

Attitudes affecting college students' preferences for distance learning

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Abstract Empirical studies that have examined psychological aspects of the use of Information and Communication Technology (ICT) have indicated that certain psychological attitudes of students towards the use of ICT are of paramount importance when evaluating the effective use of distance learning approaches to instruction and learning. Distance learning at the tertiary level, through the medium of ICT, is seemingly affected by the same psychological attitudes that are known to be related to other successful ICT applications to learning and instruction. In the present study the relationship between two distance learning ICT-based configurations were examined. The results indicate that psychological attitudes held by students differentially facilitate efficient use of distance learning approaches. Satisfaction with learning, level of control of the learning process, and study motivation for distance learning are all positively related to the students' preferences for structured distance learning, whereas independence in learning is positively connected to students' preferences for the more open Internet functionality.

Keywords: Attitude; Conferencing; Distance; Internet; Psychology; Questionnaire; Undergraduate; Video

Introduction

ICT in education

The introduction of Information and Communication Technology (ICT) into the educational system has been hailed as a major catalyst of the long dreamed-about educational revolution (Hoyle, 1983), especially as ICT is designed to serve as a major vehicle for improving the efficiency of the educational process (Jones & Knezek, 1993). Offir *et al.* (1994) described the historical development of ICT use in the educational process and indicated that, since the introduction of ICT, the 'traditional open' courseware continuum succinctly and accurately depicts the progress made in the use of ICT for learning and instruction. The 'traditional open' continuum provides an insight as to how ICT approaches evolved and developed as educational media since the early 1960s. Offir *et al.* (1993) reported that in the early days of ICT use in the school classroom, traditional CAI (computer assisted instruction), based on rigid and 'closed' drill and practice, was the dominant ICT approach. When poignant questions were raised regarding the relative advantages

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in which teachers and students are able to communicate synchronously thereby solving instructional and learning problems in real time (Becker, 1984). Third generation distance learning is flexible, and allows teachers to continuously monitor overall progress of students as well as permitting tutors to modify, reinforce and even model educational processes, thereby meeting the cognitive needs and requirements of students (Wilson & Whitelock, 1997). Interactivity of all types has also been shown to meet general student needs more comprehensively than other distance learning modes. Interaction transports students to a new cognitive environment which motivates and activates them (Finnie, 1989). Research studies have indicated that third generation distance learning is especially suited to higher education (Hoyle, 1983) and to adult learning (Barker & Patrick, 1989). In addition, the interactivity available in these approaches promotes active engagement of students in the learning process and leads to improved academic achievement (Trentin, 1997).

Some research studies have indicated that the various modes of interactive distance learning technologies give rise to positive change in the instructional and learning processes when compared with earlier distance learning systems (Yablon & Katz, 2001; Wilson & Whitelock, 1997). Other studies have emphasised the importance of student activity provided for by interactive distance learning systems and have indicated that the student activity variable contributes significantly to improved student achievement (Trentin, 1997). In addition, interactive systems, in which teachers or tutors present formal lectures or study material from a studio geographically far removed from the classroom where the receiving students are located, promote a high degree of cost-effectiveness and efficiency (Tan, 1992). For example, the CALVIN interactive and collaborative system demonstrates how student interaction with tutors, as well as with fellow students, through an interactive distance learning system facilitates more efficient group learning and problem solving, thereby providing an improved learning environment (Ellis *et al.* 1996).

Distance learning in tertiary education in Israel

In the Israeli system of tertiary education, numerous satellite university colleges, each academically supervised by one of the seven major Israeli universities, have been established in peripheral towns and regional centres. These colleges have to comply with standards congruent with those maintained by the sponsoring universities. Therefore teachers and tutors at the satellite colleges must be of a high enough academic standard in order to be recognised as academically competent by the authorities of the sponsoring universities in order to comply with rigid academic demands. However, there is a pronounced scarcity of fully qualified academic faculty members who are willing to teach at satellite colleges situated in towns geographically removed from the centre of the country.

In order to overcome this problem, and to allow senior faculty members based at Bah-Ilan University located in the centre of the country at Ramat-Gan to teach courses to students studying at satellite colleges far distant from the university campus, the University established a distance learning system which connects the main university campus with the Safed Regional College campus located 250 km. north of the university in the historical Upper Galilee town of Safed. The distance learning system connecting the university to the college comprised two different interactive technologies: a sophisticated interactive synchronous video conferencing

Instrument

A research questionnaire designed to examine satisfaction, independence, level of control and study motivation of students who studied through the two distance learning systems was specially compiled. At the outset, the questionnaire consisted of 120 items which were presented to three distance learning experts for face and content validity evaluation. Ninety-four items met the validity criteria used by the evaluators and were included in the questionnaire administered to the research sample. After administration the responses of the students were factor analysed in a principal components analysis. Eighty items met the criterion of statistical significance (0.30) and were used in the statistical analysis of the research data. The 80 items clustered around 4 significant factors (20 items per factor) which were labelled 'satisfaction with distance learning' (Cronbach reliability coefficient of $\alpha = 0.88$), 'independence in learning' ($\alpha = 0.91$), 'level of control of learning process' ($\alpha = 0.86$), and 'study motivation for distance learning' ($\alpha = 0.87$). Each factor had a latent root of unity and explained at least 10% of the variance.

The research instrument was administered to the two groups of students at the end of the second academic semester.

Procedure

At the beginning of the 1999–2000 academic year the students were randomly divided into two groups for a content-identical year-long (60 hours) courses on the topic 'Introduction to Educational Psychology'. The first group of 35 students was taught by a senior lecturer using the video-conferencing system and the second group of 32 students was instructed by the same lecturer using the Internet approach. For both groups the same senior lecturer taught from a lecture hall, located at the main university campus in Ramat Gan which was specially adapted for both teaching approaches. The synchronous lectures were performed online and the Internet lectures were downloaded from the relevant university website with the lecturer situated in the same lecture hall and teaching environment. The students in both groups studied in a specially constructed lecture theatre suited to both distance learning configurations at the Safed college campus with the video-conferencing group of students able to see the lecturer on screen and to communicate synchronously /interactively with the lecturer during the course of each lesson. In addition to the particular distance learning system used by the lecturer for both groups, all students were required to communicate once weekly with the lecturer by way of email as a secondary and complementary interactive learning system.

Results

Means and standard deviations for the 'satisfaction with distance learning', 'independence in the learning process', 'level of control of the learning process', and 'study motivation for distance learning' attitudes for each distance learning approach were computed from data collected from the research questionnaire. Thereafter a Discriminant Function analysis was computed to evaluate the contribution of each attitude to students' utilisation preferences of the two distance learning approaches. The Discriminant Function analysis indicates statistical significance (Canonical correlation = 0.66, $p < 001$) between the two distance learning approaches as well as correct assigning of 78.65% of the research subjects to their correct distance learning groups. In addition, the 'satisfaction with distance learning', 'level of control of

and effectiveness of drill and practice over more traditional learning and instruction approaches, more flexible and 'open' learning and instruction programs were developed and introduced into the educational system. These included the development of the use of spreadsheets (Dreyfus *et al.* 1997) which contribute to the enhancement of learner independence and creativity and provide students with sophisticated graphical assistance that promotes the understanding of complicated subject matter. The use of databases which were also developed and incorporated in this stage of ICT development (Appelberg, 1997) provide students with the opportunity of enriching their knowledge and comprehension of subject matter by facilitating the ability to conduct comprehensive searches for sources hitherto available only in libraries and museums. The introduction of the use of spreadsheets and databases in the educational process contributed to the promotion of improved learning and instruction and increased effectiveness in the educational process.

During the next stage of development, simulation described by Offir & Katz (1994) as a sophisticated, progressive and improved ICT approach, was introduced into learning and instruction. Through simulations, teachers are able to provide their students with realistic models of subject matter as experienced in real life situations thereby facilitating students' understanding and mastery. Thus simulation enhances ICT mediated learning by providing an added dimension that closes the gap between theoretical subject matter and the applications of knowledge to real life situations.

In the present stage of ICT-based educational developments, multimedia approaches have become an important component of the educational process. Passig & Levin (2000) provided an in-depth analysis of multimedia packages and stated that when using multimedia approaches in learning the student does not only study the subject matter, but also learns how to deal with the synthetically programmed environment. The ease of use and the uniformity of the multimedia interface have significant implications for both teacher and student, since they provide a platform for a higher level of motivation, concentration, and understanding of the content being studied. Multimedia educational packages attempt to provide a clear, consistent and attractive ICT platform, which contributes towards the ability of teachers and students to reach excellence through user-friendly instruction and learning approaches.

Distance learning

The steady evolution of ICT (radio, television, interactive video, electronic mail, world-wide web) has considerably influenced the development of distance learning (Jones & Knezek, 1995). The first generation of distance learning, using traditional printed material and communication via post and telephone, was superseded by second generation audio recordings, radio and television broadcasts (Southworth *et al.* 1981). Both first and second generation distance learning delivery systems were designed primarily to produce and distribute learning materials as efficiently as the technology of the day permitted without any attention to the lack of interactive communication between students and teachers.

As a result of the development of enhanced third generation distance learning systems which include interactive video, email, and world-wide web technologies, learning activity has been redefined to include teacher-student interaction (Katz, 1998; 2000; Trentin, 1997). Interactive video-conferencing or interaction by way of online Internet-based instructional and learning packages offer one-to-many tuition

learning process', and 'study motivation for distance learning' characterised the synchronous distance learning configuration whereas 'independence in the learning process' typified the Internet distance learning system (see Table 1).

Table 1. Statistics for variables and function analysis for two approaches ($n = 67$)

Discriminant	Picture-Tel		Internet		Function
	mean	s.d.	mean	s.d.	
Satisfaction with learning	75.56	7.34	68.91	8.02	0.72
Level of control of learning	71.42	8.22	64.17	7.40	0.61
Study motivation	73.97	6.97	61.18	7.89	0.47
Independence in the learning process	62.61	8.95	74.39	6.84	-0.62

Discussion

The findings of this study confirm the existence of a somewhat similar significant and key relationship between certain psychological attitudes held by students and ICT use (through the medium of ICT-based distance learning) in the learning process at the tertiary level to that indicated in earlier studies (Dunn & Ridgway, 1991; Katz, 1993; Katz, 1995; Katz & Offir, 1990) at the elementary and secondary levels. Results of the research indicate that the interactive synchronous video-conferencing approach was preferred by students significantly characterised by student satisfaction with learning, students' feeling of greater control of the learning process, and motivation to study. However the Internet-type distance learning approach was preferred by students typified by a feeling of independence in the learning process.

On the one hand it appears that the video-conferencing system, which is highly interactive, provides tutors and students with instructional and learning opportunities which closely resemble those available to students who are taught in a regular college lecture hall by an instructor who is physically present during lectures. Seemingly the feeling of satisfaction with learning, the feeling of control of learning and study motivation are in some way related to the students' need for teacher-student interaction that most closely resembles the traditional classroom

On the other hand students who were characterised by independence in the learning process preferred to study through the Internet-based distance learning system rather than through the medium of video-conferencing. It appears that these students were less in need of intensive teacher-student interaction and, because of their higher level of independence in the learning process, preferred the ICT system that allowed for greater freedom in learning. Seemingly the Internet learning approach which does not closely resemble the structure of a routine college lecture hall intrinsic in the video-conferencing approach or have the level of student-teacher interaction is preferred by students more independent in their learning.

From the results of the study an evaluation model, which describes the key attitudes contributing to student preference of distance learning approaches, was derived. In the model (Fig. 1) the differential

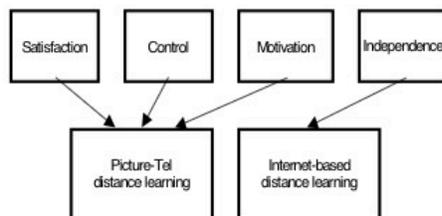


Fig. 1. Evaluation model of distance learning using key psychological variables

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system[†] which allows teachers and students to interact in a way similar to that existing in a traditional lecture hall and less sophisticated Internet technology. In the former, the teacher sees all and is seen by all students and can conduct a dialogue with the students similar to the dialogue conducted by teachers and students in traditional lecture halls. In the latter, students study their particular course material by way of online computer communication established between the university and college campuses and are able to interact (by way of an online chat-room and email correspondence with questions and responses which supplement the Internet-based study material) with a tutor located at the main university campus.

The two distance learning approaches are augmented by an email system available to teachers and students for communication in the time between lectures.

Psychological variables and ICT in education

According to the evidence, ICT use in education, including distance learning, can be described as a major breakthrough for learning and instruction. However, the issue of psychological suitability of the ICT technology to the educational process needs examination. In a series of studies a number of researchers (Chandra *et al.*, 1988; Katz & Offir, 1991; Offir & Katz, 1990) as well as numerous others, testified to the existence of psychological attitudes held by elementary and high school teachers towards the use of ICT as an instructional approach. Research studies have established that psychological attitudes such as independence, creativity, tough-mindedness, sociability, risk-taking, stimulus-and sensation-seeking are key attitudes connected with effective ICT use. Teachers characterised by the above psychological attitudes were shown in the research studies to be significantly more amenable to the use of ICT in instruction than teachers not typified by the same attitudinal constructs.

A similar situation has been found with elementary and high school students (Dunn & Ridgway, 1991; Katz, 1993; Katz, 1995; Katz & Offir, 1990). Students who held attitudes such as positive self-image, positive social-image, independence in the learning process, self-confidence in the learning process, satisfaction with learning, internal locus of control, level of control of learning, creativity, and motivation for study were significantly more positive towards the use of ICT than students not typified by the same traits.

Aim of the study

The aim of the present study was to examine whether the psychological attitudes mentioned above affect students attitudes to distance learning at the tertiary level.

Method

Sample

The research sample consisted of 67 first year students who were registered in the School of Education at the Safed Regional College. All students were accepted for study on the basis of two main criteria: (a) college entrance psychometric examination scores, and (b) mean achievement level attained in school matriculation examinations.

[†] the system used was Picture-Tel®, a commercial product purchased and used by Bar-Ilan University

relationship of the key psychological attitudes to the two distance learning approaches are graphically depicted with three psychological attitudes positively relating to the video-conferencing system and one attitude positively correlating with the Internet-based distance learning approach.

Conclusions

Results of the present research lead to the conclusion that a distance learning system that is highly interactive and most closely resembles a regular college lecture hall is preferred by students with certain learning preferences and attitudes. Students typified by independence in their learning process seemingly prefer a less interactive Internet-type distance learning approach.

When contemplating the use of a distance learning system, university and college authorities should consider the apparent advantages of a more highly interactive delivery system. This type of interactive system is preferable for students who are satisfied with the learning process, need to feel in control of learning and are motivated to study. An Internet-type approach should be considered mainly for independent and self-confident students who do not feel that they are in serious need of intense interaction with tutors or lecturers when they go about their learning.

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