TRAINING ENGLISH LANGUAGE TEACHERS THROUGH CMC-ELT BLENDED MODEL: A CASE STUDY OF ONLINE MA TEFL PROGRAMME OF AIOU

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ABSTRACT

The recent developments in technology have brought revolution in all the spheres of life especially in the field of distance education. Its potential impact on distance education delivery system has been greatly accentuated through the development of computer-mediated communication (CMC) which included internet-based information technologies, and in particular the World Wide Web. CMC not only facilitated the students at campus but also at distance and new means of education like educational technology and e-learning were introduced. Integration of CMC with distance education needs a basic infrastructure, trained faculty and technical skills of the students. CMCs based instructions have been experimented in distance education and specifically in professional education programmes in developing countries. AIOU is also building up the infrastructure for offering CMC-based education and especially teacher education programmes. A CMC-ELT blended model was conceived and implemented on two courses of MA TEFL programme of Allama Iqbal Open University. The results and students performance reflected cost-effectiveness, enhanced access to study materials and improved students' learning.

Keywords: Computer-mediated communication, Distance education, English language teaching.

Introduction

Distance education evolved through various phases including correspondence systems, print and broadcast systems, multimedia systems, online systems, etc. Each generation has offered the potential

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for a progressive increase in learner control, opportunities for interaction, and in possibilities for learner choice. Correspondence courses were offered in the late 1800s to provide education to individuals who could not join regular institutions due to geographical, social, or cultural constraints. The first generation of distance education was marked with print-based correspondence education and that was the only mean of interaction between teacher and students. British Broadcast Corporation (BBC) started educational programmes through radio broadcast in the 1924. Since then, radio has been used in reaching scattered and rural population. Experiments with television began in the 1930s but it took 20 years to become popular. Therefore, the second generation was characterized by a blend of print and broadcasting approach. The UK Open University used a range of media for distance education for the first time besides the print medium. The third generation of distance education was based on two-way communication and used CMC technologies for interaction. Students were provided print or multimedia textbooks with access to internet resources. They had opportunities to communicate with the tutors and native speakers via e-mail. These opportunities for interaction offered by the emergence of CMC were central to the third phase model of distance education. White (2003:15) comments that the hallmark of this generation was "greater and enhanced communication opportunities between the teacher and learners, and between the learners themselves, either individually or in groups". This led to the development of a virtual learning environments based on audio/video conferencing. According to Bates (2005:7), "third generation systems are sometimes described as knowledge-based, more constructivist approach to teaching and learning, dependent on student dialogue and discussion, and relatively flexible web-based administrative services". Fourth generation offered a wide variety of learning opportunities for distance education programmes which allowed students further choices about where, when and how to learn. The advent of CMC and its impact on the design of distance education increased the potential for interaction and collaborative work among students. Integration of technology in education introduced new terms, like e-learning, distributed learning, mixed more, blended and hybrid learning. The traditional form of distance education that used print, audio and video materials was supplemented with CMC for providing more opportunities for interaction and collaboration. White (2003:7) says that "the social and technological changes that prompted expansion are also transforming the nature of distance learning. They have resulted in new contexts for learning, new ways of learning and new roles and responsibilities for participants".

Computer played a significant role in the second and third generations of distance education whereas in the fourth generation its impact has been of fundamental importance by providing a wide variety of the instructional uses of computer in distance education through Internet. This change also created new context for learning which is an interconnected community of learners rather than an isolated series of individual learners.

Pakistan's socio-economic situation has prevented a high enrolment in formal education by rural people, females and workers. The idea of establishing distance education system was developed to address this problem. As a result, the world's second Open University was established in Pakistan by federal charter in 1974. AIOU is first of its kind in this region, is a unique institution because of its philosophy, system, approach, functions and overall structure. AIOU is pioneer institution in the fields of mass education, female literacy, teacher education, and media-based distance education. AIOU has been using technology in various programme/ courses at various levels. Distance education in Pakistan is still mostly dependent on print and broadcast media and a major move is needed to transform educational landscape by using technology which can dimensionally multiply the scarce resources available in the country. By integrating technology with distance education, the AIOU can provide a next generation educational delivery programme and multiply the efforts of the Ministry of Education a, Department of English Language and Applied Linguistics, Allama Iqbal Open University and Higher Education Commission.

The Department of English Language and Applied Linguistics, Allama Iqbal Open University, offers English language courses and Teaching of English as a Foreign Language (TEFL) programme. The MA TEFL is a two-year (60 credit hours) programme spreads over four semesters. The students have to attend 12 classes for each course. The students failing to attend the required number of classes are declared fail even if all the other requirements of the course have been fulfilled. They have to write four assignments for each of the courses. The fourth assignment is based on projects on which they have to give presentations. At the end of each semester, they have to appear in the final exam for each of the courses they study. In online MA TEFL programme, students were provided access to online study material, tutorials, submission of assignments and feedback by respective tutors.

Objectives of the Study

The objectives of the study were to:

i. Judge the effectiveness of the CMC-ELT Blended Model.
ii. Analyse the students' performance enrolled in online ELT courses.

Research Questions

i. Was the CMC-ELT Blended Model appropriate in distance education context in Pakistan?
ii. Was the CMC-ELT Blended Model helpful in improving students' learning enrolled in online ELT courses?

Research Design

The researcher adopted a quantitative research framework to analyze the effectiveness of CMC in English language teaching programme in distance education in Pakistan. The experimental study was conducted during Autumn 2007 semester.

Research Tool

The researcher used survey, AIOU results and pre- and post-tests for collecting the data. Survey was used to get information about students and their habits regarding use of computer and internet. AIOU results, pre- and post-tests were used for assessing the performance of the students.

Population

The population consisted of 664 students enrolled in MA TEFL programme. It consisted of 47.2% male and 52.8% female; 69.5% were from urban and 30.5% from rural areas.

Sample

A group of 27 students was selected randomly from Islamabad, Rawalpindi, Abbotabad and Chakwal regions. The researcher selected these regions because these were the main regions located in the centre of the country and they also reflected diverse population. Islamabad is the federal capital and represents population from all regions of the

country. Rawalpindi and Chakwal are located in Punjab whereas Abbotabad is located in Khyber Pakhtoon Khwah (KPK).

Theoretical Framework

There is a long list of CMC or e-learning models based on needs analysis which were designed to engage the students in meaningful tasks, quick feedback, reflection through discussions with tutors and peers, assessment, and discussion to create a community of teachers and students. The basic characteristics of the models were clear learning outcomes in terms of the subject matter or skill to be learnt, the instructional method. The role for technology involved a simulation of a process and the automatic presentation of problems that were carefully graded in difficulty. However, a few models have been selected for discussion leading to researcher's CMC-ELT Blended model.

Salmon (2004) introduced a five-stage model for fully online teaching and learning. The model describes how to motivate online participation of students, to build learning through online tasks which he termed as e-tivities, and to pace learning through various training stages. First stage describes prerequisite of the course and induction of participants, second stage guides individuals establishing their online identities, third stage exchanges students' information, fourth stage initiates course-related discussions, and fifth stage, real reflection and personal development occur in the achievement of goals.

The UK Open University (UKOU) initiated a VLE project in 2004. Because of its distance education mode of operation, a number of large-scale systems had been developed prior to the advent of VLEs. The tools it already possessed were: discussion and conferencing, authentication, template driven content delivery, blogging, audio conferencing, assignment handling and assessment. The UKOU developed an e-learning strategy which had direct resonance with the VLE project. From a VLE perspective these strategic directions favoured certain approaches; for example, in order to show leadership in modern pedagogy, an open source or service oriented approach was preferable to a commercial, proprietary solution, as it allowed flexibility in approach, and also demonstrated a degree of technical engagement with the VLE community (UKOU website).

The Open course Ware initiative at the Massachusetts Institute for Technology (US) aims to put all its educational materials online: course outlines, syllabi and activities, book lists and assessment exercises. The model offers an open access approach to learning materials. The model provides the benefits of open access for all to education around the world (OCW, 2006: online).

The Educational Management Action Research (EMAR) model is based on initial framework proposed by Goodyear and Khakhar (McPherson and Nunes, 2004:28) as a first attempt to build a general action research management framework. Action research cycle comprises: Diagnosis (data gathering, analysis and representation), Action Planning, Action Taking, and Action Evaluation. Her diagnosis is the identification of a learning need that requires development or improvement of a particular course.

CPDE (Continuing Professional Development Education) model was developed for the MA in ITM (Information Technology Management) based on "a constructivist approach, which implies the assumptions that learning involves an active process of construction by the learners at both individual and social levels, rather than the passive reception of knowledge" (McPherson and Nunes 2004:49). The course is composed of a set of explicit materials and includes a number of exercises, reflective tasks and problem solving case studies, carried out at both individual and group levels. The role of the tutor is that of "a facilitator who supports independent engagement in the process of construction through scaffolding and the provision of advanced organizers into the learning environment" (McPherson and Nunes, 2004). Collaboration and peer support relationships are essential features in order to enable engagement in dialogue, exchange of experience, ideas and feedback, and overcome isolation. Learning activities are authentic and situated within a real context if learning and skills are to be transferred easily into other contexts.

All these models reflect that the distance education has recognized "the need to provide opportunities for social interaction to support effective learning and have therefore tried to simulate face-to-face communication through the development of instructional systems based on technologies such as audio-conferencing, videoconferencing and computer mediated communication (CMC) that can support two-way

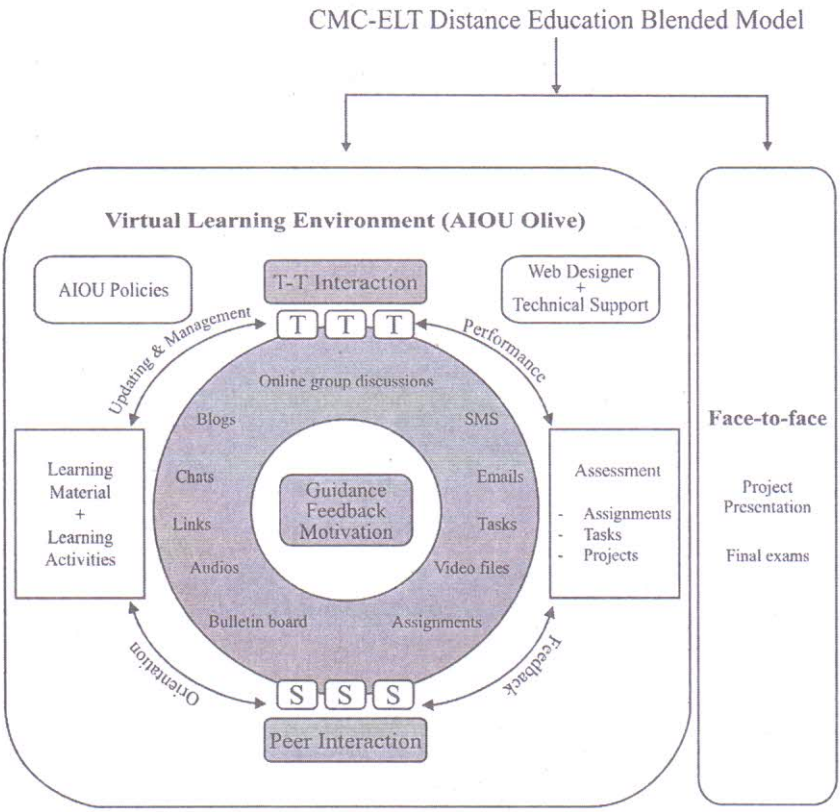
communication between students and teachers (McPherson and Nunes 2004:53).

CMC-ELT Blended Learning Model

CMC-ELT Blended Learning Model does not project a new pedagogical framework but it enhances the previous models of learning by adding the component of technology with distance education to create a more cost-efficient way of bringing the learning environment to the learners. This need-oriented model has a clear understanding of students' previous knowledge, experience, solutions and strategies. All these aspects play an important role in specifying the structure, contents and delivery strategies. Furthermore, the CMC-based model has a clear concept of theoretical foundations of learning and cognition. The model is equally effective for course development and adaptation/adoption process. The design and specification phase outlines a comprehensive set of authentic activities, tasks, scaffolding and support to be provided to the students. Blended learning combines CMC tools with traditional distance education and training to ensure maximum effectiveness. Students can share their experiences online and gain benefits of interaction with teachers and students via a virtual classroom. The reasons for implementing the blended learning in CMC-based distance education system are reducing cost, delivering training in shorter period, providing flexible models for learners to increase rate of learning, and accommodating different learning styles (Igneri & American Management Association, 2005).

The CMC-ELT blended model has been developed as a standard model, bearing in mind the fields of English language teaching. It requires implementation within a general distance educational setting, taking into account the nature of the programme, the subject matter, the profile of the students, the support facilities and educational technology available. While designing the instructional strategy (how learners are going to learn and how they are going to achieve the learning objectives) following points were kept in mind: characteristics of the learners; type of knowledge to be delivered; learning outcomes and the objectives of the course; and prerequisite knowledge.

Figure 1



The model has been designed according to AIOU virtual learning environment Olive (Online Learning Institute of Virtual Education) designed by the Department of Computer Sciences of the University. Olive has been designed in Moodle (Modular Object-Oriented Dynamic Learning Environment), an open source. The goal of CMC-ELT blended model is to give students the abilities and strategies required to manage the increasing information on the internet and to develop critical thinking and self-directed learning abilities. Therefore, the desired outcome of education becomes the construction of new knowledge structures that accommodate further learning and not the assimilation of specific bits of information. It leads us to a collaborative constructivist view of teaching and learning. This collaborative constructivist learning perspective is associated with the work of John Dewey who thinks that society and the individual cannot exist separately. He identified two basic principles of

learning that are interaction and continuity. Interaction unifies the subjective (personal) and objective (social) worlds in an immediate timeframe. Through this interaction, ideas are generated, meanings are constructed and shared.

The primary mode of communication in this model is text-based. There is significant evidence that writing has some inherent advantages over speech when engaged in critical discourse and reflection. One obvious advantage is the permanence of record of teaching and learning. The model presupposes that the students will engage with online text, supplementary reading material and relevant websites. They will apply and negotiate the theoretical knowledge in the virtual classroom. Online forum is designed for peer interaction other than the weekly online tutorials. The tutor facilitates the students in their learning through chats in virtual classroom and instant messenger. Students are assigned tasks and assignments which will be evaluated by the tutor.

The CMC-ELT model also provides tools so that tutors can communicate with students, present and structure learning materials, mark online assignments, and monitor students' progress; students can manage their time, monitor personal progress, communicate with tutors and other students, access information and guidance services, develop a personal learning plan, undertake self-assessment and develop a portfolio; and administration can produce management reports, check enrolments, identify tutors' responsibilities and obtain contact details of tutors and students.

Data Analysis

Characteristics of the Sample (Students)

The purpose of collecting data on characteristics of the sample was to confirm whether they could meet the requirements of the CMC-based programme or courses. Furthermore, it was imperative to collect data regarding access to Internet and computer using habits of the students to finalize the sample for the CMC-based classroom. There are some parameters which affect integration of CMC in distance education system. These parameters include desire to get higher education, educational background and basic computer skills. (Clarke, 2001:2-5)

Figure 2
Gender

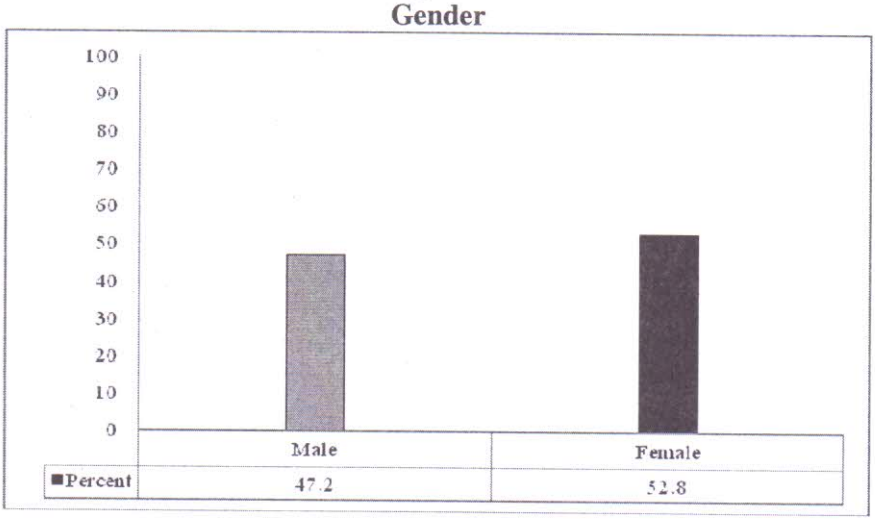


Figure 2 shows students information regarding gender. 52.8% of the students were female and 47.2% were male. Keeping in view the university's objective of reaching neglected sections of the society in education sector especially females; it can be perceived that using CMC in distance education would be beneficial for female population. It could also minimize the cultural and social barriers for females in getting higher education.

Figure 3
Qualification

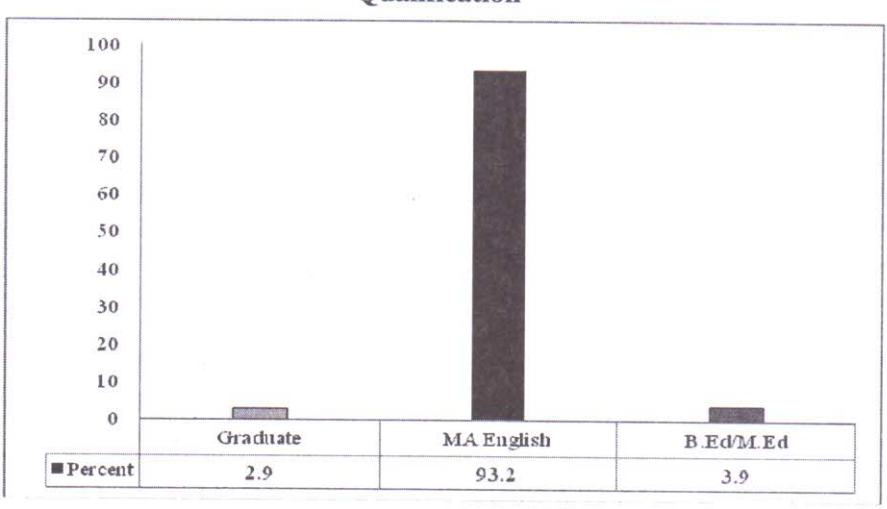


Figure 3 shows that 93.2% of the students were MA English. Though the eligibility criterion for admission to Dip/MA TEFL was graduation (45% marks) but most of the candidates applying for admission to this programme had already got Masters degree in English literature and were interested in improving their professional qualification. CMC-based interaction could better be applied in an environment when the target population had potential for independent learning and wanted to develop their professional skills. Therefore, the sample was appropriate for CMC-based instructions.

FIGURE 4
Location

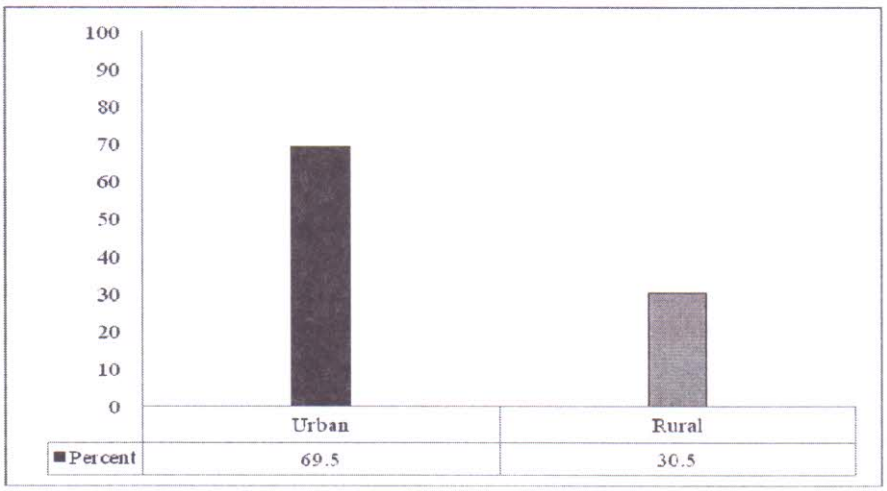


Figure 4 illustrates that 69.5% of the students were from urban areas and 30.5% from rural areas. It reveals that most of the students were based in urban areas because better communication facilities were available there as compared to rural areas. The characteristics like better educational opportunities, access to computer and Internet, computer literacy, etc. were due to urbanization which suggests that CMC-based instructions could better be implemented in such types of groups. One of the characteristics of urbanization had been better means of communication like Internet had also reached most of the population living in rural areas. So, the population from rural areas could also benefit from CMC-based education programmes.

Figure 5
Age

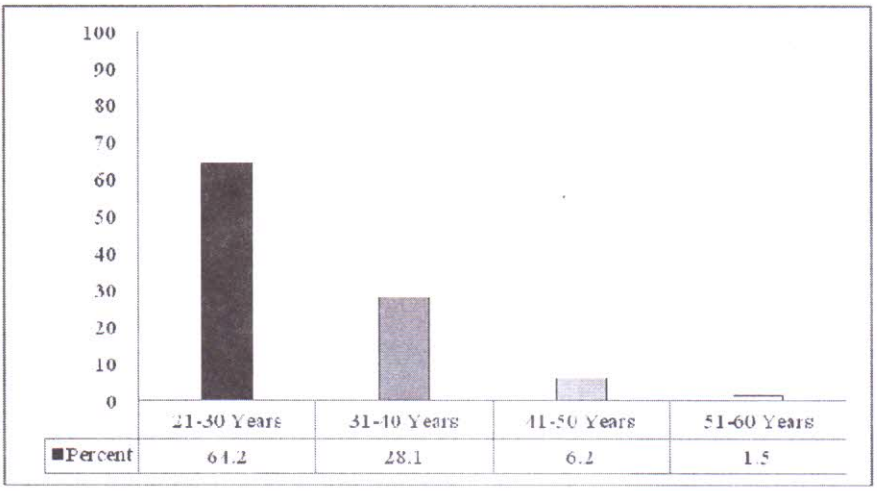
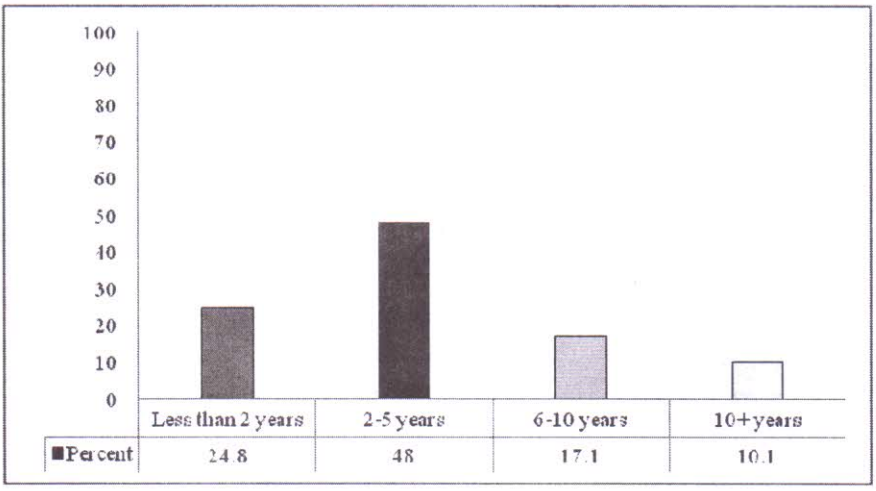


Figure 5 shows that 64.2% of the students were in the age group 21-30 year and 28.1% in age group 31-40 years. This age phase was important in a way that after completing their masters' degrees, the students had to enter into professional phase. So, they were more inclined towards independent learning for their professional development.

Figure 6
Teaching Experience



48% of the students, as reflected in Figure 6 had got up to five years while 24.8% had less than two years and the rest of the students had more than five years teaching experience. Majority of the students had started their career and they felt a need to improve their professional skills. So, keeping in view the qualification, age and teaching experience, the sample possessed potential for CMC-based learning.

Figure 7
Computer Literacy

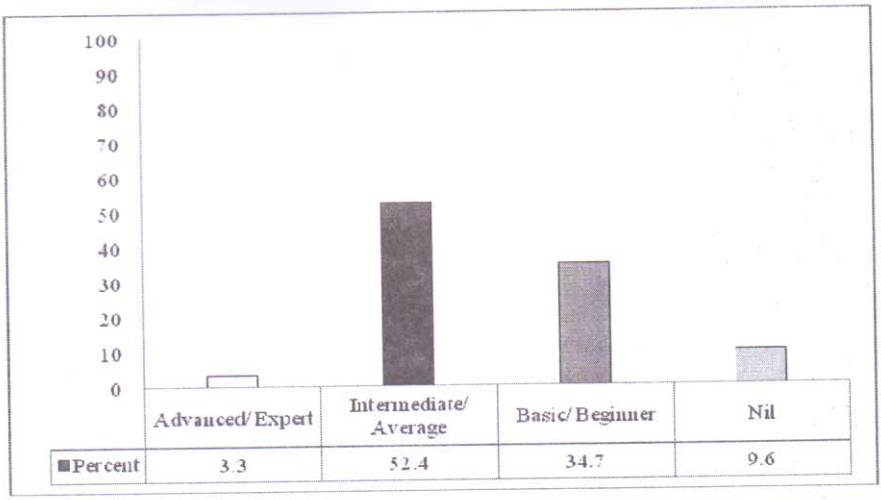


Figure 8
Access to Computer and Internet

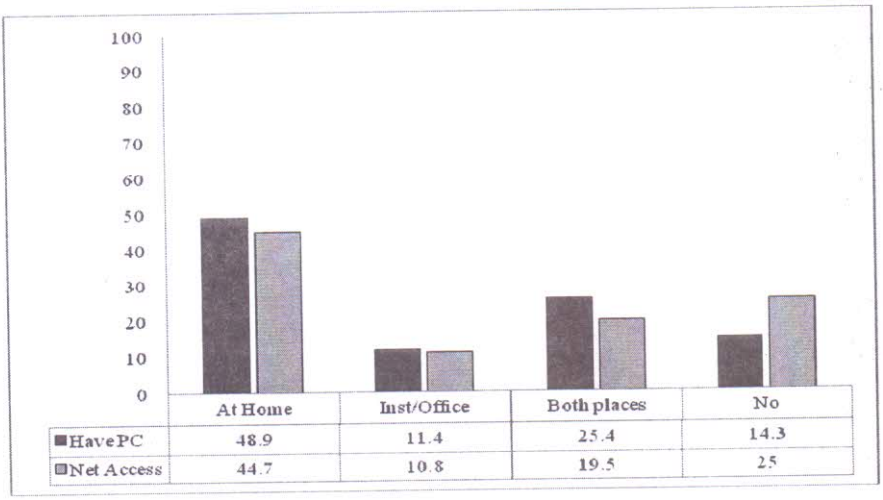
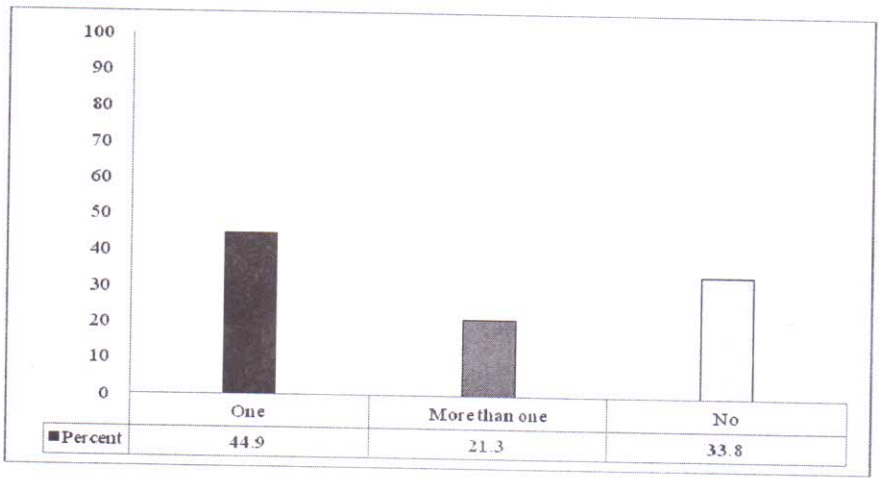


Figure 9
Have Email Address



Figures 7 to 9 reveal that 85.7% of the students had access to computer, 74% had access to Internet and 66.2% had their personal email addresses. It means that this sample had the potential for becoming subjects of CMC-based classroom from 66% to 86%. If the number of students having computer literacy is considered, the percentage of potential subjects would reach up to 90%. The students enrolled in this programme were mostly young, new in teaching profession, mostly had access to computer and Internet, and were intended to improve their learning and teaching skills.

Figure 10
Use of Computer and Internet

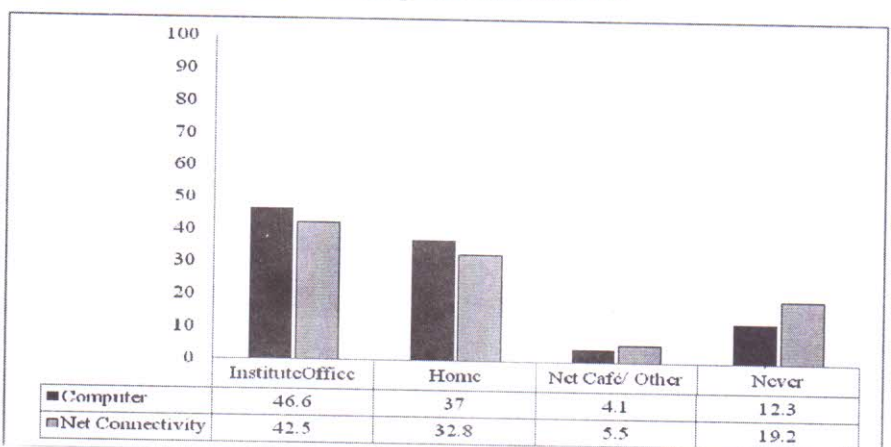
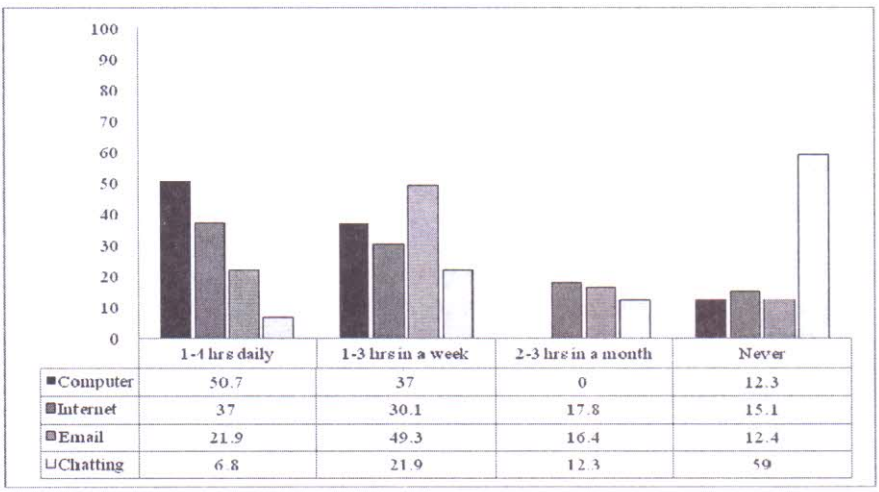


Figure 10 reflects that majority of the students, 83.6% and 75.3%, were using computer and Internet at their institutes/offices and homes. This helped the researcher to finalize many important points about CMC-based classroom, e.g., calendar of academic activities, schedule of online tutorials, etc.

Figure 11
Frequency of Using Computer, Internet, Email and Chat



	1-4 hrs daily	1-3 hrs in a week	2-3 hrs in a month	Never
Computer	50.7	37	0	12.3
Internet	37	30.1	17.8	15.1
Email	21.9	49.3	16.4	12.4
Chatting	6.8	21.9	12.3	59

Figure 11 reveals that most of the students were in the habit of using computer (50.7%) and Internet (37%) daily. This information helped the researcher in deciding what type of tools could be used in CMC-based classroom in Pakistani perspective. It also helped to finalize duration and timings of the online tutorials.

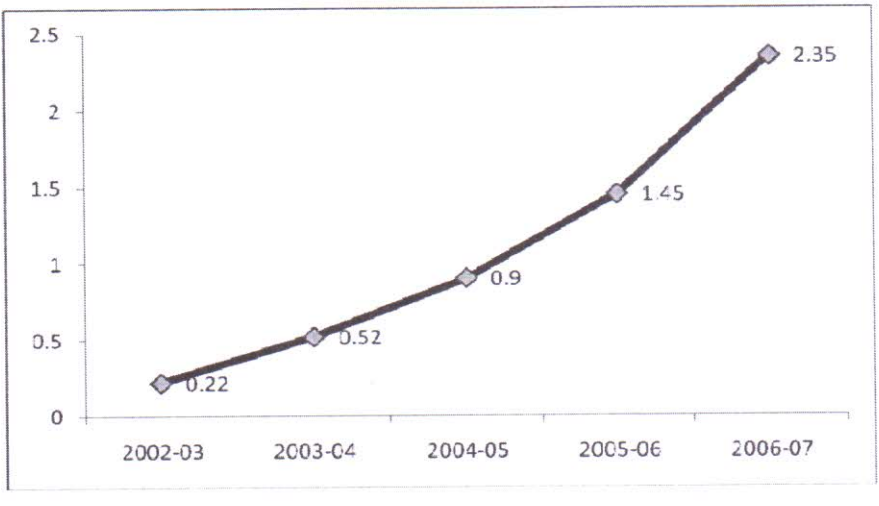
Infrastructure in Pakistan for CMC-based Education

According to InternetWorldStat (2004), Asia is the most populated area (56.45% of the world population). It is facing problems in terms of human resource development and especially in the field of teacher education. Face-to-face institutions cannot tackle with the situation so distance education institutions came up to meet the demand of professional and higher education. "International agencies such as the World Bank, UNESCO, and IDRC-PAN have initiated and supported various projects both at national and sub-regional levels" (Malik, Belawati & Baggaly, 2005). As far as infrastructure is concerned, Pakistan IT Policy (2000) suggests that "free leased line Internet access

to the public sector Universities would be provided under an agreement with the private sector Internet Service Providers and (Pakistan Telecommunication Ltd) PTCL. Bandwidth would be provided by the ISPs and PTCL would provide local lead connectivity through digital cross connect network. PTCL would also offer the reduced rates for connectivity to the educational institutions". It further envisages that "a wide-band Intranet, Pakistan Educational Intranet (PEI), connecting all educational institutions (public and private) would be established with centralized data warehouse containing teaching and research material in order that resources may be shared (through video-conferencing and distance learning)".

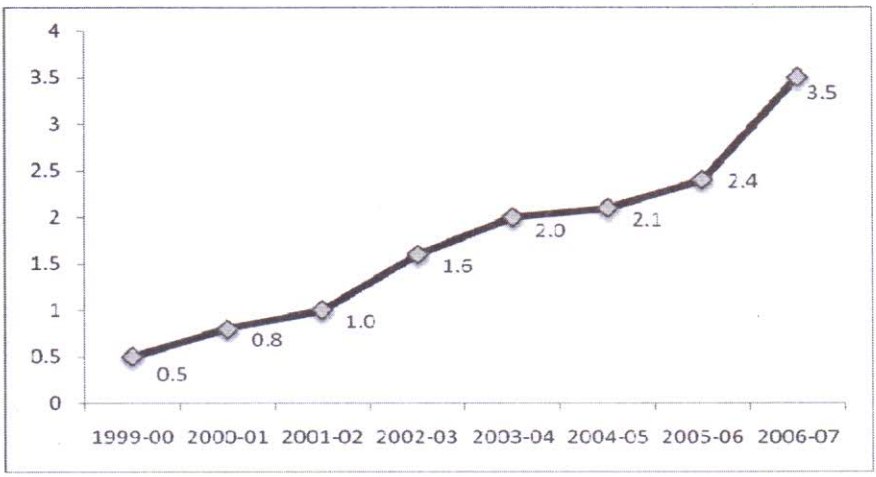
The number of personal computer is increasing in Pakistan. Computer Society of Pakistan mentions a gradual increase in the number of PCs from 0.22 million in 2002-03 to 2.35 million in 2006-07.

Figure 12
Personal computers in Pakistan (Source: Computer Society of Pakistan)



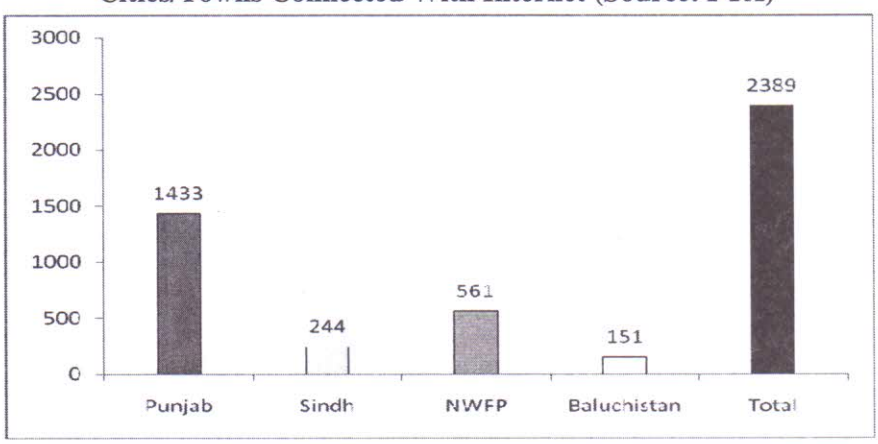
Also the number of internet subscribers is increasing. This increase shows that more and more people and specially students are using internet in their studies and research projects. Higher Education Commission of Pakistan has taken many initiatives to introduce online culture in the country and it has almost become mandatory for every students and researcher in higher education institution.

Figure 13
Increase in Number of Internet Subscribers in Pakistan (Source: PTA)



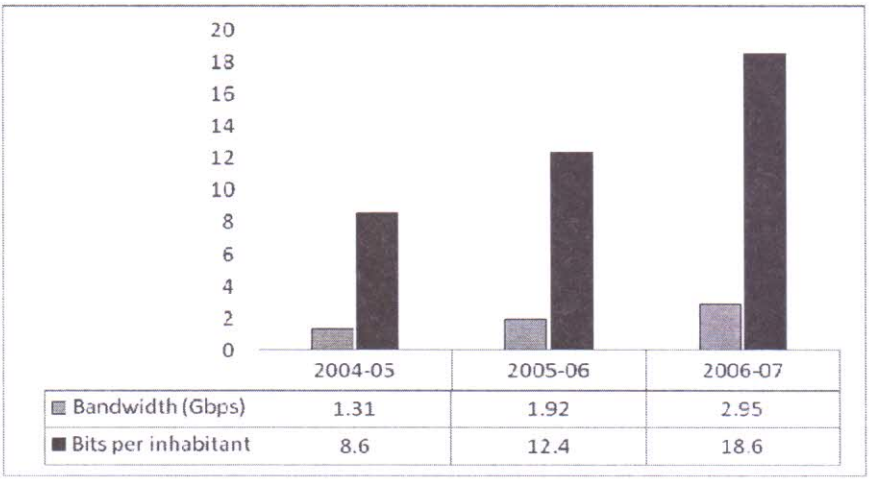
Pakistan Telecommunication Authority has provided internet facility to more than 2389 cities in the country, mostly in Punjab which is condensely populated province where as 151 cities in Baluchistan are connected through internet.

Figure 14
Cities/Towns Connected With Internet (Source: PTA)



The internet bandwidth utilization has also increased over the years as the data shows the increase from 8.6 in 2004-05 to 18.6 in 2006-07.

Figure 15
Internet Bandwidth Utilization (2005-06) (Source: PTA)

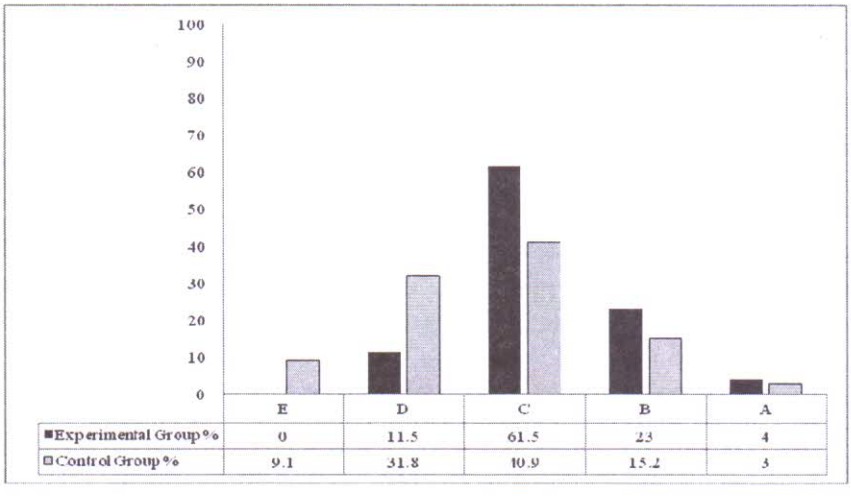


	2004-05	2005-06	2006-07
Bandwidth (Gbps)	1.31	1.92	2.95
Bits per inhabitant	8.6	12.4	18.6

The reason for increase in utilization of internet bandwidth is decrease in rates of international full circuit IP data backbone.

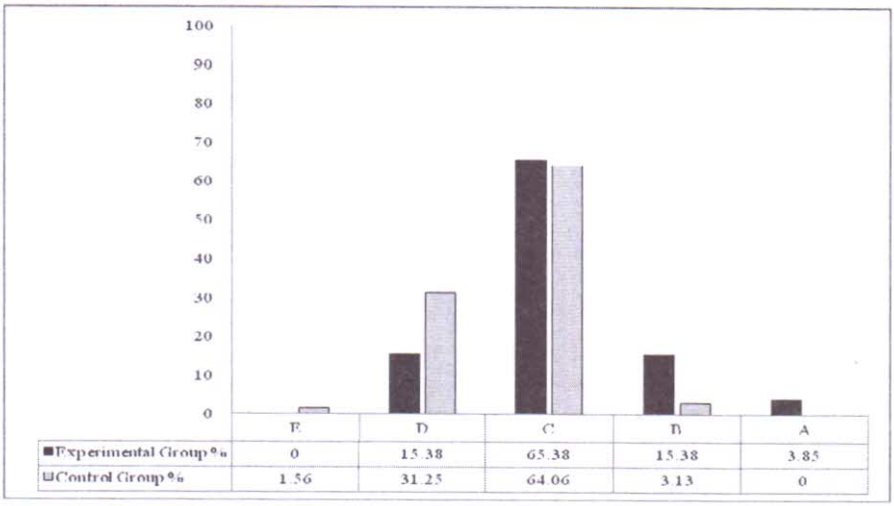
Comparison of Grades of AIOU Final Examination

Figure 16
Comparison of Grades in Final Results of Experimental Group and Control Group (Students from Four Regions) Course 553



	E	D	C	B	A
Experimental Group %	0	11.5	61.5	23	4
Control Group %	9.1	31.8	40.9	15.2	3

Figure 17
Comparison of Grades in Final results of Experimental Group and Control Group (Students from Four Regions) Course 554



	E	D	C	B	A
■Experimental Group %	0	15.38	65.38	15.38	3.85
⊟Control Group %	1.56	31.25	64.06	3.13	0

The comparison of grades achieved by the students shows that the grades of the experimental group were better than the grades achieved by other students from the selected regions for the first phase of the study.

Pre-Tests

MA TEFL (AIOU) is a teacher education programme aimed at professional development of the English language teachers across the country through distance education. All the students enrolled in this programme are usually teachers of English having teaching experience at various levels. The purpose of the pre-tests and post-tests of the experimental and control groups was to assess the teaching skills of the students before and after the treatment phase. The assessment of the pre-tests and post-tests was done keeping in view the following aspects: cognition, language (structure, grammar & written expression), organisation and content (cohesion and coherence), range and flexibility, and creativity (critical thinking, innovative ideas).

The t-test was applied on the marks of pre-tests of the experimental and the control groups of both phases as follows:

- Pre-test of experimental group vs. pre-test of control group (Course 553)
- Pre-test of experimental group vs. pre-test of control group (Course 554)

Figure 18
Comparison of Pre-Tests between Experimental Group and Control Group - Course 553

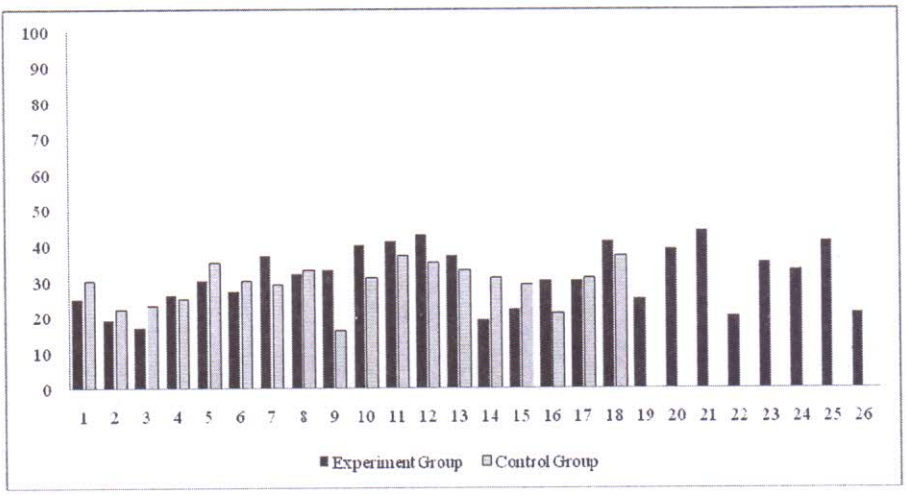


Table 1
Summary of Statistical Analysis: Comparison of Pre-Tests between Experimental Group and Control Group Course 553

Statistical Analysis	CMC-based group	Control group
No. of scores	26	18
Sum of scores	807	528
Mean	31.03	29.33
Sum of squared scores	26805	16066
SD (Standard Deviation)	8.38	5.83
A	.05	
Table value	2.021	
t-value	0.74	
Degree of freedom (d.f.)	42	

Pre-test marks (Course 553) of the experimental and the control groups (2007) are described in Figure 16. The experimental group consisted of 26 students and the control group had 18 students. The statistical analysis of the marks has been given in Table 1. It was observed that t-value of comparison was 0.74 at the probability level of 0.05 and the degree of freedom was 42. The t-value was less than the

table value which was 2.021. It means the difference between the groups was insignificant and both groups were at the same level.

Figure 19
Comparison of Pre-Tests between Experimental Group and Control Group - Course 554

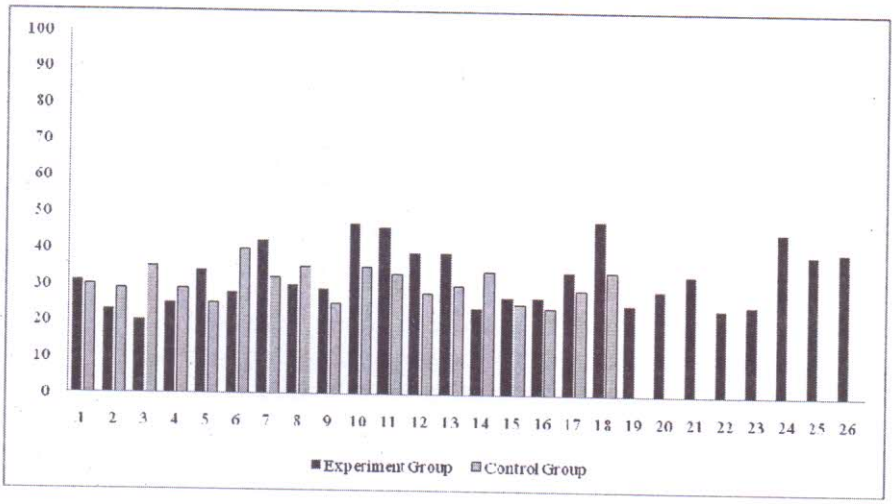


Table 2
Summary of Statistical Analysis: Comparison of Pre-Tests between Experimental Group and Control Group Course 554

Statistical Analysis	CMC-based group	Control group
No. of scores	26	18
Sum of scores	853	552
Mean	32.80	30.66
Sum of squared scores	29723	17258
SD (Standard Deviation)	8.33	4.40
α	.05	
Table value	2.021	
t-value	0.99	
Degree of freedom (df)	42	

Pre-test marks (Course 554) of the experimental and the control groups (2007) are described in Figure 17. The experimental group consisted of 26 students and the control group had 18 students. The

statistical analysis of the marks has been given in Table 2. It was observed that t-value of comparison was 0.99 at the probability level of 0.05 and the degree of freedom was 42. The t-value was less than the table value which was 2.021. It means the difference between the groups was insignificant and both groups were at the same level.

Post tests

Post-test was conducted after providing them treatment through CMC-ELT Blended Model. Statistical tests, F-test and t-tests, were applied on the data to assess the significance. The t-test was applied on the marks of pre-tests and post-tests of experimental and control groups as follows:

- pre-test vs. post-test of experimental group (Course 553)
- pre-test vs. post-test of experimental group (Course 554)
- pre-test vs. post-test of control group (Course 553)
- pre-test vs. post-test of control group (Course 554)
- post-test vs. post-test of experimental and control groups (Course 553)
- post-test vs. post-test of experimental and control groups (Course 554)

Comparison of Pre-test and Post-test of Experimental Group Course 553

Figure 20
Comparison of Pre-test and Post test:
Experimental Group - Course 553

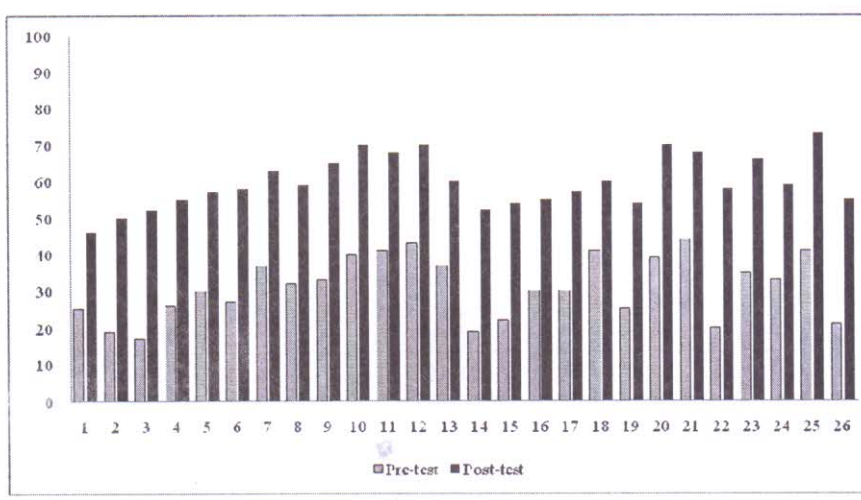


Table 3
Summary of Statistical Analysis: Comparison of Pre-test and Post test of Experimental Group - Course 553

t – test for non-independent samples	Pre-test Vs Post-test
No. of pair of scores	26
Sum of "D"	747
Sum of "D^2"	21941
Mean of "D's"	28.73
A	.001
Table value	3.725
t-value	33.46
Degree of freedom (df)	25

The analysis of the comparison between pre-test and post-test marks of the experimental group is presented in Table 3. The experimental group consisted of 26 students. The graphical presentation of marks has been given in Figure 18. It was observed that the t-value of comparison was 33.46 at the probability level of 0.001 and the degree of freedom was 25. And this t-value was greater than the table value which was 3.725. It shows the difference between the marks of pre-test and post-test was significant which means CMC-based instruction was effective.

Comparison of Pre-test and Post-test of Experimental Group - Course 554

Figure 21
Comparison of Pre-test and Post-test: Experimental Group - Course 554

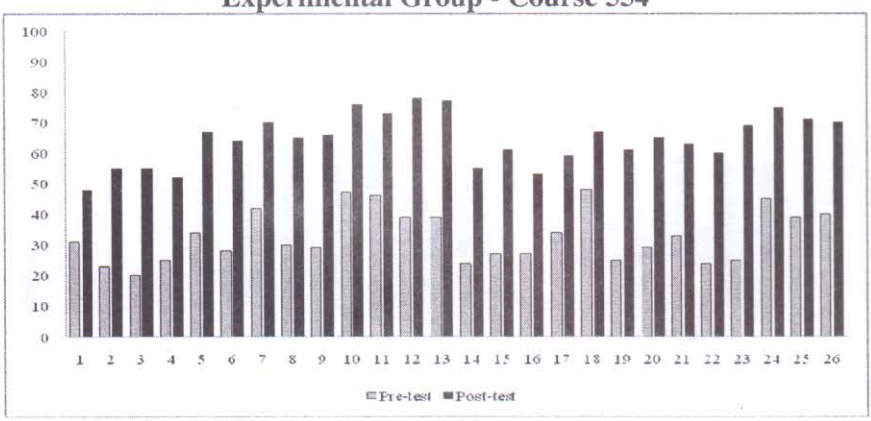


Table 4
Summary of Statistical Analysis: Comparison of pre-test and post-test of Experimental Group - Course 554

t – test for non-independent samples	Pre-test Vs Post-test
No. of pair of scores	26
Sum of "D"	822
Sum of "D^2"	26892
Mean of "D's"	31.61
A	0.001
Table value	3.725
t-value	26.80
Degree of freedom (df)	25

The analysis of the comparison between pre-test and post-test marks of the experimental group is presented in Table 4. The experimental group consisted of 26 students. The graphical presentation of marks has been given in Figures 19. It was observed that the t-value of comparison was 26.80 at the probability level of 0.001 and the degree of freedom was 25. And this t-value was greater than the table value which was 3.725. It shows the difference between the marks of pre-test and post-test was significant which means CMC-based instruction was effective.

Comparison of Pre-test and Post-test of Control Group - Course 553

Figure 22
Comparison of pre-test and post-test: Control Group - Course

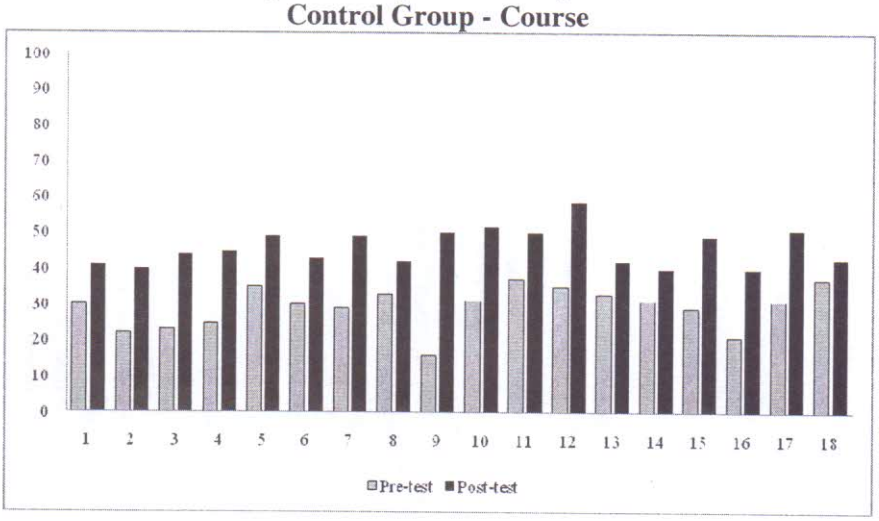


Table 5
Summary of Statistical Analysis: Comparison of Pre-test and Post-test of Control Group - Course 553

t – test for non-independent samples	Pre-test Vs Post-test
No. of pair of scores	18
Sum of "D"	301
Sum of "D^2"	5833
Mean of "D's"	16.72
α	.001
Table value	3.965
t-value	10.34
Degree of freedom (df)	17

The analysis of the comparison between pre-test and post-test marks of the control group is presented in Table 5. The control group consisted of 18 students. The graphical presentation of marks has been given in Figure 20. It was observed that the t-value of comparison was 10.34 at the probability level of 0.05 and the degree of freedom was 17. And the t-value was greater than the table value which was 3.965. It shows the difference between the marks of pre-test and post-test was significant.

Comparison of Pre-test and Post-test of Control Group - Course 554

Figure 23
Comparison of Pre-test and Post-test: Control Group - Course 554

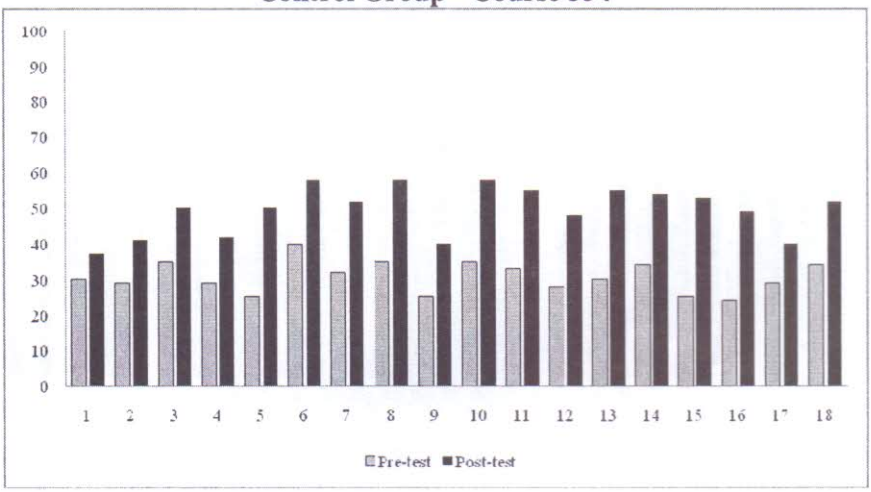


Table 6
Summary of Statistical Analysis: Comparison of Pre-test and Post-test of Control Group - Course 554

t – test for non-independent samples	Pre-test Vs Post-test
No. of pair of scores	18
Sum of "D"	340
Sum of "D^2"	6982
Mean of "D's"	18.88
α	.001
Table value	3.965
t-value	13.96
Degree of freedom (df)	17

The analysis of the comparison between pre-test and post-test marks of the control group is presented in Table 6. The control group consisted of 18 students. The graphical presentation of marks has been given in Figure 21. It was observed that the t-value of comparison was 13.96 at the probability level of 0.001 and the degree of freedom was 17. And the t-value was greater than the table value which was 3.965. It shows the difference between the marks of pre-test and post-test was significant.

Comparison of Post-tests: Experimental Group and Control Group - Course 553

Figure 24
Comparison of Post-tests: Experimental and Control Groups - Course 553

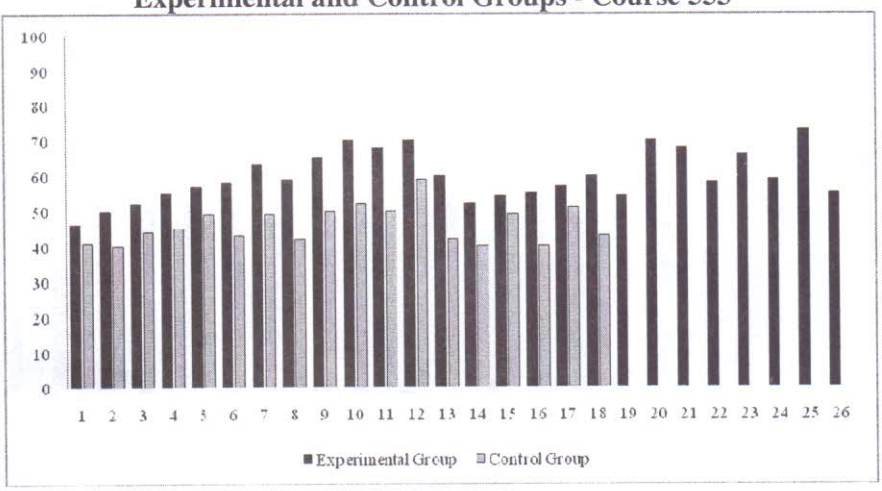


Table 7
Summary of Statistical Analysis: Comparison of Post-tests: Experimental and Control Groups - Course 553

Statistical Analysis	CMC-based group	Control group
No. of scores	26	18
Sum of scores	1554	829
Mean	59.76	46.05
Sum of squared scores	94146	38657
SD (Standard Deviation)	7.11	5.29
A	.05	
Table value	2.021	
t-value	6.94	
Degree of freedom (df)	42	

The analysis of the comparison of post-test marks of the experimental and the control groups is presented in Table 7. The experimental group consisted of 26 and the control group had 18 students. The graphical presentation of marks has been given in Figure 22. It was observed that t-value of comparison was 6.94 at the probability level of 0.05 and the degree of freedom was 42. And t-value was greater than the table value which was 2.021. It shows the significant difference between the post-test marks of the experimental and the control group. It has already been observed in Table 5 that the analysis of pre-test and post-test of the control group showed significant difference but it was less than the experimental group which has been shown in Table 3. And this post-test analysis also suggests that the experimental group performed better as compared to the control group.

Comparison of Post-tests: Experimental Group and Control Group - Course 554

Figure 25
Comparison of Post-tests: Experimental Group and Control Group Course 554

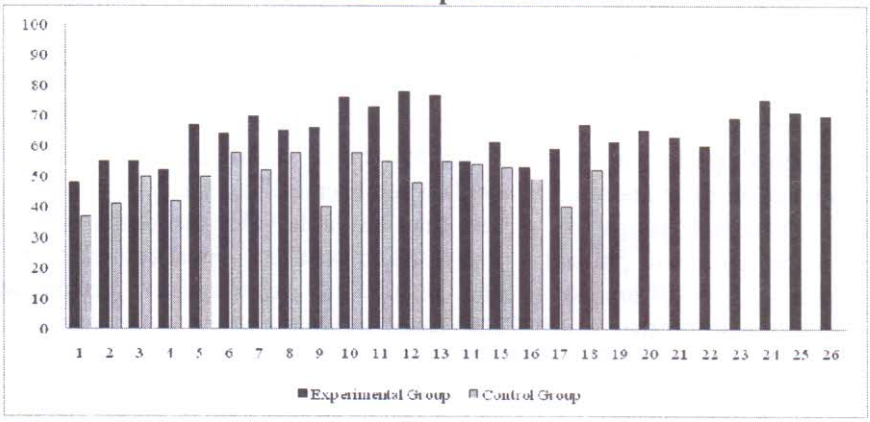


Table 8
Summary of Statistical Analysis: Comparison of Post-tests of Experimental Group and Control Groups - Course 554

Statistical Analysis	CMC-based group	Control group
No. of scores	26	18
Sum of scores	1675	892
Mean	64.42	49.55
Sum of squared scores	109609	44994
SD (Standard Deviation)	8.24	6.81
α	.05	
Table value	2.021	
t-value	6.29	
Degree of freedom (df)	42	

The analysis of the comparison of post-test marks of the experimental and the control groups is presented in Table 8. The experimental group consisted of 26 and control group had 18 students. The graphical presentation of marks has been given in Figure 23. It was observed that the t-value of comparison was 6.29 at the probability level of 0.05 and the degree of freedom was 42. And the t-value was greater than the table value which was 2.021. It shows the significant difference between the post-test marks of experimental and control group. It has already been observed in Table 6 that analysis of pre-test and post-test of the control group showed significant difference but it was less than the experimental group which has been shown in Table 4. And this post-test analysis also suggests that the experimental group performed better as compared to the control group.

Conclusion

The t-test was applied on the pre-tests and post-tests marks of the experimental and the control groups. The t-test was applied to judge students' performance whether CMC-based instruction really had an impact on their learning or not. It was observed that the critical value of experimental groups was greater than the table value as compared to the control groups in pre-test – post-test and post-test – post-test analysis. It means that difference in the results of experimental groups was significant. In other words CMC-based treatment affected the learning of the students positively.

The analysis of the marks obtained by the students in the pre-tests suggested that they had limited knowledge of the concepts of teaching English as a foreign language in the classroom. But their marks in the post-tests indicated that they had improved significantly in the relevant subject. The improvement in the performance of the groups was due to CMC-based treatment. The CMC-ELT Blended Model provided the students opportunities to access study material, ELT activities, online tutors, etc. easily and quickly. The guidance provided by the tutors during the CMC-based classroom was effective and made the students think independently and critically. They were given quick feedback on their assignments and projects which helped students in their studies.

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