Problems of Teachers in Developing Computer Assisted Instructions at University Level

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Abstract

The study was descriptive in nature and aimed to explore the problems of teachers in developing computer assisted instructions at university level. A purposive sample of twenty eight university teacher was taken for study. Participants were different lecturers, Assist professors and Professors. A questionnaire was used as a tool to find out general perceptions of teachers about computer assisted instructions and prevailing hindrances of university teachers in their development. Data was analyzed and interpreted on average and by calculating a t-test to determine the difference of hindrances among teachers with and without computer qualification. Researcher found considerable hindrances among university teachers in developing Computer Assisted Instructions. Difference among teachers with and without computer qualification was also determined. Areas needed to be improved were administrative support, provision of new PCs, extra funding,

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development of courseware for CAI, competency to deal with troubleshooting, technical hurdles, safe keeping and training of teachers to utilize computer assisted instructions in a best manner.

 Key words: CAI, Computer Assisted Instructions, CAL, Computer Assisted Learning, IT, Information Technology, NUML, National University of Modern Languages, LMS, Learning Management System, R2 & D2

Introduction

Patrick (2011) defines "Computer assisted instruction (CAI) is defined as the use of computers and software applications to teach concepts or skills." Similarly the concept of computer assisted learning (CAL) is adjacent with CAI which means use of elements regarding information and communication technology which assist within an educational setting. CAL may engage a standalone software on a single computer, wide network packages or on internet based system. Types of program may include tutorials, simulation, game, modeling, different general and specific purpose packages. Usage of this mode will enhance both cognitive and social gains.(Husan, Postlethwaite & Neville, 2001).

Hypermedia has made a significant contribution while developing different software which helps in combining and synthesizing different technologies which focus on subject matter contents. Due to this emerging trend data can be organized according to learner needs. An individual possessing normal skill can easily learn how to develop different tutorials, drills and other practical programs through multimedia productions. Hence different cognitive, affective and psychomotor objectives of Blooms Taxonomy can easily be achieved but it depends how the knowledge is sequenced and presented with the help of computer assisted instructions (Sponder & Robert, 2000).

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Computers play a dynamic role in every walk of life. In educational activities they help a lot to promote students learning. According to Patrick (2011) supporting role of computer assisted instructions describes that educational institutions are pursuing interactive computer assisted instructions into their program to in order to meet specific educational objectives. With the help of a good learning management system (LMS), students approach towards different service websites for a specific period in view of their program. Similarly there are different electronic books which are used as a source of computer assisted instructions. They can be updated, cheaper well interactive in showing the images and ideas; through different dimensions learning becomes easier.

Stetter & Tejero, 2011 described that research proved that children with learning disabilities also benefit form CAI in comprehension skills. Students get help in visual imagery, advance organizers, visual imaging, visual, summarization and self-questioning through particular strategies developed for these skills. Students generally enjoy working on computers without any special support.

Mark (2010) describing role of computers as a machine says that the statement that computers will take place of a tutor and the concept of R2 and D2 robots is still threatening in view of future predictions. Computers facilitate in teaching learning without any class, race and individual capabilities. Hence confidence of the student increases and social embarrassment reduces.

Mark further states that computers being complex machines have some limitations. A working knowledge is very much important for competency of a teacher in computer related work. Teachers are having diverse attitude towards computer in their usage. Some think that they have been pushed into the areas where they have no experience and hence they consider this practice hostile to them.

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Rapid development of ICT has an impact on teaching learning process. There are certain problem and issues in the use of computers and ICT. These include limitations of software for curriculum use and lack of physical resources in applying new media in the instructional process. According to computer assisted instruction (2011) despite the fact that trend of computer usage in classroom is increasing but still a large number of teachers are not fully utilizing CAI for their instructional purpose. According to some recent figures only one third of total teachers are utilizing CAI in America. Although a majority of them have computers in their classrooms but they do not use them. A major challenge is non availability of needed software for their instructional purpose. Only word processing is relied mainly and drill and practice software are used at elementary level.

Technical hurdles and troubles are also among factors which affect severely the use of CAI in teaching learning. Similarly the less interaction with computers or a little to no computer experience are another issues confronted by the teachers. Due to lack of experience in computers a valuable time is consumed on technical hurdles. Similarly sometimes technology is overused in class and not with paces or to support instructions hence student mental and physical interaction with teacher reduces.(Klaus. J, 2011)

Jack, Sprecher & Jerry (1983) describing multiple issues relevant to CAI says that some need assessment based initiatives should be carried out before start of these instructions specially courseware , administrative issues like vendor policy, marketing issues, back up policy may be kept in mind. Content issues in view of actual contents of courseware and technical issues like error, user friendly, speed and dependency are also important to be noted. There are also student related issues like student control, results , freedom from technology, motor skills and motivational values are also important part in developing a courseware of CAI. Despite of all that post acquisition evaluation criteria of any CAI courseware in class room setting is also necessary to judge it worth. Cost

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effectiveness and budgeting are other concerning issues which my affect the infrastructure or framework for CAI courseware.

Among these all ongoing issues and challenges teacher has to get through in view of its potential. Sponder & Hilgenfld (2001) highlighted that although there are many a teachers who are interested in developing their own software but they are going through many obstacles like lack of training, support and how to develop these programs with the help of multimedia. Consequently most of the teachers are still far away from the full advantages of CAI. Teachers and instructional designers are required to develop computer programs with the help of hypermedia like Hyper Card, TM Book and Micro media Director.

Significance of Study

In view of these tackling issues, current study will help both teachers and administrators to develop strategies and plan to meet issues relevant to development of CAI and its utilization. Study will also support in making teaching more attractive, comprehensible and outcome oriented. Teachers at universities can reduce or sweep the problems pertinent to their instructional role. Issues relevant to provision of equipments, training facilities and funding can also be resolved. The study will also help policy makers at government level to analyze survey and plan for development of instructional sources and train the teachers for usage of hypermedia and computer application on their instructional role. Study will help university teachers who are relevant to computer fields to work on development of CAI courseware and evaluation procedures

Objectives of the Study

Study was formulated with following objectives:-

(1) To find out to what extent university teachers are utilizing CAI.

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(2) To find general perceptions of university teachers abut effectiveness of CAI in learning process.

(3) To find out hindrances of university teachers in development and utilization of CAI

(4) To differentiate the hindrances of university teachers in developing and utilizing CAI in view of their computer qualification.

Research questions

In view of the problem under investigation following research questions were developed

(1) To what extent university teachers are utilizing CAI?

(2) What are the perceptions of university teachers about effectiveness of CAI in learning process?

(3) What are the major hindrances faced by a university teachers in developing and utilizing CAI?

(4) What are the differences among teachers about hindrances of CAI development with respect to their computer qualification?

Method

Participants

For the current study department of IT & Engineering at NUML was involved. There were total 43 university instructors with various designations i.e. Professors, Assistant professors and lecturers teaching in department of IT & Engineering. Because of mid term assessment an available lot of 28 teachers deputed at various exam duties were taken for the study. Some of the instructors in total staff used to visit faculty on as and when required basis. Therefore maximum available staff form department of IT & Engineering was included. All teachers were having various backgrounds in view of their age, qualification, experience and gender which is explained as under. See Table 1 for demographic characteristics.

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Table 1

Demographic Characteristics of Participants (in Percentages)

Variable	Frequency	Percentage
Gender		
Male	20	71
Female	08	29
Marital status		
Married	16	57
Single	12	33
Age		
20-30 Yrs	16	57
31-40	10	36
40 Years or more	02	07
Years of teaching experience		
0-10	25	89
11-20	03	11
21 Years or more	0	0
Highest degree held		
Graduate or less	03	11
Masters	07	25
MS/PhDs	18	64

Sampling Technique

Owing to commitment of university staff in examination department of IT & Engineering was involved in the study. Hence study was delimited to department of IT & Engineering at university. The sample was purposive in nature. There were two major purposes for selection of this sample, first to know about the instructors who were closely related to IT & Engineering, how much they are utilizing their instructional skills through computers. Second purpose was to take constructive feedback in view of computer

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related issues and further suggestions for campus in order to propose suitable measures for development and utilization of CAI. Another factor was limitation of time frame for the study due to which a specific and relevant department was taken for this study. All available teachers participated in the study. It was a total of 67% from faculty instructors at department of IT & Engineering.

Instrumentation

In order to find out the perception of university teachers about utilization and problems regarding development of CAI, a questionnaire was developed after having a detailed review of relevant literature. Questionnaire was developed in the light of set objectives. It was based on five point likert scale to judge the perceptions and relevant hindrances of instructors. Items were given the rating scale i.e. Strongly disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA).Questionnaire included 20 items with a cover letter and purpose of study . First item of questionnaire was developed in order to know to what extent university teachers were having usage of CAI while delivery of instructions in class rooms. From item 2-5 university teachers were asked questions about general perceptions with relevant to CAI and its effects on students. Item 6-19 was covering most of the hurdles faced by university instructors in development and utilization in teaching learning. Aspects of these items were build on issues relevant to administration, training , computer skills, aids and equipment, development of courseware ,funding , evaluation and political influences. Last item No 20 was kept open ended to elicit teachers to mention their views, suggestion and feedback for better development and utilization of CAI during delivery of their instructions in class rooms. Questionnaire was with cover letter having a brief purpose of study and confidentiality of information. First part of questionnaire was having the demographic information of participants like gender, age, educational qualification, computer qualification, status of employment, etc. Construct validity of questionnaire was ensured before its administration to participants. Questionnaire was put before some senior experts of research; every item was analyzed according to its purpose and relevancy to objectives.

Some of important suggestions were recommend, all these were included before preparation of its final version and administration to the sample.

Procedures

Questionnaire was administered one by one on every instructor. Instructors at university were deputed on various examination duties and they were pursued on their duty places in morning shift of university. Questionnaire was administrator after a brief introduction of researcher and purpose of study. Most of instructors returned their questionnaires after termination of paper timings. Instructors of engineering fields were administered with the questionnaire on next day. All available instructors filled in the questionnaire with sympathetic attitude. All questionnaires were collected one by one back from participants of study and gratitude was conveyed to all instructors on collection.

Data Analysis

Data acquired from university teachers was tabulated, arranged, and analyzed in every aspect of study. Data was coded and decoded, numbered and classified. Every item was given weightage on the basis SD=1, D=2, N=3, A=4 and SA=5 to find out averages of every item. Data was analyzed on percentage method to find out the level of perceptions from instructors. From item 1-19 averages were calculated, a separate t-test was used to determine the difference of perceptions among instructors with and without computer qualification. Item no one was analyzed separately, item 2-5, and 6-19 also in different phases to find out perceptions of university instructors separately. Last item was analyzed in qualitative aspect for views and perceptions regarding their hindrances in CAI. Comments of participants were summarized in view of their themes and activities with reference to CAI and its utilization.

Results and Discussion

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Results which were acquired from different instructors were analyzed and arranged separately on the basis of objectives determined. First university teachers were asked about how much they were using CAI in instructional process, then what perceptions they have about CAI effects on students, what hindrances were faced by them in developing and utilizing CAI. At the end last open ended item was analyzed in qualitative form about necessary suggestions which were incorporated by instructors. Results of above mentioned phases are elaborated separately. University instructors of utilization of CAI is as under (See Table 2)

Table 2

How much of university teachers are utilizing CAI in teaching

Statement	Mean	Std. Dev	SD (%)	D (%)	N%	A (%)	SA (%)
1. I use CAI while teaching	3.71	1.109	7	11	3	61	18

Ratio of University Teachers Utilizing CAI for Instructional Purpose

Statement No 1 was designed to identify, to what extent university teachers were utilizing or availing CAI for their instructional purpose. *I use CAI while teaching*. Total perception of university teachers was better enough. From a total sample 61% teachers were agreed while 18% strongly agreed with a mean of 3.71 and Std Dev 1.109. However a sufficient number of teachers were still with the views that they do not use CAI. From total teachers 11% were disagreed and 7% strongly disagreed, while only 3% were indecisive for their views. It showed that still a sufficient number of instructors were those who either deny or do not prefer to use CAI for educational training of students.

Table 3

Perceptions of University Teachers about Effects of CAI on Teaching Learning

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Statement	Mean	Std Dev	SD (%)	D (%)	N%	A (%)	SA(%)
2. CAI promotes good learning among students	4.14	0.755	0	3	11	53	32
3. CAI as compared to other methods is highly praised by students	3.75	0.967	0	7	39	36	18
4. CAI can well enhance teachers instructional capabilities	3.89	0.916	3	7	11	57	21
5. Students enjoy the classroom climate when CAI is used by teacher	3.75	0.967	0	14	18	46	21

General Perceptions of University Teachers for Effects of CAI on Students

Item 2-5 were structured to find out general perceptions of university teachers about effects of CAI on students (see Table 3). In all of these statements mean score of teachers ranged from 3.75 to 4.14 with a Std.Dev ranging 0.755 to 0.967 which was very significant and strong. Views of teachers in statement 2 that CAI promotes good learning among students were much stronger and a total of 53% teachers were agree and 32% strongly agree. In statement 3 when teachers were asked CAI as compared to other methods is highly praised by students was a little weak as compared to other perceptions but despite of that 36% agree and 18% were strongly agree with this statement. At item 4 when students were asked CAI can well enhance teacher's instructional capabilities. Percentages of agreed and strongly agreed were 57% and 21% which were highest in general perception. It showed that teachers were having strong perceptions about utilization of CAI for their instructional purpose. Last statement 5 was asked for the

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purpose of finding whether students enjoy and feel better when CAI is used by teachers in classroom. Here again perception was better and 46% teachers were agreed and 21% strongly agreed with this statement.

Table 4

Prevailing Hindrances of University Teachers in Developing CAI

Statement	Mean	Std. Dev	SD (%)	D (%)	N %	A (%)	SA(%)
6. Administrative issues are a source of hindrance for developing CAI	3.25	1.206	7	4	30	44	22
7. Due to lack of professional training CAI cannot be developed at campus	3.5	1	3	21	25	39	11
8. Computer qualification is a major hindrance in developing CAI	2.28	1.242	28	39	18	3	11
9. Provision of inadequate facilities of computers at campus is a source of hindrance for developing CAI	3.07	1.245	18	11	32	28	11
10. Development of CAI is negated due to time constraints	2.96	1.137	14	21	25	36	3
11. Computers are avoided to be use for CAI as they are considered hazardous machines	2.14	1.238	39	32	7	18	3
12. Being no PC or access to PC I am unable to develop CAI	2.10	1.133	32	43	14	3	7

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No.	Statement	Mean	SD					
13.	Due to technical issues of computers campus cannot focus on development of CAI	2.89	1.286	18	25	14	36	7
14.	By developing a courseware, use of CAI in classroom can better be carried out	3.82	0.818	0	7	21	54	18
15.	Cost effectiveness is one of the issues in provision of computers and related equipments for CAI development	3.67	0.862	0	14	14	61	11
16.	Instructional methods for CAI are a source of trouble for its development	3.03	1.104	7	28	25	32	7
17.	Funding is a major issue in developing CAI courseware	3.78	1.066	3	7	28	36	25
18.	If CAI courseware launched ,there would be no evaluation procedure which would be a hindrance	2.82	1.090	14	21	36	25	3
19.	Due to political influences university is still falling short of CAI development phase	3	1.217	14	21	21	36	7

Hindrances of University Teachers in Developing and Utilizing CAI

As one of the major objectives set out for the study was to diagnose the existing problems of university teachers in developing and utilizing CAI for their instructional purpose , hence in view of detailed review of literature statement 6-19 were specially focused on hindrances of university for CAI. Statement No 6 was asked relevant to

administrative issues of university. *Administrative issues are source of hindrance for developing CAI for me.* At this statement negative perception of university teacher was shown by stating 44% agreed and 22% strongly agreed. Only 4% disagreed and 7% strongly agreed, while others remained neutral. Hence at this level mean too was much higher as compared to other statement of hindrances i.e. 3.25 and Std.Dev 1.206. It showed that administrative issues were one of the major hindrances for developing and utilizing CAI. Teachers were asked at statement 7 whether due to professional training they cannot develop CAI. Again teacher perception was acceptable and they supported with a ratio of 39% agreed and 11% strongly agreed 21% disagreed and 3 percent strongly disagreed.

When teachers were asked whether computer qualification was a hindrance in developing CAI for them, at this statement mean was low enough i.e. 2.28. Teachers were having a strong negative perception. A ration of 28% with strongly disagreed and 39% strongly agreed, only 3% were agreed and 11% strongly agreed with this view. Statement No 9 was posed in order to know the views of teachers whether inadequate facilities of computers at campus were a source of hindrance for developing CAI. Most of the teachers were neutral with 32% average, 28% were agreed and 11% strongly agreed, which shows a normal perceptions of teachers but strong as compared to negative perceptions. Time limitation being a factor was asked to teachers in next coming statement No 10, whether they negate CAI due to time limitations. Teachers perception for this hindrance was much strong 36% agreed and 3% strongly agreed, a prominent ratio was against it therefore a ratio of 21% were disagreed and 14% strongly disagreed.

Some of teacher being computer phobia or considering it a complicated machine do not prefer to use it, they consider it hazardous. To know computer phobia among teachers statement 11 was inquired. *Computers are avoided to be used as they are hazardous machines.* Teacher's perception for this hindrance was too low and in negative terms. Overall in this item 32% disagreed and 39% strongly disagreed. A minor lot of

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18% and 3% were agreed and strongly agreed consecutively. In item 12 teachers access to PC or having no PC with them was enquired. Again level of perception for this hindrance was standing lowest with a mean score of 2.10. A group of 43% disagreed and 32% strongly disagreed. Only 3% were agreed and 7% strongly agreed which showed that having no PC or teachers access was no more major hindrance in developing CAI.

In statement 13 teachers provided their views either technical issues of computers were a source of trouble for developing CAI for them. Teachers were having a significant views with 36% agreed and 7% strongly agreed. A total of 25% disagreed and 18% strongly disagreed. Next statement 14 was asked in search of need and importance of CAI courseware development for classrooms. Either by developing a CAI courseware its utilization can better be carried out. Level of perception from teachers here was standing at highest point with a mean of 3.82 and Std. Dev of 0.818. It showed that CAI courseware development was essential enough. Cost effectiveness was asked among one of troublesome issues at statement 15. Most of teaches were with a strong perception with an average of 61% agreed and 11% strongly agreed. A statement about issue of instructional methods for CAI course development was raised in item 16. A number of 32% were agreeing and 7% strongly agreeing. At statement 17 while denoting insufficient funding a ratio of 36% agreed and 25% strongly agreed, favored that funding was a major issue in CAI development.

Statement 18 was followed with the purpose that if CAI courseware is developed would they think that there would be no evaluation procedure for it. Most teachers denied this statement with negative perception ratio of 21% disagree and 14% strongly disagree. A major ratio with 36% was neutral. Political issues affecting university were also elicited in last statement No 19. Perception of university teacher was better strong. Teachers with a ratio of 36% agreed, 7% disagreed, 21% neutral, 21% disagreed and 14% were strongly disagreed.

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Feedback of University Teachers in Open-ended Item

One item in the questionnaire which was kept blank for university teachers was analyzed on qualitative form. Teachers provided their feedback on many issues confronted by them in CAI development, launch and utilization at campus. Thirteen teachers out of twenty eight highlighted their viewpoints in open ended statement. One teacher totally opposed the use of CAI, claiming that CAI reduces student teacher interaction, it should only be used when teacher cannot fully expressed thoughts before students, I shall partially support it. A teacher stressed on government and other relevant institutions for promoting CAI, he stressed that sufficient funding should be allocated. An instructor highlighted the provision of computer to each faculty member separately so that every teacher may contribute easily. An instructor said that CAI best promotes students interests in course and enhances teachers capabilities. Some of the teachers emphasized on the provision of PCs and multimedia facility to every lecture room, they stated that hence they can easily deliver their lectures with deep knowledge and useful exercises. They further asked to provide software.

They said for provision of multimedia and dedication of computer labs to students. On laying emphasis on administrative hurdles it was notified by them that these hurdles must be met. Another instructor said that multimedia projectors must be facilitated to campus, high speed PCs with available space should be provided. Professional training should be provided by campus on periodic basis, proper training for CAI should be arranged. Few teachers gave comments on training either minimum of two weeks or short term courses for execution of CAI. One senior teacher gave importance to some crucial issues like funding, cost effectiveness, safe keeping and hurdles of troubleshooting should be resolved so that instructor may utilize computer in a best manner.
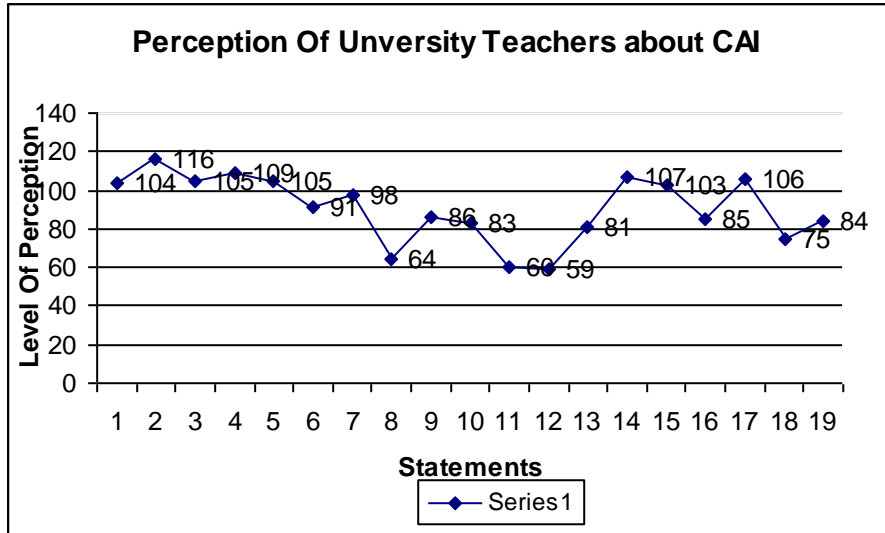
Figure: 1 Perception of University Teachers about CAI

Figure 1 shows perceptions of university teachers about effectiveness on students and their perceived hindrances. In statement 1-5 level of perception is high enough with regard to effects on students. While as statements goes on level of perception reduces relevant to perceived hindrances of university teachers in different statements.

Table 5

Differences in Perceived Hindrances for CAI between Male and Female Teachers

	Group Statistics			
Gender	N	Mean	Std	Std Error
Teachers with computer qualification	13	41.23	8.642	2.400
Teachers without computer qualification	15	42	8.577	2.216

Differences in perceived hindrances of teachers with respect of computer qualification

An independent sample t-test (see table 7) was conducted to evaluate hypothesis 1 which sought to find out whether there is a significant difference between computer qualified and without qualified university teachers. The result showed a significant

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difference between male and female teachers t (28) =-0.815, p > 0.000 (insignificant). This implies that teachers with and without computer qualification were having no significant difference.

Conclusion

Problem understudy was focused on finding perceptions of university teachers about development and utilization of CAI and also prevailing hindrances faced by teachers in this process. Most of the teachers at Department of IT & Engineering were with strong perceptions about CAI and its effects on learning. Most of the instructors were utilizing CAI for their teaching. In the similar way teachers were having strong perceptions about effects of CAI on students learning and enjoyment in classroom environment.

Most of the teachers were having the views that CAI promotes good learning among students. Teacher, s views about their perceived hindrances and issues relevant to CAI were expanded too. Administrative issues were considered among one of the major issues. Lack of professional training in the context of CAI usage in classroom was another major hindrance for teachers at university level. Teacher's personal commitments and time limitation were another issues confronting CAI development. In the similar context teachers were having low computer phobia in computers operation. Technical issues of computer were a major hindrance too for teachers, they do not had adequate know how of technical problems with respect to CAI and its use.

Taken as a whole shortage of computers at campus, having no PC with instructors or easy access to PC were problems besides. Likewise the faculties being from IT & Engineering were lacking in CAI courseware. Development of CAI courseware and its evaluation procedure was emphasized by the by the teachers. Lecture rooms of instructors were missing multimedia facilities, hence most of the teachers insisted on

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provision of multimedia to lecture rooms. In the same way teachers were asking for their own computers for their instructional purpose or an easy access.

Teachers also urged for multimedia projectors , high speed PCs and installation of multimedia or relevant accessories in their lecture rooms. Insufficient funding was another issue highlighted by the teachers, they urged for more funding hence computer, s use for instructional purpose may be made easy. Cost effectiveness, safe keeping of computers, trouble shooting issues, were mainly highlighted by university instructors which were hindering their instructional effectiveness in utilization of CAI.

Recommendation

The study being descriptive and survey type was sought to know both the general perception and prevailing hindrances in development and utilization of CAI for their instructional purpose. As teachers are instructional leaders therefore they need professional competency, organizational support and favorable attitude from staff and workplace. In view of the outcomes of currents study there were many areas which required both institutional and staff role in their respective fields. Most university teachers were utilizing CAI for their instructional roles and they had positive views about impact of CAI on students learning. But despite all these, teachers required an encouragement for its maximum use in class room. As compared to normal instructors and teachers from fields of IT and Engineering, these teachers require more competency , back-up and utilizing techniques of CAI in their instructional process.

Administrative support may be provided in view of easy access to computes, availability of computer related audio video aids and provision of new computers to labs. Teachers may be provided training for utilization of CAI either periodic or on short term basis. Issue of time limitation and commitments may be resolved with provision of separate PCs or relevant resources which may help teachers to develop CAI in a limited

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time. To resolve technical issues of computers technical suggestions, guidelines and training may be provided by computer competent members of faculty.

Actions for development of CAI course ware for staff at campus may be taken along with evaluation procedures. It will assist instructors a lot in a better access, interaction, easy way of utilizing CAI and instructional improvements. University may have to take steps for provision of necessary funding which may overcome problems in purchase of new hardware, software and multimedia. Lecture rooms may be provided with high speed PCs and audio visual technology. Likewise issues of safekeeping, cost effectiveness and trouble shooting may be resolved or overcome through involvement technical experts of relevant fields or training of personnel who have to utilize CAI.

Future Research Needs

The result of this study cannot be generalized on a large sample, it is a case study but as a whole it give overall picture of teaching in Pakistani culture. Future researches may have to be extended to other departments of university, especially fields of social sciences. Researches on teacher's competency in computer skills and on administrative issues relevant to computers would also be required.

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