

**A RESEARCH REVIEW ON THE ROLE OF TECHNOLOGY IN EDUCATION: PERCEPTIONS
OF LEARNERS AND TEACHERS**

**TEKNOLOJİNİN EĞİTİMDEKİ ROLÜ ÜZERİNE BİR ARAŞTIRMA İNCELEMESİ:
ÖĞRETMEN VE ÖĞRENCİLERİN ALGILAMALARI**

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Abstract

This paper is a small meta-analysis of four articles published in China, Israel, Turkey and the United Arab Emirates in 2003 on the role of the new medium used in education namely the internet. Four totally different studies conducted in four different contexts on the same topic reveal different results which institutions should consider before they use this new medium in their teaching. The common point of the articles was that once the students and teachers believe in the effectiveness of the new way of teaching and learning they try to get as much as they can from it. However, it is also common that institutions should consider some points before they establish an online course. The level of computer literacy of both students and teachers, the institution's technical support and students's readiness to the new medium must be taken into consideration.

Key Words: Technology, the Internet, Learners' Perceptions, Teachers' Perceptions.

Özet

Bu çalışma, Çin, İsrail, Türkiye ve Birleşik Arap Emirlikleri'nde 2003 tarihinde eğitimde kullanılan yeni bir araç olarak internet hakkında yayımlanmış dört makalenin küçük bir analizidir. Bu birbirinden tamamen farklı dört çalışma, farklı ortamlarda aynı konu üzerine yapılmış ve kurumların bu yeni eğitim aracını kullanmadan önce göz önünde bulundurmaları gerekenler hakkında farklı sonuçlar vermiştir. Makalelerin ortak yanı ise, öğretmen ve öğrencilerin bu yeni aracın etkisi hakkında tatmin olmaları durumunda, onu en etkili biçimde kullandıklarını göstermektedir. Ancak, kurumların bilgisayar destekli bir ders vermeden önce göz önünde bulundurmaları gereken bazı noktalar olduğu da ortaya çıkmıştır. Hem öğretmenlerin hem de öğrencilerin bilgisayar okur-yazarlığı, kurumun teknik desteği ve öğrencilerin bu yeni eğitim aracına hazırlık seviyeleri dikkate alınmalıdır.

Anahtar Sözcükler: Teknoloji, İnternet, Öğrenci Anlayışı, Öğretmen Anlayışı

INTRODUCTION

Technological developments have made educators to use technology in their teaching practices. The issue chosen for this research review is in general the use of technology in teaching. Students, taking courses online, have some problems at first since the media used for learning is a new one for them. Teachers who teach online, also have some other problems because most of them throughout their teaching career have only experienced face-to-face teaching and the new way of teaching brings some new issues to consider. Because of the reasons stated above, four articles about the perceptions of students and teachers in distance and online learning have been investigated. Basically, the study in hand, tries to find out answer to the following questions:

1. What are the expectations of students and teachers,
2. why do they want to learn or teach online,
3. what is a better online teaching or learning situation for them.

All studies reviewed were survey studies on students' and teachers' views. All were very recent studies, conducted in 2003. In order to have a global idea about the issue, four studies conducted at four different countries were chosen. The studies were done in Hong Kong (China), United Arab Emirates, Israel, and Turkey. Two were investigating the perceptions of undergraduate students, one of MA students, and one of teachers teaching online. Except for one, instructors who were in charge of teaching

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online conducted the studies. Only in one study, the researcher himself was a student trying to earn his MA degree online. As for their background in conducting research, the first and the last studies' researchers seem to have less experience in the field. Since an MA student conducted the first study, there were some lacking points. It is even possible to observe that from the number of the references used in the literature review part. The second and the third studies were supported by prior studies and in some cases prior studies were used as a starting point for these studies. For example, Selim (2003)¹ designs his study on a model called Course Website Acceptance Model, designed by experts in the field.

SUMMARY OF THE STUDIES

The first study that is analyzed for the research review is titled "Meeting the Needs of Distance Learners" by Sampson, N. (2003)². The study mainly investigates the satisfaction level of a group of both native and non-native students who enrolled on a British University's Master in Education (MEd) distance learning program administered in Hong Kong. The study is intended to assess the experiences of actual distance learners and to see if students' needs were being met by the program. In order to achieve this goal, the researcher has developed an 8-item questionnaire consisting of 6 Likert Type questions and 2 open-ended questions, and administered it to a group of 54 students. The questions were prepared on the following basis: course materials, choice of modules, assignment feedback, assignment completion time, student support, and suggestions for improving the course. For suggestions to improve the course, two open-ended questions were prepared. The other questions on the scale were four-point (Very Satisfied-Satisfied- Dissatisfied- Very Dissatisfied) Likert Type scale. The results of the study reveal that the students were satisfied with the course materials, the choice of modules, assignment feedback, and length of time given to complete the assignments. However, the results also reveal that the students were not satisfied with the support given to them by their instructors both in the United Kingdom and by the advisors in Hong Kong.

The study by Selim H. (2003)³ also investigates the student acceptance of course websites and tries to specify the critical factors contributing to the course website usefulness, ease of use and usage. The researcher comes up with three hypotheses:

1. Usefulness is important in predicting the course websites usage. Course websites' usefulness positively impacts its usage.
2. Course website usage will significantly and positively associate with its ease of use.
3. The course website ease of use significantly impacts its usefulness.

In order to test these hypotheses Selim designs a 27-item scale in which the first 11 items assessed the demographic characteristics, and the next 16 items assessed the above hypotheses. Only the last 16 questions were seven-point Likert-type scale. All the 450 undergraduate students who participated volunteered. The analysis indicated that course website usefulness has significant and direct impact on the course website acceptance, and ease of use significantly affects the students' usefulness.

In another study conducted by Bethy-Marom et al. (2003)⁴, internet-assisted versus traditional distance learning environments were compared, trying to find out what makes students prefer one over the other. The purpose of the study was to examine differences between students who choose two learning environments because at the Open University of Israel students had the chance to choose between face-to-

¹ Selim, H. M. (2003). An Empirical Investigation of Student Acceptance of Course Websites. *Computers and Education*. 40. 343-360.

² Sampson, N. (2003). Meeting the Needs of Distance Learners. *Language Learning and Technology*. Vol. 7. No. 3. 103-118.

³ Selim, H. M. (2003). An Empirical Investigation of Student Acceptance of Course Websites. *Computers and Education*. 40. 343-360.

⁴ Bethy-Marom, R., Chaujut, E., Roccas, S. & Savig, L. (2003). Internet-assisted versus Traditional Distance Learning Environments: Factors Affecting Students' Preferences. *Computers and Education*. 41. 65-76.

face and online learning environments. While investigating the factors, researchers had three types of variables, which were demographic variables, achievement variables and value priorities. Under demographic variables they considered gender and age. For students' past academic achievement they examined three variables; such as, grade in an "Introduction to Statistics" course, English proficiency grade, and the general grade point average. Conservatism values and openness to change values were the other two values that the researchers examined under the value priorities. Data regarding demographic and academic achievement variables were taken from the main student information database for the five courses chosen. They have collected data from 2118 students who enrolled these five courses. A sub-sample of students completed a shortened version of Schwartz Value Survey, which consisted of the 44 values that were found to have consistent meaning across culture. The scale they used was a nine-point Likert Type scale ranging from -1 (opposing my principles), 0 (not important) to 7 (of supreme importance). According to the results of the study, some of their hypotheses were corrected but some were falsified. As expected, the percentage of males in IDL (Internet-assisted Distance Learning) environment was significantly higher than in the TDL (Traditional Distance Learning) environment, across the sample. However, the IDL students had a higher percentage of very young students and of older students compared with the TDL group. In contrast, TDL group had a higher percentage of students in the 21-30 age range, which was something that the researchers did not expect. They were expecting the IDL to have younger group of students. For achievement variables it was found that the students who enrolled in IDL group were better in Statistics. In all courses the IDL group had a higher percentage of students with English proficiency than the TDL group and in four of the courses the average grade in the IDL group was higher than the TDL group and in two of them this difference was significant as expected. Also, consistent with hypotheses students who opted for the IDL environment attributed higher importance to self-direction values, and lower importance to tradition values. As a result, the researchers found out that the students who choose the Internet-assisted Distance Learning environment differ from those who choose the Traditional Distance Learning environment in most of the predicted demographic, achievement and value variables.

The last study has a different point of view. This time not the students' but the instructors' perceptions on online teaching have been investigated by Oruç and Yürekli (2003)⁵. 10 instructors working at Anadolu University, Eskisehir, Turkey had taken an online course for 10 weeks and then they were asked to design their own web pages and teach two courses online using WebCT as a tool. Since all the 10 instructors and their assistants were new in online teaching environment, the researchers wanted to find out the instructors' perceptions on online teaching and if their perceptions will change after a period of time they teach online. In order to investigate this, the researchers design a 20-item Likert-type scale with five points. 17 instructors giving online courses participated in the study. The researchers excluded themselves from the study, since they prepared the questionnaire. To see if the instructors' perceptions have changed over time, they give the questionnaire at the very beginning of the term (right when the instructors start teaching online) and towards the end of the term, to see if there have been any changes in these instructors' perceptions. After an analysis, it was found that the instructors' views towards online teaching had not changed when compared to the beginning of the term.

ASSESSMENT OF THE FOUR STUDIES

Since all the four articles were survey studies, first how a survey analysis should be will be discussed. According to Jaeger (1997)⁶, the purpose of survey research is to describe specific characteristics of a large group of persons, objects, or institutions. Here we have researchers investigating

⁵ Yürekli, A. & Oruç, N. (2003). I Cannot Teach Online. Can I? Paper presented at the Third International Educational Technology Conference & Fair. Eastern Mediterranean University, Turkish Republic of Northern Cyprus.

⁶ Jaeger, R. M. (1997). Complementary Methods for Research in Education. (2nd Edition). Washington DC: American Educational Research Association.

the perceptions of students and teachers towards online teaching and learning. The number of the participants in the surveys which have been analyzed varies from 18 to thousands.

Survey research is the best way to find out a group of people's perceptions about a particular issue. As was also stated in Jaeger (1997)⁷ the most obvious way to secure the desired information is to ask the right people. Since, the purpose is to understand the students' and teachers' point of view, they are the group of people who should be asked about this issue. Because of that, the survey method was the most appropriate way of gathering data from the group of people being studied. Another reason why survey is the most appropriate method to be used is that, with survey studies the researcher wants to find out what is going on in the present. Also, Cohen and Manion (1994)⁸ state "surveys gather data at a particular point in time with the intension of describing the nature of existing conditions or determining the relationships which exist between specific events" (p. 83). The goal is not to see the effect of a variable. The goal is to understand the present situation. This is what distinguishes survey from experimental studies. Therefore, understanding these people's perceptions towards online teaching and learning would be best studied with survey research.

However, using the best way to gather data does not mean that the research or the study is a perfect one. There are some other issues to consider while assessing a study. To begin with, how they define the construct that they are going to deal with is important. For the first study, the concept is the learning needs of online learners and the students' acceptance of course websites as an effective learning tool is the concept dealt with for the second study. In the third study, the concept was what makes the students to choose one way of learning to the other. How do teachers feel about online teaching was the concept investigated for the last study. Having reviewed the concepts, now we have to look at the instruments that have been designed or adopted to search for the concepts mentioned above.

Table-1 A Quantitative Comparison of the Studies

Study #	Number of questions	Number of open-ended questions	Number of respondents	x-point scale	Reliability check
1	8	2	22	4-point scale	√
2	27	-	450	7-point scale	√
3	44	-	-	9-point scale	-
4	20	-	17	5-point scale	-

All four studies have used Likert type scales for data gathering. As can be seen from the table above (See Table-1), the number of questions used in the questionnaires varied from 8 to 44. The number of the respondents varied from 17 to 450. for the third study, the researchers collected the demographic data from 2118 students, but they have not stated to how many students they have given the questionnaire. They only thing we know is that a sub-sample of students has completed the survey. The respondents were given 4 to 9 options to choose from-a wide range to be discussed later.

In the light of the information above, let us begin with discussing the first study. It is stated in the literature that 8 questions are enough to understand the concerns of the learners (Jaeger, 1997). In one of

⁷ Ibid

⁸ Cohen, L., & Manion, L. (1994). Research Methods in Education (4th Edition). London: Routledge.

the questions the respondents were asked about the satisfaction level of support provided on the program. (QN6: How satisfied are you with the level of support provided on the programme i.e., is it enough?). Considering the fact that the students with different levels of knowledge about computers will require different levels of support from the instructors, one cannot decide about the sufficiency of the support provided with only this question. The researcher should have asked some other questions, or maybe before all these questions there might have been a part about the background of the students that can help the researcher when analyzing the results of the questionnaire. Having 2 open-ended questions, the researcher states that he did not want respondents to feel pressured into writing too much. However, in order to eliminate this problem, the researcher could have limited the open-ended questions or word them better. It is always possible to ask respondents to-the-point open-ended questions so that both the researcher and the respondents will not face any problems. For example; one of the open-ended questions used was “What areas (if any) of the program could be improved?”. A respondent can simply list the names of the areas she believes to be improved. However, this may not be enough for the researcher. To ask for the ways of improving these areas might help the researcher in the future to come up with alternatives or suggestions to develop the program because the students can suggest very valuable ways. So, just adding the question “How” at the end of the open-ended question would be helpful. This is why, it is so important to be able to word the questions clearly. Therefore, the researcher’s concern about respondents’ to feel pressured into writing too much might have been solved by wording the items more carefully. Although what have been suggested above might cause the respondents to write more, the most important thing is not to make them tell you what you already know, but to tell you something you do not know.

Among the four studies, only the first one has used two open-ended questions to collect data. Even though the analysis of open-ended questions can be harder for the researcher, they may provide some valuable information which otherwise cannot be collected with a five or seven-point scale. Although researchers need to be very careful when wording open-ended questions, once carefully designed, they may be used as a reliable tool to collect data.

Another important point to consider here is the number of the choices given to the respondents. In this case, having only four choices (Very Satisfied- Satisfied- Dissatisfied- Very Dissatisfied) the respondents did not have the chance to say undecided. The omission of a middle category like “undecided” might have affected the results severely. If a person is undecided the closest choices to him are Satisfied and Dissatisfied, which are totally different than being undecided.

When we look at the second study we see an instrument consisting of 27 items the first 11 of which is used to collect demographic characteristics such as age, gender, nationality and major. The scale was a seven-point Likert scale varying from exceptionally disagree to exceptionally agree. It is possible that the respondents having seven options to choose from had difficulties. According to the literature it is always better to give five options to the respondents, because the more options they have the more difficult it is to decide. In that respect when we analyze the third study we see that the respondents had a 9-point scale to answer. A 9-point scale is really too much for a respondent. It is also confusing, because it is stated that the scale ranged from -1 (opposing my principles), 0 (not important) to 7 (of supreme importance). Since we are not given the questionnaire in the appendix, we do not know what 2, 3, or 5 refers to but still 9 options are too many to choose one among them.

The other 16 items of the second study’s questionnaire were adopted from previous research. Adopting the items from previous research might help for the reliability of the instrument. What made the instrument better than the first study was that the researcher has pre-tested the instrument with 50 undergraduate students and according to the feedback he got he had made some changes on the instrument. Literature suggests that pre-testing of an instrument before giving it to the real audience is one of the best ways to increase the reliability of an instrument. The third study also uses 44 items from a survey study conducted before, but unlike the second study they do not pre-test the instrument with another group of students. Adopting the items from previous studies, without a pre-test, may not be enough for the reliability of a scale. When the fourth study is analyzed, it is possible to see that the

researchers have neither used an adopted scale nor made a reliability check. The 20 items on the questionnaire have been developed by the researchers for the study but; unfortunately, no reliability check was made. On the other hand, the fourth study is the only study, which has used a five-point scale, which makes respondents to decide easily.

Since all the four studies were survey studies, we need to talk about the reactive and novelty threats and how the researchers have dealt with them too. The first three studies collected their data from students and in each case the students were told that all the data were anonymous and were to be used in assessing the acceptance of course websites technology in the higher education instruction environment. In one of the studies the researcher himself was also a student and collected the data from his classmates, but in the other two cases, the students were told to answer the questionnaires by their teachers. We all know that in some cases the participants, especially when they know that they are a part of a study, tend to please the researcher and if their teacher collects the data this possibility is higher. In the last study, the researchers collected the data from their colleagues. Novelty threat, which is known as the willingness to try something new, has been considered by the last study only. For the first three studies we do not know if teaching/learning online was a new concept for them, so we cannot talk about the novelty threat, but in the last case we know that the instructors were using online teaching for the first time in their teaching career and because of that the researchers wanted to see if their perceptions change within time.

Now that we have finished the concepts being investigated and the way the data were collected we can talk about how they have reported their findings. In three of the four studies which have been analyzed the researchers have used tables and bar charts, and they have even used some statistical terms, which made it harder to understand, to explain their findings. Only in the first study tables and bar charts have not been used.

The interpretation of the data is one of the most important issues to deal with. Our concern here was to see if the researchers were able to discuss their findings even though they come up with contradictory results. Beyth-Marom et. al. (2003)⁹, for example, state the hypothesis that the students who choose traditional distance learning environments would be older than the students who prefer internet-assisted learning environment. However, the analysis of the demographic data show that the TDL group had a higher percentage of students in the 21-30 age range which disconfirms the hypothesis. When presenting this result, the researchers try to state possible reasons for this. However, they do not do the same thing for the results, which confirms their other hypotheses. The last study that investigated the perceptions of the instructors on online teaching tends to do the same thing. The researchers expected a change in the perceptions of instructors towards online teaching after they start to teach online and when the results did not support the claim, they relate this with the number of students who attended the courses provided online. According to them, since some of the students did not continue attending online courses, this caused teachers not to have the opportunity to give technical or pedagogical support to their students and this is why their perceptions did not change.

When we look at the figure below, we see how the interpretations of the researchers can be misleading. Figure-1 shows the Mean of GPAs for males and females in Traditional versus Internet distance learning groups. According to the researchers the difference between the scores is big and the students (both males and females) who have high GPAs prefer online distance learning to traditional distance learning. However, when carefully analyzed it is possible to see that the differences of GPA for females is 2.6. For the males the difference is only 2.3. A two-point difference between the grades of the students cannot be stated as a reason for choosing a learning media instead of the other. The difference is not so big. The researchers state the situation as follows “The figures clearly demonstrate that the differences between the IDL (internet group) and the TDL (traditional group) groups....” (p. 71).

⁹ Betyth-Marom, R., Chaujut, E., Roccas, S. & Savig, L. (2003). Internet-assisted versus Traditional Distance Learning Environments: Factors Affecting Students' Preferences. *Computers and Education*. 41. 65-76.

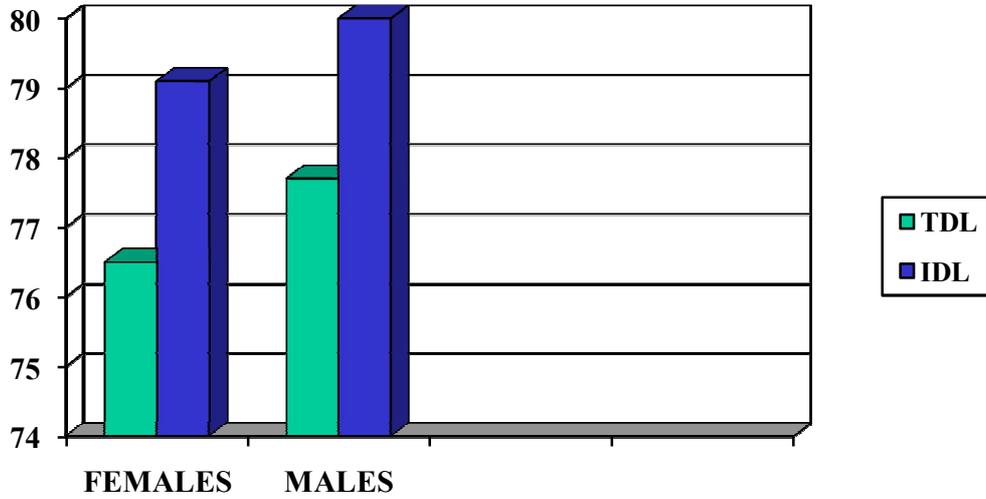


Figure-1 Mean GPA for males and females in TDL and IDL groups

In another study by Selim (2003)¹⁰, the demographic profile of the respondents was collected and the respondents' answers to the survey were matched with the demographic profile. However, years of Internet experience of respondents, which was later correlated with the hypothesis that course website usefulness positively impact its usage, varied among the three groups. This variation might have affected the results. The problem is that the researcher has analyzed the results for all groups together. If the data were analyzed separately for each group, the results could have been different because the number of the students in the 1-3 group is relatively higher than the number of the students in the 6-8 group. When you analyze the results together then there is no need to divide them into three groups.

Table 2 Grouping of the Participants in Selim (2003)

	Groups	Frequency
Years of Internet experience	1-3	276
	3-6	121
	6-8	6

¹⁰ Selim, H. M. (2003). An Empirical Investigation of Student Acceptance of Course Websites. Computers and Education. 40. 343-360.

In Yürekli and Oruç (2003)¹¹, it is possible to talk about what Gilovich calls “flawed rationality”. Since the researchers could not support the idea that the instructors’ perceptions towards online teaching had changed, they decide to analyze the items of the questionnaire related to pedagogy, technical and administrative support separately and yet could not come up with enough significance level of mean. As a result, they state that the reason for this could be the fact that the course was offered optional and therefore there were a lot of dropouts from the course which led the instructors not to use what they have learned when they were taking online courses.

CONCLUSION

According to the results of an analysis of only four studies conducted on the role of technology in education, it is very clear that the new media for learning and teaching have brought different topics for discussion for different people all around the world. What is common for all contexts in which this new media is being used is the shared perceptions of the students and the teachers towards online teaching and learning.

The common point of the articles was that once the students and teachers believe in the effectiveness of the new way of teaching and learning they try to get as much as they can from it. However, it is also common that institutions should consider some points before they establish an online course. The level of computer literacy of both students and teachers must be taken into consideration. An online instructor should be able to give technical support to his/her students, and students need to have access to the Internet. Once the institution accomplishes all these necessities, it is the instructors’ job to design user-friendly web sites for their online courses. The study by Selim (2003)¹² clearly states that usefulness and ease of use can affect the students’ perception of a course website as an effective learning tool.

Also, in Sampson (2003)¹³ it is stated that students feel the need of dialogue with their instructors and with the other students, so it is important for the institution and the instructors to facilitate the interaction among the students and teachers. How the students feel and what the teachers should do to solve these problems? The results of Sampson’s study show that the students want to be in touch with their mentors whenever they need help.

As a result, we can conclude that in order to improve the quality of an online course, an instructor should consider the needs of his/her students and the institution that the instructors are working for should consider the needs of the instructors who are teaching online. In that aspect, it seems that the needs and the perceptions are not so different than a classical face-to-face teaching and learning environment.

¹¹ Yürekli, A. & Oruç, N. (2003). I Cannot Teach Online. Can I? Paper presented at the Third International Educational Technology Conference & Fair. Eastern Mediterranean University, Turkish Republic of Northern Cyprus.

¹² Selim, H. M. (2003). An Empirical Investigation of Student Acceptance of Course Websites. *Computers and Education*. 40. 343-360.

¹³ Sampson, N. (2003). Meeting the Needs of Distance Learners. *Language Learning and Technology*. Vol. 7. No. 3. 103-118.