Intellectual Discourse, 1997
Vol 5, No 1, 51-67

Computer Literacy among University Academic Staff: The Case of IIUM

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Abstract: *The objective of this study was to investigate the nature and extent of computing skills of International Islamic University Malaysia (IIUM) faculty members. A questionnaire was used to elicit information regarding computer literacy from a sample of 114 faculty members. The study shows that the level of computer literacy among IIUM faculty members is quite low: most of them have been using computers for word processing only. Other computer applications are being used by a limited number of academic staff. Irrespective of the existing level of computer literacy, almost all academic staff showed interest in attending computer courses.*

Rapid developments in information technology (IT) are bringing dramatic changes in individual life styles as well as in the society as a whole. In advanced societies, computer literacy is considered essential for all individuals. Computers have become so strongly integrated into the social fabric of these societies that an individual without adequate computer knowledge would feel an alien in that society. Many aspects of our lives have simply become impossible without computers. Being able to assist in labour-intensive, time consuming and high quality jobs, computers are also being used for intellectual and creative works. Incredibly fast computers that can process complicated and huge amounts of data in seconds, equally supported by sophisticated user-friendly software, offer tremendous potentials in enhancing the productivity of an average individual.

Fast development of computer technology and its inculcation in all spheres of life demands a high level of computer literacy. Furthermore,

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the development of the information superhighway (the Internet) has further hastened the emergence of the information society. An increasing number of Internet users are benefiting from an unimaginably vast store of information.

The Malaysian Scenario

The Malaysian society is also quickly embracing information technology. The government is investing huge sums of money on the establishment of sophisticated IT infrastructure in the country. It has already launched a mega-project for the establishment of a Multimedia Super-Corridor (MSC) extending from Kuala Lumpur City Centre (KLCC) to Kuala Lumpur International Airport (KLIA). It will have 2.5 to 10 gigabyte backbone with ATM switches. The Malaysian government is providing a lot of incentives to local and international companies to venture in the MSC. Some of the MSC features include multimedia banking, R&D cluster, worldwide manufacturing web, borderless marketing centre, telemedicine, etc. The Malaysian government is already vigorously promoting the concept of "Electronic Government." The office of the Malaysian Prime Minister is expected to be completely electronic by the year 2000. Some of the cabinet meetings will also be held electronically. To actualize the concept of electronic government, some agencies have already developed a variety of databases and computerized information services like Civil Service Link, SIRIMLINK, Knowledge Resource Centre, PALMOILIS, South Trade and Technology Data Exchange Centre, Agricultural Information System, Price Information Centre, Malaysian Science and Technology Centre, etc. Other government departments are also actively developing their plans to operate electronically.[1]

Computers in Education

Developments in information technology have not left the academic institutions unchanged, and a major shift from the traditional classroom to a hi-tech one is taking place. It is now quite common to come across terms like electronic-, multimedia-, digital-, virtual-, cyber-classrooms for the future learning sites. It is expected that by the year 2000 more than 60% of the classrooms in United States will have access to computer networks through the Internet. Malaysian universities are also coming up with projects to develop the latest IT infrastructures. The Malaysian government is actively promoting the concept of *Smart Schools* with emphasis on extensive use of IT in the

teaching and learning process. The new campus of the International Islamic University Malaysia (IIUM) at Gombak is also expected to be a hi-tech campus providing access to the latest IT-based information sources and services.

Mere addition of high-tech hardware is not enough to integrate the latest technology in the pedagogical process. It is desirable that curricula at all levels should be thoroughly revised to expose students to technological advancements. Most school children in the West get the opportunity to become computer literate at an early age and also learn how to access electronic information sources. They become acquainted with computer basics and word processing during elementary classes. Later they learn how to search databases and navigate through the Internet. They also explore educational resources available on the Internet through specially designed exercises.[2]

The advancements in information technology have posed great challenges for academicians responsible for educating and training future generations. It is, therefore, desirable that academic staff should be highly computer literate to educate students in such a way that they may adjust themselves to the emerging information society. In future it would be less likely for a computer illiterate faculty member to prepare high quality lectures, assign student projects, guide and supervise student research, and benefit from a variety of electronic information sources and services. He may feel uncomfortable in using library automated catalogue, CD-ROM databases for literature searching, and navigating the Internet. By the same token he may not be able to guide his students in the use of electronic information sources to search literature for their assignments and projects.

The Internet

Computer literacy is particularly important for IIUM academic staff because most of the world information sources are being converted into electronic format. It is estimated that currently well over 80 million people are using the Information Superhighway (Internet). A number of World Wide Web (WWW) sites are also providing access to information on Islam and related disciplines. However, it has been observed that some of the information on Islam available on the Internet is misleading and put by some deviationist groups. Only a computer-literate Muslim scholar can evaluate these sources and present a balanced viewpoint regarding Islam. Similarly, computer literacy can also help academicians to navigate through various Internet sites,

establish scholarly communication with their colleagues, and engage in Internet publishing.

Studies on Computer Literacy

Several studies have shown that there is a strong need for computer literacy among teachers and academic staff. Only a computer literate faculty member can optimally benefit from computer technology that is considered an effective and valuable tool in the pedagogical process. Many researchers believe that the use of computers in teaching could enhance intellectual growth and development of students.

A number of educationists have highlighted the impact of computers in education and various computer applications used in teaching. They also describe how computer literacy could be integrated with curriculum. They believe that computers could play a significant role in education although they are not a panacea for all problems faced by the education sector, nor can they replace teachers.[3] Novak and Knowles observed that computers are not only challenging pupils but teachers as well. They propose that teacher training programmes should include an introduction to the computer, its operation, and potential use in the classroom.[4] Bullough and Beatty assessed microcomputer use and applications in the classroom. They evaluated different instructional packages and their integration into curriculum, and came to the conclusion that computers could greatly enhance the quality of learning since they change radically the way students are taught. Roose and Northup have described how computers might be used in teaching, and how thinking skills can be developed and improved by using computers. In their opinion, the traditional classroom environment was not condu-cive to learning as it was "dominated by lecture, memorization of isolated facts, and evaluation of students based on recall of these facts."[5] They consider such memorization as a poor use of educational time as it did not provide an opportunity for thinking, problem solving, analysis, synthesis, evaluation and application of knowledge in real life situations. The authors believe that implementation of Computer-Assisted Instruction (CAI) in education would help develop thinking skills in students, improving their motivation, attention span and attendance. Light and Mevarech have similarly argued that learning through computer would improve quality of students and their academic achievements, cognitive process, metacognitive skills, motivation toward learning, self-esteem, and social development.[6]

Some computer-based special services for academicians have been designed to assist them in teaching. The BUBL system offers ways for accessing Computer in Teaching Initiative (CTI) at twenty centres catering for needs in specific subject areas. The CTI was designed to enable academic faculty in higher education to support their teaching through World Wide Web (WWW). McMahon described the CTI services and how they were being used to disseminate research results and findings by the academicians.[7] All the US universities are presently connected to the Internet, and the academics have been among the first to participate in the Net activities, although many of them are still not fully aware of the Internet resources and services.[8] In their study on the use of hypertext in the university educational process, Ansel and Jucker found that instruction in universities had created problems with the quality of education, and that it was very difficult to achieve the aims of education with textbooks that present linear and sequential information. They concluded that hypertext might help university students to become familiar with interaction within the phenomena, and to study them from different viewpoints and contexts.[9] Studies regarding TeacherNet, designed to integrate technology into the education and training process, showed that students reported increased rapport with and support from the university supervisors, increased team-support, self-esteem, increased knowledge of information retrieval techniques, as well as increased use of computers at home for personal and professional work.[10]

Optimal benefits from using information technology in the pedagogical process can only be achieved if the educators themselves are adequately exposed to computer and related technology. Some studies projected the problem of computer-anxiety among educators. It has generally been found that adult educators who were avoiding using computer provided in their classrooms, were actually feeling very uncomfortable in using them. When these academicians were enrolled in an individualized instructional course designed to reduce computer anxiety, they became comfortable in using computer. The study concluded that computer-anxiety can be overcome by imparting training in a conducive environment.[11] As a matter of fact there is a strong correlation between level of computer anxiety, duration of computer experience, and expertise in computer use.[12] The educators who feel themselves ill-prepared in information technology would also resist integration of computers and other technology into their instruction. Proper training programmes could play a vital role in reducing

computer anxiety among academicians and to make them confident computer users.[13]

Realizing the multitude of benefits of using information technology in the pedagogical process, it was considered desirable to investigate the computing skills of IIUM academic staff and their use of different computer applications and packages. Findings of this study may be useful in developing a comprehensive plan for improving computing skills of university academic staff.

METHODOLOGY

Respondents

The population of the study consisted of 360 academic staff from the four faculties (*Kulliyyahs*) of International Islamic University Malaysia: IRK & HS, Laws, Economics & Management, and Engineering. It also included academic staff from the Centre for Languages and Pre-University Academic Development (CELPAD). A proportional stratified random sampling technique was used to generate samples. Lecturers, Assistant Professors, Associate Professors, and Professors constituted strata for the sample. A sample size of 50 percent was planned and a total of 180 individuals were randomly selected for the survey. The questionnaire was distributed personally in the offices of faculty members. A total of 114 questionnaires (63.3%) were received back and used for data analysis.

The largest group of respondents, 49 (42.9%), was from the Kulliyyah (Faculty) of Islamic Revealed Knowledge and Human Sciences (KIRK & HS). Thirty respondents (26.3%) belonged to the Kulliyyah of Laws. The Kulliyyahs of Economics & Management, Engineering, and Centre for Languages and Pre-University Education (CELPAD) were represented by 16 (14.0%), 6 (5.3%) and 13 (11.4%) respondents, respectively. The breakdown of respondents by their job titles is given in table 1.

Eighty respondents (70.2%) were male and 34 (29.8%) were female. Sixty-eight respondents (61.3%) had Ph.D. degrees while 43 (38.7%) had Master degree only. The breakdown of respondents by age is shown in table 2.

Table 1. Distribution of Respondents by Job Title

Job Title	*Frequency*	*Percentage*
Lecturer	46	40.4
Assistant Professor	41	35.9
Associate Professor	13	11.4
Professor	14	12.4
Total	114	100

Table 2. Age of Respondents

Age Group	*Frequency*	*Percentage*
30 years and below	19	16.8
31-40 years	36	31.9
41-50 years	34	30.1
51 years and above	24	21.2
Total	113	100

The Instrument

The study used a questionnaire-based survey design for data collection. The questionnaire consisted of 24 questions, divided into four sections. The first section of the questionnaire was on computing skills of the academic staff, source of their computer training, and computer applications used by them. The next section dealt with the use of electronic information sources. The third section was aimed at investigating the training needs of the faculty members. The last section of the questionnaire was designed to obtain personal information about respondents, i.e., gender, age, qualifications, etc.

RESULTS AND DISCUSSION

Computing Skills

The respondents were asked if they had access to computers. Data analysis showed that 104 (91.2%) respondents had access to computers, and 79 (76%) of them had computers at their homes. Only 10 (8.8%) respondents said that they had never used a computer.

Respondents were asked to indicate how long they had been using computers. Forty-eight respondents (47.0%) revealed that they had started using computers during the last five years. Twenty-six respondents (25.5%) indicated that they had been using computers for the last 6-10 years, whereas 28 (27.5%) respondents had been using computers for more than 10 years.

Level of Computing Skills

In the absence of a standard criterion for measuring the level of computing skills, the respondents were asked to provide a self-assessment of their computing skills. According to their own assessment, 17 respondents (16.5%) possessed "very good" or "excellent" computing skills (table 3). Twenty-nine (28.2%) faculty members rated their computing skills as "good." Over 55% respondents considered their computing skills as "fair" or "poor."

Table 3. Self-assessment of Computing Skills

Skill Level	*Frequency*	*Percentage*
Excellent	5	4.8
Very good	12	11.7
Good	29	28.2
Fair	38	36.9
Poor	19	18.4
Total	103	100

It was also found that there are significant differences between the computing skills of academics belonging to various faculties. Faculty members belonging to the Centre for Languages rated themselves highest, followed by the staff of Economics and Management Faculty. Faculty of Laws came at the bottom (table 4).

In order to determine the relationships between computing skills of respondents and their positions (job titles), year of obtaining highest qualification, gender and age, a number of analyses were performed. The data analysis revealed that a majority of professors rated their computing skills rather highly. On the other hand, a number of them rated themselves very low. Lecturers and Associate Professors rated themselves lowest, followed by Assistant Professors. It may be noted that there were far more variations in the ratings of Professors about themselves than in any other group (see table 5).

Table 4. Differences in Self-assessment of Computing Skills by Faculty

Faculty	*N*	*Mean*	*SD*
KIRK & HS	47	2.53	1.14
Laws	24	1.95	0.75
E&M	15	2.60	0.91
Engineering	11	2.36	1.02
CELPAD	6	3.83	0.98

$F=4.42$, $df=4, 98$, $p<.002$

Table 5. Computing Skills and Job Titles

Job Title	*N*	*M*	*SD*
Professor	14	3.00	1.70
Assoc. Professor	12	2.17	0.93
Asst. Professor	36	2.94	1.04
Lecturer	42	2.17	0.91

$F= 4.65$, $df= 3, 100$, $p<.005$

Computing Skills and Year of Obtaining the Highest Qualification

Mean scores were calculated to determine the relationship between the year of obtaining the highest qualification and the respondents' computing skills. Data analysis (table 6) demonstrated that the respondents who graduated during the period 1958-1984, possessed the lowest level of computing skills. Those who graduated during the last six years, i.e., 1991-1996, possessed moderate level of computing skills (mean score 1.62). It was observed that those respondents who obtained their highest qualifications between the period 1985-1990, possessed the highest level of computing skills. A possible explanation for this could be that these individuals were exposed to computers during their studies and, later its use for some time helped refine their computing skills.

It seems that computing skills require some time to mature, and the 1985-90 group not only acquired computing skills during their studies, they were also able to polish them to maturity. On the other hand the pre-1984 group may or may not have received any training in computer use at all.

Table 6. Computing Skills by the Year of Highest Qualification Obtained

	Frequency	*Mean*	*SD*
1958-84	28	1.13	0.47
1985-90	26	1.83	0.81
1991-96	51	1.62	0.78

$F=8.11$, $df=2, 102$, $p<.01$

Relationship between Age and Level of Computing Skills

Mean scores were calculated to investigate the relationship between age of respondents and level of their computing skills. Those respondents whose ages were between 41-50 years rated their computing skills at the lowest level ($M=1.22$). Those respondents whose ages were between 31-40 years rated themselves slightly higher than others. These differences were however not significant.

Table 7. Computing Skills and Age of Respondents

Age Group	*Frequency*	*Mean*	*SD*
30 years and below	19	1.30	1.16
31-40 years	36	1.76	0.85
41-50 years	34	1.22	1.07
51 years and above	24	1.47	1.26

$F=1.36$, $df=3,109$, $p>.05$

Mean score was also calculated for computing skills of respondents by their gender. Male respondents considered their computing skills better than their female counterparts. The mean score for male respondents was 1.58, whereas it was 1.25 for female respondents.

Source of Computer Training

Respondents were asked to indicate the source(s) of their computer training. Forty-eight respondents indicated that they had learnt computer use by themselves. Twenty-eight respondents had learnt computers as a requirement for course work during their studies. Training courses were attended by 27 respondents, twenty-two individuals revealed that they had learnt computer use with the help of their friends, colleagues, and relatives.

Computer Applications Used

Respondents were asked to indicate the frequency of using different computer application packages. The purpose was to find out which applications were more popular.

Word Processors: English language word-processors were used by 88 (72.2%) respondents, whereas Arabic word-processors were used by 33 (28.9%) respondents (table 8). Seventeen (51.5%) users of the Arabic word-processors were using them frequently, and 16 (48.5%) infrequently. Twenty-one (60%) Arabic word processor users belonged to the Kulliyyah of IRK & HS. English word-processors were frequently used by 64 (72.7%) and infrequently by 24 (27.3%) respondents. The *MS Word* and *WordPerfect* were the most popular English word-processors, and were used by 41 (35.9%) and 35

(29.8%) respondents, respectively. Other comparatively less popular word-processor packages were *Professional Writer, Word Star, Windows Write*, etc.

Spreadsheet Packages: Only 33 (26.4%) respondents marked their responses for the spreadsheet packages. This low response rate for spreadsheet programmes could be interpreted as unfamiliarity of respondents with this application. Eleven (9.6%) respondents were using spreadsheet frequently and 22 (19.3%) infrequently. Most users of spreadsheet packages belonged to Kulliyyahs of Economics & Management, and Engineering. Among the spreadsheet packages, *Excel, Lotus,* and *QuattroPro* were the most popular ones.

Table 8. Use of Different Application Packages

Application	*Users*	*Non-users*
Word Processing		
Arabic	33 (28.9%)	81 (71.1%)
English	88 (77.2%)	26 (22.8%)
Spreadsheet	13 (11.4%)	101(88.6%)
Computer Graphics	32 (28.1%)	82 (71.9%)
Statistical Packages	43 (37.7%)	71 (62.3%)
Database Packages	30 (26.3%)	84 (73.6%)

Computer Graphics: Use of computer graphics was no more popular than spreadsheet packages. The computer graphics were frequently used by only 5 (4.3%) respondents and infrequently by 27 (23.3%) faculty members. *Harvard Graphics* was the most popular package among the users of computer graphics. Other graphic programmes used by the academic staff included packages like *Paint, Power Point*, and *Designer*.

Statistical Packages: Statistical packages were frequently used by 9 (7.8%) and infrequently by 34 (29.3%) respondents. Most of the faculty members using statistical packages belonged to Kulliyyahs of

Economics & Management, and Engineering. A majority of respondents from the Kulliyyahs of IRK & HS and Laws were among the non-users. Although many statistical packages were mentioned, over 50 percent users of statistical packages were using SPSS. Other statistical packages used by respondents included *Stat View, Minitab, SAS, Statistica.*

Database Packages: Database packages were frequently used by only 3 (2.6%), and infrequently by 27 (23.3%) respondents. Most popular database programme was dBase and used by 22 (73.3%) faculty members.

It is evident from above discussion that the use of computer packages, other than word-processors, is very low among faculty members. Only 11.4 percent respondents had been using spreadsheet programmes. The database, graphics, and statistical packages are used by 26.3%, 28.1%, and 37.7% respondents, respectively. Irrespective of the affiliations of the academic staff, these packages can be effectively used to conduct research, analyze research data, prepare presentations, and develop teaching materials.

Hardware Knowledge

It was felt that self-assessment by respondents for their computing skills might be some what inflated. It was, therefore, considered desirable to obtain more information from respondents to indirectly assess their level of computer literacy. Respondents were given a hypothetical situation where they were expected to select a computer for their home. Respondents were asked to rank computer hardware components that they would consider in their selection process. The hardware features listed in the questionnaire included hard disk capacity, RAM size, microprocessor speed, modem, multimedia, number and capacity of drives, price, etc. It was assumed that a computer literate respondent would be familiar with basic computer hardware components and their importance in the performance of a computer.

Data analysis showed that the respondents felt that hard disk capacity would be the most important criterion in their selection process, followed by microprocessor speed. The RAM size, price, and multimedia capabilities were also considered important (table 9). Number and capacity of disk drives and modems were considered least important factors. It was evident that most respondents were familiar with basic computer hardware and were capable of prioritizing various

hardware components. However, several respondents stated that they were not familiar with some of the computer hardware components. Most of such respondents were unfamiliar with terms like modem, RAM, microprocessor speed, and multimedia capabilities.

Table 9. Relative Importance of Hardware Components

Computer Hardware Feature	*Importance (Mean)*
Hard disk capacity	2.77
Microprocessor speed	2.75
RAM size	2.68
Price	2.52
Multimedia capabilities	2.40
Number & capacity of drives	2.32
Modem	2.27

Scale: 1= Not important, 2= Important, 3= Very Important

Training Needs

In order to assess the training needs of IIUM faculty members, the respondents were asked to identify the type of training courses they would like to attend. One hundred three (90.4%) respondents felt they do need training to improve their computing skills. Fifty-five respondents were interested in attending training courses in database development, 39 in word processing, and 36 each in computer basics and computer graphics (table 10). Thirty-five respondents showed their desire to attend a training course on the use of statistical packages, and another 31 respondents were interested in spreadsheet applications.

It is interesting to note that even those faculty members who rated their computing skills as "very good" or "excellent," expressed a desire for further training. It can be concluded that, irrespective of their present computer awareness, most IIUM faculty members were interested in enhancing their computing skills.

Table 10. Training Needs for Developing Computing Skills

Training Areas	*Frequency*
Database development	55
Word processing	39
Computer basics	36
Computer graphics	36
Statistical packages	35
Spreadsheet packages	31

Suggestions for Improving Computer Literacy

Respondents were asked to offer suggestions for improving computer literacy among IIUM faculty members. Eighty-nine (78.1%) respondents gave some suggestions. Their ideas are summarized as under:

Computer Literacy Development Programme: Sixty-one (68.5%) respondents said that IIUM should organize more computer training courses for the academic staff. They recommended that these courses should be comprehensive, and offered regularly. Both beginner and advanced level courses were suggested. It was also recommended that these courses should emphasise integration of computers in the teaching process. One respondent suggested "provide computer courses... from the basic to the most advanced level. These courses should be flexible and tailored to the needs of the staff." Some respondents felt that IIUM management should be more assertive in improving computing skills of its faculty members: "enforce [computer training] programmes, make it compulsory to attend"; "training sessions must be mandatory"; "include computer literacy in regular orientation programmes for the new [academic] staff...organize continuous workshops throughout the academic year on new technologies."

Access to Computers: Twenty-three respondents suggested that IIUM should provide computers to all faculty members, connected to the library catalogue (OPAC), CD-ROM network, and the Internet. One respondent felt that IIUM should provide incentives to academic staff

to buy their personal computers. Some other suggestions are: "put a network connection on every faculty member's desk, linked to the library and the Internet"; "... IIUM should provide computers to lecturers to utilize their office hours more productively."

Professional Help: Six faculty members recommended that IIUM management should appoint an adequate number of computer technicians for providing help to academic staff. These technicians should be placed in different computer laboratories all over the campus.

CONCLUSIONS

The study indicates that while the use of computers is widespread in the International Islamic University Malaysia, the usage is limited to word-processing, and the level of literacy is not satisfactory. Academic staff belonging to some disciplines are using computer facilities less frequently than the others. Older faculty members are not using computers as much as the younger ones.

Computers are being used mostly as typewriters. Other uses of computers, including data-base management, statistical analysis and graphic designing are hardly being made.

Only about a quarter of the respondents received any formal training in computing during their studies. Another quarter learnt to use computer by attending short training courses. The rest learnt computing on their own, at times with the help of friends. This lack of training is probably the major reason why they are not using computers more frequently or at a higher level. However, most of them feel the need for upgrading their computing skills, and are willing to participate in training programmes if organized by the university.

Notes

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