Proceedings of Informing Science & IT Education Conference (InSITE) 2012

IT in Academic Learning: Views from Student Survey Projects

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Abstract

Students entering the higher education instructional arena are likely to encounter various forms and levels of IT integration. Although they may be labeled "Digital Natives", these students may not know how to employ technology-based tools strategically to optimize learning experiences in university settings. As they become exposed to the affordances and challenges of employing IT for learning, they form views and concerns which are of interest to educators and researchers. One way of gaining access to the students' own perspective is to provide opportunities for students to identify issues related to IT in Academic Learning which they find relevant, formulate research questions, prepare and distribute survey questionnaires and analyze the collected data. Thus, they can probe views and behaviors of students in their own and other institutions and departments and develop a wider perspective concerning these issues. Such an opportunity is afforded by the Survey Project framed within our first year Social Science Research course. The Survey project presents a performance task that encourages students to actively integrate and apply knowledge and produce meaningful products, even at the early stages of their undergraduate studies. We will describe the instructional design and provide evidence for the instructional effectiveness, based on student products from the 2010-2011 academic years. The analysis will deal with survey topics, survey questionnaires, samples and methods of collecting data, research questions, data processing and methods of information representation. Using 6 survey samples we will show how the survey topics and questionnaire items reflect students' views and concerns related to IT in academic learning.

Keywords: IT in higher education, Instructional Systems' Technologies, Social Science Research Methods, authentic task, survey questionnaire, IT in academic learning, Data presentation,

Introduction

For more than a decade higher education has been urged to take advantage of the instructional opportunities offered by Information Technology (IT) and embed IT meaningfully in learning and instruction (e.g. Bates & Poole, 2003; Fallows & Steven, 2000; Rogers, 2000; Somekh, 1998; Surry et al., 2005; West, 1999). Students encounter different levels of IT integration in learning depending on the institution, study domain, course topic and the course lecturer (Jacobson, 1998; Georgina & Olson, 2008; Nelson-Laird &

Kuh, 2005). For many first year students this can mean a significant change from their previous high school learning experience. Students encountering IT-rich learning environments need to adapt to sometimes unfamiliar practices such as participating in discussion forums, submitting assignments in file form, communicating with lecturers using specific discussion forums or checking online for schedule updates and other information. The informed use of IT in the educational context may prove challenging even for Digital Natives: "We cannot assume that being a member of the Net Generation is synonymous with knowing how to employ technology-based tools strategically to optimize learning experiences in university settings." (Kennedy et al., 2008). Pertinent examples can be seen in the controversies surrounding the use of laptops and other portable technology in lectures (Bryan, 2004; Gilroy, 2004; Lauricella & Kay, 2010; Ronen et al., 2010).

Inquiry into students' perspectives and concerns regarding IT-rich learning environments has traditionally been carried out by faculty-initiated research using surveys and interviews (e.g. Haywood et al., 2004). This paper describes an alternative method, which consists of having students themselves design, conduct and analyze such research as an authentic performance task within the Social Science Research Methods course. Thus, students were encouraged to reflect on different aspects of IT related practices, and their effect on learning, motivation and retention. The topics students selected and the questions they asked, as well as the information they gathered will be used to display an inside view of students' ideas and concerns. Following a description of the instructional context and activity design, we will present several examples of surveys conducted during the 2010 and 2011 academic years, which we will analyze with two targets in mind:

1. Which aspects of research expertise did students exhibit?
2. Which views and concerns related to IT in Academic Learning were reflected in the surveys?

Instructional Context

The department of Instructional Systems' Technologies (IST) prepares students for careers in Organizational Training and Workplace Learning, which require analysis, design, development, evaluation, implementation and management of instructional systems and other learning environments. The curriculum provides students with the necessary tools to promote and implement advanced information technologies in systems of information, learning and training in the public and the private sectors.

IST students are exposed from the start to a rich variety of IT-based instructional environments. The High Learn content and learning management system (HighLearn - Britannica) provides an integrative environment within which courses are conducted and communication is maintained with official college services (e.g. the library and student administration). Web-based communication and information resources are used (email and popular search engines), as well as course specific information technologies (e.g. spreadsheets and graphic software). Most of the lectures are accompanied by Microsoft Powerpoint presentations. Students employ a variety of IT applications for their personal use such as email, social networks, and search engines. The IST department uses several classrooms equipped with desk-top computers and internet connections, as well as a wireless network freely available throughout the campus. A growing number of students bring and use their own laptops during lectures and recital lessons.

The "Social Science Research Methods" (SSR) first year course is taught in the 2nd semester (4 lessons per week). This is a pivotal course for IST students, as it is related to preceding, parallel and subsequent courses spanning the 3 year degree. The course deals with two main fields: Research methods and an introduction to Statistics. The SSR curriculum is based on interweaving issues from both fields, so that students acquire theoretical knowledge and skills enabling them to read and comprehend research reports and to design, carry out and report on their own research efforts.

The SSR course deals with all basic issues related to Social and Behavioral Science Research such as: research as a way of acquiring and testing knowledge, defining research variables, measurement scales, formulating research questions, confounding factors, defining populations and selecting samples, causation vs. correlation, survey research tools and methods, constructing survey questionnaires, experimental research methodology, descriptive statistics (frequency distributions, measures of central tendency and dispersion, correlation, normal distribution), data presentation methods (tables and graphs), inferential statistics (null and alternative hypotheses, hypothesis refutation, standardized values, t-test, chi-square test).

The survey project is started in the third course meeting and the final product is presented by the pair-teams approximately 6 weeks later. During that period work on the project continues parallel to content learning: students select partners and survey topics within the wide range of IT applications in learning, instruction and training, formulate survey questionnaires and improve them through peer and lecturer feedback, select a sample and administer the questionnaires using various methods, collect and analyze data and prepare and submit a formal research report which they present in class.

The instructional approach driving the inclusion of a survey project as a central assignment in the SSR course is the idea that students learn best by doing and reflecting. Empowering students to implement their acquired knowledge and skills in meaningful and relevant real world contexts is considered a hallmark of high quality education (e.g. De Corte, 2003; Donnelly & Fitzmaurice, 2005; McGrath, 2003). Educators are called to seek ways for engaging students in active learning by defining performance tasks involving team work, independent design, multiple skills, knowledge integration, use of technology, authentic field work, data analysis and reflection. This is important not only for a deeper understanding of the knowledge principles but also for fostering employability skills (e.g. Johns-Boast & Flint, 2009).

General Survey Aspects

Survey Topics

The survey project instructions direct students to select topics dealing with education, instruction, learning, organizational training, informatics, information and communication technologies, student recruitment or other topics relevant to studies in the IST department. To prevent duplication, teams enter two preferences in an interactive shared document. The final topics are decided following some inter-team negotiation and, when necessary, lecturer intervention. Further changes may occur later owing to unforeseen difficulties in carrying out the planned research (e.g. employer disapproval of research in the workplace, difficulty in obtaining permission to survey in schools, lack of team partner's collaboration). Initial research topics are often formulated in overly general terms and are unsuitable for the relatively modest project scope. For example "Tools used for finding information by learners in the education system" or "E-learning at the workplace in Israel" deal with overly extensive populations and multiple issues. Lecturer feedback, delivered either using the course discussion forum or personal face-to-face counseling, leads to narrowing and focusing the field of investigation.

48 survey projects were carried out in the 2010 and 2011 academic years (28 during 2010). Most of the projects were team-pair products, but about 20% were individual student projects, due to

special individual interests or a preference for working alone. The survey projects covered 8 themes (Table 1):

Table 1: Distribution of survey themes

Learning experiences	IT in academic learning	IT in organizational training	IT for assessment	IT in school education	IT at home	IT for advertising, commercial	Other
10	19	4	1	2	2	4	6

The "Learning experiences" theme contains a variety of issues such as "Working and studying", "Effects of previous experience" and "Collaborative assignments". The "IT in Academic Learning" theme contained several recurring issues:

- "Effects of using portable technology during lectures" (5 projects),
- "Effects of the High Learn learning management system on achievements" (3 projects),
- "Using social networks for learning purposes" (2 projects).

Other interesting issues in this theme were "Effect of IT integrated instruction on academic success"; "Attitudes towards IT based learning" and "The selection and use of search engines for learning".

The selection of many topics related to IT in Academic Learning indicate students' concerns and conceptions such as: Dealing with the tension between the freedom to use portable technology and the likely consequences for attentiveness and focus on lesson content; or Assessing the contribution of the integrative Content and Learning Management System.

Survey Questionnaire Structure

The students were given guidelines regarding the required general questionnaire structure. Each questionnaire was to have a short introduction explaining the research context and its expected benefits, promising participant anonymity, identifying the researchers and courteously requesting participant cooperation (Figure 1).

A SURVEY ABOUT THE USE OF INSTRUCTIONAL TECHNOLOGIES
We are students in the IST department of the HIT college. This questionnaire is part of the requirements of the Social Science Research course. The questionnaire is intended to examine various aspects related to online technological tools for learning. The questionnaire is anonymous and intended for research purposes only. We would be very grateful if you could devote a few minutes of your time to fill this questionnaire. Many thanks M. and S.

Figure 1: An example of an introduction to a survey questionnaire.

Students were guided to collect only information they clearly needed and to avoid embarrassing questions. Questionnaires typically began with several simple demographic items such as age, gender, study year, department, ownership of equipment and grade range (Figure 2).

General information

What is your gender?

○ male

○ female

What is your age? 18-22 ▾

Figure 2: Sample demographic items.

The questionnaires contained item clusters dealing with different aspects of the topic under investigation. These were organized in table form (Figure 3) and formulated as statements with which the participants expressed their degree of agreement on a 4 or 5 level ordinal scale (e.g. totally agree to totally disagree).

Study preferences: Mark the degree you agree with the statements **1**=totally disagree, 2=quite disagree, 3=quite agree, 4=totally agree	**1**	**2**	**3**	**4**
I prefer independent study.				
I prefer learning with courseware.				
I prefer learning using the internet.				
I prefer learning with tutorial videos.				
I prefer learning with presentations.				
I have previous experience with web based learning.				

Figure 3: An example of an attitude item cluster.

An additional item cluster dealt with frequency of given behaviors. The participants selected the frequency with which they performed each behavior (Figure 4), on a 4 or 5 level ordinal scale (e.g. very rarely to very often).

Classroom attentiveness: Mark how often the statement correctly describes you 1=very rarely, 2=quite rarely, 3=quite often, 4= very often	**1**	**2**	**3**	**4**
1. At the end of the lesson, can you reconstruct the main ideas that were taught?				
2. Do you chat with your class mates during lessons?				
3. Do you listen to the lecturer attentively during lessons?				
4. Do you leave the classroom during lessons?				
5. Do you play an active role during lessons?				
6. During lessons, do you find your thoughts straying to unrelated issues?				

Figure 4: An example of a behavior item cluster.

Students probably constructed their questionnaires based on examples they had been given, and later refined them through peer assessment and lecturer remarks. One team first interviewed prospective participants from different institutions about web-based learning habits and used this information along with ideas from the literature dealing with "Digital Natives" to build their own questionnaire.

Many students used online survey software to create their questionnaire and distribute it. By marking items as "required" students were able to ensure completion of the questionnaire.

Survey Samples and Data Collecting Methods

The students were instructed to collect survey data from at least 30 participants (excluding members of their own class). The resulting survey samples ranged between 22 and 196 participants, averaging about 50 participants. The sample size depended on students' access to a range of fellow students and acquaintances and the time they began collecting data. Usually, students collected convenience samples depending on whoever was willing to participate. Some teams invested extra effort for achieving balanced samples regarding gender or college departments.

Gender distribution varied between projects, females ranging between 37% - 72% (average = 53%). The participants' ages ranged mostly between 22-30, which is a natural outcome of the convenience sampling and the fact that many of the surveys dealt with undergraduate related topics.

Many of the questionnaires were prepared for online distribution using the GoogleDocs survey tool. This was suitable for distributing to participants via email or using social networks and virtual communities. This method also ensured participant anonymity. An additional bonus was that the data were automatically entered into a spreadsheet and frequency distributions were calculated. Some teams were disappointed by the low online response rate or by the skewed sample it produced, and set out to distribute their questionnaires manually around the campus, or within their circle of friends or work mates.

Research Variables

Students defined two kinds of variables for their research questions and data analysis "simple" and "compound":

Simple variables: Determined by a single questionnaire item and receiving a value according to response options. Examples: age, gender, learning disability, personal status, study domain, study year**,** average grade range

Compound variables: Determined by several questionnaire items each providing a facet of the measured aspect. Value calculated by summing up or averaging the values of the component items. Examples: attentiveness, technological literacy, satisfaction level.

Depending on their sophistication, students defined variables as simple or compound. For instance "information source reliability" could be treated as a simple variable for which the participants select one of the values between "very high" and "very low", or it could be treated as a compound variable based on factors such as the identity of the author, organization, publication etc. Following is an example of the constituent facets of the variable "Student Technology Level" (Figure 5):

A technologically inclined student is one who is acquainted with many technological learning tools and uses them on a regular basis for learning.

1. How frequently do you use the online learning system of your institution?

2. To what extent do you use online information methods and file sharing for learning?

3. How often do you use video recordings of lectures for learning?

4. Which of the following learning tools to you know and use?

The variable was calculated using the average of participants' responses to the above 4 questions. Students with an average above 4 were considered "highly technologically inclined".

Figure 5: An example of the constituents of a compound variable.

Survey Research Questions

The survey project instructions guided students to define 5-10 focused research questions to enable students discover the relationship between the variables related to their research topic. Formulating well-formed research questions had proved a challenge and required considerable training. In a preliminary exercise students were required to formulate relevant research questions about statistical data dealing with the frequency of road accidents and types of vehicles or the distribution of causes of death during a given period. Students often posed "why" or "how" questions, which reflected their legitimate curiosity, rather than formulating questions about the relationship between variables.

Following the mentoring process, most of the research questions in the submitted projects conformed to the required format "What is the relationship / dependence between variable 1 and variable 2, given that (condition)?" or "How is variable 1 related to variable 2?

Some examples:

1. How is student satisfaction with presentation based lectures related to student gender?
2. How is students' online information search ability related to having informatics' training?
3. How are the tools used for content searches related to students' "Learning Motivation"?

Some problematic formulations:

- What is the relationship between the level of technological literacy and web-based learning?"

  Problem: Web-based learning is not a variable
- What is the relationship between a learning disability and the attitude towards web-based learning?

  Problem: Undefined variable
- What are the most popular online learning tools for students in Israel?

  Problem: Not about a relationship
- How much are online learning tools currently used by students in Israel?

  Problem: Fuzzy variables.
- Is there a relationship between the learner's age and his Digital literacy?

  Problem: "Is there?" instead of "What is…?"

Data Analysis

Microsoft Excel was the main tool students used for data analysis and preparing diagrams and graphs. This software was chosen in preference to more sophisticated data analysis software, because students were acquainted with it as part of the MS Office applications and because it covered all the requirements students would need, up to and including their final year project.

Data analysis included descriptive statistics such as frequency distributions, calculation of averages and standard deviation and correlations. Students presented data in tables and varied diagrammatic forms available in Excel. A parallel course dealing with Knowledge Organization and Presentation taught students to prepare compact presentations including multiple information facets (Figure 6), which relates the average quality of learning to the types of student use of the computer during the lecture. For example using the computer for summarizing the lesson is related to relatively high learning quality (3.6), whereas random web- surfing is related to a lower learning quality (3.2).

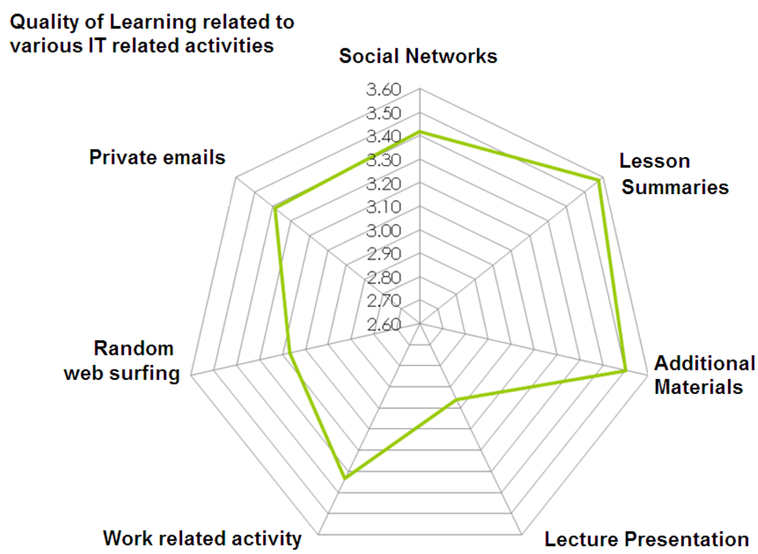


Figure 6: Radar-type graph presenting multiple data facets

Information Technology in Academic Learning: Six Survey Samples

Following are 6 survey samples dealing with various aspects of IT in Academic Learning. For each study we shall present the rationale, some survey research questions, and a summary of the findings. Each study presents a specific issue or concern which the students found relevant. The findings provide information related to the issue of interest with respect to the target population – comprised mainly of undergraduate students in various departments and institutions.

Study 1: Student satisfaction with the use of computer-based presentations during lectures. (Lugasi & Weiss, 2010)

Rationale

The increasing influence of technology on the domains of education and academia has resulted in significant changes in traditional instructional methods. One of these is the transition from writing on a board to projecting presentations during lessons. Undoubtedly, integrating presentations has many advantages: it can present complex images, visual examples and links to relevant web sites. Presentations also save time and effort required for writing, and are helpful for creating an organized lesson plan. However, we must now refer to some major disadvantages of presentations as instructional tools, which might negatively affect students' learning habits:

1. According to published data (The Office of Curriculum Development and Management, 2009; Bartsch & Cobern, 2003) using presentations distracts students' attention and concentration.
2. A presentation-based instructional method might dictate rigid lesson management. The lecturer might adhere to the presentation and be reluctant to stray from the subject boundaries, even if this could be valuable for students. The lecturer might be hurried into covering the content covered by the presentation – at the expense of student understanding.
3. Students may very well avoid summarizing the lecture content, believing the material will continue being available to them. Summarizing lectures has been shown to contribute greatly to knowledge internalization (King, 1992).

Sample research questions

How is satisfaction with Presentation-based Lectures (PBL) related to the…

1. Student's gender?
2. Study domain?
3. Extent lecturers rely on their presentations in lectures?
4. Class size?
5. Frequency of students' use of the presentation?

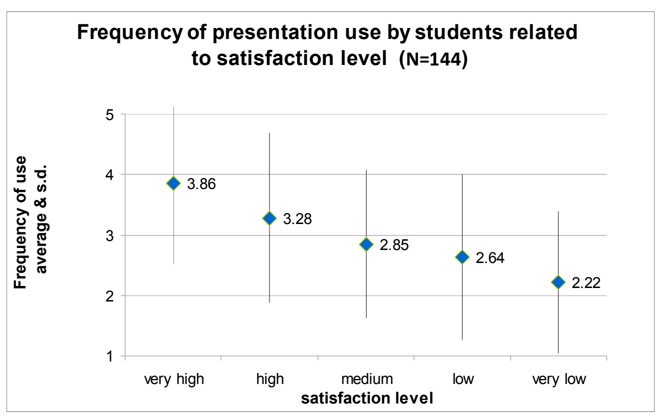


Figure 7: Satisfaction with PBL vs. frequency of lecturer use.

Findings

The sample included 144 students (64% females) from various institutions, studying different subjects. 80 participants (55%) indicated high and very high satisfaction levels with PBL. Average satisfaction level was unrelated to gender or class size. However, there was considerable within-gender diversity. Student satisfaction increased with frequency of use (Figure 7).

Figure 8 summarizes levels of agreement regarding 4 benefits of PBL for learning, by gender. Overall, greater female endorsement was found. The dominant benefits were enhanced concentration for males and facilitating test preparation, for females.

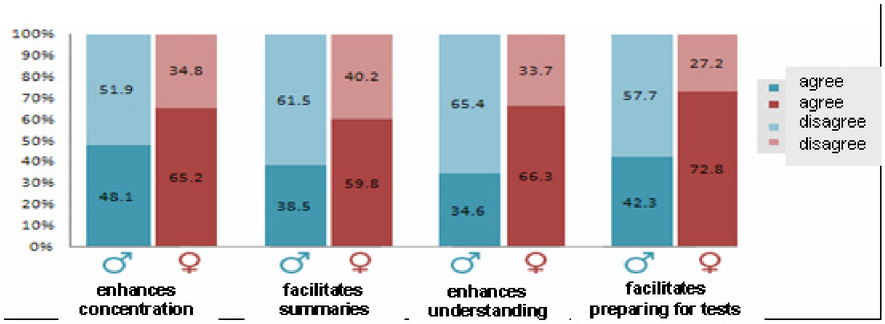


Figure 8: Presentation based lectures' contribution to learning, by gender (N=144)

Study 2: Student Use of Online Resources. (Skurnik & Mizrachi, 2011)

Rationale

In this project we shall focus on investigating the use of online learning tools by students in Israel. We are basing our work on a comprehensive ongoing research, Digital Learners in Higher Education by a research group in the Technological Institute of British Columbia, Canada, since 2008. Social researchers have attributed certain characteristics to people born after 1982 and have labeled them the Y Generation, or the Net Generation (Tapscott, 2009). This generation's attributes are:

- The ability and readiness for team work and group work. The ability to split attention and deal with two or more issues in parallel.
- Technological skills and the ability to quickly learn to operate new appliances.
- Full control of computers and common applications, including the internet.
- Some previous research in the literature:
- Great improvement is needed for advancing Education students' perceptions concerning the use and potential of technology for promoting learning and instruction. Although these are Web Generation natives and are constantly exposed to technology, they prefer to adhere to traditional and well known instructional methods rather than applying technology for techno-pedagogical reforms (Barak & Kogan, 2008).
- Research carried out amongst faculty members of the TA university has shown that with time there has been an increase in integrating the internet in academic instruction, while responding to lecturer and student needs for an improved learning environment (Shamla & Nachmias, 2005).
- Owstone (1997) claimed that after many years of investigating instructional tools, no evidence has been found for the advantage of any single method. One of the explanations is that improved learning may depend on the content and not on the means of delivering it. If the web is considered merely as a mediator then one should not expect a significant improvement in the quality of learning occurring within it. .. For example, in a traditional classroom lacking docu-

mentation, the content of discussions disappears. Whereas web-based discussions are preserved and can be revisited, analyzed, processed, polished, extended and completed.

Research questions

1. Are the online tools we use as IST students implemented in a similar manner in the general student population?
2. What is the relationship between the use of online resources and the study domain?
3. Is there a relationship between the type of academic institution and the level of using online learning tools?

Findings

The sample included 47 students (72% females) from various institutions, studying different subjects. Skype (73%), Google Docs (59%), and Drop box (46%), were the most frequently mentioned types of online software used by students. Considerable use of social networks for learning - moderate (34%) and high (36%). "Technological students" are more exposed to online learning tools (70% vs. 30%) (Figure 9).

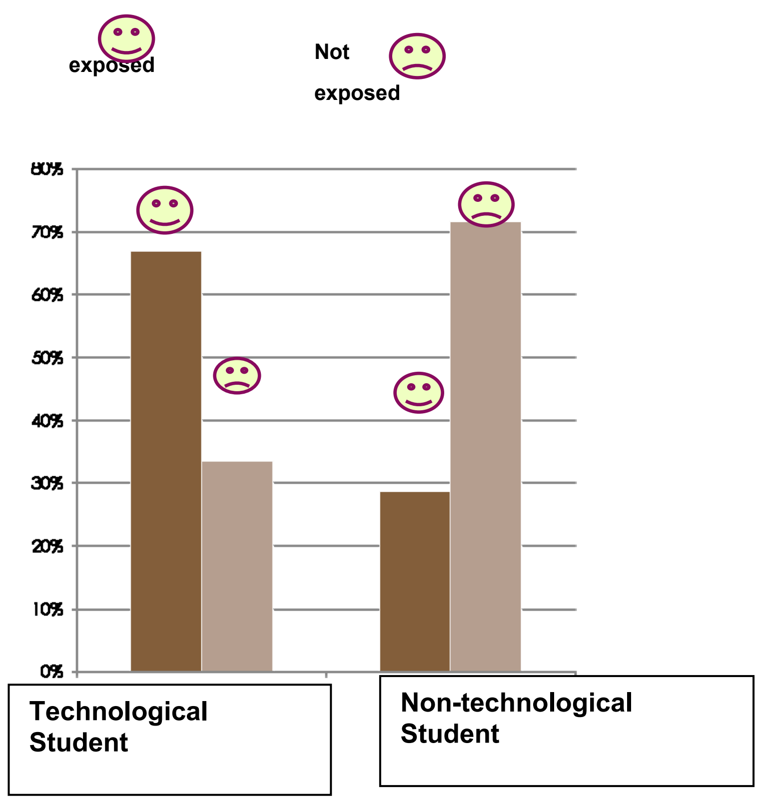


Figure 9: Exposure to online learning tools for student types

Conclusions

Our survey has shown extensive use of online social communication channels for learning purposes. We believe that learning objects involving Skype-based conference calls have great potential. We have also seen that wiki environments form a collaborative virtual learning environment.

Study 3: Tools Students Use for Seeking Information Online. (Zarum & Horowitz, 2011)

Rationale

Most of the information students require for their academic assignments can be found in different forms on the web. Students should develop various skills for mining and processing this information. IST students take the course "Introduction to Informatics" in which they acquire skills for seeking information on the web. We want to find out what tools students use for that purpose and whether the tools they employ are related to their learning motivation, conceptions about the internet, search skills, specific training and more. We shall relate to the paper: Student searching behavior and the web: Use of academic resources and Google (Griffiths, 2005). This paper referred to two studies, one of which dealt with online search habits of students in Britain. The 27 participants were given a list of 15 search tasks requiring use of the institution's information resources. The study examined the sites which students approached first for each task. 45% first accessed Google, 36% - other search engines and 10% accessed the institute's resources.

Sample research questions

1. How is students' search ability related to participating in an informatics course?
2. How are tools used for content searches related to academic experience?
3. How are tools used for content searches related to students' "Learning motivation"?

Findings

The sample included 196 students (females=67%) studying different subject in several colleges and universities. The most popular search engines used by students: Google (38%), Wikipedia (34%), and Google Scholar (17%). Google is the first search engine accessed for information search for a large portion of the sample. However, students who had taken the Informatics course accessed more professional sites and wikis. Such students indicated the effect of the Informatics course on improving search skills: greatly (21%) or somewhat (51%). Figure 10 shows information search skills' levels for Informatics learners (N=53, blue diagram) and others (N=146, red diagram). Main difference were seen in selecting targeted search engines.

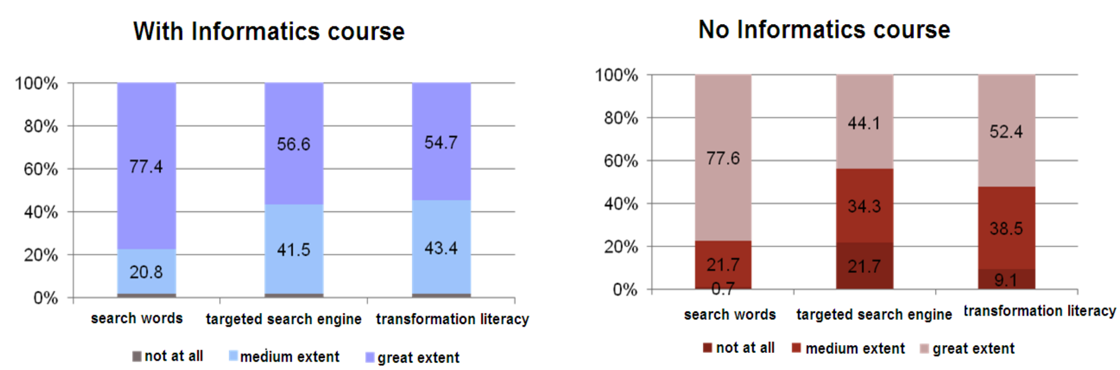


Figure 10: Effects of Informatics course on search skills

Conclusions

Most students access Google and Wikipedia as first search options, both for personal and study related information searches. The main contribution of an informatics course is the selection of higher quality and more professional search engines. However, the potential is only partially fulfilled. Students' information search efforts depend on their interest in the study subject. Lecturers can play an important role in enhancing student interest in the learnt topics.

Study 4: Effects of using portable technology during lectures on student attentiveness. (Hilu & Vizel, 2010)

Rationale

Nowadays lap-tops are an integral component of the equipment we and our fellow students bring to lessons. Our personal experience shows that using the lap-top in class is very helpful and enables us to experience and practice what we learn. However, we have noticed that while using our lap-tops during lessons, we are tempted to do things unrelated to the lesson, and thus lose our attentiveness. We believe that even the most focused student will find it difficult to ignore the distractions caused by using the lap-top during lessons. All it needs is one moment during which the lecturer halts the lesson for any reason, and the student will escape to the many content worlds available on her personal computer and in the internet. Thus we hypothesized that using lap-tops during lessons results in a decrease in students' attentiveness.

Research questions

1. How does the use of a lap-top during lessons affect students' attentiveness?
2. How is the attentiveness level related to gender?
3. What is the relationship between the participant's socio-economic status and using a lap-top during lectures?
4. How is the student's age related to his multitasking ability?

Findings

The sample included 38 students (47% females), studying different subjects in several colleges and universities. The sample was split almost evenly between lap-top users and non users. No correlation was found between student age and multitasking ability, or between student motivation level and attentiveness during lectures. Figure 11 shows average self ratings of attentiveness by lap top use, gender and combining work and studies. No significant differences were found.

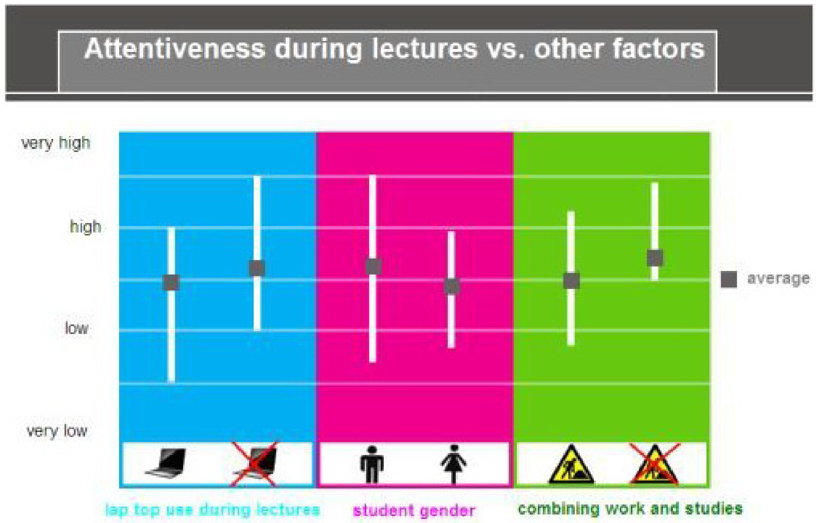


Figure 11: Attentiveness related to lap top use, gender and work.

Conclusions

The survey results did not reveal significant correlations between the variables. However, some of the graphs indicate that students who refrain from using lap-tops during lectures are more attentive. It is possible that with a larger sample more conclusive results could have been reached.

Study 5: Satisfaction with High Learn as a tool for assisting learning. (Resnik & Ben Ari, 2010)

Rationale

High Learn, by its definition, is a wide modular technological platform enabling organizations and educational institutions to implement internet- or intranet-based, systemic projects for learning and knowledge management. As first year students we have been making daily use of this system for varied purposes: checking schedule changes, using online learning materials as well as updates for assignments to be submitted.

The High Learn system forms a comprehensive tool which should assist our study process. Thus we want to examine student satisfaction with the existing system in different departments.

According to a previous survey (Haifa University, 2004) many students considered the system friendly and convenient to use, and most of them preferred to integrate the system as a significant replacement of their lectures. However, the said research focused more on fully online courses rather than on using High Learn for accompanying traditional courses.

Research questions

1. How is frequency of use / satisfaction level related to the college department?
2. How is the satisfaction level related to students' technological literacy?
3. How is the frequency of use related to the satisfaction level, per department?

Findings

The sample included 46 students (37% females) distributed evenly across 4 different departments of our college (Design, Sciences, Engineering & IST). Frequency of use of the High Learn system and satisfaction level varied between departments: low for Design, high for IST (Figure 12). A positive relationship was found between the department averages and all sample individual participant values. (Pearson correlation r=0.5, p=0.0002).

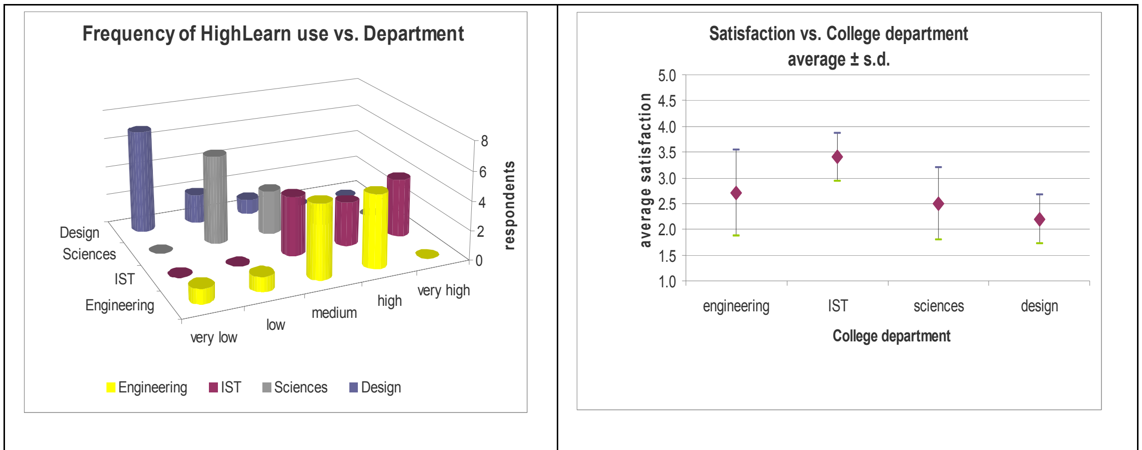


Figure 12: Frequency of use and satisfaction levels for different departments.

Figure 13 shows a multi-facet departmental profile of average of High Learn user attributes. Frequency of use and Satisfaction level – lowest for Design and highest for IST. Overall the system was not considered very user friendly, or easy to use.

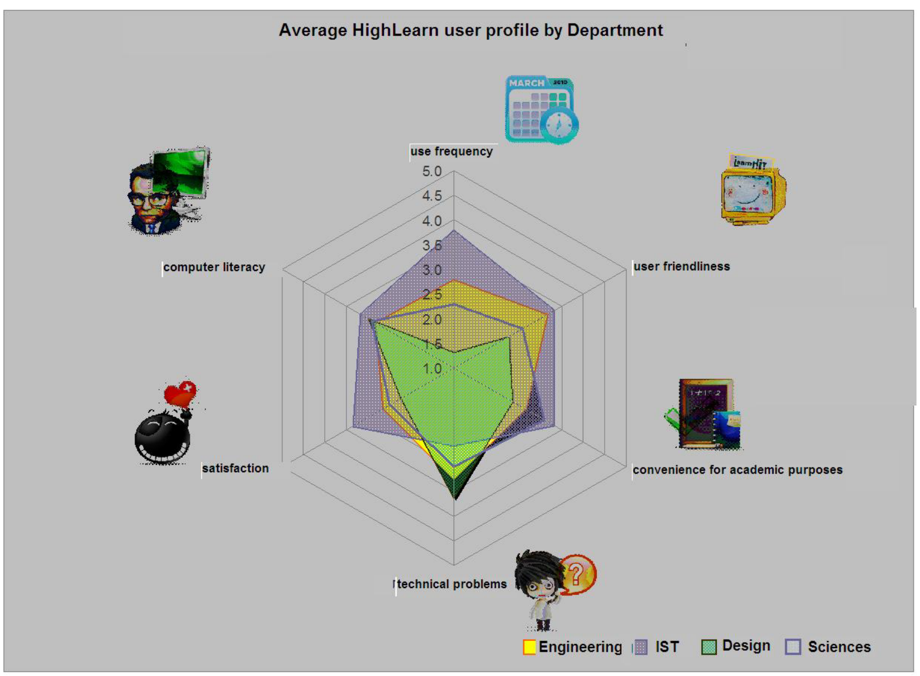


Figure 13: Multiple aspects of student assessment of High Learn per department

Conclusions

The frequency of using High Learn is heavily department dependent. In spite of comparable computer literacy amongst all students, the system is considered less convenient and satisfying and friendly by those students whose lecturers employ it least.

Study 6: Lecturer Use of High Learn. (Bahamam & Nagar, 2011)

Rationale

In the past few years there have been developments in the area of ICT based learning, connecting teachers and students. Nowadays, such systems are common in developed and developing countries and help many students with their learning. In the HIT college students and lecturers use an ICT based system. In our survey we intend to examine the extent and kinds of use amongst lecturers in the Science, Engineering and Technology Management departments.

Research questions

1. What is the relationship between the lecturer's teaching experience and frequency of using HighLearn?
2. What is the relationship between the lecturer's teaching experience and level of control in HighLearn?
3. What is the relationship between the lecturer's department and the frequency of HighLearn use?

Findings

The sample included 33 lecturers from 3 different departments of our college (Sciences, Engineering and Technology Management). 52% indicated using the system several times a week. 67% stated that the time for accessing the system exceeded 2 minutes. Lecturers' system expertise increased a little with teaching experience. Lecturer control increased with number of courses in which High Learn was used. Greater teaching experience was related to greater variety of using the High Learn system for instruction. Figure 14 shows the distribution of types of lecturer use of High Learn per department: Uploading presentations and learning materials, open and closed assignment submission and lecturer-student consultation.

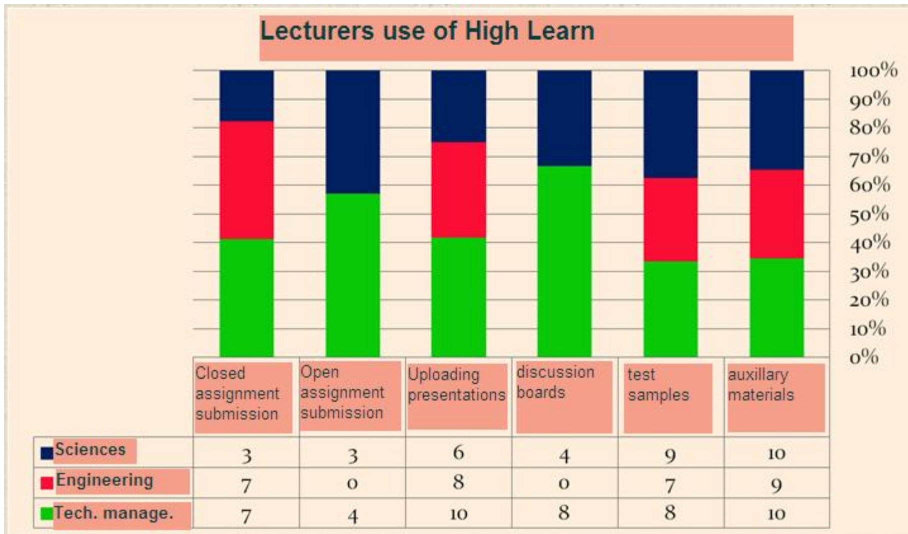


Figure 14: Distribution of lecturer use of High Learn in different departments.

Conclusions

Lecturer use of the High Learn system varies with department and teaching experience. Some lecturers require considerable time to access the system – which may explain their infrequent use.

Discussion

1. Which aspects of research expertise did students exhibit?

The following aspects provide evidence for acquired research expertise:

Defining variables and formulating research questions: Almost all student teams were able to formulate standard research questions related to their research issue. Students defined simple and compound variables.

Going beyond the immediate social scene: Student teams surveyed learners in other departments and institutions. A special effort was required to survey lecturers, using contact information from the institutions home page.

Some concern for balanced samples: While most teams were content with any convenience sample they could obtain, some teams made special efforts to survey balanced samples and did so by re-distributing the questionnaires either electronically or manually around the campus.

Using IT tools for distributing survey questionnaires and collecting data: Students used available platforms for creating aesthetic web-based questionnaires and relied on personal or organizational contact information to distribute the surveys.

Using IT tools for data analysis and presentation: Students used a variety of graphic data presentations such as column and bar graphs, XY scatter graphs and radar and stock diagrams. We found examples of data-rich global representation using text, numbers, colours & picture icons highlighting differences between different groups (e.g. figures in study 5). This expertise can be mainly attributed to the inputs of the "Knowledge Organization and Representation" course taught parallel to the SSR course. Although most of the presentations were correct, if not particularly inspiring, we found some examples of poor presentation skills such as presenting each participant's response to a given questionnaire item in serial fashion (Figure 15).

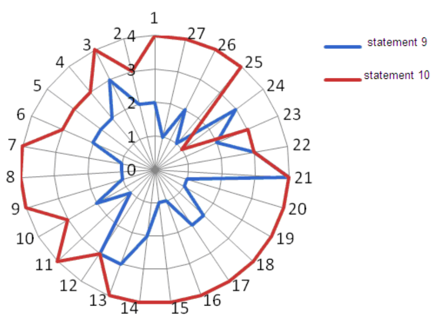
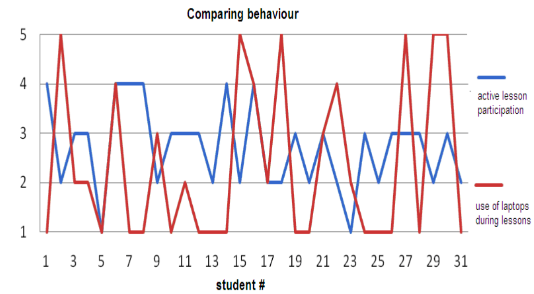
Each participant's response to statements 9 ("system suitable for all users of all ages"), and 10 ("system equally suitable for females and males").	Each participant's response to **"**Active participation" and "Using lap tops in lectures**".**
	

Figure 15: Examples of poorly designed graphic representations.

Employing basic statistical methods for data analysis: Students computed averages, standard deviations and correlation coefficients, showing some sensitivity to variable scales.

Reviewing & citing relevant research literature: In the introductory section of their research reports students cited relevant previous research.

Preparing research reports and presentations: Student teams wrote up their reports and prepared presentations for classroom display.

2. Which views and concerns related to IT in Academic Learning were reflected in the surveys?

It is important to realize that the student surveys open windows allowing two types of views: one presenting the surveying teams' experiences and concerns and the other presenting the surveyed samples' experiences and attitudes.

The premise underlying the following discussion is that the research questions students posed indicated their assumptions and hypotheses regarding the issues which were of interest to them. Thus a question about the relationship between socio-economic status and possession of a lap-top may reveal students' assumption that they will discover that students of lower socio-economic status are less likely to own one.

The effect of IT integration on learning achievements: This issue is addressed in several surveys by trying to correlate average grades to the extent students use a given technology (e.g. laptops, the High Learn management system or computer-based presentations). There is a genuine interest in finding out the usefulness of the technologies for improving grades. One survey which questioned students about their ability to study independently from an online resource arrived at the conclusion that students prefer traditional lectures augmented by IT based activities.

Variance in integration of IT learning tools related to department or lecturer: Students seemed aware of the difference between the level of integration of IT in the IST department compared to other college departments. This was expressed in their research questions and later in the data analysis. Likewise, differences between lecturers were related to their departments and their teaching experience. Surveys dealing with other institutions or departments indicated a need to compare the students' experience with that of others. Surveys involving lecturers show an ability to go beyond the student's perspective and explore lecturers' views and behaviours.

Factors determining satisfaction with an IT-based learning system: Several surveys dealt with the effect of the institution's infrastructure on the satisfaction related to IT based learning. The question posed to lecturers about the time required to access the High Learn management system indicated some dissatisfaction with the system's operating speed.

Motivational issues: There was noticeable interest in trying to relate behaviour in the IT-rich environment to learning motivation. Does motivation determine the following: The extent the High Learn system is used? Students' attentiveness during lectures? The extent laptops are used for non-academic purposes? Or, the type of search engines used to find information?

Benefits and drawbacks of student autonomy: This issue was evident in surveys dealing with the free use of mobile technology, as well as various behaviours related to inattention to the learning scene. In phrasing questionnaire items such as "How often do you leave the lecture hall?", or "How often are you busy checking email or dealing with work issues?" students revealed that they were aware of such behavior patterns and that they themselves might be involved in them. As they posed the question about whether the use of mobile technology should be banned during lectures, they were voicing a concern that it might be legitimate and even beneficial for learning, but that they would not like to be denied of their "electronic toy" for any length of time.

Gender Issues: This issue recurred in many survey reports. Students were interested in finding out whether gender determined the attitude to and the use of information technology. Do females use social networks more than males? Are there gender-related differences in grades for IT based learning? Are females as attentive as males during lectures?

Summary and Implications

The integration of IT into instruction in higher education has the potential to enhance learning and facilitate instruction by providing multiple channels for accessing information in a variety of forms, communicating with peers and lecturers and extending the spatial and temporal educational horizon. However, the process must relate to the needs and limitation of the involved partners i.e. lecturers, students, departments representing different disciplines and traditions and finally the technology providers. Some of these aspects have been addressed by the student surveys, and the results reflect some widely held views amongst undergraduates in a variety of institutions and departments.

The student survey project presents an authentic assignment relevant to IST students both during their study course and later in their professional careers. The project motivated students to reflect on their own and their fellow students' experiences in IT rich environments, formulating researchable questions, and later analyzing the data to arrive at interesting conclusions. The survey questions reflect concerns and views which the findings sometimes upheld and sometimes refuted. One team commented *"Our initial hypothesis was refuted. We believed that intensive use and dependence on the High Learn system would result in greater frustration and technical difficulties and decrease satisfaction. However, we discovered that satisfaction increased with the frequency of use"*. The surveys can be seen as authentic efforts to discover which variables can be related to successful use of IT in academic learning and which variables have detrimental effects. One team wrote *"Following this study we managed to understand the extent different instructional features affected students' understanding of newly learnt computer software"*.

Based on their findings students were able to suggest required further research and suggest improvement of IT systems. The team who studied student satisfaction with presentation based lectures commented "*We have found a direct relation between student satisfaction and the extent lecturers relied on presentations, but we have found that very high reliance decreased satisfaction. This fine border line needs to be investigated to increase instructional effectiveness*." A team who studied attitudes towards the High Learn system commented "*It is important to conduct more studies into this issue in the future so that some significant answers can be discovered. We also recommend that changes should be introduced into the High Learn system making it more user-friendly. It should become more interactive involving chat and video conferencing facilities, thus enabling student groups to study together from their homes*".

The project presented an authentic challenge which necessitated a variety of interactions within the teams and with the outside world. The project required students to implement a variety of skills which they had acquired in several first year courses. A sense of real achievement was evident when the teams presented their work: *"In spite of the many difficulties we encountered during this project, now that we have reached the end we are pleased with the opportunity we were given to experience and learn many new things along the way."*

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Acknowledgements

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Biography

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