Students' IT Confidence and Skills

The Affects of an Information Systems Approach, The Oman Experience

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Abstract This paper addresses the affects of Information Systems Approach on students' IT confidence and their IT skills in comparison to a more Traditional Approach. The data was collected using questionnaires on IT skills, confidence and attitudes and analysed using Sign test and comparing the simple means of responses using pretest, posttest control group. design. The study found that the group following the Information Systems Approach were generally more confident and acquired more IT skills than the groups followed the Traditional Approach. The study suggest that the business students should be introduced IT following the Information Systems Approach in preference to the Traditional Approach.

1. INTRODUCTION

This study is an attempt to improve the quality of education and better prepare the students of the College of Commerce and Economics in Oman, where this research was conducted, to be more IT literate specially in business applications. It is in line with the objective of the college to impart IT skills to students to match the changing needs of the local business organisations, which offer jobs to graduates of the college.

There are several possible approaches for delivering IT skills including Word-processing First Approach, which is also known as the Traditional Approach (TA), the Spreadsheet First Approach (SFA) and the Database

First Approach, known as Information Systems Approach (ISA). The most common one is the Traditional Approach. This approach after introducing some computer concepts, begins with word-processing and students enhance their IT skills most in this, many researchers believe, and less in other follow-up IT applications such as spreadsheets, graphics and databases (Naqvi 2001). By contrast, the ISA as proposed by Freeman & Rowley, after introducing the computer concepts and IT applications used in business, begins with databases followed by spreadsheets, graphics and word-processing (Freeman et al. 1995).

This approach offers a more realistic perspective on the contribution, which IT can make to the effective operation of business activities. This approach encourages students to consider information first, and then to progress to tools for its analysis and presentation. This is more in keeping with developing an appreciation of the way in which information systems are used in business. The SFA starts with spreadsheets and graphics, followed often by word-processing and then students will usually, but not always are introduced to databases and database software (Freeman et al. 1995). This approach is not commonly practiced, as it alone is restricted to handling quantitative data skills.

There is hardly any literature on the empirical study of these approaches. This has therefore led to this present study in the College of Commerce and Economics in Oman. The purpose of this research study, as highlighted earlier, is to investigate the students' IT confidence and the acquisition of their IT skills by two comparable groups, one following the Information Systems Approach and known as the ISA group and the other group following the Traditional Approach, called the TA group. The focus is on whether the ISA is more effective on issues, such as IT confidence and IT skills, in comparison to the TA.

This research was based on a longitudinal study to increase the validity and reliability of the results, comprising a Phase I study followed by Phase II and Phase III in the subsequent semesters. In a study of this nature pretest data needed to be collected to assess the initial IT abilities of students and posttest data for comparison, to see the effectiveness of the approaches followed. For this purpose a pretest-posttest control group research design was selected and mainly questionnaires were used as data collection tools to assess the merits of the proposed ISA on IT confidence and IT skills issues in comparison to the TA.

2. METHODOLOGY

Questionnaire: A questionnaire was developed and used to collect initial and final data on students IT confidence and their skills. The questions were grouped on these issues. The questions on IT skills were general and related to word-processing, spreadsheets/graphics and databases. The responses to each item was based on a Likert scale ranging from 1 to 5, where 1 = Unable, 2 = Slightly Able, 3 = Uncertain, 4 = Able and 5 = Strongly Able.

Sample: Data were collected from nearly 150 students in all the six groups with similar academic standards. All these groups were drawn from the College of Commerce and Economics, where this research was conducted, where two groups were randomly selected for each phase of study.

Procedures: An identical questionnaire was used to collect data from the groups. The questionnaires were administered during normal classroom lesson time by the researcher. For Phase I, one group was introduced IT through the ISA, while the other group used the TA. The data collection process was repeated in similar fashion for Phase II and III taking two groups at a time in each phase.

The initial data was collected in two stages prior to the course, called as 'Prior' and in retrospect, conducted at the end of the course and called 'Retro'. The Retro was planned to validate the initial IT abilities, assuming that the Prior and Retro will stay the same, if not, then either the students overestimated or underestimated their IT abilities at the Prior stage. The final IT abilities were also assessed through the questionnaire at the end of the course.

The initial IT abilities of both the groups were compared to assess the similarity between them. The comparisons of the groups were on two major issues, namely, IT confidence and IT skills. If the two groups were similar in their initial abilities then the final abilities of the two groups were considered. Otherwise, these initial IT abilities were then compared with their final IT abilities.

Statistical tests were used to analyse the data including the 'Sign Test' to compare the positive and negative responses and using simple group means to assess the size of change in the ISA and the TA groups. The results of these statistical tests were incorporated to examine the merits of the ISA in comparison to the TA.

3. SUMMARY OF THE FINDINGS

The results indicated that the groups were not exactly similar in their initial IT confidence and IT skills either at Prior or Retro stages. To see the effectiveness of the ISA, 'Sign Test' was used to compare the number of positive and negative responses like Prior-with-After and Retro-with-After stages. These results are summarised in Table 1 and Table 2 and graphically presented the After stage results in Figure 1 and Figure 2.

3.1 IT confidence

Phase I. The results of the ISA group indicated more positive responses than the TA group when compared Prior and After responses. The size of change of the ISA was much higher than the TA corresponding to 1.72 versus 0.72. The results appeared similar, when compared the Retro and After responses, the size of change of the ISA group was 1.69 corresponding to 1.40 of the TA group. These results suggest that the ISA seems more effective in building IT confidence in comparison to the TA.

Phase II. The overall trend of the result of the Phase II appeared similar, though these changes were not so high compared with Phase I. The ISA group responded more positive corresponding to the TA and the size of change from Prior to After was corresponding to 1.06 versus 0.87. When compared Retro and After responses the size of change of the ISA was 1.63 corresponding to 1.27 of the TA. The ISA seems more effective in enhancing the students IT confidence.

Phase III. In general, the students of both groups agreed with the statements and clearly indicated a great deal of improvement in their IT confidence at the end of the course compared to before the course. The size of change for the ISA group was much higher than the TA group either in comparison with Prior-versus-After or Retro-versus-After. This change from Prior to After responses of the ISA group was 1.56 corresponding to 1.05 in the TA and Retro to After was 2.03 versus 1.25 (see Table 1). The trend of these results is similar to the Phase I and II results, rather higher.

There is consistency in the results of Phase I, II and III. It appears that the ISA is effective in enhancing more students' IT confidence than the TA as shown in Figure 1.

Table 1. IT Confidence Group Mean Responses

Groups	Prior	Retro	After	Difference = After – Prior	Difference = After – Retro
TA (Phase I)	3.21	2.53	3.93	0.72	1.40
ISA (Phase I)	2.54	2.57	4.26	1.72	1.69
TA (Phase II)	3.28	2.88	4.15	0.87	1.27
ISA (Phase II)	3.18	2.61	4.24	1.06	1.63
TA (Phase III)	2.83	2.64	3.88	1.05	1.25
ISA (Phase III)	3.07	2.60	4.63	1.56	2.03

Figure 1.

3.2 IT Skills

Likewise, the ISA had made a significant effect on the acquisition of IT skills in all the modules presented including databases, spreadsheets/graphics and word-processing. The size of change in IT skills from Prior-to-After and Retro-to-After stages of both groups are presented in Table 2 and the comparison of After stage results are graphically presented in Figure 2.

Phase I. The ISA group responded far more positive than the TA group. The size of change from Prior-to-After stage of the ISA was 2.75 corresponding to 1.09 of the TA group. Similarly the change from Retro-to-After was 2.88 of the ISA versus 1.75 of the TA. This indicated that the

students in both the groups improved their IT skills, but this improvement appears far more in the ISA group.

Phase II. A similar result appeared in Phase II, the students of the ISA group had given more positive responses and the size of change from Prior-to-After of the ISA group was high, compared to the TA corresponding to 2.04 versus 1.39 and from Retro-to-After were corresponding to 2.60 versus 1.92. These results lead to similar findings that the ISA appears more effective in developing IT skills than the TA.

Phase III. Likewise, the results of Phase I and II, Phase III had shown far greater improvement in students' IT skills as compared to the TA group. The size of change from Prior-to-After in the ISA group was 2.50 versus 1.72 in the TA and the Retro-to-After was 2.61 versus 1.71.

The results of Phase I, II and III are consistent and indicated that the ISA made a significant effect in bringing about positive change in developing more IT skills than the TA. This can also be seen in Figure 2.

Table 2. IT Skills Group Mean Responses

Groups	Prior	Retro	After	Change = After – Prior	Change = After – Retro
TA (Phase I)	2.70	2.07	3.79	1.09	1.72
ISA (Phase I)	1.85	1.72	4.60	2.75	2.88
TA (Phase II)	2.54	2.01	3.93	1.39	1.92
ISA (Phase II)	2.41	1.85	4.45	2.04	2.60
TA (Phase III)	1.89	1.90	3.61	1.72	1.71
ISA (Phase III)	2.09	1.98	4.59	2.50	2.61

Overall, it seems that the ISA has made a significant affect not only on students' IT confidence but also on their IT skills.

4. CONCLUSION

A number of preliminary conclusion emerged from consideration of the research question posed in the study. The findings of this study suggest that the students in the ISA group demonstrated more IT confidence and consequently more IT skills in support of business activities as compared to the TA. These findings are in line with Freeman and Rowley's view on the ISA (Freeman et al. 1995).

This finding is also supported by the relationships diagram as shown in Figure 3 between IT conceptual understanding, IT usage, IT attitudes, IT confidence and IT competence (Naqvi 2000).

Figure 2.

Figure 3. IT concepts, usage, confidence and competence relationship diagram

Greater conceptual understanding motivates the students to use IT more and more use brings about more IT confidence and competence. The findings of this study suggest that since the ISA puts more emphasis on information literacy and on IT applications in business, the business students in the ISA group could relate their class work to the IT applications used in business organisations. The students felt the immediate usefulness of the material learnt in class, which brought them closer to the IT to use it more with enthusiasm.

The findings of this study are in line with several others findings (Hunt et al. 1993, Kohang 1989, Soule 1995), as these findings lead us to believe that more use of IT, especially in the direction of its intended use, bring about more positive attitudes and hence give more confidence to the users. This enhanced confidence turns students to use IT more often and so paved the way for higher IT skills.

The findings of this study also support that the groups with more positive attitudes towards IT is generally expected to be more confident in IT, in turn enhances IT skills (Buckland 1995, Leavenworth 1994, Zoraini 1995).

Another interesting finding of this study supports that the groups, which started with word-processing and followed the Traditional Approach gained more skills in word-processing and not so much in other applications of IT such as the follow-up modules, spreadsheets and databases (Freeman et al. 1995).

With the proliferation of powerful PCs and the availability of more user-friendly business software packages, however, most business organisations are looking for skills in information handling and not merely in word-processing. Many business organisations use databases and spreadsheets/graphics programs for their data processing needs and use word-processing for data presentations. At present the clerks and secretarial staff use word-processing but for business information and for decision-making the popular packages used in businesses are databases and spreadsheets software.

Since the ISA appears more effective in developing IT skills, it could be followed in any institute of higher learning in their introductory IT course, to acquire more information handling skills and not merely word-processing. In addition, the scope of the ISA needed to be extended to cover also the topics, such as the Internet, e-Mail, a World Wide Web (WWW) of computers and on line information searching techniques to meet the changing needs of IT in businesses.

Though there are many merits of ISA, still learning IT through the ISA would not make the students fully conversant with all of the IT applications used in businesses, but it may help to form a firm foundation on which to explore advanced techniques of IT.

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BIOGRAPHY

Syed Naqvi is presently teaching Computer and Information Systems courses at Sultan Qaboos University, Oman. Besides teaching, he is actively involved in research on computer education, delivering IT skills to business students, multimedia and e-commerce.