schooling, age, and gender.

In addition, it was found that students do not prefer learning in the classroom when the instruction is conducted remotely (in a digital classroom). The average response for the questionnaire examining distance learning through digital means was 2.93 (SD = 0.844), while the average response for the questionnaire assessing in-class learning was 3.68 (SD = 0.693). This difference was statistically significant (p < 0.001, t = -4.266).

In Group 2, the relationships among the participants' attitudes were examined. Thus, the relationships between average attitudes towards learning in the classroom and in the digital environment were examined. The reliability of the index that examined attitudes towards learning in the classroom, measured by Cronbach's Alpha, was 0.932. The reliability of the index examining attitudes toward learning in the digital environment, as measured by Cronbach's Alpha, was 0.919. Table 3 illustrates the relationships among the various variables.

Variables	1	2	3	4
1. Attitudes towards classroom learning				
2. Attitudes towards learning in the digital classroom	-.734**			
3. Years of education	-.042	.223		
4. Age	.117	-.082	.427**	

Table 3. The relationships between the variables

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

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

A regression analysis was conducted to examine the relationships among the various indices. The regression model is significant and explains 55.2% of the variance (adjusted R^2 =.552), $F_{(4, 49)}$ = 17.357, p <.001. Table 4 presents the values from the regression analysis. The findings indicate a negative relationship between attitudes toward learning in traditional classrooms and those in digital classrooms. A relationship was also found between the number of years of study and attitudes toward learning in the digital classroom.

Variables	B	Std. Error	Beta	T	Sig.
Attitudes towards classroom learning	-.754	.098	-.719	-7.669	.000
Years of education	.153	.066	.237	2.324	.024
Age	-.007	.008	-.091	-.870	.388
Sex	.078	.149	.049	.524	.603

Table 4. The relationship between attitudes towards learning in the digital classroom (dependent variable) and attitudes towards traditional classrooms (independent variables), as well as the number of years of study, age, and gender.

In addition, the findings indicate that students do not prefer learning in the classroom when instruction is conducted remotely (in a digital classroom). The average response for the questionnaire examining distance learning was 3.37 (SD = 0.844), while the average response for the questionnaire assessing classroom learning was 3.51 (SD = 0.778).

In Group 3, the relationships between the attitudes of the participants were examined. Thus, the relationships between average attitudes toward learning in the classroom and average attitudes toward learning in the digital environment were examined. The reliability of the index examining attitudes towards learning in the classroom, as measured by Cronbach's Alpha, was 0.902. The reliability of the index examining attitudes towards learning in the digital environment, as measured by Cronbach's Alpha, was 0.931. Table 5 illustrates the relationships among the various variables.

Variables	1	2	3
1. Attitudes towards classroom learning			
2. Attitudes towards learning in the digital classroom	-.653[**]		
3. Age	-.300[*]	.381[**]	

Table 5. The relationships between the variables

**. *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 to examine the relationships between the indices. The regression model is significant and explains 46.5% of the variance (adjusted R^2 =.465), $F(3, 42)$ = 14.043, $p < .001$. Table 6 presents the results of the regression analysis. The findings indicate a negative relationship between attitudes towards learning in traditional classrooms and attitudes towards learning in digital classrooms. A relationship was also found between age and attitudes toward learning in the digital classroom.

Variables	B	Std. Error	Beta	T	Sig.
Attitudes towards classroom learning	−.675	.140	−.559	−4.826	.001
Age	.312	.131	.308	2.388	.022
Sex	−.357	.205	−.214	−1.742	.089

Table 6. The relationship between attitudes towards learning in the digital classroom (dependent variable) and attitudes towards classroom learning, as well as age and gender.

And finally, it was found that students do not prefer distance learning in the digital classroom. Thus, the average response for the questionnaire that tested attitudes towards distance learning was 3.31 (SD = 0.837), while the average response for the questionnaire that tested attitudes towards learning in the classroom was 3.39 (SD = 0.693).

Discussion

In this study, a relationship was found between students' attitudes towards learning in a digital classroom and their attitudes towards learning in a traditional classroom without digital means. If the relationship found was positive, it could be assumed that the transition for the learners between the two learning environments was easy. In other words, it could be assumed that the learning environment is perceived as the same, regardless of whether digital means are used. On the other hand, if we do not find a relationship between attitudes towards learning in digital and non-digital classrooms, it may suggest that these two environments are experienced as separate rather than as one cohesive environment. For demonstration purposes, an earlier study we conducted found a relationship between risk perception while driving and risk perception while crossing the road. This finding indicates that the road environment is perceived as the road environment, regardless of whether one is driving or crossing it. Presumably, the road environment is experienced differently when driving compared to when crossing a road; however, as mentioned, no findings support this. In another study, we found no relationship between risk perception while driving a car and risk

perception while working. This finding clearly indicates that the road environment is perceived as distinct from the work environment.

However, the relationship identified in this study is negative. This finding indicates that learners perceive the learning environment as different when digital means are used compared to when they are not. Moreover, it appears that the transition between environments is challenging for the learners. There may even be feelings of discomfort when transitioning to learning in the new environment. For students accustomed to learning in a classroom that does not utilize digital tools, transitioning to a new environment can be challenging, as indicated by the negative relationship observed.

It is difficult to transfer knowledge learned in one environment to a new environment[20]. Similarly, according to our findings, once learners become accustomed to one learning environment, it can be difficult for them to adapt to a new one. Similar findings were observed in laboratory conditions, where a sequence of actions learned in one context is performed more slowly when executed in a new environment, i.e., a new context. That is to say, there is also evidence from experimental studies conducted in the laboratory that, in many situations, an activity learned in one environment cannot be performed with the same speed and ease in a different and new environment[21]. As suggested by Hoffman and others, an activity performed in a specific context and environment is locked into that context and cannot be executed with the same speed and ease in a different context or environment[22][23].

In conclusion, the negative relationship identified in this study between attitudes toward learning in traditional classrooms and those in digital classrooms suggests that the digital environment is perceived as distinct and separate from the traditional classroom where digital tools are not utilized. These findings could have numerous important implications for the transition to digital learning. For example, it is not possible to move and learn in the new learning environment as if it were the same as the old one. Therefore, the necessary adjustments must be made. These adjustments may include, for example, special training for the teachers. Similar findings were observed in a study that has not yet been published, which examined the transition to working from home.

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

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.

Conflicts of interest

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

Ethics

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

References

1. [a, b]*Askim J, Fimreite AL, Moseley A, Pedersen LH (2011). One-stop shops for social welfare: The adaptati on of an organizational form in three countries. Public Administration, 89(4), 1451-1468.*

2. [^]*Åkesson M, Edvardsson B, Tronvoll B (2014). Customer experience from a self-service system perspecti ve. JOSM, 25(5), 677-698.*

3. [^]*Mickelsson KJ (2013). Customer activity in service. Journal of Service Management, 24(5), 534-552.*

4. [^]*Bolton RN, Parasuraman A, Hoefnagels A, Migchels N, Kabadayi S, Gruber T, Loureiro YK, Solnet D (20 13). Understanding Generation Y and their use of social media: a review and research agenda. Journal of Service Management, 24(3), 245-267.*

5. [a, b]*Rosner Y, Perlman A (2018). The effect of the usage of computer-based assistive devices on the functi oning and quality of life of individuals who are blind or have low vision. Journal of Visual Impairment & Blindness, 112(1), 87-99.*

6. [^]*Wang YS, Yeh CH, Liao YW (2013). What drives purchase intention in the context of online content servi ces? The moderating role of ethical self-efficacy for online piracy. International Journal of Information Management, 33(1), 199-208.*

7. [^]*Perlman A (2025, January 26). Virtual Reality as a Metaphor to Explain Reality. https://doi.org/10.3123 4/osf.io/4h2g7*

8. [^]*Amichai-Hamburger Y (2002). Internet and personality. Computers in Human Behavior, 18(1), 1-10.*

9. [^]*Hamburger YA, Ben-Artzi E (2000). The relationship between extraversion and neuroticism and the di fferent uses of the Internet. Computers in Human Behavior, 16(4), 441-449.*

10. <u>a</u>, <u>b</u>*Lazar J, Bessiere K, Ceaparu I, Robinson J, Shneiderman B (2003). Help! I'm lost: User frustration in web navigation. It & Society, 1(3), 18-26.*

11. <u>^</u>*Hargittai E (2002). Beyond logs and surveys: In-depth measures of people's web use skills. Journal of the American Society for Information Science and Technology, 53(14), 1239-1244.*

12. <u>^</u>*Fisk RP, Dean AM, Alkire (née Nasr) L, Joubert A, Previte J, Robertson N, Rosenbaum MS (2018). Design for service inclusion: creating inclusive service systems by 2050. Journal of Service Management, 29 (5), 834-858.*

13. <u>^</u>*Butterworth B, Varma S, Laurillard D (2011). Dyscalculia: from brain to education. Science, 332(6033), 1049-1053.*

14. <u>^</u>*Wilson AJ, Revkin SK, Cohen D, Cohen L, Dehaene S (2006). An open trial assessment of "The Number Race", an adaptive computer game for remediation of dyscalculia. Behavioral and Brain Functions, 2, 20. doi:10.1186/1744-9081-2-20.*

15. <u>^</u>*Cho YH, Choi H, Shin J, Yu HC, Kim YK, Kim JY (2015). Review of research on online learning environments in higher education. Procedia-Social and Behavioral Sciences, 191, 2012-2017.*

16. <u>^</u>*Carrillo C, Flores MA (2020). COVID-19 and teacher education: a literature review of online teaching and learning practices. European Journal of Teacher Education, 43(4), 466-487.*

17. <u>^</u>*Castro MDB, Tumibay GM (2021). A literature review: efficacy of online learning courses for higher education institution using meta-analysis. Education and Information Technologies, 26(2), 1367-1385.*

18. <u>^</u>*Aragon SR, Johnson SD, Shaik N (2002). The influence of learning style preferences on student success in online versus face-to-face environments. The American Journal of Distance Education, 16(4), 227-243.*

19. <u>^</u>*Müller C, Mildenberger T (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. Review of Educational Research, 34(1), 100394.*

20. <u>^</u>*Barnett SM, Ceci SJ (2002). When and where do we apply what we learn? A taxonomy for far transfer. Psychological Bulletin, 128(4), 612-637.*

21. <u>^</u>*Perlman A, Pothos EM, Edwards DJ, Tzelgov J (2010). Task-relevant chunking in sequence learning. Journal of Experimental Psychology: Human Perception and Performance, 36(3), 649-661.*

22. <u>^</u>*Hoffman Y, Perlman A, Orr-Urtreger B, Tzelgov J, Pothos EM, Edwards DJ (2017). Unitization of route knowledge. Psychological Research, 81(6), 1241-1254.*

23. ^Perlman A, Hoffman Y, Tzelgov J, Pothos EM, Edwards DJ (2016). *The notion of contextual locking: Previously learnt items are not accessible as such when appearing in a less common context. Quarterly Journal of Experimental Psychology, 69(3), 410–431.*

Declarations