EFFECTIVENESS OF CUSTOMIZED COURSE ON ENGLISH COMMUNICATION SKILLS FOR COMPUTER SCIENCE STUDENTS: AN EXPERIMENTAL STUDY

By

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Effectiveness of Customized Course on English Communication Skills For Computer Science Students: An Experimental Study

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ABSTRACT

Title: Effectiveness Of Customized Course On English Communication Skills For Computer Science Students: An Experimental Study

The importance of English for Specific Purpose (ESP) is not recognized fully especially by experts from technical fields in Pakistan. This weakness, on part of educationists, has created major deficiency in capabilities of graduates which is exposed at their workplace. This deficiency is clearly visible in Government approved curriculum which is being followed in the universities especially for technical degree programs. The major impact of such shortcoming is observed when feedback is obtained by alumni and employers. This study is an effort to identify the requirements in course outline of Communication Skills for CS students and its effectiveness. The study focuses on improving the contents instead of teaching methodology to fulfill the workplace needs of computer science graduates. The study is quasi experimental and it prepares two groups of subjects for the comparison of the effectiveness of two treatments (old course outline and novel course outline). The experiment involves the comparison in the performance of the two groups which are Control Group(for treatment with old course outline) and Experimental Group (for treatment with novel course outline) of size 25 subjects each, at pre-test phase and then at post-test phase. Finally, another comparison, between each group's two performances, is performed to evaluate how much improvements is made by the groups. T-testis used on the final evaluation score to determine whether the improvement was significant as a result of the treatment. The evaluation was performed by a panel of eight members from different software houses, working at managerial level. The evaluators were kept same for the pre-test as well as for the post-test and they evaluated both groups to ensure uniformity in evaluation in the experiment. The results showed improvement in both groups but the experimental group (treated with novel course outline) outperformed the control group (treated with old course outline) by a significant margin. The t-test value of 4.43×10^{-7} justified the alternative hypothesis. The results also conclude that Higher Education Commission of Pakistan needs to take notice of ESP's positive effects on English language courses included in non-language degree programs. Currently, there is no linguist in curriculum revision for computing and engineering degree programs as the list of academicians indicate, and the deficiencies highlighted in this study go unnoticed during curriculum revision. The findings support medical, engineering, mass communication, economics, and business students' case as well for inclusion of ESP in their courses. Similarly, these are applicable on all regions of Pakistan as the overall country shares similar social and economic status if not the same. In future, this study can be extended to other regions of Pakistan and can be applied to other fields of study as well.

Keywords: English for Specific Purpose (ESP), computer science, communication skills, Pakistan.

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LIST OF ABBREVIATIONS

AVA: Audio Visual Aids

BBA: Bachelor of Business Administration

BSCS: Bachelor of Science – Computer Science

BSSE: Bachelor of Science – Software Engineering

CGPA: Cumulative Grade Point Average

CPEC: China Pakistan Economic Corridor

CS: Computer Science

DAI: Degree Awarding Institutes

EAP: English for Academic Purposes

EOP: English for Occupational Purposes

ERP: Enterprise Resource Planning

ESL: English as Secoond Langauge

ESP: English for Specific Purposes

HEC: Higher Education Commission

IT: Information Technology

MBA: Master of Business Administration

NCRC: National Curriculum Revision Committee

NUML: National University of Modern Langauges

PjBL: Project-Based Learning

PPRA: Pakistan Procurement Regulatory Authority

RFQ: Request for Quotation

USAID: United States Agency for International Development

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DEDICATION

This thesis is dedicated to my beloved husband Muhammad Naveed Alam for his love, endless support and encouragement.

CHAPTER 1

INTRODUCTION

This chapter contains overview of the research report. The background of the study and the problem statement are covered in the beginning and then research objectives are discussed. Research Hypothesis mentions the two hypothesis namely null hypothesis and the alternate / research hypothesis. Delimitation of the research highlights the delimitations as well as the limitation factors that affected the research work. The methodology followed in this study, is introduced in research methodology. The significance of this research is given next and in the end, the overall organization of the thesis is covered.

1.1 Background to the Study

The importance of English language in Pakistan is unquestioned. Despite Urdu being the National language, English has acquired the status of official language in Pakistan (Mahboob, 2002). With so much importance given to English language, it is obvious that higher education is offered in English language. The Higher Education Commission of Pakistan (HEC) prepares curriculum for degree programs through National Curriculum Review Committee and this curriculum is implemented in DAIs all over the country (HEC, 2013). As per HEC, three courses (English Comprehension, Technical and Business Writing, Communication Skills) are a minimum requirement of any degree program in Business, Science, Engineering, Mathematics and Computer Science (HEC.gov.pk, 2018). One of these three courses in all such degree programs is ‘Communication Skills’ which is offered as a compulsory course.

A great deal of research has been conducted vigorously over improvement of teaching methodologies especially for languages. However, the focus on structuring the course contents has got less attention than the teaching methods. This applies in Pakistan as well where every now and then, latest methods of teaching are being tried out to enhance students’ learning capacity in a language class. With introduction of technology in Pakistani schools, colleges and universities, focus towards teaching aids to enhance effectiveness of teaching has grown automatically. This also applies to computer science

students in Pakistan who themselves, are more eager to learn through new teaching styles with Audio Visual Aids (AVA).

In this situation, the importance of tailoring the course contents to enhance effectiveness of teaching and improved outcome of course is revisited in this study (Ho, 2015). The course of communication skills for computer science students in Pakistani universities is generic. Rest of the world is inclined towards English for Specific Purposes (ESP) but in Pakistan, it is not recognized much beyond the linguists. This study implemented the course of communication skills, tailored for the requirements of computer science students at workplace. The results were matched with the group of students who took a generic course of communication skills and all the signs of improvements were investigated with the help of evaluation and questionnaires. Interviews of employers (managers in software house) of some of the computer science graduates of NUML were conducted before the experiment, and deficiencies in communication skills of the employees (graduates) were noted, requirements of the workplace environments were also penned down and then the course contents were tailored accordingly.

1.2 Problem Statement

The computer science graduates in Pakistan, struggle in communication skills at workplace despite having sufficient technical knowledge and expertise. This observation is solidified by the feedback that is obtained from employers. Several surveys conducted to get the problems faced by computer science Alumni of university, ended up pointing towards lack of specific communication skills for computer science graduates. The problem is identified as lack of communication skills related to computer science workplace. The problem causes failure or at least poor performance of IT graduates at workplace whether they are required to prepare write ups of software based projects or have to convince clients (national and international) or have to prepare tenders or bids for the projects etc. These people enter the IT world only to know that they might have acquired the technical skills but the language expertise pertaining to the IT environment that they never valued, is a major hindrance in their success.

The aim of this research is to find out the requirements in course outline of Communication Skills for computer science students of NUML and its effectiveness. The

positive outcomes of the results would help the graduates preparing themselves for the tasks at their workplace.

1.3 Research Objectives

1. To find out the effectiveness of custom-made course in communication skills for computer science students.
2. To identify the requirements in Communication Skills course specific to computing students that would prepare them well for job in IT industry.

1.4 Research Hypothesis

The learners (students) who learn communication skills in English with the help of tailor made course, perform better than those learners who learn communication skills in English with the help of traditional generic course. The research hypothesis is also called alternate hypothesis with respect to null hypothesis.

1.5 Null Hypothesis

The old course outline is sufficient enough to train the student of computer science domain for their communication needs at workplace and novel course brings no significant changes.

1.6 Delimitation of the Research

The research is delimited to certain factors beyond which work has not been done. The delimitations are the target students in this study who are from computer science domain only. Other domains are not investigated. Secondly, students are picked only from BSCS and BSSE programs in NUML. Students from other programs in the university could not be included in the experiment due to time constraints as well as difficulty in maintaining the same level of control which is possible on selected two program's students. .

Time and Geographical constraints are the limitation factors which are beyond the control of the researcher. Due to time and geographical constraints, employers included in the research for interviews and questionnaire are from Rawalpindi and Islamabad only. Training of only one semester was conducted on both the groups because of limited time available to the researcher as well as subjects' availability.

1.7 Research Methodology

First of all, need analysis was conducted for the new course outline of Communication Skills (Appendix E). Once, new outline was prepared, the experimentation phase started for which subjects were selected. The selection of subjects in this research was confined to students of computer science and software engineering programs in National university of Modern Languages (NUML), Islamabad campus. The very first task was to prepare a tailor made course outline of communication skills course for IT students. First step towards completion of the task was to identify the main duties which, the IT graduates had to contend with at their workplace on frequent basis. It was done with the help of Questionnaire and Interview. Next step was to get feedback from the employers (managers) from Islamabad and Rawalpindi based software houses to affirm the frequent tasks identified through the graduates' questionnaire. This was done with the help of interview of the software house managers and another questionnaire. For the selection of software house managers, total six parameters were defined for their qualification for the experiment. This was all part of the background of the experiment.

The study was a mix of qualitative and quantitative research with later being the dominant component. To conduct the experiment, a sample of 50 students was selected with 25 students of these were BSCS program and 25 were from BSSE program. These students had already gone through English proficiency test at the time of admission in NUML and they passed it. Once these students were selected and grouped as Experimental Group (BSCS students) and Control Group (BSSE students), pre-test of two hours duration was conducted to evaluate the performance of the subjects prior to treatment. The Treatment phase was conducted for a total of 32 hours duration on both groups. The teaching was done without any difference between the two groups and to ensure that the research stayed within its scope, teaching method was made the same as done in previous years, in order to avoid it being a factor in influencing the outcome of the experiment. The course outline offered during this phase was the old course outline for the Control Group and novel outline for the Experimental Group. The customization for the novel course was done on the basis of short comings identified by the employers/software house managers and the factors identified in graduates' feedback. After the treatment phase was completed,

post-test was conducted by allowing the employers to interview and evaluate the two groups. A comparison between them was made to observe the product variable.

1.8 Significance of the Study

The importance of Communication Skills course is evident from the fact that the Higher Education Commission of Pakistan (HEC) has made it compulsory to add this course in each and every program at undergraduate level (HEC.gov.pk, 2018). Any step towards improvement in this course is justified from this very fact.

The feedback received by the department, obtained from employers of computer science and software engineering graduates (employees), is not very positive on some accounts. The most common issue has always been poor communication skills. The most embarrassing part of the problem is that although graduates are technically sound, what they express tells a false story and they either fail to get the job or face difficulties in surviving in the IT industry. This study is an important step towards analyzing the effectiveness of custom - made course of communication skills in English language for computer science students. The main benefit of the research is to raise awareness of importance of acquiring English for Specific Purposes, amongst educationist in computer science degree program in specific, and in technical and medical degree programs in general.

Previously, several researchers have raised questions over ESP not being applied in language courses designed for non-linguistic degree programs but no one in the Pakistani context has clearly proposed the course outline that is suggested to be followed by the teachers. This research differs from previous works (Dar, 2010), (Ho, 2015), (Nisar, 2016) because it not only raises the importance of ESP for computer science students in Pakistan but it also analyses the new ESP course outline that was implemented on group of students during the experiment.

1.9 Organization of the Thesis

This thesis is composed of six units/chapters. The first chapter is introduction which contains the introduction of the thesis. Problem statement is defined in this chapter alongside Research Objectives and Significance of Research.

Second chapter is based on Literature Review. Third chapter contains Research Methodology which covers comprehensive write up of research process. Chapter four focuses on Data Presentation and Analysis. Chapter five is based on Results of the experiment presented in tabular form as well as graphs. T-test results are also discussed in detail in this chapter. Chapter six is the final chapter and it contains conclusion of the whole study in detail.

1.10 Conclusion

This chapter includes an overview of the effectiveness of the customized course outline based on ESP course for computer science students in Pakistan. It highlights how ESP course in each field can help the students and professionals at their workplace.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter contains literature review on communication and its importance from a generic perspective. The flow goes from the introduction of communication to English language in general and then particularly in Pakistan to ESP in Pakistan and finally its importance for computer science students.

2.1 Communication

Human being is called paragon of all creatures (Dobbs, 2003). The salient features being his abilities to learn and exhibit intelligence (Sternberg, 1982). These two features have paved way for education and in between all these, is the power of effective communication. Keeping in mind the intelligence exhibited by animals like dolphin, McCaw, poodle etc, learning ability of parrot, dog and horse etc and communication mechanism between pack of wolves, flock of migrating birds and pride of lion etc are all wonders of nature but humans possess all these qualities and to the greatest extent. Yet, some of these qualities are not given importance that they deserve. Communication is also one such unfortunate skill. As per (Littlejohn & Foss, 2008) the importance of communication is diminished because nowadays it is mixed into our lives so much that people have forgotten its role and importance. In other words, communication and its importance are like those factors in our life which are taken for granted and whose presence is felt only when we lose them and are made to realize about their lacking at workplace or in examination hall.

In views of (Azad, 2015), Islam is not just a religion, it is a complete code of life. Islam urges people to find and apply best possible form of human communication. Islam is very clear in following ideal form of all kinds of communication. Thus the importance of communication skills is not just academic and profession-based, but it is also a religious duty for the followers of Islam.

Communication between humans is not just process of information transfer but it is recognized as a proper skill. In all academic wordings, communication is referred to as

communication skills. Communication Skills are one of the greatest qualities that humans possess. This quality is the one that existed since the very beginning; Adam and Eve. The communication between humans was mainly gestures based and with the passage of time, vocal sounds started to be incorporated in them thus creating languages. Scientists are convinced that man had proper communication skills in the Stone Age evident from signs and symbols discovered in caves around 30,000 BC (Lester, 2005). The very next advancement took almost another 10,000 years that marked the era of Petroglyphs where rocks were carved for communication (Diringer, 1953). According to (Wikipedia C. , History of Communication, 2019), this period was followed by Pictograms where illustrations were created to represent events, place, activity and concept etc. The time period went another 10,000 years and this period is dated approximately 9,000 BC. The timeline continued with human population spreading across the globe and each part inventing its own vocal recognitions and combining the good ones, discarding the less effective.

The creation of languages meant more and more sophisticated way of communication and thus polishing of communication skills. The very first language of the world is still contested and no concrete proof is available against a language. Claims ranging from Phoenician to Egyptian to Tamil are still argued (Wikipedia c. , 2019).

2.2 English Language

English language is of significant importance, not only today but in the history of natural languages. (Baugh & Cable, 1993) claim that the origin of English language dates back to 5th to 7th century AD and was originated from Anglo-Frisian dialects of West Germanic language. They write in their book that history of English was actually a story of cultures. The study, therefore, brings light into language history along with culture of the people associated with the old English language. The time period goes around 1500 years back in history.

(Altbach, 2007) terms English as Imperial language and he discusses the domination of English in academics, research, science, technology and scholarship etc. The English hegemony originated from countries like England, United States of America and most of the Europe emerging as the academic power house. USA in particular, became

super power in terms of academics, wealth and power itself. USA has been home to most of the top universities in the world and almost half of the world's RnD funds is spent by USA alone. The lion's share in top Journals (scholarly and scientific) of the world is also held by USA. All this contributes towards the importance of English as second language in non-native countries to English, which alongside the native ones, make up the highest ratio of English language speaking countries thus making it the world ruler.

(Davidson, 2007) uses the term Anglophone to represent English speaking persons and works on stats that demonstrate how significant English is and has been at global level. As per his claim, approximately 5400 languages out of 6000 are under threat. English is not one of those threatened languages and it may not have a major share in ousting other languages either. The only threat English is facing is maintaining its popularity. People like Jacques Chirac showing great offense towards quitting a European Summit in 2006 when one of the French businessmen addressed in English language. Then there are also threats from languages that are catching up English in popularity. The first name that comes to mind is Chinese-Mandarin. According to (Sawe, 2018), English is still the most spoken language in the world, closely followed by Chinese-Mandarin. In same lines, (Welch & Welch, 2008) raise the importance of language in transfer of knowledge at International level. Authors have explicitly mentioned English as the most influential language when it comes to be used by non-natives as well, due to its significance in knowledge transfer. (Buckley, Carter, Clegg, & Tan, 2005) have also described language and communication as the main two ingredients to enable knowledge transfer in an effective manner. Figure 2.1 explains the relationship between language and knowledge transfer.

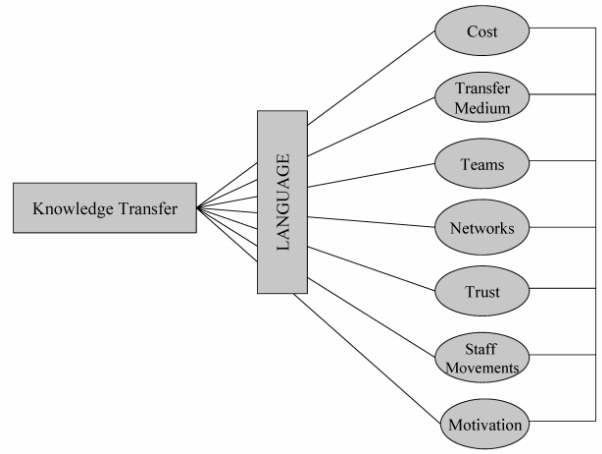

Figure 2. 1-knowledge transfer: significance of language.

(Welch & Welch, 2008) explain in figure 2.1 that knowledge transfer at international level or workplace requires seven variables:

Cost: the term cost here refers to the cost incurred while transferring knowledge at international level. This cost is low for explicit or codified knowledge but shoots up very high for tacit knowledge. Similarly, the translation cost varies, it may be low upfront but hidden cost may be high. Staff needs training in language that is required to be translated to or from as cited in (Welch & Welch, 2008). Language is the key in determining the cost as choice of language would directly affect the cost. English, Chinese, Spanish and Arabic are on top of the list. When a team is familiar with any of these and has to communicate in the same language, then the cost will certainly remain low. English enjoys its place at the top and is therefore a de facto choice in most of the organizations.

Transfer Medium: This can be face-to-face interaction as for tacit knowledge, it is considered very effective (Hedlund, 1999) as cited in (Welch & Welch, 2008). It is applicable on both ICT facilitated knowledge and conventional modes of knowledge.

Once again, language can change the impact of this variable as choice of common and popular language in the organization which is also expected to be followed the world over, means easy face-to-face interaction in which only knowledge would be transferred and no time and resource will be wasted on new language learning.

Teams: A strong team of multinationals is advocated by the authors to be very successful in organizations. Language diversity may bring more positive results in a team's

communication abilities. The element of language influencing the selection of team refers to smart team from linguistics point of view. All speakers of local language and no exposure to international language would certainly raise problems when inter-organization or inter-culture communication comes into play. On the other hand a mix of team members with abilities to communicate in local as well as international language is an asset that has to be kept in mind while team building.

Networks: Inter-personal relationship as well as social networks are very critical in successful knowledge flow. In the era of IT, online social networking is identified as a key to strong networking amongst peers and organizations. Language is the factor that decides whether a linkage will be formed or not. For any type of networking; whether within the organization or between organizations, language should not a barrier rather it should be the bridge that works as catalyst to transform relationship and build network. English language enjoys very strong position as not only being the most spoken language in the world (Sawe, 2018) but it is the language of the Internet. At the moment, the world of Internet is no different. As per statistics of (W3Techs, 2019), for the top 10 million websites in the world, 54% content is available in English language followed by Russian (6%), German (5.9%) and Spanish (4.9%). Whereas the languages used on internet in terms of popularity are English (25.4%), Chinese (19.3%), Spanish (8.1%) and Arabic (5.3%) according to the statistics provided by (InternetWorldStats, 2018). The choice of English will influence the sub-factor of influence; Networks in a very positive manner.

Trust: When it comes to knowledge transfer, trust is as important as it is in money transfer. But it differs in the way here, language plays an important role in forming trust. Sharing information requires mutual trust and language is key to build trust amongst people who are strangers in international ventures. The trust factor to influence knowledge transfer is directly controlled by the language chosen. English being the most popular and widely spoken language in the world (Sawe, 2018) would build trust to greater level than any of the local languages that is not recognized beyond a small community.

Staff Movement: One of the very effective way of knowledge transfer is to move staff members. It assists knowledge transfer as (Buckley & Clegg, 2003) as cited in (Welch & Welch, 2008) mention the importance of extensive short-term transfer or movement of

team members internationally in order to personalize knowledge. Language is the key influencing factor. The major purpose in this kind of staff movement is to establish language understanding and then smoothen the knowledge acquire process for the organization. However, such transfers have not resulted in 100% success. The main purpose for staff movement is to get acquainted with each other's environment for better knowledge transfer and ties in future. Language is the barrier and it is again the barrier remover. If played out this card smartly, staff movement will never fail. English in this case, will almost be a guarantee for success as it is still the number one choice in international collaborations. With English language spoken at both sides; transferring and transferee, the chances of positive results are very high.

Motivation: The role of motivation is unchallenged in any competitive environment. In case of knowledge transfer, motivation is equally critical factor but it is influenced by the language. Knowledge is known to confer powers which goes with competence in language since knowledge without expression (language proficiency) is wasted. Motivating people to overcome language barriers and adopt to foreign languages is difficult and this level varies from culture to culture but it is a very important variable in knowledge transfer at international level. Putting English in the picture would ease out the motivation process. Consider a motivation speech where people are not understanding the speaker rather trying to translate his words and vocabulary. It can be disastrous if motivational speaker is using alien language so this influencing factor can be put in right direction with correct choice of language; English.

Despite the importance of seven factors which make up for the knowledge transfer, it is language which comes up as the game changer. Changing the language actually changes the personnel at various levels and thus completely creating different results. The authors call language as the reconfiguration agent which can change the entire way the seven factors will influence the knowledge flow within and between organizations and enjoys its status as the reconfiguration agent in majority of the organizations due to its popularity and global usage.

2.3 Importance of English language in Pakistan

(Mahboob, 2002) claims that without English language, one has no future in Pakistan. The claim is backed by looking deep into the history of English language in the subcontinent when the British started colonization in the then-India. The introduction of English and then imposing it as official language to replace Persian language, which was official language of Mughal Empire, was very purposeful. The power of language is unquestioned in defining as well as driving a culture. The British wanted people of the then -India to realize that Muslim ruling was over and they were going to be ruled by the British for which English language was declared as official language in 1835. When the movement for independent Pakistan started, Muslims were symbolized with Urdu language. Thus, on 14th August 1947, when Pakistan came into being, the need to recognize Urdu as national language gained momentum but it was hindered by the demand of East Pakistan's wish for Bengali language to be declared the national language of Pakistan. This tug of war between these two languages kept English alive like it was 100 years ago in the region as exclusive language. When Bangladesh separated from Pakistan in 1971, Urdu was the uncontested national language of Pakistan. In 1977, the then-President of Pakistan, General Muhammad Zia ul Haq imposed 'Urdu only' policies which further deteriorated the language dilemma at official and higher education level. The schooling was divided into English Medium and Urdu Medium and elites were more attracted towards the former. Even the higher Government jobs, bureaucracy, military and private business positions demanded English as the requirement to work as entry pass into the system. So the importance of English language in Pakistan never declined since 1835.

(Mansoor, 2004) calls English as the language of power in Pakistan. With so many regional languages flourishing in Pakistan, it is the duo of Urdu and English that rules the country. The author concludes his research on the very fact that the attitude of the youth is more tilted towards Urdu and English, and less towards regional languages and between the two major languages, English is preferred in private institutes.

English language is enjoying its promotion in Pakistan media and entertainment industry as well. English is also considered a status symbol and media and entertainment are playing their part in spreading this thought among all. In general, masses try to speak

English or at least a mix of Urdu and English even if they are not inclined towards getting education at all. This attitude is observed in all cities of Pakistan. Even the poorest of people try to speak words from English language, no matter how poor their accent and pronunciation is. They just utter the words sometimes without knowing their meaning. Media and Entertainment are the major sources from where they learn these words. (Sultana, 2010), admits that media has positive affect on spreading and promoting English language in Pakistan and now it should be used as a constructive medium for English education. Author feels that media should take it as responsibility rather than blindly promoting the English language culture without taking into account the poor version and accent of English which these masses and less educated people are adopting.

(Pinon & Haydon, 2010) describe recognition the importance of English language as part of the growth strategies to be part of International business world. The foreign investment in countries like Pakistan, Bangladesh, Cameroon, Nigeria and Rwanda is open and has its attractions but it is possible when English language is prospering in these countries where investor would see the opportunities without any language barriers that may otherwise be a repelling factor. For Pakistan, the report has raised the importance of English language as the tool for economic development. English is still the language for official works though Urdu is the national language. The individual Pakistani's prosperity is linked with English language and in long term growth of Pakistan, these individuals will form together the prosperous Pakistan. The importance of English in Pakistan is demand driven by the workplace. More than half of the white collar jobs in Pakistan require basic to intermediate level of English. The study highlights the value that a degree or certificate holds when gained from English speaking country. This speaks of the mind-set of the employers. As per the report, Pakistan's official communication is conducted in English, Law is written in English. Likewise Constitution is also prepared in English. The number of English speakers in Pakistan by the year 2010, when this research was conducted, was 49% with English speakers getting approximately 15% higher salaries than those who could not speak English. Jobs are advertised in English as well as Urdu language but higher posts are announced in English only. Even the English version for low level jobs is targeted by the recruiting agency. The youth is inclined towards higher education in English speaking countries and despite lucrative offers by Germany and France, students from

Pakistan prefer English language over German and French and undertake less scholarships from German and French speaking countries. Similarly, proficiency at English is considered an academic achievement. Private schools are shifting towards O-Level and A-Level from conventional annual system based on education board by the Government, thus further moving in favor of English centric curriculum. The report ends with the final nail in the coffin being the USAID based rating of the private education sector in Pakistan. The private education sector in Pakistan supports English medium in teaching. All this keeps English not only alive in Pakistan but virtually eternal.

(Crystal, 2012) thinks that South Asia has significant number of English speakers which include Pakistan, Bangladesh, Sri Lanka, Nepal and Bhutan. He calls it the South-Asian English. Although entire South Asia considers English as a symbol of cultural modernity, it is interesting to note that out of all South Asian countries, only Pakistan has accepted English as official language.

2.4 English for Specific Purposes

English language is popular, adopted by highest number of people, taken as top choice for writing Internet content but one application of English language or any language for that matter is felt missing and it is its usage in a specific environment or for a specific purpose. English for Specific Purposes (ESP) is teaching English language to those who are non-native to this language with a particular set of requirements in a workplace. ESP designed for university students prior to joining market or field, is sometimes termed as English for Academic Purposes (EAP). It is considered as a type of ESP, which itself is called subset of English as Second Language (ESL), rooting to the English language (Wikipedia C. , English for specific purposes, 2018).

(Anthony, 1997) describes English for Specific Purposes as the English language taught for a purpose. Whereas some consider ESP different from EAP and some count academics as one of those purposes with no real differences.

(Dudley-Evans & John, 1998) define ESP as version of English language that meets the specific needs of targeted students. This version of English focuses on discipline that

the students are going to follow and the set of most relevant genre, discourse, lexis and grammar is selected to transform the course accordingly.

ESP can be called as English for specific situations, most appropriate for university students in which basic or introductory part is skipped.

(Hutchinson & Waters, 1987) focus on the difference between General English and ESP to make the definition clearer. They very briefly describe this difference as theoretically nil but when it comes to practical implementation, there is a lot of difference. With need-analysis of students being conducted by teachers these days, the purpose of English for specific group or class of students is a more pronounced need than ever before.

(Benesch, 2001) takes the need analysis part in ESP to another level claiming that need analysis should include critical need analysis as well as rights analysis. Here, rights analysis refers to power and power means the authority to decide which contents are suitable for the students and should be included in the course. Rights analysis as whole is the power and authority given to the students to query on the syllabus and classes etc. The inclusion of students in course design is encouraged to properly shape General English into ESP.

The major reason people in Pakistani universities are not following ESP, is that they do not realize language for specific purpose although a very strong case that advocates the language for specific purpose is Urdu and Persian languages during the Mughal Emperor's rule in the then India. The Mughals used to engage best linguistic experts in Urdu language and Persian who would teach language to their children; their future kings, the kind of language that is spoken by emperors. It was slightly different and more formal version of the two languages which was not used by common people. This was Urdu and Persian for specific purpose where the purpose was to communicate like an emperor. People in Pakistan still do not realize this importance and thus English for Specific Purposes remains an important version of language for linguist only.

The version of English spoken by diplomats is again slightly different from the casual version of the English language. Graduates seeking jobs in embassies also need to undergo extensive English language course which is a form of ESP.

With every field requiring some part of the English language to be tailored in accordance to its requirements, the ESP version of English should be accepted and implemented. Here it is pertinent to say that Higher Education Commission of Pakistan (HEC) is working on raising the importance of ESP and other specialized flavors of English language like English for Academic Purposes (EAP) and English Enhancement Program (EEP) by introducing certain courses in its four year degree program in English language (HEC.gov.pk, 2018). However, the focus in the BS English program is not reflected in other programs where English language returns in generic form even in the latest revised curriculum.

(Manzoor, Awan, & Javed, 2017) studied the aptitude of students of management sciences towards accepting ESP course as part of their curriculum. Although the study yielded positive results towards ESP course but there was no work done on customization of the course.

(Khalid, 2016) reviewed the needs of ESP in Pakistan and his studies, which revolved around need analysis, concluded that despite the fact that English language was researched in various ways all around the world, especially the ESP version, there was a significant drought of good research in Pakistan in this domain. Most of the research in his views was generic and not focused entirely on Pakistani culture's needs.

In a study on ESP at Diploma level in National University of Modern Languages (NUML), Pakistan, (Dar, 2010) scrutinizes the target needs of English language in LLB students and professionals in Pakistan. Her research type was case-study using triangulation strategy. Her population was students, faculty members and alumni from NUML and her sample consisted of 20 students, who joined English Diploma course for occupational purposes, 5 teachers and 5 alumni. Random sampling method was used in this study. The research tools were interviews, questionnaires and observations. Final analysis was conducted using SPSS tool. The results of this study indicated that students in English Diploma courses, who were LLB professionals or students, needed to communicate with Judges, fellow lawyers and clients in English. However the requirements of English differed for them from others as per their profession. A true ESP course was their prime requirement.

2.5 ESP for Computer Science Students

Computer Science is one of the most dynamic fields in the world. The merger of computers with several other fields, forming hybrid fields of studies is further galvanizing the interest that youth is showing in computer sciences. Fields like bioinformatics; mix of biology (genetics) and computer science, speech recognition; mix of natural language and artificial intelligence, data science; combination of computer science, mathematics and statistics are some of the examples where computer science is attracting students from other fields of studies.

The ESP course, if tailored for computer science, medical or engineering fields will show the value of this subset of English that is much easier to understand and recognize. For decades, computer science graduates are serving the world over, and Pakistan's contribution in this field is significant. Currently, graduates in computer science are serving in all developed countries of the world in addition to the developing countries. These IT professionals have won several accolades, paving ways for others to follow but some short comings have been consistently pointed out. Pakistan being a Muslim country and rich in languages, has a niche for English language that entire world recognizes. With universities, colleges and institutes, all playing their roles in improving English in the country, the need for English for Specific Purposes is raising higher and higher. International employers praise the technical skills of Pakistani graduates but language is still a barrier. There are complaints that these professionals are lacking something in their communication skills which is hindering their growth or at least slowing it down. This 'something' is the training as per the technical terms used in workplace of computer professional and the most common terms spoken and written as part of job. These are different from what a medical officer or doctor will use during his write ups or verbal conversation at work place. Similarly, a civil engineer would require different set of communication skills at workplace than a marketer would. (Riemer M. J., 2002) elaborates his work on Engineers in Australian University environment and focuses on English Communication Skills for specific purposes. The extended study in similar area by (Riemer M. J., 2007) again is based on Engineers in Australian University. The cause for ESP for computer science students is also supported in (Eberle, Karro, Lerner, & Stallmann, 2013) but this study was how to incorporate customization with respect to the course of Data Structures and Algorithms. In

short, these studies yielded results favoring the inclusion if ESP for computer science students. (Ho, 2015) conducted experiments on participants from computer science field and compared their performance at internship and workplace. As per his study, the frequency of communicating in English in reading, writing, listening and speaking increased in the participants' workplace as compared to internships. The workplace of IT graduates demanded much more use of English language for which they were required to be trained during their studies. His experiments were an effort to convince academicians to identify the requirements of computer science graduates at workplace and include them in ESP course. He proposed some of the topics to be included in the curriculum but those were designed for the students whose mother tongue was English and thus those were not suitable for Pakistani students who study English as second language. (Dar, 2010) focused on need of ESP course for Pakistani students but her work was based on LLB students and course contents were not part of her research work.

(Imtiaz & Sarwar, 2014) targeted lower tier administrative staff (clerks) at Government Islamia College, Lahore, Pakistan and conducted their need analysis for ESP course. Their study also included course design for the clerical staff. The study was based on survey research strategy using triangulation. Questionnaires and interviews were used as tool for collecting data. The population for the study was 40 clerks out of which 20 samples were selected. Sample also included Superintendent and Deputy Superintendent, who were interviewed. The data analysis revealed lack of reading and writing skills in administrative staff and the course design recommended by the authors was primarily based on the needs of the clerical staff level persons and their needs i.e. the very basic English language skills required to perform daily tasks in an educational institute. The study was targeting people at work at lower administrative level and no science and technology involved at workplace. The requirements of CS graduates are completely different from clerical staff as the former get jobs at higher level in if it is at administrative side. The course designed in this study was therefore not applicable on CS students at undergraduate level.

(Alharby, 2005) investigates the needs of ESP in the medical field in Saudi Arabian culture. His study revolves around the needs of English language and the kind of skills

which are most needed at workplace for doctors. He admits that despite the importance of ESP, the curriculum in Saudi Arabia is void of true customized courses. In his study, he conducted need analysis for the usage of English in medical field in Saudi Arabia and focused on reading, writing, listening and speaking skills. His research instrument was questionnaire and sample population was combination of physicians, dentists, pharmacists, and applied medical technicians with effective participation from 257 samples in the study. For conclusion, he used statistical analysis using mean value of the stats and his study generated positive results towards requirement of ESP for medical practitioners in Saudi Arabia.

A similar study was undertaken by (Siming, et al., 2015) on Pakistani Undergraduates in science domain but it was again focused on their motivation towards ESL and ESP. The study was conducted using questionnaires on a sample of 80 respondents from 1st year to 4th year students in Quaid e Awam University of Engineering Science and Technology (QUEST), Pakistan. The results were calculated through statistical analysis using Standard Deviation. The conclusion once again showed students' inclination towards acquiring English as second language and students showed interest in ESP to some extent but the contents of English language course science students were not discussed for. This study concluded with the reasons for Pakistani students' motivation for learning English being instrumental and integrative reasons.

(Sultan & Javaid, 2018) studied the perception of Pakistani students for project-based learning (PjBL) implemented in English language course. The study was conducted on students in a private university in Karachi, Pakistan. The population was students from computer science department. Sample size was 37 students, selected through non-random convenience sampling method. Data was collected in the form of brief reports written by the respondents. The contents were analyzed using coding technique over sample text and was placed into pre-defined categories. The result of the study indicated students favoring the PjBL approach. This study indicated the problems, computer science students in Pakistan are facing in learning English language at undergraduate level and suggested PjBL approach but it did mention anything about the course contents that may be altered to produce better results.

(Nisar, 2016) conducted a research on female students of computer science department in International Islamic University to evaluate the needs of ESP and current state of satisfaction among students regarding their English language course. The main focus in this study was on the difficulties faced by the students in reading, writing, speaking and listening in English language for academic purposes. She used random sampling for this study with questionnaire being the tool. Her population was based on female students of 6th semester of BSCS in International Islamic University, Pakistan. Her sample consisted of 20 students. Her tools for data collection was questionnaire. The study concluded that the students needed more focus on speaking and writing skills. The new course contents that would be required for focusing more on these skills was not worked upon in this research.

(Irshad & Anwar, 2018) worked on designing course for computer science students in Pakistan. Their target was to design a course in further sub-domain of ESP; English for Academic Purposes (EAP). Although, their study raised very genuine questions over the differences that an EAP and English for Occupational Purposes (EOP) may really have, their focus remained on designing a course of EAP under ESP for Computer Science students in Pakistan. They used both qualitative as well as quantitative research methodologies and prepared questionnaires for students as well as for faculty members. They used Target Situation Analysis (TSA) and Target Situation Analysis (TSA) for the need analysis of the course design. Their research tools were interviews and questionnaires. The population was students and faculty members from Punjab and they picked sample of 30 students of 7th semester of BSCS program and four faculty members. The study concluded that out of the four language skills, speaking and writing should be given more importance. Their study ended with recommendations for task based as well as structural syllabi for the computer science students. The study however did not discuss the course outlines or contents in detail. Their suggested syllabi was much similar to what is already recommended by HEC in the first course of English Comprehension for CS students. There was not enough material that differentiates an ESP course for CS students from English for students of other fields of study.

2.6 Why English and not any other language?

English is considered de facto choice for students in computer science all over the world. The usage of English is one major contributing factor but the fact that English is the language of the Internet (Sawe, 2018) enhances the requirement of English proficiency exponentially.

Almost 54% of the data available on Internet is in English language (W3Techs, 2019). The 2nd most dominant language happens to be the Russian language forming only 6% of Internet contents. Next comes German and then Spanish covering very small percentage of the Internet contents.

In terms of languages used on the Internet mainly in emails, social networking (Facebook, Twitter, Linked-In etc) and chatting etc, English tops the world with 24%. However, in this case the 2nd most used language, Chinese Mandarin is at 19% and seems to be catching up English very fast but as long as contents remain in English language, there is no danger to the popularity of English (InternetWorldStats, 2018).

With such a huge difference between English and its competitors, it would be criminal to ignore English language for any one. And for computer science students, it is not only accessing the Internet material, but also using the World Wide Web for professional growth and further tasks. Apart from the contents on Internet, the application available all over the world are in English language. The programming language may differ but for the end user, the inter-face is made available in English. The software platform used by majority of the computer users is Microsoft Windows. Although, Windows comes in English, German, Arabic and French etc, the most widely version used is that in English language. The competitor to Microsoft Windows platform are UNIX and Linux. These two also are available in several languages but the most stable version are those in English language.

Similarly, mobile phones are all around us and be it smart phone of older technology with buttons, the interface are written in English languages first and then the add-ons are provided for translation into other languages which generally do not attract users. The most popular platforms in mobile technology are Android, Windows and

iPhone. All of these use English as default language or the only language. There are very few technologies in the world which lack English language support and these are not so popular for the language reason.

As per (Manzoor, Awan, & Javed, 2017), the survey conducted on students of first year enrolled in BBA programs in Karachi based universities, showed very positive attitude towards acquiring English for Specific Purposes. Students in Pakistan are ready for ESP courses in their syllabus but there is no appropriate introduction of such courses in non-language degree programs in Pakistan. According to this study, English is acceptable to all students.

Therefore when it comes to choice of language for specific purpose, English has to be the most logical choice for all and Pakistani students are no exception.

2.7 Why novelty is required in the course?

The Computer Science students require some very specific areas of expertise to survive in the workplace. These are mainly the development, programming, networking solutions, database development, software engineering etc. apart from practically engaging on the technical tasks, which is one of the most important steps to win a project. Pakistani graduates are full of zeal and their intellect, combined with knowledge in IT domain makes them a real asset. The shortcoming that hinders their way are workplace-specific communication skills. There are several tasks related to computer science that require specialized communication skills. A computer science graduate or student prefers to start free lancing which is development of projects without being employed to anyone. This task requires writing skills to win a project and it is completely up to the bidder to prepare a write up to impress the potential employer in order to win the project bid. Pakistani graduates lack writing skills for the project write ups in abstract form and also in detailed form. The choice of words they use, jargons and combination of words are not impressive or appropriate enough in most of the cases due to which they fail despite possessing immense IT skills. At the moment, in Islamabad and Rawalpindi, numerous software houses are functional but only those are at ease who have good communicators in their team. Most of the software houses complain about not being able to acquire projects. The whole process in free lancing is based on electronic communication (email, chats, tweets

etc) through which, the software house has to impress the client. At higher level, the project acquiring requires bidding against tenders. In this case, a very comprehensive report on company's capabilities, report on what the company understands about the project and how it is going to get the job done, is required. The overall competition in Pakistan software industry has come down to the writing and speaking styles of the companies to acquire the project. There are numerous occasions when less skilled companies are more successful because they have the right combinations to prepare appropriate write ups that highlight their company's skills rightfully against the required skill-set for the project thus convincing the client that they are fully capable and the right choice for the project.

This skill to promote one's software house and impress the client is not attained by the generalized course of English. There are certain ways in which IT industry differs from engineering workplace and completely changed environment from medical jobs. Therefore a single course outline cannot be sufficient for all of them. The need for ESP is felt from the very beginning in Pakistan but the problem lies in realization of this need as the Higher Education Commission of Pakistan's recommended curriculum, which is to be followed by all universities, does not cater for ESP. The HEC prepared curriculum is revised very regularly but the curriculum development wing for computer science related degree programs does not involve any linguistic expert. The team is formed of very learned and highly skilled academicians from computer science field from all over the country and to add more depth to this team, people from IT industry are also made part of this team. These respected members are Gurus in their own field but they do not have in-depth knowledge that a linguistic expert has and it is clearly evident from even the latest revised curriculum for computer science domain in 2017-18 by National Curriculum Revision Committee (NCRC) in which computer science and mathematics domain courses are wonderfully updated but the course of Communication Skills is still a generalized one. This course has certainly got new title; Communication and Presentation Skills but the contents are almost the same and generic which revolve around business English. The NCRC has no mention of ESP or any such sort regarding English language for computer science graduates.

One cannot deny the importance of Basic English required even for university students who join higher education after minimum 12 years of formal education. This 12

years long period has English language as at least one course in every grade/class. For English medium schools, the practice to study and speak in English enhances considerably and subsequently, these students become much more proficient at English as compared to their counterparts from Urdu medium schools. Despite all this long chain through which, students go through in Pakistan, they are again taught same old contents of English language at university level (first course) as refresher. This is completely a generic course. This course is followed by a course of Technical & Business Writing and third course of Communication and Presentation Skills. These courses at university level are still generic and do not do enough good to the computer science students as they should. Changing the focus area of communication skills course to little extent, towards the computer science professionals' workplace requirements is the sort of revision that is required.

2.8 Evaluation of Course of Communication Skills for CS Students at NUML

The current and most recently revised course of communication skills for computer science students is very good. The course contents focus on improving the verbal, non-verbal, written and presentation skills of Pakistani students who study English as second language. However, the contents and topics have no direct connection with computer science-specific requirements at workplace. World is adopting different techniques to make studies more meaningful but Pakistanis are not.

Different methodologies are followed all over the world instead of linear and conventional approach which might have worked well in the past. (Almenoar, 2014) worked on improving communication skills using snowballing method for effective understanding of Quranic verses in English. Her point of view is that despite teachers working very hard to transfer knowledge, students do not show sufficient improvements in communication skills with respect to 2nd language and changing method to suit the task they are required to, understanding Quran in English in this case, gives much better results.

2.8.1 Course Description

The course of Communication Skills is offered in most of the 4-year degree programs in Pakistan. The course is offered as compulsory course. Its credit hours are 3+0 which means three hours of lecture per week. As per Higher Education Commission of

Pakistan, lectures include teacher–student interaction within the classroom. It may be conventional lecture, presentations, interactive sessions, workshops, seminar etc. The course is offered in 2nd or 3rd semester. The pre–requisite to this course is 'English Comprehension and Composition' which is also a compulsory course and its credit hours are 3+0. The course of 'English Comprehension and Composition' is offered in first semester which covers the revision of basics of English language and some advanced topics to prepare the students for next the two courses.

2.8.2 Course Length

The course holds weightage of 3 credit hours which is appropriate for a technical degree course (BSCS). This aspect is further strengthened by the fact that this course is preceded by 'English Comprehension' and followed by 'Technical and Business Writing', each with a weightage of 3 credit hours. For technical degree program, this length is considered appropriate and no changes are worked upon over it, in this research.

2.8.3 Focus Area

The current course contents are very broad but lack the focus area of communication skills. The little bit tilt goes towards business and therefore it seems much focused on business students pursuing degrees like BBA and MBA. For computer science students, some contents need to be tailored accordingly. This aspect is perhaps the most critical one because this is what makes an English language course, a course of English for Specific Purposes. The area of focus is the 'specific purpose' which is mostly studied in this research.

2.8.4 Inter Cultural Communication Aspect

Inter-cultural communication is important and in today's dynamic world it has attained so much value that it cannot be omitted from communication skills course. (Roux, 2002) declares good teachers to be culturally competent at communication and effectiveness of education is related with how effective communication skills of teacher and students are. Cross cultural communication is very important when student has to communicate with people from different cultures. Writer thinks that there exists no concept of culturally neutral education in the world. Therefore it is up to the teacher to develop his students from cultural point of view as well. Multiculturalism is supported in this study for

betterment of the students. A gap between speaker and listener of different cultures means chances of wrong perception of meaning of speaker's words will definitely be higher. The successful teacher in language teaching is the one who has the focus on students' needs.

(Kaushal, 2014) also suggests that intercultural communication is important and for this reason, the role of verbal and non-verbal communication are critical. The study focuses on how non-verbal communication can help in enhancing the effectiveness of successful cross-communication.

(Applbaum, 1979) shares similar views regarding the role of non-verbal communication in cross-cultural communication when the two parties are forced to infer each other's meanings.

The Pakistani computer science graduates have to deal with international clients very frequently. Most of their clientage is from abroad and is spread across the world. The need for cross-cultural communication is very high and it is a plus that such an important factor is already included in the course. It is also worth mentioning that the need for cross cultural communication skills is also essential for those who are working within Pakistan as the country is very rich and diverse in culture and the number of regional languages spoken in Pakistan is above 70 (Wikipedia C. , 2018). Apart from regional languages, the project of China – Pakistan – Economic – Corridor (CPEC) is also bringing Chinese culture in Pakistan to a new level. With new job openings, computer science graduates are in line for large number of jobs.

The current course has a section for Inter - Cultural Communication but this does not cater for the needs of computer science students, the focus is again business oriented or to a large extent, unfocused thus making it less effective.

2.8.5 Ethics and Communication

The ethical context is also important part of the course. The ethical situations that occur in a workplace and the appropriate way to communicate it to higher ups or subordinates matter a lot. Current course certainly includes this sub-part but the situations and context discussed are business oriented. The ethical dilemma in an organization and issues pertaining to general business are discussed in this section with respect to

communication skills needed to address those. The overall organizational structure of a software house differs a lot from conventional business set up. The ethical and moral issues in a software house are sometimes very complex. Currently, the ethical context in an IT company is not made part of the course which would have prepared students exactly what most of them will be facing at workplace.

2.8.6 Rhetoric

Rhetoric is the art of effective communication, verbal and/or written, to persuade the listener. The 'persuasion for' may be anything, as targeted by the speaker. The term rhetoric has no better use than in commercial or research activities where entire focus is; to convince a customer (business/commercial activity), business meeting (boss or sub-ordinates/team), research proposal where listeners (mainly highly learned people/scientists) are to be convinced about the feasibility of a research idea/proposal that may be fantastic but prone to rejection if not presented properly/effectively. Similarly, rhetoric is also a form of discourse for motivation. The key is to use a mix of logic, emotions and mental level of the audience/listeners.

The factor of Rhetoric is essential part of Communication Skills course and rightly so, it is part of the course followed in Pakistani Universities. The topic of Rhetoric is divided into five sub parts but these are again generic and miss specific target. When we define the term rhetoric, we talk about persuasive communication and if focus is on the mentality of IT professionals and clients coming up with IT based projects, the overall contents will certainly change to a great extent. A medical professional will use completely different set of rhetoric as compared to IT professional. So the two require different study material. The reason for tailoring the sub-topic of rhetoric is evident from the very basic definition of the rhetoric. When we talk about persuasive communication, we need to target whom are we talking to. When we use the term playing with emotions and logic of audience/listeners, we need to define who could be the potential listeners/audience.

2.8.7 Job Search Communication

This part is already rich in contents and it is neutral in the sense that the overall scenarios are same in every field of life. However, very few modifications are definitely required. Like searching for IT based job search, Resume of an IT graduate (what to include

and what not to), self-assessment from technical point of view, market assessment of IT industry etc.

2.8.8 Meetings

The sub-part of Meetings is same for all disciplines and can be taught in generic context. The topics under this heading are common in all types of business and do not need specialized criterion. However, slight modifications can be made under meeting types to incorporate the specific type of meetings in software house.

2.8.9 Interviews

The interview part is also fine because interviews are generic enough to be included without any specific focus area in mind. As per (Gill, Stewart, Treasure, & Chadwick, 2008), interview is the most common and effective method of data collection in qualitative research. Such an important aspect cannot be ignored at any level.

2.8.10 Books

Text books recommended for this course are focusing on business students. The book; Effective Business Communication' by H A Murphy is very popular in Pakistan. However, it does not fulfill the requirements that are raised in this study. Similarly, two more books are recommended but both are titled Business Communication. The fourth book is on History of Languages. It is also a good book but supports a very small part of the course contents. The specialized titles for computer science students are missing in this list. One or more addition, targeted towards technical students, more specifically IT students, would be sufficient.

2.9 Selection of Teaching Method

For a good teacher, teaching is an art and there are numerous ways a good teacher can effectively teach a course. The teaching methods are sometimes specific to languages as one language may favor one specific method which would not be very successful for other language. Similarly, a very effective method for teaching a specific language may not suit a group of students depending upon the demographics like age, gender, geographical distribution etc.

The use of multidimensional approach in teaching is more effective and no single criterion can be that effective (Marsh & Roche, 1997). It is very important to select the appropriate teaching method as per the group of students.

The teaching methodology used in this experiment is a blend of Comprehension Approach and Communication Approach. These two approaches, mixed together with some local touch, have proven to be more effective in teaching English language based courses in Pakistan. Moreover, such a mixed approach is already followed by the researcher in the past and thus it would not overshadow the effectiveness of customized course in computer science student's success at workplace. A totally new teaching method, if successful, would certainly take some credit away from the course contents and may harm the focus and spirit of the research.

2.10 Conclusion

The chapter presented literature review on ESP in Pakistani universities for computer science students. The topic was broken into small pieces and each term was reviewed separately and then aligned with the previous one to end on the main topic. Literature on communication and its importance was selected and then English language was added into the literature under review. These combinations were added with communication in English language in Pakistan and then ESP came into focus. A little bit of choice of English as foreign language in Pakistan was also reviewed. The need of novelty in the current courses was discussed next and then course of communication skills for computer science students in Pakistan was thoroughly studied. Last word on teaching methodology was added briefly.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

This chapter contains Research Methodology; the complete method of how this research was conducted. This chapter also covers Research Objectives, the Operational Framework, Research Design and method of the experiment. Finally the method used in teaching to students is discussed along with brief review of the various options available.

3.1 Research Design

The research consisted of two phases which were course outline preparation and experiment to examine its effectiveness. For the first phase, need analysis was performed using questionnaire (Appendix E). According to (Jordan, 1997), need analysis can be performed using various methods according to situations and no specific approach fits all circumstances.

For this research, mainly Target Situation Analysis (TSA) was used. (Robinson, 1991) defines TSA for ESP as "What the students needed to become able to do something". This approach fitted best for the situation in this research. (Khalid, 2016) conducted need assessment in ESP on Pakistani students. He concluded that Pakistani students do need ESP as per their professions for better performance at workplace.

The main aspects retrieved for the new course outline in this research were obtained by the software house managers' feedback and subjects' assessment.

The next and major part of the research was experiment. Therefore it was mainly an experimental research. According to (Sabanci, Sahin, & Ozdemir, 2016), experimental design is aimed at finding cause or effect of the variable studied. As per (Ary, 1985), experimental study is meant to test a certain hypothesis. Such research generates numeric data to answer predetermined hypotheses or questions. Among the types of experimental research types, this research fits into the type of quasi-experimental research.

Its research design is as follows:

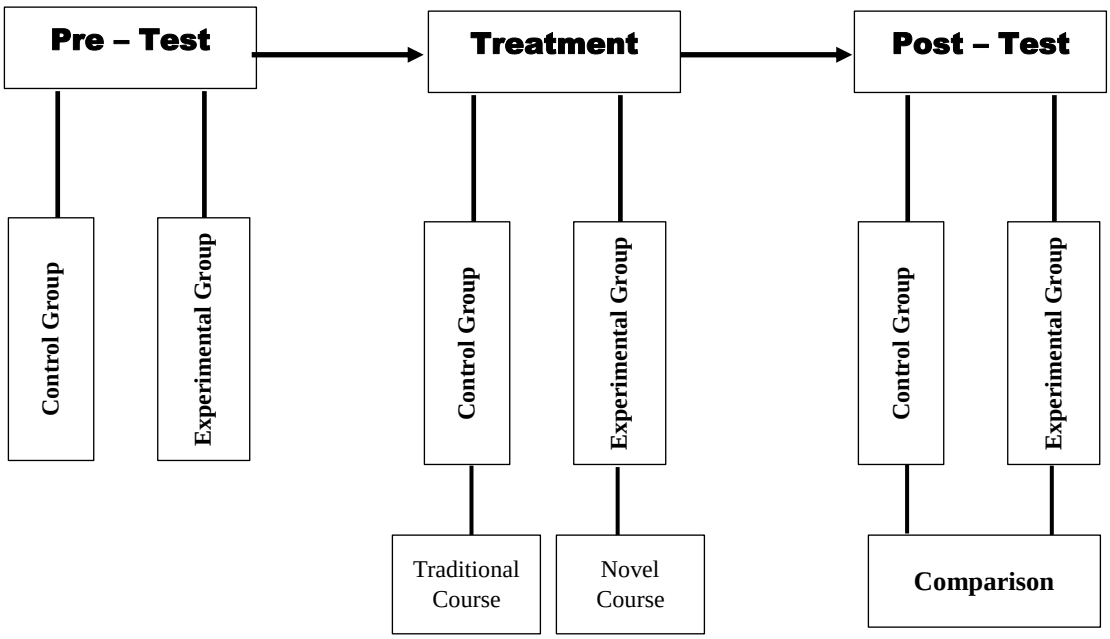

Figure 3. 1-Post-test Detailed Comparison: Control Group vs Experimental Group

The subjects in this study were not selected out of randomization. According to (White & Sabarwal, 2014), a quasi – experimental research design is used to validate/test hypothesis with the emphasis on how effective the treatment has been. There have to be some indicators to evaluate the results at the end of the treatment phase. Also, the control group/comparison group is critical because it is used in comparison at pre-test and post – test stage. If the control group is similar to experimental group, the outcome is more authentic. Therefore, in the pre – test phase, the experimental group and control group were made from the students of computer science department of NUML and no other departments or universities were included in the research. The pre – test was conducted to ensure that homogenous groups were selected for the experiment. The two groups were given Treatment in similar conditions (similar classrooms, same teaching methodology, same time duration etc). The control group was taught traditional communication skills course where as the experimental group differed with the course contents that it was taught. The experimental group followed novel course of communication skills (which was the independent variable in this study) and it was the only difference between the two groups. Once the treatment/experiment time was completed, both groups were evaluated by the software house managers in post – test phase. The verdict was recorded via questionnaire to document the product variables. Then, t-test was performed on the two groups' aggregate scores against the 17 parameters used in the evaluation.

3.2 Population

A population can be defined as the organisms that are from the same group or species and share the same geographical area (Barreiro, Albandoz, & MaMaEuSch, 2001). Population is a collection of entities that have one or more than one features / attributes of interest.

The population of this study was students from Computer Science and Engineering departments of NUML. The experiment was conducted on students of BSCS and BSSE programs which study three courses of English language.

3.3 Sample

Sample can be considered as a chunk taken out of the population. As per (Ary, Jacobs, Sorenson, & Razavieh, 2010), a sample is a small group picked from certain population for the sake of observations and experiments in a study. Picking up sample is very important. According to (Cohen, Manion, & Morrison, 2007), sampling strategy is one of the most critical factors in a research that could decide the success or failure of the whole study. Wrong sample or a sample that has direct connection with the study would bring incorrect results.

As (Cohen, Manion, & Morrison, 2007) suggest, population is identified first and then it is narrowed down to subset of population which is called its sample. In this study, a sample of 50 students was picked. The sample was not randomly selected. Instead, a very careful selection of samples was made to ensure homogeneity between them. These students were divided into two groups; Experimental and Control Group. BSCS students were the Experimental Group (subjected to follow novel course) whereas the BSSE students were the Control Group (set to study the conventional course). The sample size of Experimental Group was 25 students and Control Group was also 25 students. The sample had passed English proficiency test at time of admission in NUML. For the pre-test phase, homogeneity parameters were ‘CGPA’, ‘Age’ and ‘Degree Program’. For third parameter; Degree program, BSCS and BSSE were picked which focused on ‘software development’ based studies. The parameters are given in table 3.1.

Table 3. 1
Homogeneity factors

Sr#	Parameter	Value
1	Program	BSCS / BSSE
2	Level	3rd semester
3	CGPA	2.5-3.0
4	Age	19-21 years

Telecommunication and Electrical Engineering programs in the same department were not selected because their workplace requirements with respect to communication skills were different from the former.

3.4 Research Instruments

The main instrument used to collect data for quantification and further statistical analysis of the experiment was questionnaire. Total two questionnaires were used. According to (Oppenheim, 1992), the layout quality, format and size are of critical importance for obtaining effective response from the respondents. These questionnaires were very carefully designed. Also, the size of the questionnaires was confined to one page only because these were followed by the extensive tests conducted on two groups. (Dornyei, 2003) suggests that questionnaire for second language research should be brief enough to be answered within 30 minutes and limited to around three pages.

Following two sets of questionnaires were used in this research:

i) Questionnaire I: This document consisted of 17 questions regarding different skills that were required in computer science graduates at workplace in general. This questionnaire was prepared in consultation with the software house managers. The questionnaire rated the overall performance of the two groups by each evaluator on a scale of three with highest indicator being ‘Good’ holding 3 points, second rank was marked ‘Fair’ with 2 points and least rating was of value 1 and titled ‘Weak’. The purpose of this questionnaire was to evaluate the English language skills of the two groups at pre-test stage before they underwent the treatment.

ii) Questionnaire II: this document also consisted of 17 questions which were exactly the same as in questionnaire I, but its evaluation criterion was different. The questionnaire documented the improvements, if any, observed by the

evaluators in the two groups. In this document, the rating was made on a scale of three with highest indicator being 'Significantly Improved' holding 3 points, second rank was marked 'Slightly Improved' with 2 points and lowest rating was of value 1 and titled 'Not Improved'. This questionnaire was intended to evaluate the post-test performance of the two groups after getting treatment.

3.5 Validity and Reliability of Questionnaires

(Bolarinwa, 2015) states that there are several ways to validate a questionnaire. The questionnaires were checked for validity using various methods out of which, Face validity was used in this study.

As per (Bölenius, Brulin, Grankvist, Lindkvist, & J., 2012), this method establishes validity over opinion of an expert in the relevant research domain. In this method, expert just carefully observes the questionnaire and gives his consent that the test can measure the concept which is being studied. It is considered very soft form of validity test according to (Engel & Schutt, 2012). However, it is considered as the most used approach according to (Sangoseni, Hellman, & Hill, 2013). This method was utilized by an expert from Computer Science's department holding doctoral degree.

If a test is conducted again and again, it has to produce same results in order to be termed reliable (Bolarinwa, 2015). It can also be termed as the stability of results / scores over repeated trials. The questionnaires were tested for reliability using Alternate-form Reliability. This method refers to use of alternate (different) research instruments and the amount of agreement between them (Ong, 2012).

In this research, the difference / alternate came in the form of evaluators. There were eight evaluators who were given different evaluation styles thus creating eight trials (questionnaires were kept same for documenting their results).

3.6 Data Collection Techniques

Questionnaires were the main instruments to collect data. These questionnaires were used at pre-test and post-test stages. The Questionnaire I was used at pre-test phase to quantify the performance of control group and Experimental Group. This performance was termed

O_1 for each group. Questionnaire II was used at post-test stage once treatment was given to both groups. This performance was termed O2. The symbol X represented treatment. According to (Creswell, 2012), this research could be represented as:

$$O_1 \quad X \quad O_2$$

3.7 Research Procedure

This was quasi experimental study and as per (Noveck & Sperber, 2004), any experimental study must include factors like subjects, treatment (experiment/test which is the independent variable), experimental units, sample size, pre – test, post – test, analysis, results etc.

The evaluators were one of the most critical components of this research as their input was the basis of amendments in the course of communication skills at first stage (prior to pre-test) and evaluation of the two groups at Pre-test and Post-test phase. The evaluators were selected on the basis of these parameters: Designation, Field, Experience, Area, Previous Employer of NUML CS graduates and Availability for both stages of the experiment; pre-test and post-test.

The selected evaluators were designated at managerial level in a software house. Anyone below this level/designation was ignored. ‘Designations’ included; Chief Executive Officer (CEO), General Manager, Project Manager and HR Manager.

The ‘Field’ parameter was confined strictly to IT which covered both computer science and software engineering. Any employer other than this filed was ignored because that could change the nature of the job of the employee.

‘Experience’ was very important because less experienced persons could not very correctly identify the problems and lacking, that graduates had at workplace. People with five year experience in the software industry were selected.

‘Area’ in this experiment meant geographical distribution. The areas / location of software house included in the research were Islamabad and Rawalpindi and their vicinity. Other cities were ignored because it was becoming difficult to engage the interviewees in both stages of the experiment.

The parameter of 'Previous Employer of NUML CS Graduates' was fairly simple. The selected employer must be employer of NUML CS graduates (at least three employees) at present or in the past and employees had spent at least 6 months with them.

Last parameter was 'Availability' of the Employers for both stages of the experiment because once their suggested contents were incorporated in the course outline and classes (treatment) were conducted, the outcome needed to be assessed by the same persons to identify any changes in the students. Table 3.2 contains the interviewees attributes considered in experiment and reason for their selection.

Table 3.2
Parameters for selection of Respondents/Evaluators (Employer)

Sr#	Attribute	Check Value	Reason for inclusion
1	Designation	Top management	Decision makers who are aware of employee's strength and weaknesses.
2	Field	IT	Requirements are different for all disciplines and study is focused on English for IT students
3	Experience	At least 5 years	Generally a less experienced employer may not give strong input.
4	Area	Rawalpindi, Islamabad	Easy to access the interviewees.
5	Previously Employed NUML CS Graduates	Mandatory	Must have judged NUML CS graduates who have gone through current generic course of communication skills at NUML.
6	Availability for both stages of experiment	Mandatory	Must participate in both parts of the experiment for correctness of results.

3.8 Treatment

The treatment was the teaching using course outlines of the English language course. The two outlines used for control group and experimental group were slightly

different from one another. For the former, conventional outline was used where as for the later, novel outline was used. The treatment required modified outline for which the available literature was mainly based on countries like Hong Kong, Japan, Thailand, Malaysia, Canada (Ho, 2015) and (Havill & Ludwig, 2007) which were focused on Computer Science, Engineering and Mathematics graduates. The literature was given less weightage in determining the additions in the course outlines because none was based on Pakistani computer science students. Some material/suggestions were selected on the basis of similarity in workplace of computer science graduates. Some of the parameters used in questionnaire I were adopted from (Ho, 2015). In general, standard outline suggested by Higher Education Commission of Pakistan was used because it was not permissible by the university to design a completely new outline. The course was revised only, to incorporate topics specific to software industry and the needs of computer science graduates in workplace. A very generic course was slightly modified into English for Specific Purposes (ESP) with specific purpose being IT industry and application on Pakistani students. Inter-cultural Communication was also included considering the needs of software developer to communicate with foreigners in major projects as well as small projects undertaken as free lancers. The course contents were carefully designed to be coverable in regular semester of sixteen weeks. Topics like writing a technical report, project description etc were excluded as these are taught in the course of Technical and Business Writing. Similarly, basic English language teaching was also left out because it was covered in the very first course; 'English Comprehension'. The contents revised in this experimental course were with strong consideration that other two English language courses (English Comprehension, Technical & Business Writing) were not altered. (Nisar, 2016) conducted similar research on Pakistani students of computer science and although this study did not focus on creating a new outline, it helped in deciding some of the elements to be included in the novel course.

3.9 Experimental Part

According to (Gill, Stewart, Treasure, & Chadwick, 2008) the most important tool for any qualitative research is interviews and questionnaire is very effective in quantifying the questionnaires' data. The research part consisted of following:

i. Pre – Test
ii. Post – Test
iii. Questionnaire

3.9.1 Pre – Test

In pre-test phase, the two groups were evaluated by eight evaluators from software houses. These evaluators gave their response in questionnaire I and the average of these scores was used by the researcher as final value. A two hour test was conducted on both groups to evaluate their academic level with respect to English language. The pre-test scores obtained through questionnaire I brought similar results between the two groups which supported the initial claim in this research that both group were homogenous and were at similar academic level.

3.9.2 Post - Test

The post – test was conducted after the completion of the treatment whose duration was 32 hours. The post – test was conducted with the help of software house managers who had already participated in the pre–test phase. These managers were given Questionnaire II which contained parameters pertaining to the tasks identified in Questionnaire I. The results marked comparison between performances of Control Group and Experimental Group at pre-test and post-test stages (Intra departmental) as well as the difference between the improvement levels of the two groups (Inter Departmental). The evaluation procedure for the two groups was left up to the managers/evaluators' panel e.g. One evaluator wanted to conduct written test and other felt more comfortable in testing the skills on Live projects. However, each evaluator was bound to use same method on both groups and on all members of the group.

3.10 T-Test

The quantification of an experiment results strengthens the research. The best way to quantify this research was t-test which was performed to validate the results and null hypothesis. The p-value and Pearson Correlation value were of prime importance in determining the statistical outcome.

3.11 Analysis of Results

The final results were compiled on the basis of ratings given in questionnaire II. The respondents/evaluators were asked to mark improvements over a scale of three viz; 'No Improvements', 'Slightly Improved' and 'Significantly Improved'. The data collected from the questionnaire, was tabulated in spreadsheet format and graphs were generated (bar graphs and pie charts) to highlight the results where improvements were observed and where not. T-test was applied on the final consolidated date. The outcome of the t-test; specifically the 'p' value was the deciding factor to determine whether Null hypothesis would be rejected in favor of Research Hypothesis (alternate hypothesis) or a p value of above 0.05 would term the improvement non-significant and null hypothesis will prevail over the alternate hypothesis.

3.12 Conclusion

The research methodology of the study was discussed in this chapter. The study was based on quasi experimental approach. The population was students from BSCS and BSSE programs in NUML, Islamabad campus. Sample consisted of 50 students who were divided into two groups, named as control group and experimental group. Both of these groups had 25students each and the former group had BSSE students and later had BSCS students from 3rd semester each. Questionnaires were research instruments whose validity was checked using face validity method. The reliability of the questionnaire was checked with the help of alternate-form method. Data was collected using two questionnaires which were used at different stages of the experiment. The experiment was conducted using old and novel course outlines which were implemented on control group and experimental group respectively during treatment phase. The two groups were evaluated by group of eight evaluators whose evaluations were collected using questionnaires at pre-test and post-phase. Final statistics were analyzed with the help of t-test and the value of 'p' was the used to represent level of improvements in the two groups' experiment which would prove the alternate hypothesis acceptable or not.

CHAPTER 4

DATA PRESENTATION & ANALYSIS

Introduction

This chapter contains the overall data presentation of the experiment and its analysis. The data was collected in the form of questionnaires and made quantifiable through spread sheet (MS Excel). T-test was performed on the data for results. For the ease of understanding, data was presented in the form of tables and for visuals, graphs and charts were used.

4.1 Pre-test

The pre-test phase comprised of two stages. First, two groups were formed of twenty five subjects each. One group was named Control Group and it contained subjects (students) from BSSE program and the other group; the Experimental Group, comprised of students from BSCS program. The subjects were selected on the basis of their performance in NUML admission test which contains portion of English proficiency evaluation. These subjects were all closer in marks obtained which were in the same range in the admission test (55% to 65%). To ensure the homogeneity between the two groups, certain parameters were considered viz cumulative GPA (which showed subjects' academic performance at NUML), age (which was kept between 19 to 21 years to ensure no subject is older and had more exposure than the others) and degree program (which was BSSE for control group and BSCS for experimental group because these two programs were quite similar and closer to one another than the others). Once homogenous groups were formed, evaluation was conducted on both groups. The evaluation was performed by the panel of evaluators which consisted of eight evaluators who were from software house in Islamabad or Rawalpindi. These evaluators were serving at managerial level or above in the software houses and had employed IT graduates of NUML. The evaluation results were collected in the form of Questionnaire I which contained seventeen parameters. Both groups were evaluated by the same panel of evaluators for uniformity.

The overall score of both groups is presented in table 4.1. The overall performance of both groups was almost same with Control group scoring 42.9% marks against the experimental group whose performance was gauged at 43.76%.

Table 4. 1
Comparative score of Control and Experimental Group at Pre-test

Sr	Document Type	Control Group			Experimental Group		
		Weak	Fair	Good	Weak	Fair	Good
		1	2	3	1	2	3
1	Technical Specifications	**18**	**7**	**0**	**19**	**6**	**0**
2	Memo	**25**	**0**	**0**	**25**	**0**	**0**
3	Letter	**10**	**10**	**5**	**8**	**12**	**5**
4	Preparing & Presenting Agenda	**25**	**0**	**0**	**25**	**0**	**0**
5	Preparing Minutes	**25**	**0**	**0**	**25**	**0**	**0**
6	Project Proposal Presentation	**20**	**5**	**0**	**20**	**4**	**1**
7	Presenting Manuals	**22**	**3**	**0**	**18**	**7**	**0**
8	Technical Specifications Writing	**15**	**9**	**1**	**13**	**12**	**0**
9	Tender	**25**	**0**	**0**	**25**	**0**	**0**
10	Bids	**25**	**0**	**0**	**25**	**0**	**0**
11	Project Introduction	**10**	**15**	**0**	**13**	**12**	**0**
12	Meeting with Client	**12**	**7**	**6**	**15**	**5**	**5**
13	Negotiation with Client	**15**	**5**	**5**	**12**	**8**	**5**
14	Technical Support	**20**	**5**	**0**	**17**	**8**	**0**
15	Communication using Digital Media	**19**	**4**	**2**	**21**	**2**	**2**
16	Communication on Social Network	**14**	**11**	**0**	**10**	**15**	**0**
17	Business Promotion on social media	**22**	**3**	**0**	**20**	**4**	**1**

The table 4.1 consists of rating of each of the twenty five subjects in each group against three options viz ‘Poor’, ‘Fair’ and ‘Good’. These three options were assigned marks with 1 point/mark for the option ‘Poor’, 2 points for option ‘Fair’ and for the best evaluation; ‘Good’, 3 points were awarded.

A questionnaire was prepared for the graduates of NUML who were working in IT industry. The objective was to identify the frequency of most common tasks in the work place of a software house that would require proper training during their course work. A

total of 20 employees were asked to mention the frequency of the tasks so that the questionnaire for subjects in the pre-test could be prepared. The questionnaire included in the experiment part was termed Questionnaire I and it was designed for the two groups of students (subjects) to evaluate their English language skills before the treatment phase and scale the outcome for comparisons later on. The pre-test was based on two hour written test for evaluation by the panel of evaluators (software house managers). The outcomes were recorded in the questionnaire on a scale of three ratings i.e. 'Weak', 'Fair' and 'Good'.

4.2 Breakdown of Results of Questionnaire I and Analysis

The questionnaire I consisted of seventeen parameters that were identified to be more frequent in the IT industry. A breakdown of results of each group is given below:

4.2.1 Technical Specifications Presentation

Rationale:

Technical Specifications of a software are the blue print of an application and presenting them in correct and effective manner adds to the value of the software. On the other hand, a poor description, sometimes kills the aura that the developer and its marketer create.

Control Group Evaluation
Parameter: 1. Technical Specifications Presentation
Summary

Weak	**18**
Fair	**7**
Good	**0**

Table 4. 2
Performance over Technical Specification Presentation: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
Fair																			√	√	√	√	√	√	√
Good																									

Experimental Group Evaluation
Parameter: 1. Technical Specifications Presentation
Summary

Weak	**19**
Fair	**6**
Good	**0**

Table 4. 3
Performance over Technical Specification Presentation: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						
Fair																				√	√	√	√	√	√
Good																									

Results:

Technical Specifications is completely IT related term and it is something that students need to be trained for. The results were very obvious and as per expectations, majority was rated 'Weak' in both groups. Results were close in comparative terms as no one from either groups was found good and results were almost equal and same as in table 4.2 and 4.3.

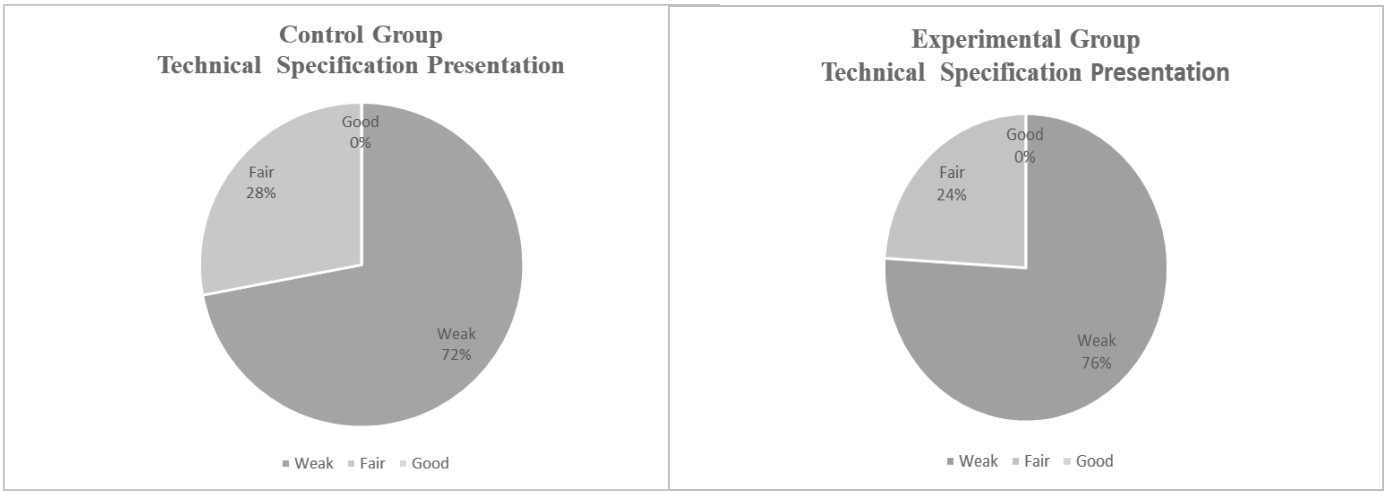

Figure 4. 1-Comparison over technical specification presentation

The pie charts above, show equal performance results between both groups. Both groups could not get 'Good' ratings. 24% subjects were marked 'Fair' in Control Group and 28% in Experimental Group. The lowest ranking of 'Weak' was assigned to 72% subjects in Control Group and 76% subjects in Experimental Group.

4.2.2 Memo Preparation

Rationale:

Control Group Evaluation
Parameter: 2. Memo

Summary

Weak	**25**
Fair	**0**
Good	**0**

A memo is a short form of memorandum. It is used to serve as reminder or short note that is meant to be circulated within the organization. Nowadays, memo is replaced with emails and SMS in many firms but the handwritten version is still used. In true spirit, memo is handwritten and this version (handwritten) is very frequently used in IT industry, therefore it was included in the experiment.

Table 4. 4
Performance over Memo: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Experimental Group Evaluation
Parameter: 2. Memo

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4. 5
Performance over Memo: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Results:

The results were exactly the same as both groups were rated ‘Weak’ completely, indicated in table 4.4 and 4.5. This was not unusual because memo preparation is new to all students as it is used in office environments only. The similar thing serving the same purpose at home or school for a student is reminder.

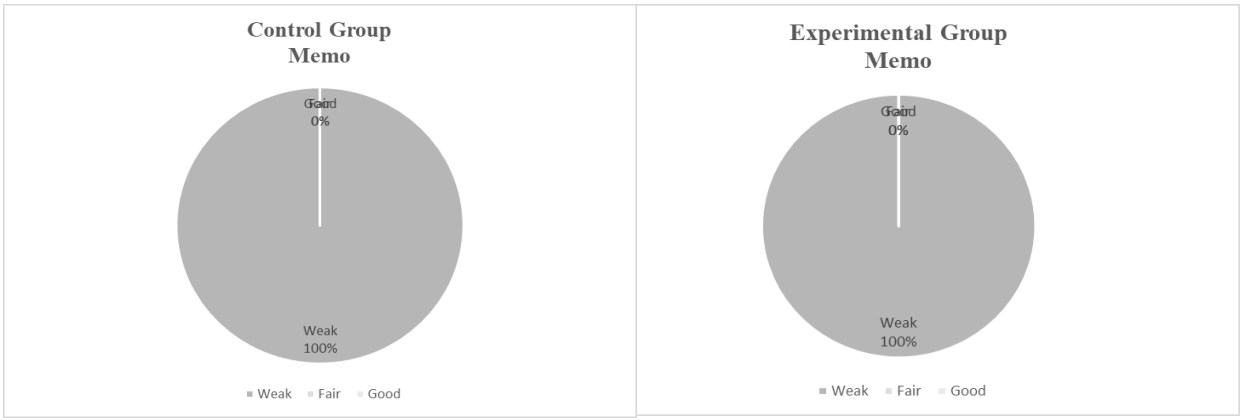

Figure 4. 2-Comparison over memo

The comparative results show exactly same results with 100% subjects were marked 'Weak' in both groups. And no one got any other rating from either group.

4.2.3 Letter

Rationale:

Letter is written mode of formal communication that is used to communicate both internally as well as externally. The internal mode is used when something more formal and serious than the memo is required. External communication refers to correspondence with the people outside the organization. Typically, letter outside the organization is written on business letter head, based on white paper of standard 'letter' size. Formal training at university level is compulsory, therefore it was included in the experiment.

Results:

Letter preparation is taught to the students at primary level and adding formal touch at university level is done mainly in the course of 'Technical & Business Writing'. Students are always somewhat prepared for this task and therefore, performance at pre-test stage was very encouraging as most of the students were already ahead of the 'Weak' ratings.

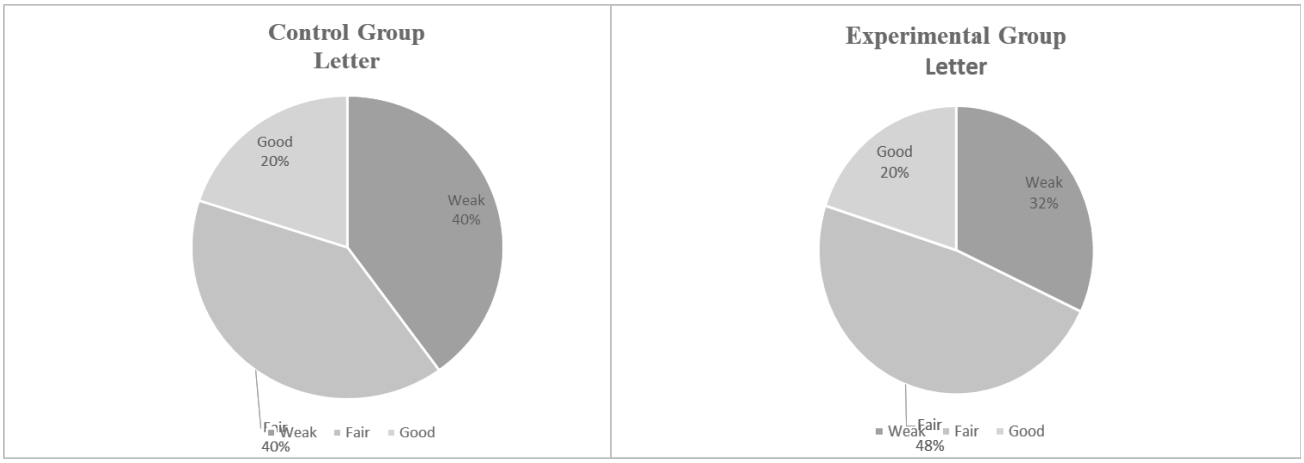

Figure 4. 3-Comparison over letter

On comparative note, 20% subjects were marked 'Good' in each group and 'Fair' rank was given to 40% subjects in Control Group as compared to 48% subjects in Experimental Group. Overall, it was again a similar performance.

4.2.4 Agenda Preparation & Presentation

Rationale:

Agenda or Agenda Points preparation and presentation is frequently faced by IT professionals and Engineers. Agenda means the important point(s) that is to be discussed in a meeting or the main point around which discussions take place. It is very common that every IT professional has to prepare agenda point at some stage of his job if not on daily basis. It is important to note that meetings are very frequent in software industry because of the nature of the business, therefore agenda/agenda points are frequently tackled.

Results:

The term agenda points was relatively new to the subjects and they were not up to the mark when evaluated by the panel. Most of the subjects knew nothing about it and therefore all of them in both groups were given the rating of 'Weak'. This was expected result because of the academic background of the students. Students have almost zero exposure to professional environment due to which, they are not aware with agenda points.

Control Group Evaluation
Parameter: 4. Preparing & Presenting Agenda

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.6
Performance over Preparing & Preparing Agenda: Control Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Experimental Group Evaluation
Parameter: 4. Preparing & Presenting Agenda

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.770
Performance over Preparing & Preparing Agenda: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Figure 4. 4-Comparison over preparing & preparing agenda

The results, shown in the tables 4.6 and table 4.7, indicate how close these two groups were in their academics related to English proficiency and IT based office requirements. Comparative results showed 100% same results which proved the homogeneity between the two groups.

4.2.5 Minutes Preparation

Rationale:

Minutes refer to meetings or conference etc. The importance of minutes of a meeting are well known but in IT industry, the importance is enhanced because there are so many petty issues and minute details that need to be recorded instantly.

If Agenda Points are the starting points of a meeting, then Minutes of Meeting are the end notes taken immediately when a meeting ends. It is a written record of what has been discussed in the meeting against the agenda points floated before the meeting. Normally, these minutes are hand written initially and then circulated among the concerned people in formal way (email, letter etc).

Results:

Control Group Evaluation
Parameter: 5. Preparing Minutes

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.8
Performance over Preparing Minutes: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Experimental Group Evaluation
Parameter: 5. Preparing Minutes

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.9
Performance over Preparing Minutes: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

The term Meeting Minutes is another formal activity which is performed in an official environment, The subjects, just coming out of the teen age, had no exposure to job environment, performed very poor and all of them were marked 'Weak' by the evaluators.

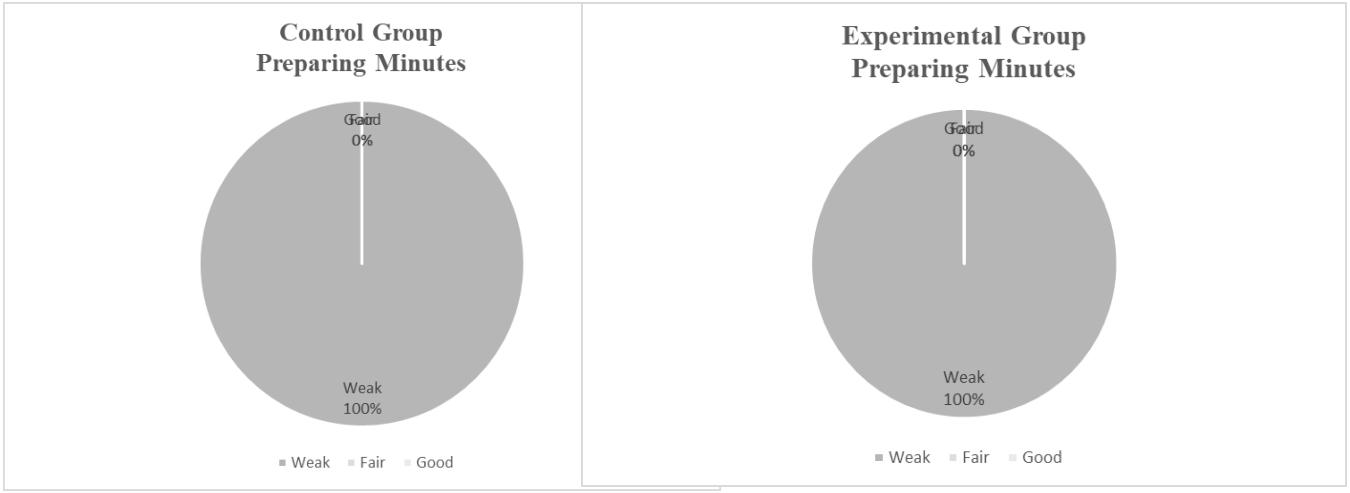

Figure 4. 5-Comparison over preparing minutes

In comparative charts, both groups were completely at same level with all of the subjects of both groups performing poor as shown in table 4.8 and 4.9.

4.2.6 Project Proposal Presentation

Rationale:

The proposal in any business matters a lot. In case of software industry, proposal of products, services and projects are very frequently used. A proposal is an idea of something or plan to do something. Typically proposal is presented in written form but it can be oral yet has to be formally presented using audio visual aids. The purpose of the proposal is to make the decision makers think about it and presenter tends to get their approval and favorable decision. In IT industry, project or product proposal is also a very common thing. IT professionals are required to prepare these proposals every now and

then. Numerous proposals get rejected by the decision makers or clients and die within the files. The ratio of approval of proposals is considered to be linked with how effectively proposal is prepared and presented rather than the actual idea itself. Proposal writing is assigned to almost everyone in the respondent group and it is ranked amongst those with high frequency.

Results:

Control Group Evaluation
Parameter: 6. Project Proposal Presentation

Summary

Weak	**20**
Fair	**5**
Good	**0**

Table 4.10
Performance over Project Proposal Presentation: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair						√	√	√	√	√															
Good																									

Experimental Group Evaluation
Parameter: 6. Project Proposal Presentation

Summary

Weak	**20**
Fair	**4**
Good	**1**

Table 4.11
Performance over Project Proposal Presentation: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					
Fair																					√	√	√	√	
Good																									√

The results, as given in table 4.10 and 4.11, were similar with most students getting the rating of 'Weak' others falling in the category of 'Fair'. Only 4% subjects from Experimental Group was marked 'Good'.

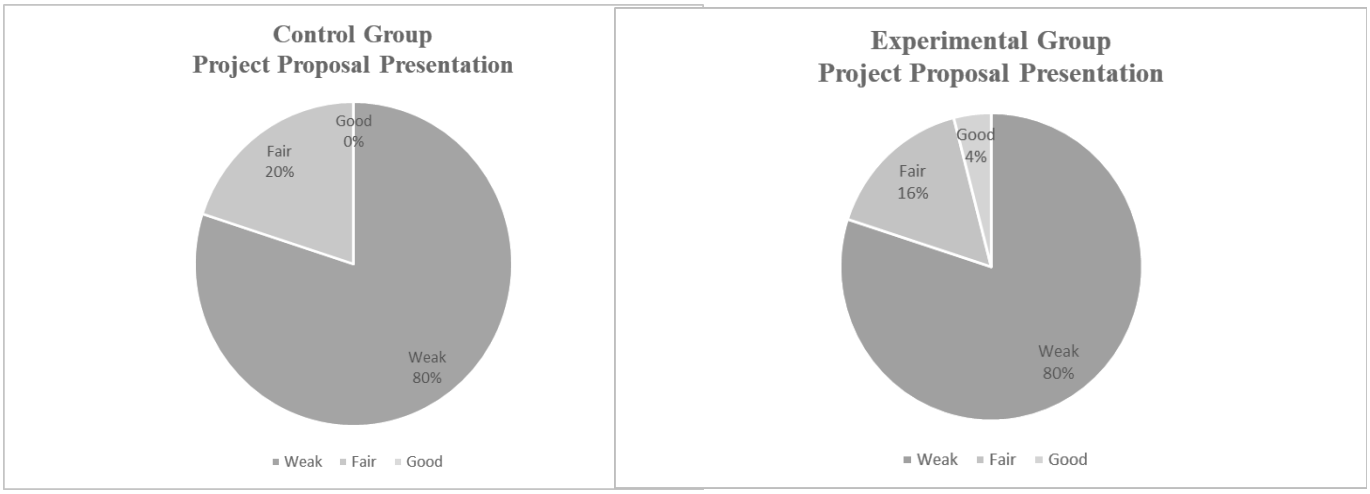

Figure 4. 6-Comparison over Project Proposal Presentation

The comparative charts showed similar trends between the two groups. Here, most of the subjects were much better at the pre-test level because they were taught about project proposal preparations from the very first semester.

4.2.7 Presenting Manuals

Rationale:

User Manuals in software are equally important as these are in a hardware. Manuals are read/presented to the clients/customers especially in a project that leads to a specific product. User manual (also referred to as user guide) is a technical document. It is intended to provide guidelines/assistance to common users on how to use the particular item/equipment. Since the software industry has brought itself with all the principles and terms, previously associated only with engineering (hardware/physical objects), the user manual applies to each software too. Using a software application correctly requires user manual, even if it is a video game. Therefore, for every project/product developed in the software house, there has to be a user manual. The job requires extensive work and since it is all about correctly using the software, only an IT professional is the appropriate choice for it. It is a fulltime job to write user manuals for a software. Even for video games, various

versions of user manuals are available on the Internet which are official as well as unofficial (written by users/fans on their own).

Results:

Control Group Evaluation
Parameter: 7. Presenting Manuals

Summary

Weak	**22**
Fair	**3**
Good	**0**

Table 4.12
Performance over Presenting Manuals: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			
Fair																							√	√	√
Good																									

Experimental Group Evaluation
Parameter: 7. Presenting Manuals

Summary

Weak	**18**
Fair	**7**
Good	**0**

Table 4.13
Performance over Presenting Manuals: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							
Fair																			√	√	√	√	√	√	√
Good																									

This parameter returned slightly better results by the Experimental Group. Overall, 12% students were ‘Fair’ and 88% were termed ‘Weak’ in the Control Group as shown in table 4.12. From Experimental Group, 28% subjects were ‘Fair’ and 72% were evaluated to be ‘Weak’ which is indicated in table 4.13.

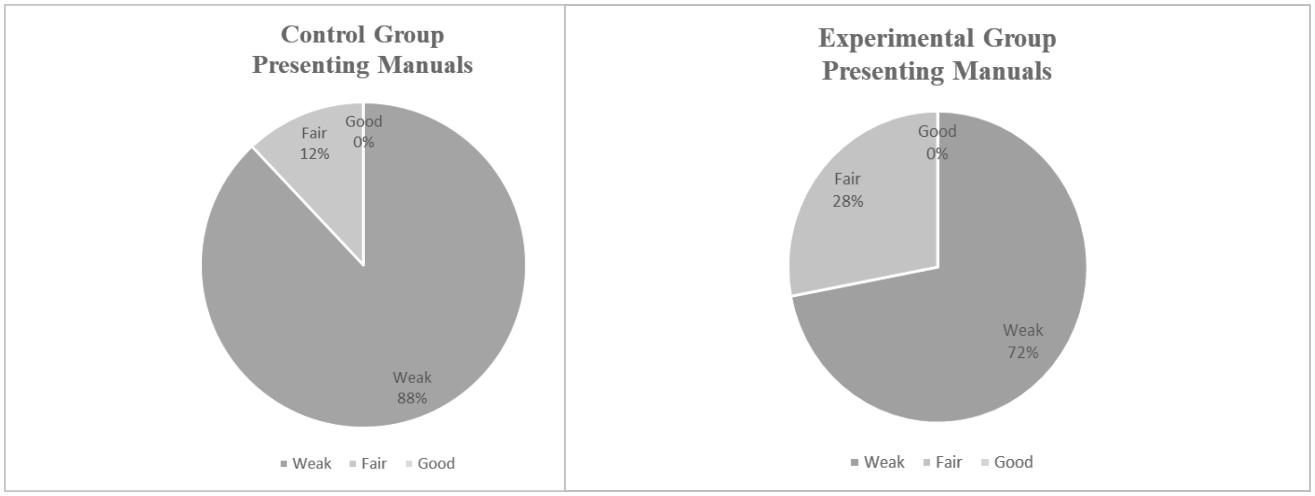

Figure 4. 7-Comparison over presenting manuals

The comparative results showed the very first instance of more diversion between the performance results of the two groups where Experimental Group got much better ratings. However, none from either group could get the rank 'Good'.

4.2.8 Technical Specifications Writing

Rationale:

Technical Specifications are the details of a product/application which are meant for technical persons. These are normally beyond the understandings of common people. Technical Specifications are made available with every product whether hardware or software and people today, are very smart to ask these specs whether they understand them or not. A learned technical expert with good speaking skills and knowledge, to transfer the information to the customer/client is very important. The term technical specifications is a mandatory short and brief document, usually written in tabular form. It comes in two types: one is prepared before preparation of a project/product, second is prepared once the product is ready to be marketed or handed over to the client. In first case, technical requirements are mentioned that the product/project must meet. This type of document is applicable at the time of project advertisements, tender documents; Request for Quotation (RFQs) and issuance of any technical contract. The other usage of technical specifications is common from the manufacturer/developer's side which is prepared upon completion of the project/product. This brief write up is a summary of the technical components of the

product mentioning each and every minute detail. In case of an ordered product, the client can easily match the technical specifications details provided by the developer with technical specifications demanded by the client at the time of start of the project. If the product is for general public (not for a targeted client), this document goes with the packing (normally the CD/DVD pack) and/or Internet. With the world becoming digital, people today are smarter than before and they are too much interested in technical specifications of every house hold equipment. For this purpose, IT professionals have found it to be a fulltime job to launch websites that offer technical specifications of popular hardware (equipment that range from house hold items, electronic equipment, computers and computing accessories etc) as well as most popular software ranging from PC applications, mobile software, games and even movies and songs etc.

Results:

Control Group Evaluation
Parameter: 8. Technical Specifications Writing

Summary

Weak	**15**
Fair	**9**
Good	**1**

Table 4.14
Performance over Technical Specifications Writing: Control Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										
Fair																√	√	√	√	√	√	√	√	√	
Good																									√

Experimental Group Evaluation
Parameter: 8. Technical Specifications Writing

Summary

Weak	**13**
Fair	**12**
Good	**0**

Table 4.15
Performance over Technical Specifications Writing; Experimental Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√												
Fair														√	√	√	√	√	√	√	√	√	√	√	√
Good																									

The technical specifications writing parameter was very important and for this task, subjects were already prepared from previous semesters. Only 60% subjects in Control Group were 'Weak' , 36% were 'Fair' and 4% got the highest rank of 'Good' as shwon in table 4.14. The Experimental Group also performed well with 52% subjects marked 'Weak', 48% were 'Fair'. No one from Experimental Group could get the 'Good' rank which is shown in table 4.15.

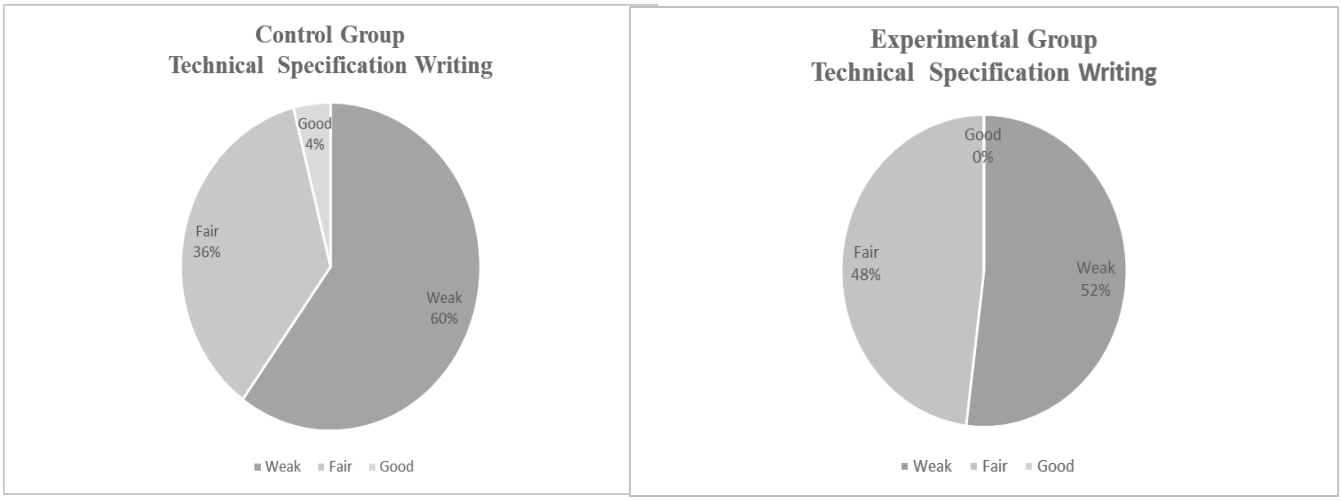

Figure 4. 8-Comparison over technical specifications writing

Although the comparative charts show zero 'Good' for Experimental Group against 4% 'Good' of Control Group but the rating of 'Weak' was asigned to almost equal subjects i.e. 60% from Control Group versus 58% from Experimental Group which meant that overall all the subjects were similar over this parameter as indicated in figure 4.8.

4.2.9 Tender Document

Rationale:

A Tender document is an open invitation to all vendors to file their bids against the information announced. It is a long process which starts with tender document preparation and ends when product/project is purchased. It takes several steps to complete the whole process of tender based project completion.

Although tender preparation is cumbersome task, its presentation to the potential clients is very critical as it needs full understanding of the project, tender rules; which are governed by Public Procurement Regulatory Authority (PPRA) and very good communication skills.

A Tender Document is formal and official way of announcing a project which may be service based or product based. Purchase of equipment also falls under this category. The document is an open invitation and it is purely legal document written in format as approved by Pakistan Procurement Regulatory Authority (PPRA). This document is difficult to write because it has to be not only technically correct, but its language must cover the legal terms as prescribed in PPRA guidelines. The documents takes days or weeks or sometimes, more than a month for preparation because once it is made public, i.e. announced on the Internet and/or newspaper, it becomes a legal liability on the firm announcing it. The document writing is therefore assigned to people who have a formal degree in the relevant field, are good at English language writing skills and know little bit about legalities in the country.

Results:

Control Group Evaluation
Parameter:9. Tender Document
Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.16

Performance over Tender Document: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Experimental Group Evaluation
Parameter:9. Tender Document

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.17
Performance over Tender Document: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Tender document preparation is not a very common task and it is left to the procurement sections in most of the organizations. It was natural that subjects would be totally unaware about this term and would eventually fall in the lowest category in evelaution. The results were exactly the same between the two groups and all of the subjects were completey blank to this task. Table 4.16 and 4.17 clearly shows that.

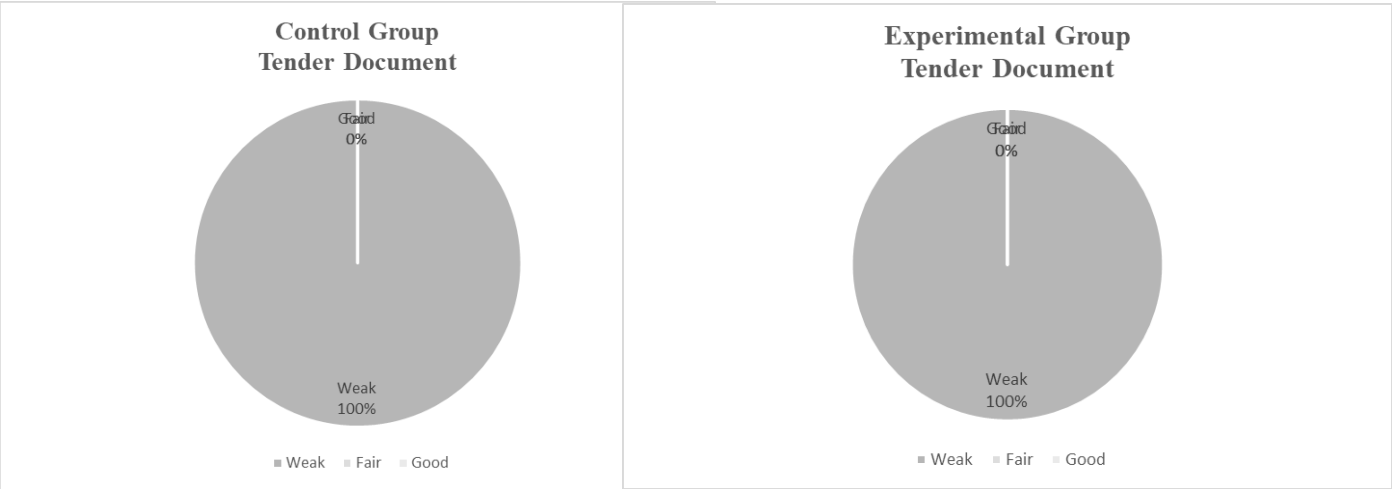

Figure 4. 9-Comparison over tender document

Figure 4.9 shows that comparison drawn between the two groups was easy to interpret as nothing was there to separate the two groups' subjects from one another.

4.2.10 Bids

Rationale:

Bids are the offered prices against which bidder agrees to provide certain products/items/services mentioned in the Tender document**.** In case of Free Lancing, bidding is the main step that decides in winning or losing a project. Against every tender, bids are made by the companies (software house in this case) offering their expertise and skill set to accomplish the advertised task against minimum expense/charges. Like a tender document, bid document is written in formal language covering technical and legal aspects under the guidelines of PPRA. Typically, large organizations have 'procurement departments' which handle this type of tasks but this team has dominating number of IT professionals.

In Pakistan, it is very common to see a tender process getting controversial resulting in defame of the bidder or the organization offering tender or in some cases, both of them. In majority of such cases, ill-intentions are not the cause rather this happens when inexperienced or incompetent people participate in the bidding process and at later stages when bid documents are scrutinized, errors are found and therefore objections are raised which normally result in disqualification. On average, such controversies are observed in every tender where firms/companies get disqualified at preliminary stage or later. More successful bidders are those who might compromise on the skills of bid presentation team but they are very strict on the selection of bid document preparation team. In Pakistan, the software industry is very profitable but there is also a cut-throat environment where winning/acquiring a project is considered as half the job done. When a failure is subjected to disqualification of a firm from the tender process, all eyes turn towards the bid preparation team due to which IT professionals who have not been prepared well for this kind of duty, are very reluctant to jump into it.

Results:

Control Group Evaluation
Parameter:10. Bidding

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.18
Performance over Bids Preparation: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Experimental Group
Evaluation
Parameter:10. Bidding

Summary

Weak	**25**
Fair	**0**
Good	**0**

Table 4.19
Performance over Bids Preparation: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fair																									
Good																									

Just like Tender documents, Bids obtained same results with all of the subjects in each group scoring rating of 'Weak' as shown in table 4.18 and 4.19. The term bidding was only heard about by some of the subjects but they had no idea how to prepare or present bids.

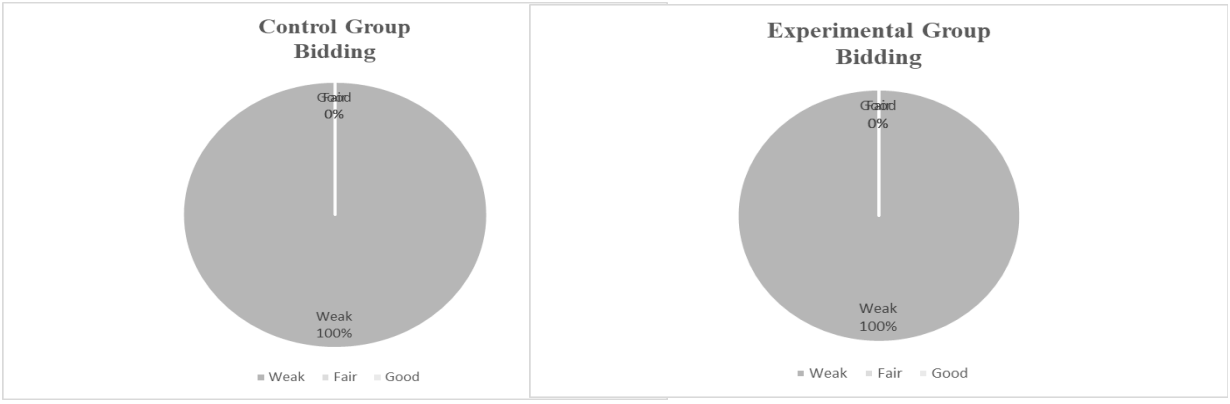

Figure 4. 10-Comparison over bids preparation

The comparative sketch, which is shown in figure 4.10, was again fairly simple with no score against ‘Fair’ or ‘Good’ by even a single subject in either group and all of them falling in the same category of ‘Weak’.

4.2.11 Project Introduction

Rationale:

The term Project is very broad in software industry. It may refer to preparing a software/application, it can be service oriented like computer network installation, layout design plan or server configurations etc. It can relate to simply the procurement of IT equipment or as large as development of whole solution; ERP which may take year(s) to complete.

The write-up of a project starts from university life of a computer science professional. In every degree program related to IT in Pakistan, a comprehensive Final Year Project of 6 credit hours is mandatory. The write up for a project starts from that project proposal. The final project report is a technical document that encompasses the whole project. At job, the write up means a very comprehensive and detailed report that covers each and every aspect of the project, written in formal way. It is meant to eliminate the need for the writer of the document to explain the terms to the chain of experts working on it. Such a detailed document requires very good writing skills as well as sound technical skills and updated knowledge of what is happening in IT industry with updated data bank.

The complete group of respondents confirmed that they were required to prepare the project reports on regular basis on job because it was a task that no person other than IT professional, could perform in this business.

Results:

Control Group Evaluation
Parameter:11. Project Introduction
Summary

Weak	**10**
Fair	**15**
Good	**0**

Table 4.2071

Performance over Project Introduction: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√															
Fair											√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Good																									

Experimental Group Evaluation
Parameter:11. Project Introduction

Summary

Weak	**13**
Fair	**12**
Good	**0**

Table 4.21

Performance over Project Introduction: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√												
Fair														√	√	√	√	√	√	√	√	√	√	√	√
Good																									

The word Project is very well known to most of the students in computer sciences. The outcome of the Project Introduction was expectedly better than some of the parameters which were totally new to the subjects. Although there was no one from either group to be termed 'Good', 60% subjects in Control Group were 'Fair' and 40% were 'Weak' indicated in table 4.20. From Experimentl Group, 48% subjects were marked average and 52% were 'weak' as shown in table 4.21.

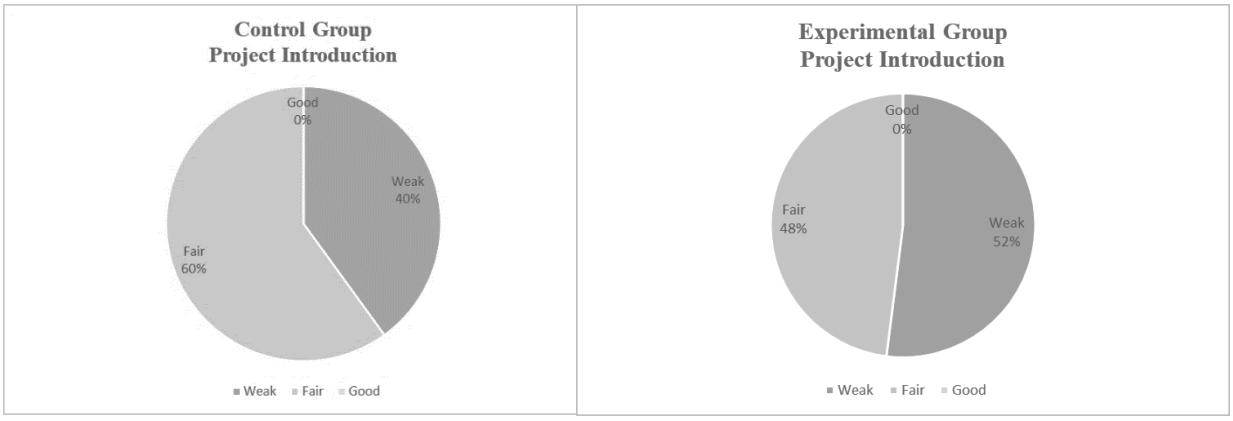

Figure 4. 11-Comparison over project introduction

As shown in the comparative charts in figure 4.11, results were slighlty seperated between the two groups and not as similar as in most of the other parameters. Control Group subjects were a little bit ahead of their counter parts.

4.2.12 Meeting with the Client

Rationale:

Meetings are frequent in some businesses and occasional in others. Software house falls in the former category. A software has virtually no physical existence, therefore changes in the interface/design are very frequent. The working of an application also gets several tweaks and upgrades during the course of the development apart from what happens after the deployment/installation of the application. All these processes are initiated by the clients/users whose requirements drive the need to make changes or upgrades. The formal way to discuss these requirements by the clients with the developers is through meeting. Another type of meeting is intra-organization meeting in which people from within the software house hold one-on-one sessions to discuss various issues. With digital media on rise, now the meeting types include several ways where physical presence of one or more members is not necessary.

The task of meeting with the client is taken as generic one, while not realizing that the nature of the business as well as the academic and financial status of the clients can change the way meeting is held. A client in a software industry is always an educated person because an uneducated person will never go for a software project. Even if he has to, he will always take someone with him who has little bit of knowledge about software. That accomplice becomes the temporary client and in this way, the interaction remains between educated personel from both sides. Such meetings are very formal and crititcal because the decisions taken in such meetings lay foundation of the project that is to be developed and little bit of misunderstanging may lead to software failure. A very proper training module is therefore required in this course.

It is important to note the aspect of client varies from business to business and focusing on clients with respect to the nature of business (for eample IT, civil works, services etc).

Results:

Control Group Evaluation
Parameter:12. Meeting with Client

Summary

Weak	**12**
Fair	**7**
Good	**6**

Table 4.22
Performance over Meeting with the Client: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√													
Fair													√	√	√	√	√	√	√						
Good																				√	√	√	√	√	√

Experimental Group Evaluation
Parameter:12. Meeting with Client

Summary

Weak	**15**
Fair	**5**
Good	**5**

Table 4.23
Performance over Meeting with the Client: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										
Fair																√	√	√	√	√					
Good																					√	√	√	√	√

Although formal training on meeting with the client is required, students are somewhat trained even before the training starts. This was the first parameter in which subjects were scoring heavily for the grade 'Good'. Table 4.22 shows these statistics. 24% subjects were found to be 'Good', 28% were 'Fair' and 48% were 'Weak' in the Control Group. In the Experimental Group, 20% were 'Good', 20% were 'Fair' and 60% were 'Weak' which is depicted in table 4.23.

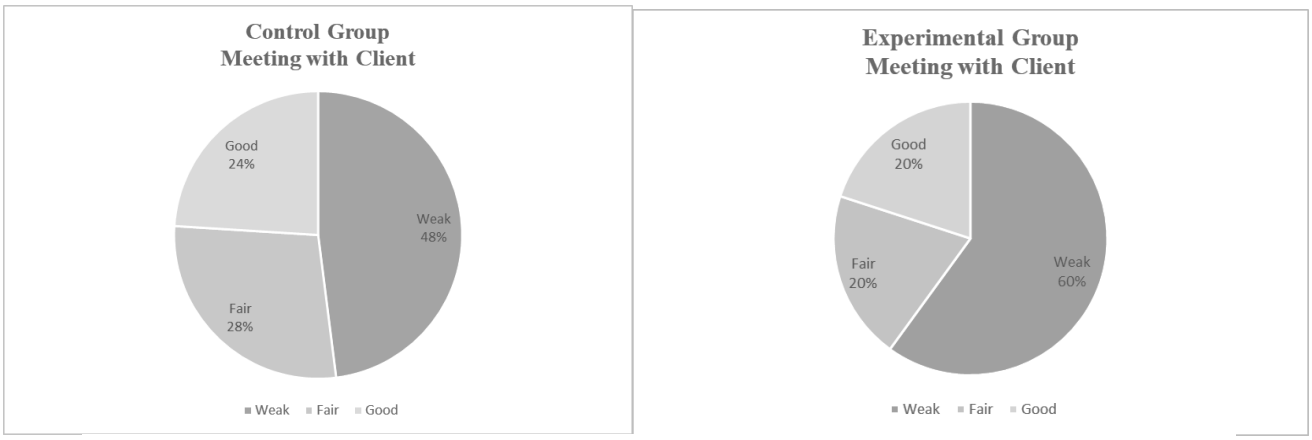

Figure 4. 12-Comparison over meeting with the client

The comparisons looked close and similar but Control Group edged passed Experimental Group in the 'Weak' category as the former's 48% subjects were weak against later's 60% subjects which is shown in figure 4.12.

4.2.13 Negotiation with Client

Rationale:

Negotiations with the clients is necessary for the success of a venture. In software industry, negotiation is more frequent because choices are made for each and every aspect as per clients' choice and in case the choice is not suitable or feasible as perceived by the developers, the team needs to negotiate for the change in choice. Also, the cost component needs several sittings with the clients at the start of the project, during the development process and even when it is handed over to the client due to additional changes/updates that may come in to the mind of the client at later stages.

Results:

Control Group Evaluation
Parameter:13. Negotiation with Client
Summary

Weak	**15**
Fair	**5**
Good	**5**

Table 4.24
Performance over Negotiating with the Client: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										
Fair																√	√	√	√	√					
Good																					√	√	√	√	√

Experimental Group Evaluation
Parameter:13. Negotiation with Client

Summary

Weak	**12**
Fair	**8**
Good	**5**

Table 4.25
Performance over Negotiating with the Client: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√													
Fair													√	√	√	√	√	√	√	√					
Good																					√	√	√	√	√

Once again, this parameter is the one which many students feel they are already well equipped with. This was evident in their performance as 20% subjects were ranked 'Good' and 20% were 'Fair' with 60% falling in the 'Weak' category in Control Group. Similarly, 20% were 'Good', 32% were 'Fair' and 48% were 'Weak' in the Experimental Group.

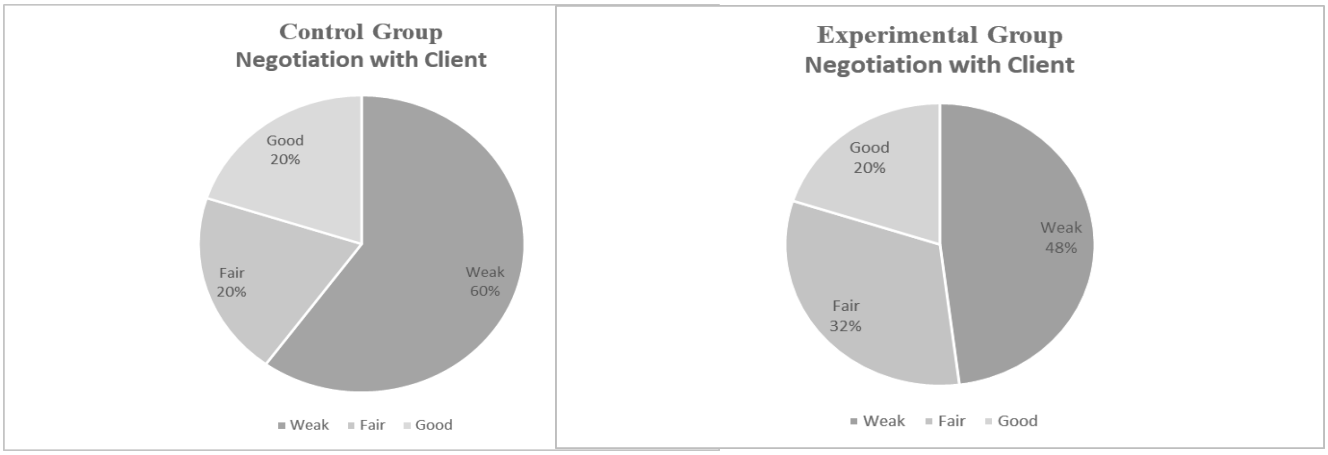

Figure 4. 13-Comparison over negotiating with the client

The comparison showed again close results but this time, slight advantage went in favor of Experimental Group whose 52% subjects were above the weakness level as compared to 40% subjects of Control Group who avoided 'Weak' rank as presented in figure 4.13. Table 4.24 and 4.25 show supporting stats.

4.2.14 Technical Support

Rationale:

Technical Support is something that was available way back in the history of business and commerce but was never highlighted in the marketing strategy. Nowadays, a company very proudly announces its team of technical support and works hard to make this assistance available 24 hours a day, 7 days a week, every week. The rapid growth of support on telephone is evident in Pakistan as more and more call centers are operational and for the very first time, these are providing telephonic technical assistance in Pakistan. Previously, this call center service was provided by Pakistani people to European and American public on behalf of foreign companies but now Pakistani businessmen are also adopting this service for their local customers. Similarly, software industry is providing this service to its local and international customers. The local customers are relatively easier to talk to because of no language barrier but for international customers/clients, the service provider has to be highly proficient at English as well technically competent. He has to be able to provide technical assistance on telephone in a professional manner because it may not be very easy to guide someone when the guide cannot see customer/client's computer screen. This becomes further tricky when the client is non-technical and some error/problem requires advanced level troubleshooting.

Results:

Control Group Evaluation
Parameter:14. Technical Support
Summary

Weak	**20**
Fair	**5**
Good	**0**

Table 4.2672

Performance over Technical Support: Control Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						√	√	√	√	√
Fair																√	√	√	√	√					
Good																									

Experimental Group Evaluation
Parameter:14. Technical Support

Summary

Weak	**17**
Fair	**8**
Good	**0**

Table 4.27

Performance over Technical Support: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√								
Fair																		√	√	√	√	√	√	√	√
Good																									

Technical Support was the parameter that exposed subjects weakness with 80% subjects of Control Group getting lowest rank of 'Weak' and 20% getting 'Fair' rank with no one getting 'Good' rating. In Experimental Group, 32% subjects were termed 'Fair' and 68% were 'Weak'. No one was considered 'Good' by the evaluators in this group as well.

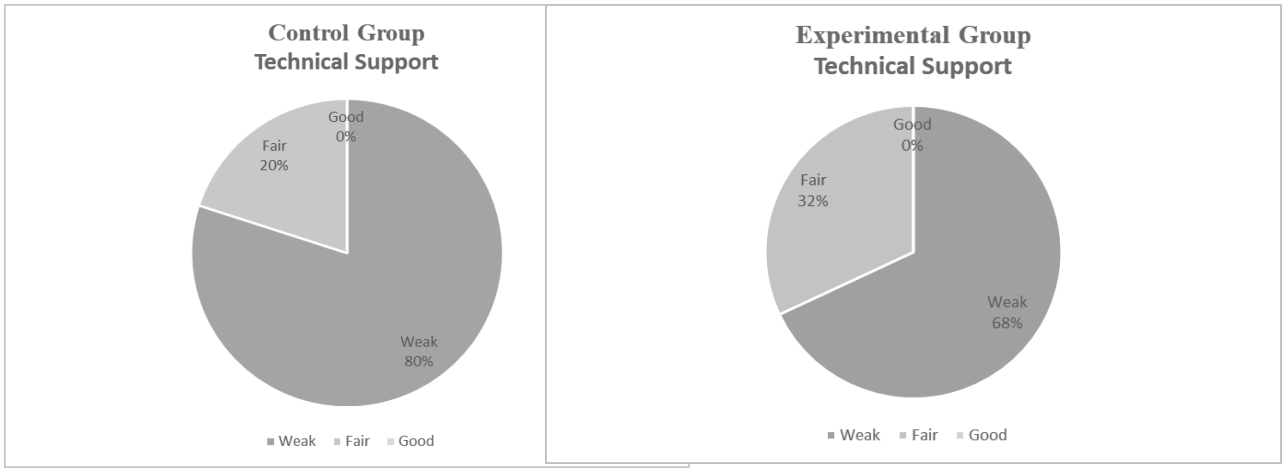

Figure 4. 14-Comparison over technical support

The comparisons, shown in figure 4.14, were similar with no one from either group getting highest rank of ‘Good’. Experimental Group was slighlty better but on the whole, almost equal performance was observed as data in table 4.26 and 4.27 indicate.

4.2.15 Communication using Digital Media

Rationale:

Communication using digital media is an obvious choice for inclusion in communication skills course these days. Email is arguably the most common mode of communication in the modern world. Gone are the days of regular mail and fax etc. Generally, all IT professionals are required to communicate with their business clients, peers, team lead, managers etc, via email. The trend of email thread has added the correspondence history so handy that professionals feel it very convenient to overview the past record. Also, emails are very easy to forward to others especially the mode of ‘carbon copy’ and ‘blind carbon copy’. These aspects have made emails de facto choice of official correspondence and every professional has to prepare/write emails.

Similarly, Video Conference is one of the most convenient modes of meeting especially when people are very busy and don’t have time to physically move outside their office. This mode of meeting was initially used for inter – country or inter – city communication only but now it is a norm to use it for inter – organization meetings even when the companies are situated near to one another. The high speed Internet in the country and its low cost is one of the driving forces and with camera available in most of the devices like laptops, mobiles, tables etc, it is economical and fast way of communication. Most of the organizations follow hybrid approach in which available members visit the meeting location and some persons join the session via video conference.

Conference Call is much like video conference with a difference of audio only, in the former and the later facilitates with live video as well. It is much older technology and was available before the Internet and mobile phones era. Now, it is much easier and economical for multiple groups/teams working on a project, especially which has been divided into modules, to communicate via conference calls. Communication with clients is also made using this technology but in IT field, it is more frequently used between the

developers. However, in case of arbitration over dispute between the IT company and the client, this mode is used with legal advisor being the third party.

All these aspects together make very strong case for inclusion of the topic of communication using digital media.

Results:

Control Group Evaluation
Parameter:15. Communication using Digital Media

Summary

Weak	**19**
Fair	**4**
Good	**2**

Table 4.28
Performance over Communication using Digital Media: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						
Fair																				√	√	√	√		
Good																								√	√

Experimental Group Evaluation
Parameter:15. Communication using Digital Media

Summary

Weak	**21**
Fair	**2**
Good	**2**

Table 4.29
Performance over Communication using Digital Media: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					√	√	√	√	√	√
Fair																√	√								
Good																		√	√						

Table 4.28 shows that the results of use of digital media for communication were surprisingly very poor as 76% subjects were termed ‘Weak’ from Control Group and only 16% were ‘Fair’ and 8% got ‘Good’ ranking. Similarly, 84% subjects were found to be ‘Weak’ in Experimental Group and only 8% were ‘Fair’ and 8% were ‘Good’ which is

presented in table 4.29. The major drawback identifined by the evaluatiors was not the inability to use technology but it was the factor of effective communication missing from their practices.

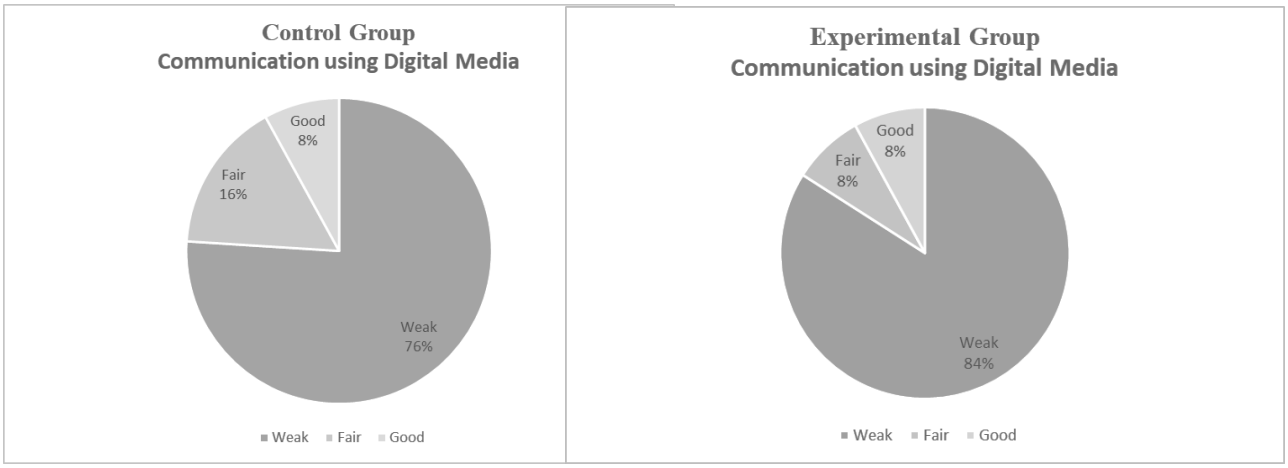

Figure 4. 15-Comparison over communication using digital media

The comparison, given in figure 4.15, was again close with majority of the subjects in both groups deemed 'Weak' but the slight better results belonged to the Control Group. However, the 'Good' rank was won by equal number of subjects from the two groups i.e. 8% each.

4.2.16 Communication on Social Network

Rationale:

The term social media is new as compared to older concepts of print and electronic media in which the term electronic media was conventionally confined to television and radio only. When computer and later Internet were introduced in the media, a new term social media was originated which engulfed Facebook, Twitter, Linked-In, Instagram and WhatsApp etc. This media is not only free to use (user pays for Internet connection only), it is instant and has global coverage which makes it the best way although its availability in poor countries or parts of a country where electricity, internet and mobile coverage is not provided, makes its effectiveness nil. The use of this technology in software industry is also an obvious choice because this is something that has originated from computer science and major part of successful marketing relies on social media. One of most

important features of communication on social media is the tracking of previous communication and threads which creates chain of all correspondences that can be used later on, at any stage.

Formal training on how to communicate on social networks is mandatory. It was therefore included in the pre-test evaluation and in the treatment phase.

Results:

Control Group Evaluation
Parameter:16. Communication on Social Network
Summary

Weak	**14**
Fair	**11**
Good	**0**

Table 4.30
Performance over Social Network: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√											
Fair															√	√	√	√	√	√	√	√	√	√	√
Good																									

Experimental Group Evaluation
Parameter: 16. Communication on Social Network
Summary

Weak	**10**
Fair	**15**
Good	**0**

Table 4.31
Performance over Social Network: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√															
Fair											√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Good																									

Every subject was very ethuusiastic over this parameter but when test was conducted, results were disappointing for the subjects as well as the evaluators because no one was considered ‘Good’ from either side. The performance was however better than the communication on digital media because today’s youth is more used to spend time on social networking sites. The problem remained the same as the subjects were not up to the marks when formal communication on social networking sites was evalauted. According to table 4.30 and 4.31, 56% subjects were ‘Weak’ and 44% were ‘Fair’ in Control Group where as 40% were ‘Weak’ and 60% were ‘Fair’ in the Experimental Group. No one from either group was ‘Good’.

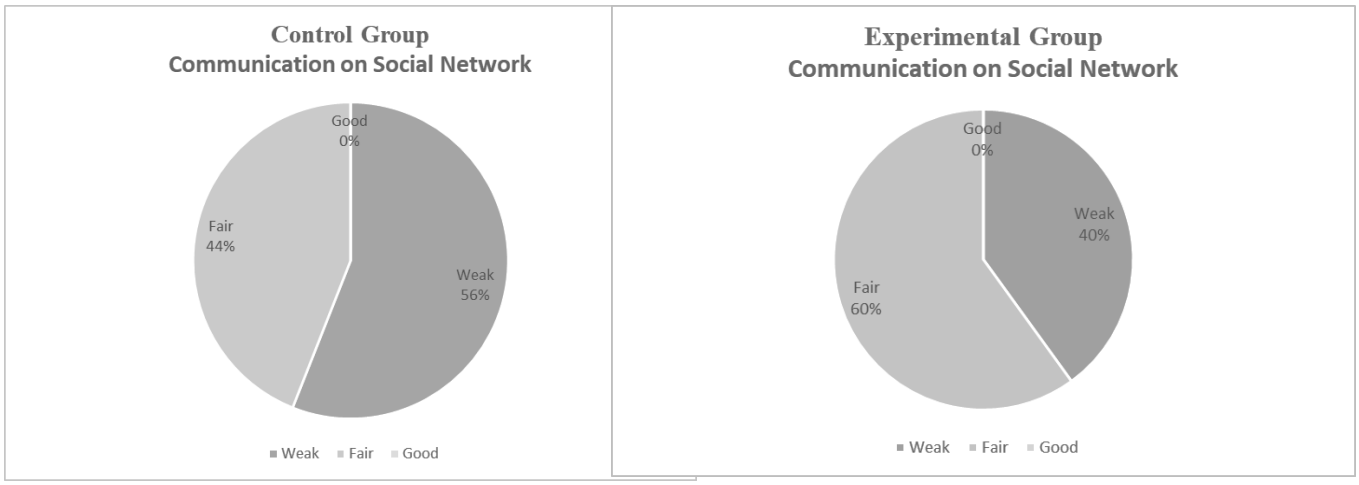

Figure 4. 16-Comparison over social network

Figure 4.16 shows comparisons which were similar with no ‘Good’ performance from either side. Slight difference between the two went in favor of Experimental Group where more subjects were categorized as ‘Fair’.

4.2.17 Business Promotion on Social Media

Rationale:

The current era is also called digital era due to everything converted into soft mode and made available on the Internet. The marketing and advertising strategies have changed completely. The conventional paper and electronic media is still alive but for the purpose of promotion of a product, one must not ignore the Internet. Every product has to be presented and/or promoted on website. With Facebook, Twitter and Linked-in growing in

numbers for members and users, anything placed on social media is guaranteed to reach millions of people all over the world in an instant and all this, virtually without any payment. No one knows the importance of business promotion on social media better than the IT graduate. It would be shocking to know if a software house is not indulging into social media for its business promotion.

The art of promoting a product or service on Internet media is different from that on other media. The topic that polishes students' communication skills in this aspect is another mandatory one, therefore it was added in the new course and subjects were evaluated for it.

Results:

Control Group Evaluation
Parameter:17. Business Promotion on Social Media

Summary

Weak	**22**
Fair	**3**
Good	**0**

Table 4.32

Performance over Business Promotion on Social Media: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			
Fair																							√	√	√
Good																									

Experimental Group Evaluation
Parameter:17. Business Promotion on Social Media

Summary

Weak	**20**
Fair	**4**
Good	**1**

Table 4.33
Performance over Business Promotion on Social Media: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Weak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					
Fair																					√	√	√	√	
Good																									√

The results for this one were once again exposing the weakness of all the subjects with 88% subjects in the Control Group falling in the lowest category of 'Weak' and only 12% managing to reach 'Fair' level which is shown in table 4.32. No one was 'Good' in this Control over this variable/parameter. In Experimental Group which is shown in table 4.33, 80% subjects were 'Weak' and 16% reached 'Fair' level. 4% subjects from this group succeeded in getting 'Good' rank.

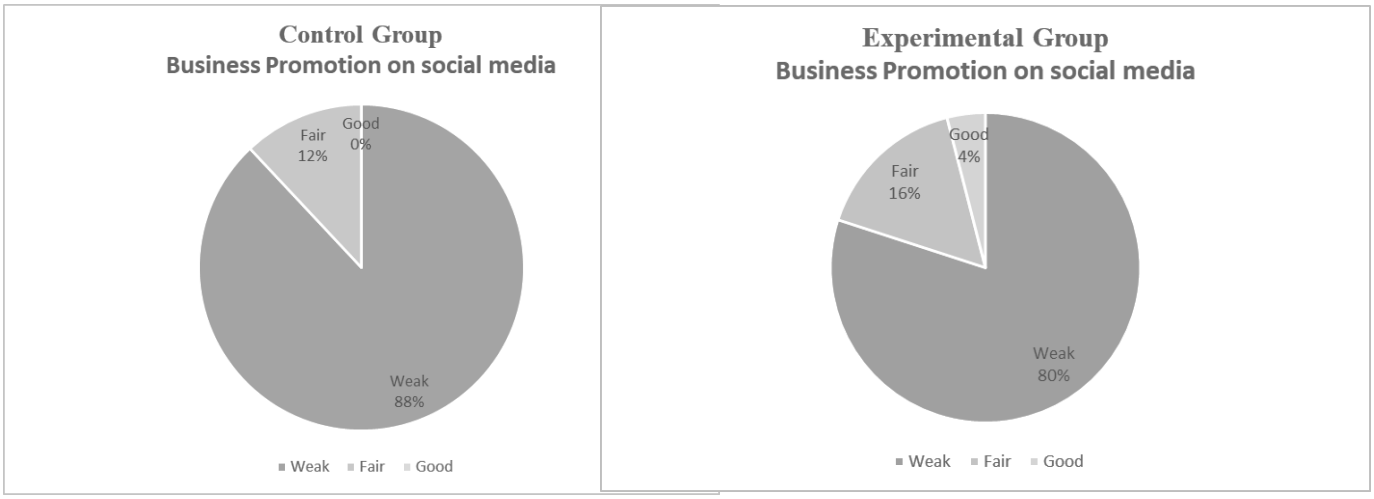

Figure 4. 17-Comparison over business promotion on social media

Figure 4.17 represents the comparison of final in which, variable/parameter drew similar results with majority of the subjects from each group getting lowest ranking. The 'Fair' rank was awarded to almost same number of subjects. The only difference was the 4% subjects from Experimental Group who got 'Good' rank against zero number of subjects from their counterparts.

4.3 Cumulative Results

The cumulative results between the two groups after completion of pre-test showed very close results as shown in table 4.34. The Control Group's 75.76% subjects were 'Weak' versus 73.18% subjects of Experimental Group, 19.76% subjects of Control Group were marked 'Fair' against 22.35% subjects from Experimental Group and finally, 4.47% subjects were rated 'Good' from each group.

Table 4.34
Comparison over Score out of 100

Control Group			Experimental Group		
Weak	**Fair**	**Good**	**Weak**	**Fair**	**Good**
75.76%	**19.76%**	**4.47%**	**73.18%**	**22.35%**	**4.47%**

The table 4.34 shows the breakdown of percentage in Control Group as well in Experimental Group out of 100.

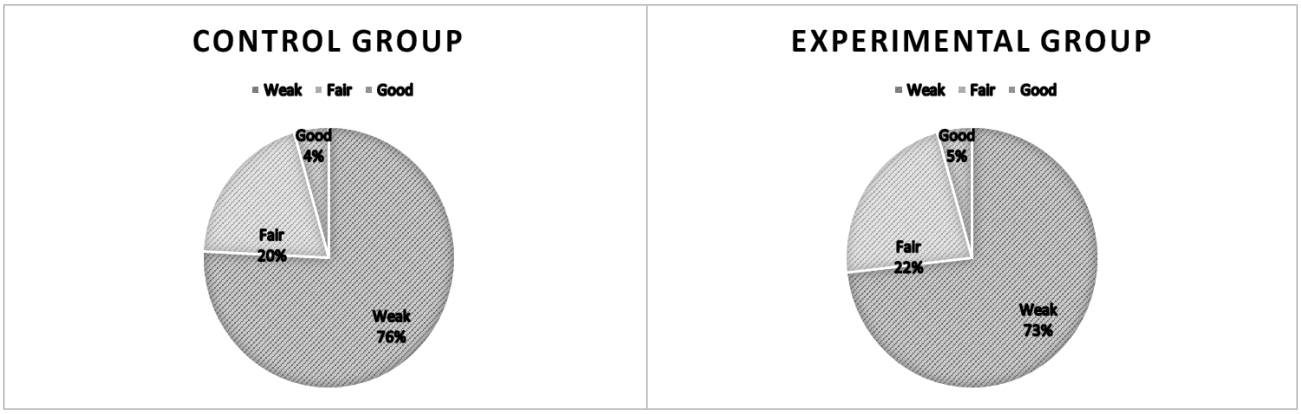

Figure 4. 18-Comparison over cumulative performance

The comparative charts in figure 4.18, show very close performance in pre-test by both groups. The similarity in performance measures validated the homogeneity between the two groups.

4.4 Analysis and Results (Post - Test)

After thirty two hours of teaching (treatment phase), both Control Group and Experiment Group were evaluated by the team/panel of employers who participated in the pre – experiment evaluation. The control group represented the students who had studied the same communication skills course that their seniors studied, who graduated from

NUML and had worked or were currently working in the software house of the employers/evaluators.

The evaluators took their time to evaluate both groups, they spent equal time on both the groups. It was up to the evaluators to evaluate the students as per their own criteria and they were allowed to do so in groups of subjects or on individual basis or combination of these. The panel asked the subjects to present their class projects before audience of three categories:

i. Technical experts/teachers
ii. Technical students
iii. Teachers & Students who were non-technical.

These three arbitrary categories were created to evaluate how these subjects would change their speech, choice of words and adjust to mixture of technical details and non-technical aspects in accordance to the audience category. This mode of evaluation was particularly adopted by the panel on request of the computer science department who had been pointing out this problem in the past that students fail to adopt to their language and speech according to the change in the audience type and they act monotonously during events like Open House, national level competitions (final year project based) etc.

Once evaluation was completed, next step was to document their evaluation in quantitative manner. The evaluators' panel was given questionnaire I which was brief as compared to previous ones and it was to observe any improvements in the students of control group and experimental group. The response of the panel was further clarified by the interview session that was conducted individually for each respondent/evaluator after the submission of the questionnaire. This further explained the narrative of the evaluators.

The questionnaire contained three choice against seventeen parameters. For the three choices, each vote against '***Not Improved*** was awarded one point, for the option of '***Slightly Improved***', two points were given and for each '***Significantly Improved***' selection, three points were added in the total. Total points against each of the seventeen parameters were calculated for control group and experimental group and the totals were compared using t-test method.

4.4.1 Questionnaire II

The questionnaire II comprised of 17 parameters against which, three options of '***Not Improved***', '***Slightly Improved***' and '***Significantly Improved***' were given as choices to pick from. Table 4.35 shows comparison between the two groups at post test phase.

Table 4.3573
Post-test Comparison over all parameters between the two groups

		CONTROL Group (Old Course)			**EXPERIMENTAL Group (new course)**		
Sr	**Parameter**	**Not improved**	**Slightly improved**	**Significantly Improved**	**Not improved**	**Slightly improved**	**Significantly Improved**
	Marks	**1**	**2**	**3**	**1**	**2**	**3**
1	Technical Specifications	**5**	**18**	**2**	**0**	**15**	**10**
2	Memo	**0**	**10**	**15**	**0**	**5**	**20**
3	Letter	**0**	**0**	**25**	**0**	**0**	**25**
4	Preparing & Presenting Agenda	**10**	**15**	**0**	**3**	**7**	**15**
5	Preparing Minutes	**10**	**15**	**0**	**0**	**13**	**12**
6	Project Proposal Presentation	**20**	**5**	**0**	**0**	**10**	**15**
7	Presenting Manuals	**20**	**5**	**0**	**0**	**10**	**15**
8	Technical Specifications	**15**	**5**	**0**	**0**	**8**	**17**
9	Tender	**25**	**0**	**0**	**0**	**12**	**13**
10	Bids	**25**	**0**	**0**	**0**	**12**	**13**
11	Project Introduction	**5**	**15**	**5**	**2**	**15**	**8**
12	Meeting with Client	**12**	**13**	**0**	**2**	**10**	**13**
13	Negotiation with Client	**15**	**10**	**0**	**0**	**6**	**19**
14	Technical Support	**20**	**5**	**0**	**0**	**10**	**15**
15	Communication using Digital Media	**5**	**17**	**3**	**0**	**4**	**21**
16	Communication on Social Network	**14**	**11**	**0**	**0**	**4**	**21**
17	Business Promotion on social media	**22**	**3**	**0**	**1**	**8**	**16**

Total eight evaluators were included in the evaluation panel which participated in the post – test evaluation. For the sake of uniformity, same panel of evaluators was given the evaluation duties for both groups i.e. control and experimental. Table 4.35 shows the evaluation results with evaluators giving their verdict against each of the seventeen

parameters for the three choices for each student (subject) in each group. Interestingly, the option of 'Not Improved' was picked against only nine instances of students in experimental group as compared to control group whose 223 instances of students fall in this category. In other words, 52.5% of the control group instances were marked '*Not Improved*' versus only 1.88% of experimental group i.e. almost all of the instances of students were deemed improved in experimental group.

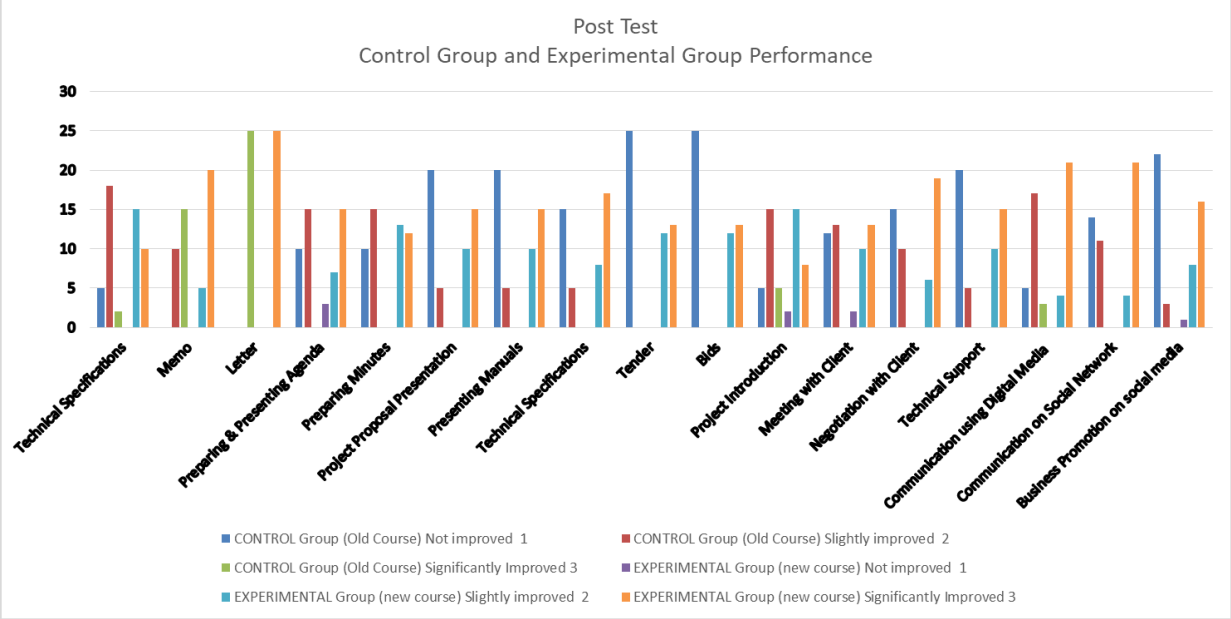

Figure 4. 19-Comparison over post-test performance of both groups

The Graph in Figure 4.19 shows a complete comparison of all instances of control group and experimental group.

Following is the breakdown of the results of the post – test evaluation by the evaluation panel with comparison between control group and experimental group.

4.4.2 Result and Analysis: Technical Specifications Presentation

Technical specifications are not a straight forward document to present to the client. Its preparation may be slightly easier because it mainly requires a template to be filled but its presentation is a bit tricky. Both the courses prepared subjects well for this aspect and therefore the results showed improvements in students of both groups but the experimental group had edge over their competitors as the number of 'significant improvement' in experimental group was five times better.

Experimental Group Evaluation
Parameter: 1. Technical Specifications Presentation

Summary

Not improved	**0**
Slightly improved	**15**
Significantly Improved	**10**

Control Group Evaluation
Parameter: 1. Technical Specifications Presentation

Summary

Not improved	**5**
Slightly improved	**18**
Significantly Improved	**2**

Table 4.36
Post-test Performance over Technical Specifications Writing: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved		√				√	√						√		√										
Slightly improved	√			√	√				√	√	√	√		√		√	√	√	√	√	√	√	√	√	√
Significantly Improved			√					√																	

Table 4.37
Post-test Performance over Technical Specifications Writing: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved																									
Slightly improved						√	√	√	√	√	√	√		√		√	√	√	√	√	√	√			
Significantly Improved	√	√	√	√	√								√		√								√	√	√

A brief comparison in tables 4.36 and 4.37 shows the ‘significant improvement’ in experiment group was much more prominent (by five times) and by going through formal training, no one was marked un-improved in the experimental group in contrary to control group which had 20% students un-improved. Figure 4.20 shows these comparisons in graphical form.

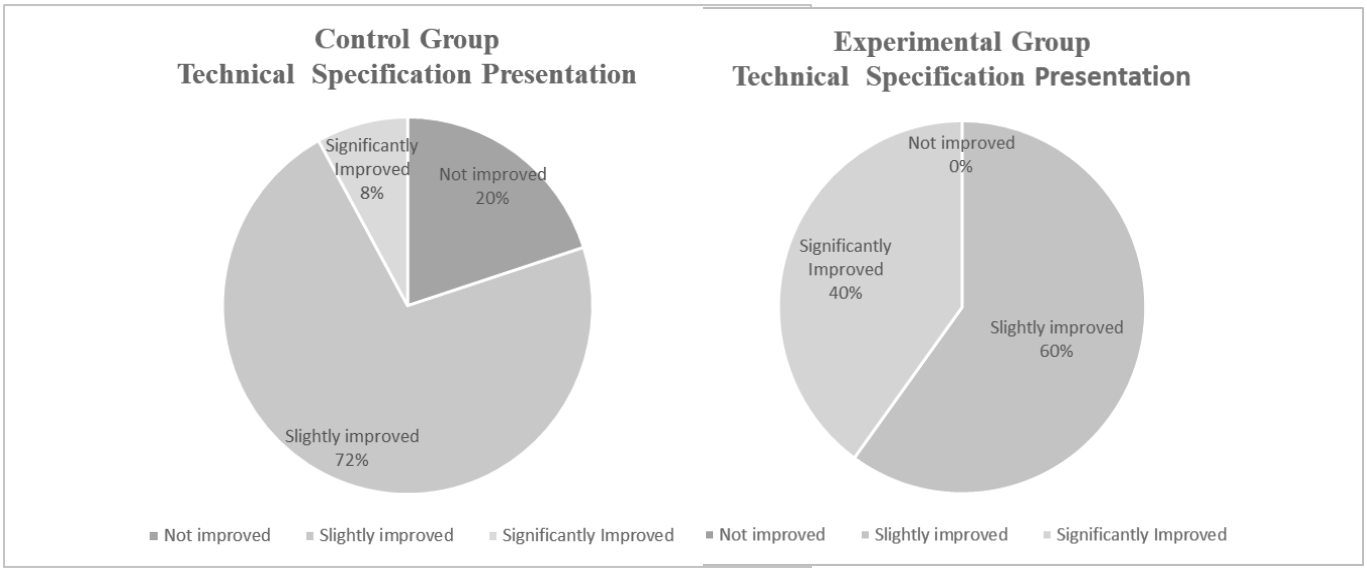

Figure 4. 20-Post-test comparison over technical specifications writing

4.4.3 Result and Analysis: Memo

Control Group Evaluation
Parameter: 2. Memo

Summary

Not improved	**0**
Slightly improved	**10**
Significantly Improved	**15**

Table 4.38
Post-test Performance over Memo: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved																									
Slightly improved											√	√		√		√		√		√	√	√	√	√	
Significantly Improved	√	√	√	√	√	√	√	√	√	√			√		√		√		√						√

Experimental Group Evaluation
Parameter: 2. Memo

Summary

Not improved	**0**
Slightly improved	**5**
Significantly Improved	**20**

Table 4.39

Post-test Performance over Memo: Experimental Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved														√		√	√	√	√						
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√		√					√	√	√	√	√	√

The office memorandum is slightly easier task and goes with the major duties. This is one of the activities that everybody performs without giving any considerable importance. Inclusion of Memo preparation in software industry environment brought little bit of improvement as most the graduates (previously) were prepared for it in generic way and they adopted to the changes that were required in IT jobs. Tables 4.38 and 4.39 present the stats where both groups improved a lot but in comparison, as shown in figure 4.21, the experimental group was dominant.

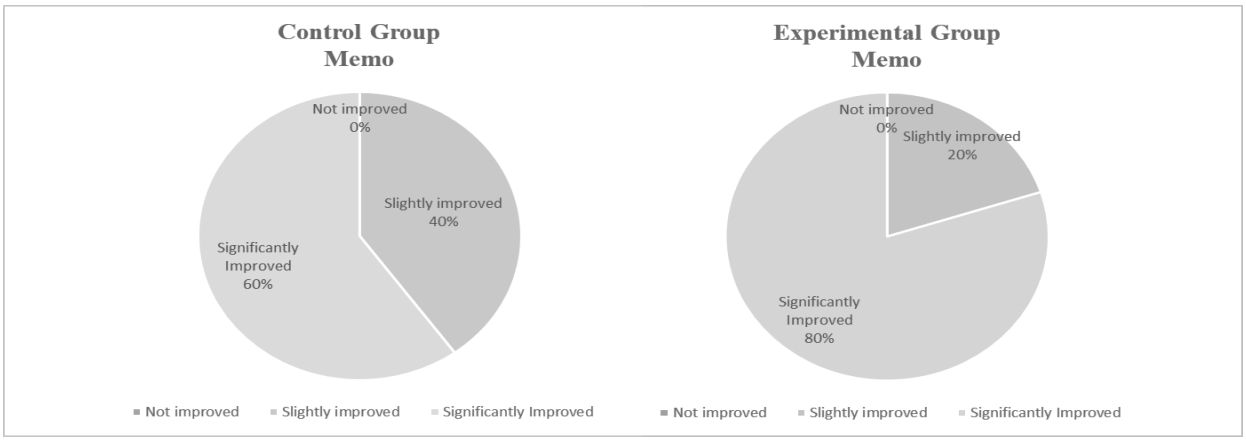

Figure 4. 21-Post-test comparison over memo

4.4.4 Result and Analysis: Letter

Control Group Evaluation
Parameter: 3. Letter

Summary

Not improved	**0**
Slightly improved	**0**
Significantly Improved	**25**

Table 4.40

Post-test Performance over Letter: Control Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved																									
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Experimental Group Evaluation
Parameter: 3. Letter

Summary

Not improved	**0**
Slightly improved	**0**
Significantly Improved	**25**

Table 4.41

Post-test Performance over Letter: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved																									
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

The letter writing has been a weak point for most of the Pakistani graduates in technical fields. The area is already being worked upon to a high degree but it always comes up with 'improvements required'. Although the pre – test evaluation earned average or better, further improvements were observed after the test and all subjects from both groups showed significant improvement. It was a rare attribute that brought exactly the same results with both groups securing highest rank in evaluation as shown in tables 4.40 and 4.41. The comparison shown in figure 4.22 is two identical pie charts for this parameter.

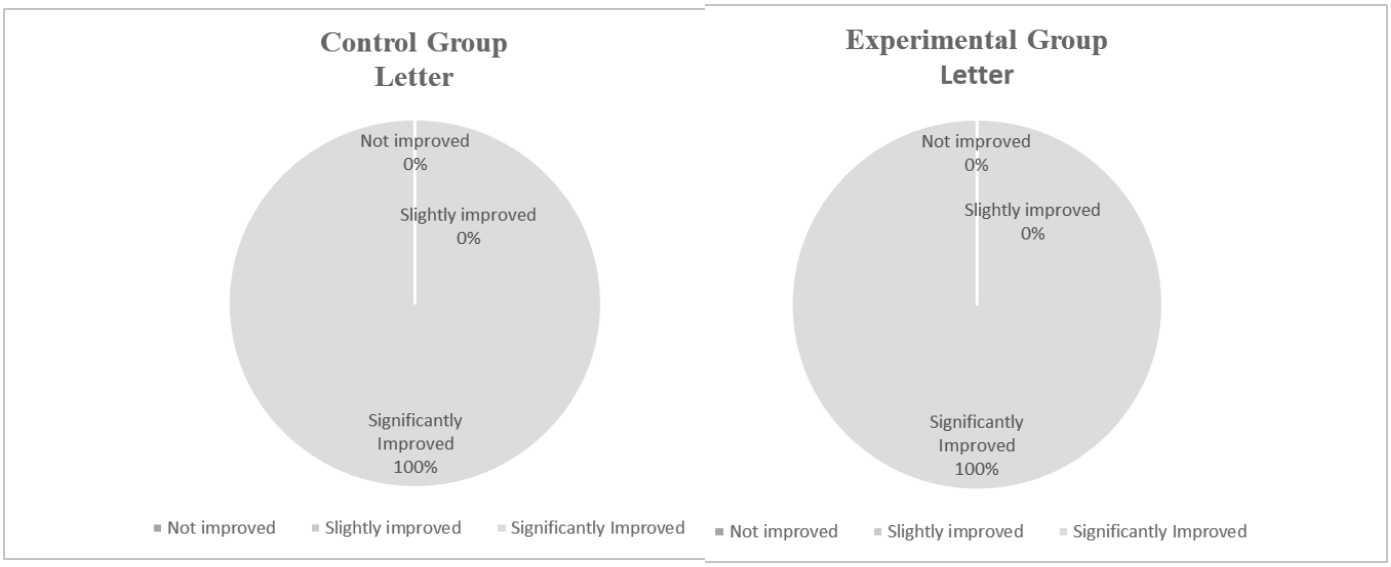

Figure 4. 22-Post-test comparison over letter

4.4.5 Result and Analysis: Agenda

Control Group Evaluation
Parameter: 4. Preparing & Presenting Agenda

Summary

Not improved	**10**
Slightly improved	**15**
Significantly Improved	**0**

Table 4.42

Post-test Performance over Preparing & Presenting Agenda: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√								√		√								√	√	√
Slightly improved						√	√	√	√	√	√	√		√		√	√	√	√	√	√	√			
Significantly Improved																									

Experimental Group Evaluation
Parameter: 4. Preparing & Presenting Agenda

Summary

Not improved	**3**
Slightly improved	**7**
Significantly Improved	**15**

Table 4.43

Post-test Performance over Preparing & Presenting Agenda: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved							√	√	√																
Slightly improved	√	√												√		√	√	√	√						
Significantly Improved			√	√	√	√				√	√	√	√		√					√	√	√	√	√	√

The agenda point's preparation is more of a communication skills topic than computing but in an IT organization, the agenda point differs from that in a typical business environment. Agenda point's preparation earned mixed evaluation with no significant improvement in Control Group as compared to 60% from Experimental Group. Slight improvement went to 60% of the Control Group subjects and 28% from the Experimental Group. 40% subjects did not improve in the Control Group as compared to 12% from the Experimental Group as shown in tables 4.42 and 4.43.

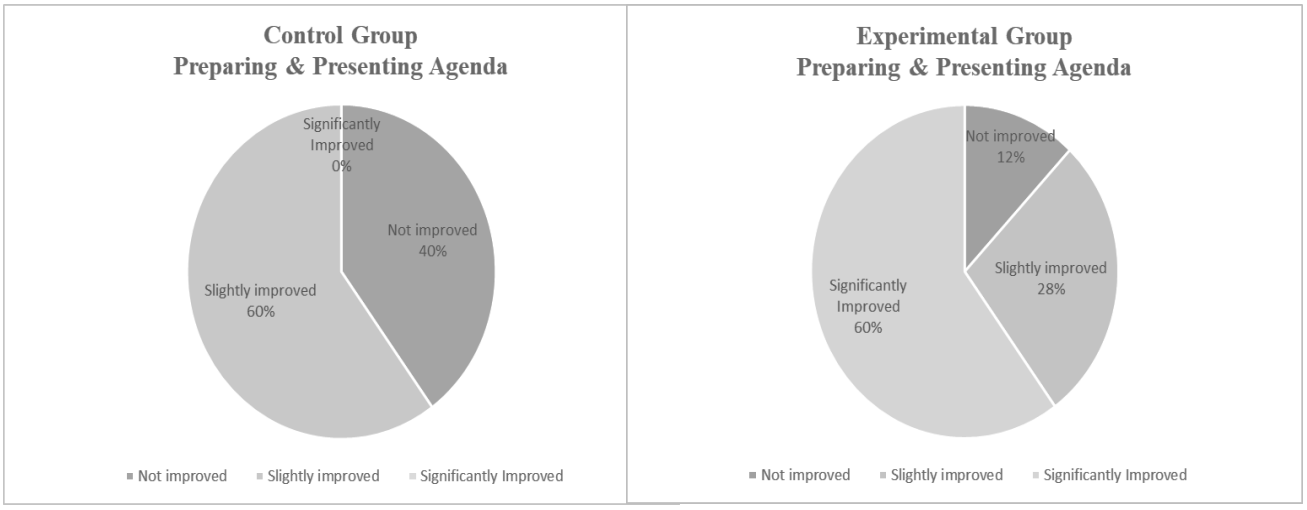

Figure 4. 23-Post-test comparison over preparing & presenting agenda

Figure 4.23 demonstrates the difference between the two groups in agenda preparation and presentation.

4.4.6 Result and Analysis: Minutes

Control Group Evaluation
Parameter: 5. Preparing Minutes

Summary

Not improved	**10**
Slightly improved	**15**
Significantly Improved	**0**

Table 4.44
Post-test Performance over Preparing Minutes: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√								√		√								√	√	√
Slightly improved						√	√	√	√	√	√	√		√		√	√	√	√	√	√	√			
Significantly Improved																									

Experimental Group Evaluation
Parameter: 5. Preparing Minutes

Summary

Not improved	**0**
Slightly improved	**13**
Significantly Improved	**12**

Table 4.45
Post-test Performance over Preparing Minutes: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved	√	√					√	√	√					√		√	√	√	√				√	√	√
Significantly Improved			√	√	√	√				√	√	√	√		√					√	√	√			

Meeting minutes are required when a formal meeting is held. It is always useful to prepare meeting minutes immediately after the session is over to ensure every point is documented for further processing. The process is formal and formal acts always need proper training and guidance.

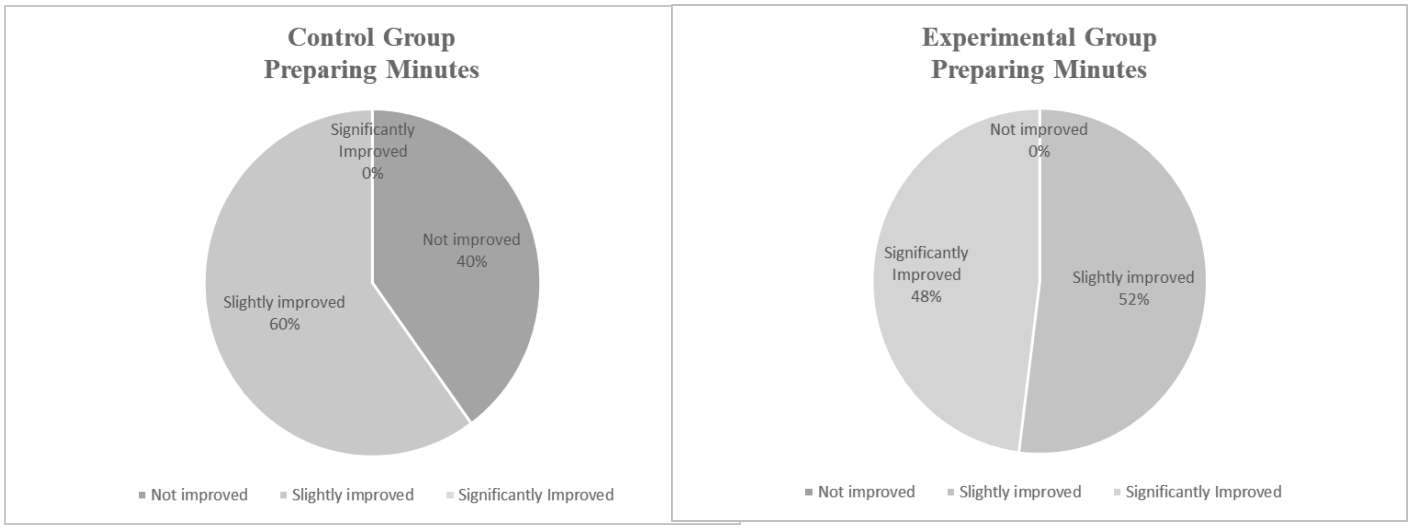

Figure 4. 24-Post-test comparison over preparing minutes

As shown in figure 4.24, Experimental Group was clear winner once again as all of the subjects improved with 52% improving a little bit and 48% improved significantly where as 40% subjects from Control Group could not improve at all, 60% improved slightly and no one was termed good. These statistics are presented in tables 4.44 and 4.45.

4.4.7 Result and Analysis: Proposal

Control Group Evaluation
Parameter: 6. Project Proposal Presentation

Summary

Not improved	**20**
Slightly improved	**5**
Significantly Improved	**0**

Table 4.46

Post-test Performance over Project Proposal Presentation: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Slightly improved						√	√	√	√	√															
Significantly Improved																									

Experimental Group Evaluation
Parameter: 6. Project Proposal Presentation

Summary

Not improved	**0**
Slightly improved	**10**
Significantly Improved	**15**

Table 4.47

Post-test Performance over Project Proposal Presentation: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved	√	√					√	√	√					√		√	√	√	√						
Significantly Improved			√	√	√	√				√	√	√	√		√					√	√	√	√	√	√

Proposal writing is newer term for computer science students and generally they come to know about it during university studies. Writing for proposal is trained under the courses of 'technical and business writing' as well as 'communication skills.' The overall performance of our graduates under this parameter was average or below (poor) but after training, 60% subjects improved significantly, 40% improved a bit and no one returned results without improvements in the Experimental Group as shown in tables 4.46 and 4.47. On the other hand, again, no subject managed to get significant improvement rather only

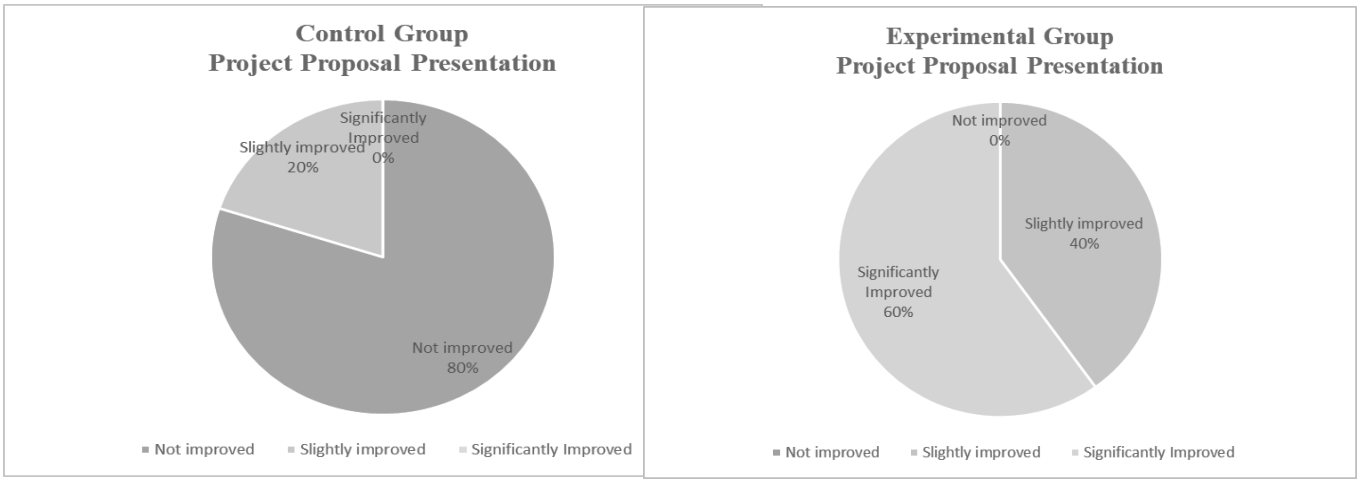

Figure 4. 25-Post-test comparison over project proposal presentation

20% subjects were evaluated as being slightly improved. 80% subjects did not improve at all in the Control Group which is also presented in figure 4.25.

4.4.8 Result and Analysis: Manuals

Writing manuals is also made a part of technical and business writing but its introduction and its impact is taught in the customized course of communication skills where the focus was on how clarity in words and term makes the write ups attractive to the users/readers. This was also achieved in the topics of rhetoric. As per plan, the art of persuasion was taught in this course and full format of writing a manual was made part in the technical and business writing course.

Control Group Evaluation
Parameter: 7. Presenting Manuals

Summary

Not improved	**20**
Slightly improved	**5**
Significantly Improved	**0**

Table 4.49

Post-test Performance over Presenting Manuals: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Slightly improved						√	√	√	√	√															
Significantly Improved																									

Experimental Group Evaluation
Parameter: 7. Presenting Manuals

Summary

Not improved	**0**
Slightly improved	**10**
Significantly Improved	**15**

Table 4.50

Post-test Performance over Presenting Manuals: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved	√	√					√	√	√					√		√	√	√	√						
Significantly Improved			√	√	√	√				√	√	√	√		√					√	√	√	√	√	√

Major difference between the two groups was observed here too with the Experimental Group outperforming the Control Group as depicted in tables 4.49 and 4.50.

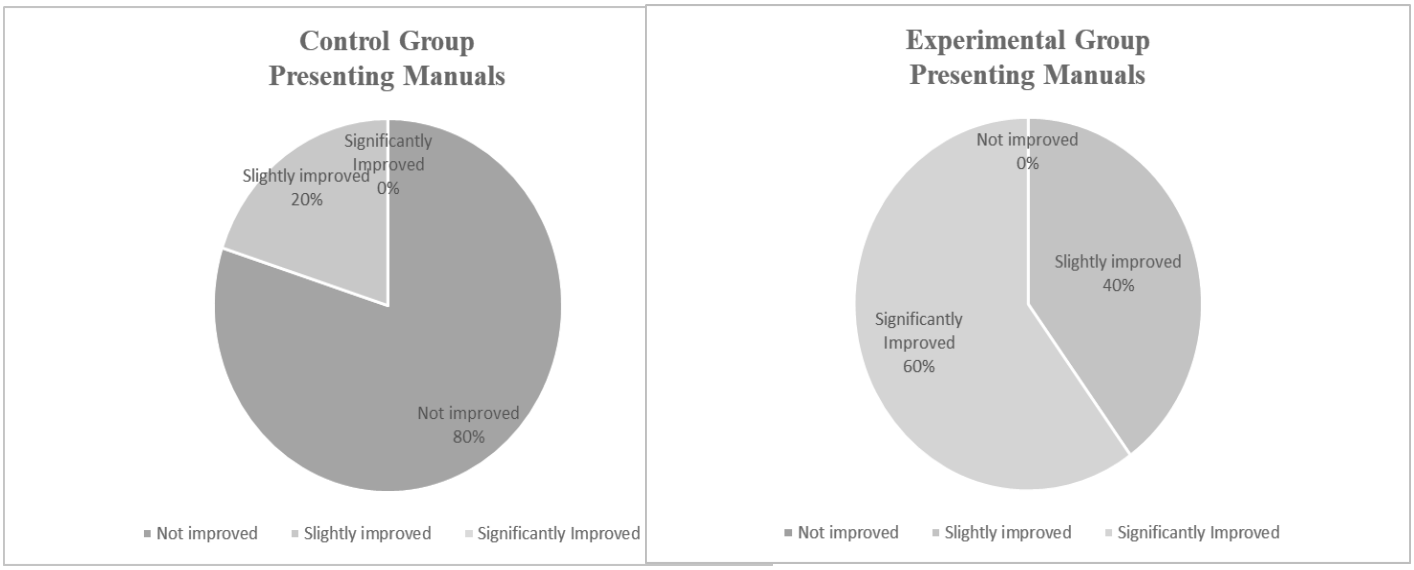

Figure 4. 26-Post-test comparison over presenting manuals

According to the graph in figure 4.26, the Control Group showed slight improvement in only 20% subjects and remaining 80% were not improved at all. On the contrary, 60% subjects in Experimental Group were significantly improved and remaining 40% also showed some degree of improvement.

4.4.9 Result and Analysis: Technical Specifications

Control Group Evaluation
Parameter: 8. Technical Specifications Writing
Summary

Not improved	**20**
Slightly improved	**5**
Significantly Improved	**0**

Table 4.51

Post-test Performance over Technical Specifications Writing: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved		√	√			√	√	√			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Slightly improved	√			√	√				√	√															
Significantly Improved																									

Experimental Group Evaluation
Parameter: 8. Technical Specifications Writing

Summary

Not improved	**0**
Slightly improved	**8**
Significantly Improved	**17**

Table 4.52

Post-test Performance over Technical Specifications Writing: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved																√	√	√	√	√	√	√	√		
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√									√	√

Technical specifications is not a very difficult document to prepare for IT professionals because once a template is made, it's all simple work from there on. However, it is formation of the template that may take some doing.

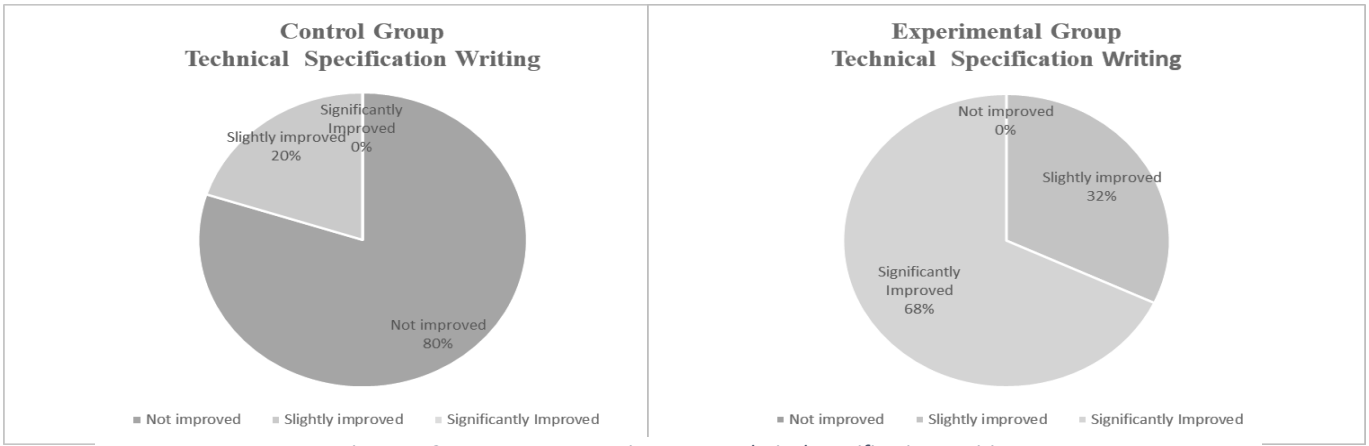

Figure 4. 27-Post-test comparison over technical specifications writing

Another aspect where Control Group could not come close to Experimental Group's performance. 80% subjects were very poor and remaining 20% were improved a little with no one getting highest rank as given in table 4.51. The Experimental Group showed good results in 68% subjects and 32% subjects improved to some extent which is presented in table 4.52. All were improved with no instance of poor performance which is shown in figure 4.27.

4.4.10 Result and Analysis: Tender Document

Control Group Evaluation
Parameter:9. Tender Document

Summary

Not improved	**25**
Slightly improved	**0**
Significantly Improved	**0**

Table 4.53

Post-test Performance over Tender Document: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Slightly improved																									
Significantly Improved																									

Experimental Group Evaluation
Parameter:9. Tender Document

Summary

Not improved	**0**
Slightly improved	**12**
Significantly Improved	**13**

Table 4.54

Post-test Performance over Tender Document: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved	√	√	√	√	√	√														√	√	√	√	√	√
Significantly Improved							√	√	√	√	√	√	√	√	√	√	√	√	√						

The term tender document is totally new to students of computer science and they only learn it when they face a task relating to it at workplace which is not the appropriate place to start learning something from scratch.

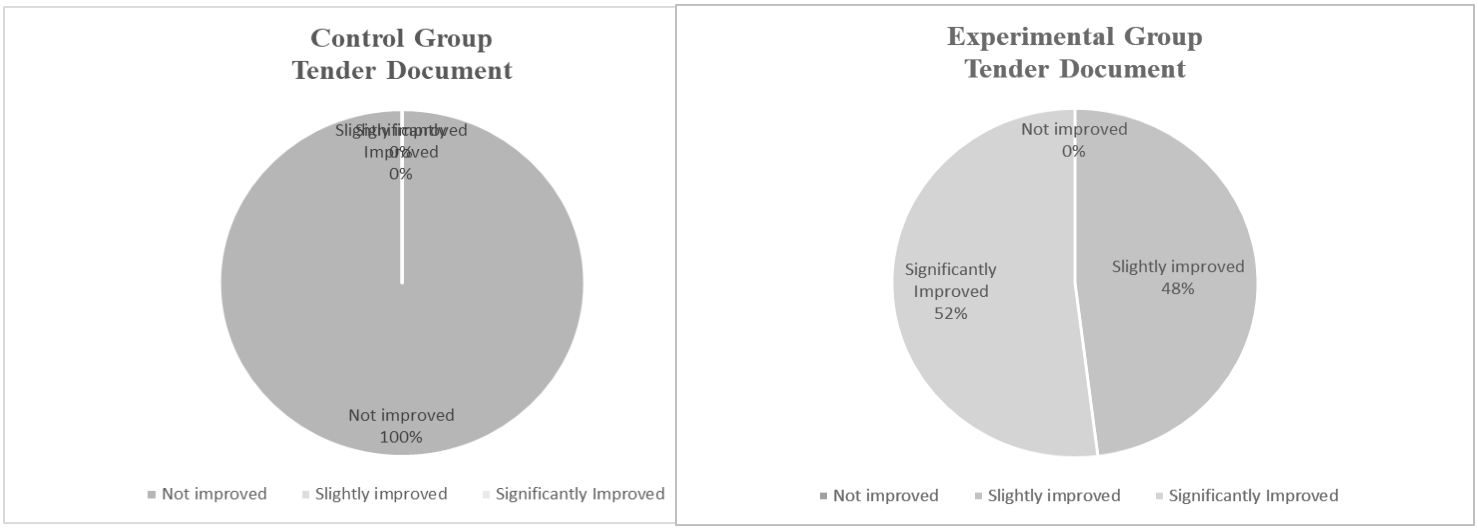

Figure 4. 28-Post-test comparison over tender document

The topic of 'art of writing for winning technical projects' was key for the subjects in the Experimental Group to perform well with 52% subjects showing significant improvement and 48% were also improved although a little bit. The Control Group failed miserably as all the subjects were deemed poor and could not improve at all. Results were very easily demonstrable as given in figure 4.28. Complete stats are provided in tables 4.53 and 4.54.

4.4.11 Result and Analysis: Bids

The process of tender document preparation automatically means that the organization has task of biding as well. When students are made aware of the process of tender document, it is obvious they will have to be prepared for bidding process to compete in the procurement process.

Control Group Evaluation
Parameter:10. Bidding

Summary

Not improved	**25**
Slightly improved	**0**
Significantly Improved	**0**

Table 4.55

Post-test Performance over Bidding: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Slightly improved																									
Significantly Improved																									

Experimental Group Evaluation
Parameter:10. Bidding

Summary

Not improved	0
Slightly improved	12
Significantly Improved	13

Table 4.56

Post-test Performance over Bidding: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved	√	√	√	√	√	√														√	√	√	√	√	√
Significantly Improved							√	√	√	√	√	√	√	√	√	√	√	√	√						

Like tender document preparation task, subjects in Experimental Group obtained appraisal by the evaluators in bids preparation. The topic that facilitated the subjects was 'art of winning technical projects' which was designed around winning IT projects in tenders through successful bidding and successfully bidding for online projects in free lancing. Tables 4.55 and 4.56 provide complete stats.

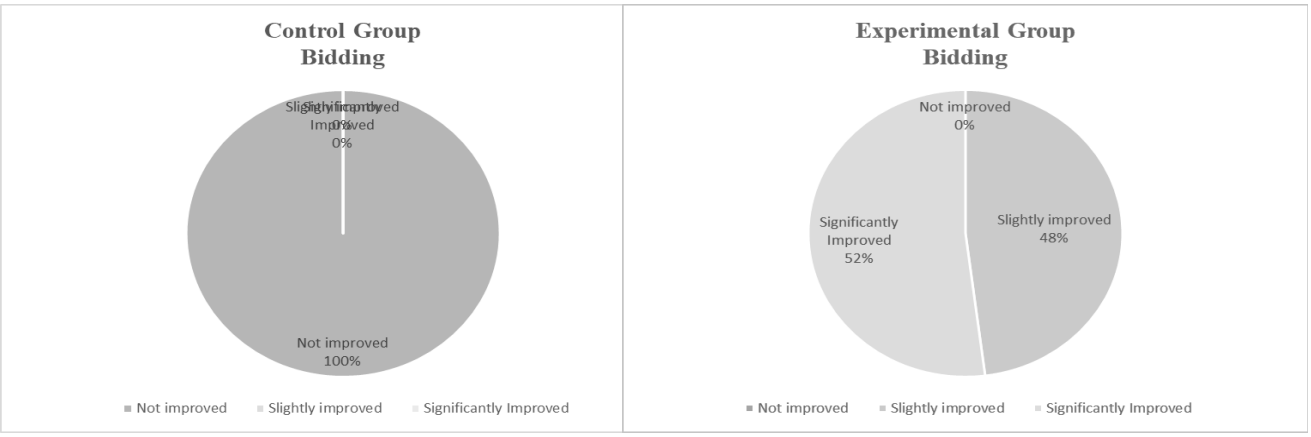

Figure 4. 29-Post-test comparison over bidding

Results were very simple with all of the subjects in the Control Group falling in to the lowest rank and the Experimental Group taking 52% of major improvement and 48% improving somewhat but all of the subjects getting something out of the treatment which is shown in figure 4.29.

4.4.12 Result and Analysis: Project Introduction

Project introduction is influenced by the topic 'art of writing for technical projects' and the reference books added; 'A Guide to Customer Service Skills for the Service Desk Professional' and 'Communication Skills for Technical Students'. This task is mainly described in 'technical and business writing' course therefore its effectiveness without TBW was half done. Table 4.30 shows the results for this parameter.

Control Group Evaluation
Parameter:11. Project Introduction
Summary

Not improved	**5**
Slightly improved	**15**
Significantly Improved	**5**

Table 4.57

Post-test Performance over Project Introduction: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√																				
Slightly improved						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					
Significantly Improved																					√	√	√	√	√

Experimental Group Evaluation
Parameter:11. Project Introduction
Summary

Not improved	**2**
Slightly improved	**15**
Significantly Improved	**8**

Table 4.58

Post-test Performance over Project Introduction: Experimental Group

Evaluation	Subjects																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√																							
Slightly improved			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√								
Significantly Improved																		√	√	√	√	√	√	√	√

In this parameter, results were a bit similar between the two groups. Both groups managing the slight improvement in 60% of their subjects as indicated in tables 4.57 and 4.58. For significant improvement, Experimental Group's 32% subjects were successful as compared to Control Group's 20 subjects only. 8% subjects were unimproved from Experimental Group and 20% subjects were left unchanged from the Control Group as

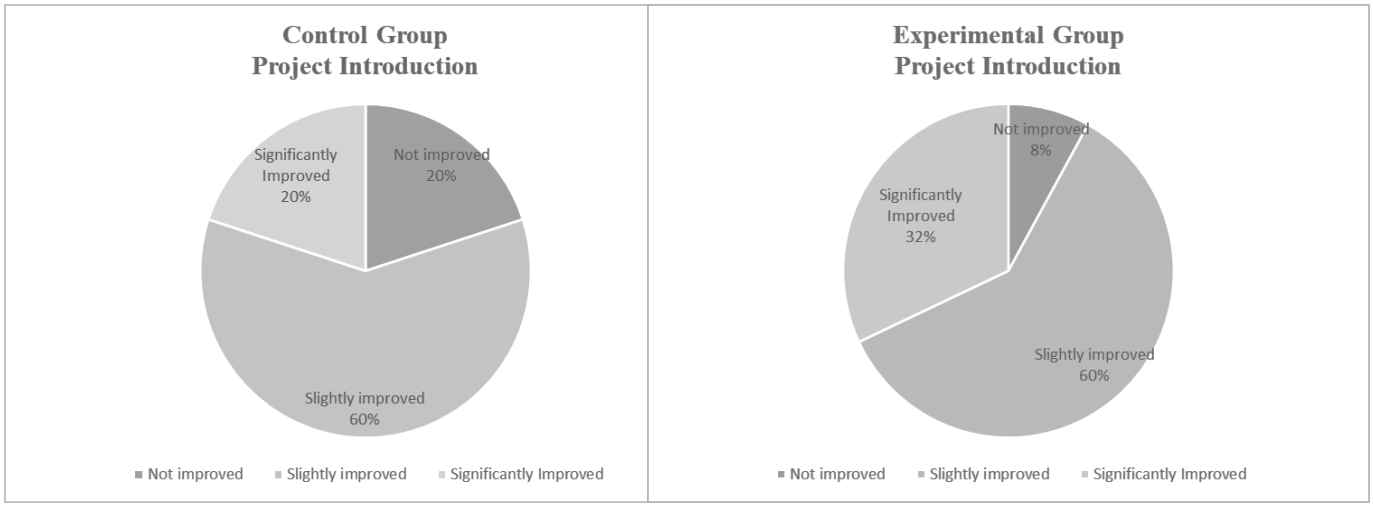

Figure 4. 30-Post-test comparison over project introduction

presented in figure 4.30.

4.4.13 Result and Analysis: Meeting with Clients

Meeting with clients is a topic that directly falls under communication skills and it is part of the course since the course was offered for the first time in BSCS program in NUML. The tweak was required and it was given to the sub – topic of 'participating in a meeting' which was further broken in to three parts viz Roles in a Meeting: Team Lead, Team Member and Project Manager. The tweak was in reference to organogram of a typical software house in Pakistan and the nature of clientage that comes up with projects.

Control Group Evaluation
Parameter:12. Meeting with Client

Summary

Not improved	**12**
Slightly improved	**13**
Significantly Improved	**0**

Table 4.59

Post-test Performance over Meeting with the Client: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√	√														√	√	√	√	√	√
Slightly improved							√	√	√	√	√	√	√	√	√	√	√	√	√						
Significantly Improved																									

Experimental Group Evaluation
Parameter:12. Meeting with Client

Summary

Not improved	**2**
Slightly improved	**10**
Significantly Improved	**13**

Table 4.60

Post-test Performance over Meeting with the Client: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√																							
Slightly improved															√	√	√	√	√	√	√	√	√	√	
Significantly Improved			√	√	√	√	√	√	√	√	√	√	√	√											√

The tweak resulted in major improvements in Experimental Group with 52% subjects marked good and 40% were slightly improved and only 8% subjects were not improved as given in table 4.60. On the other hand, 48% subjects of Control Group were not improved and 52% improved marginally, and no one was termed good in this group over this parameter which is presented in table 4.59.

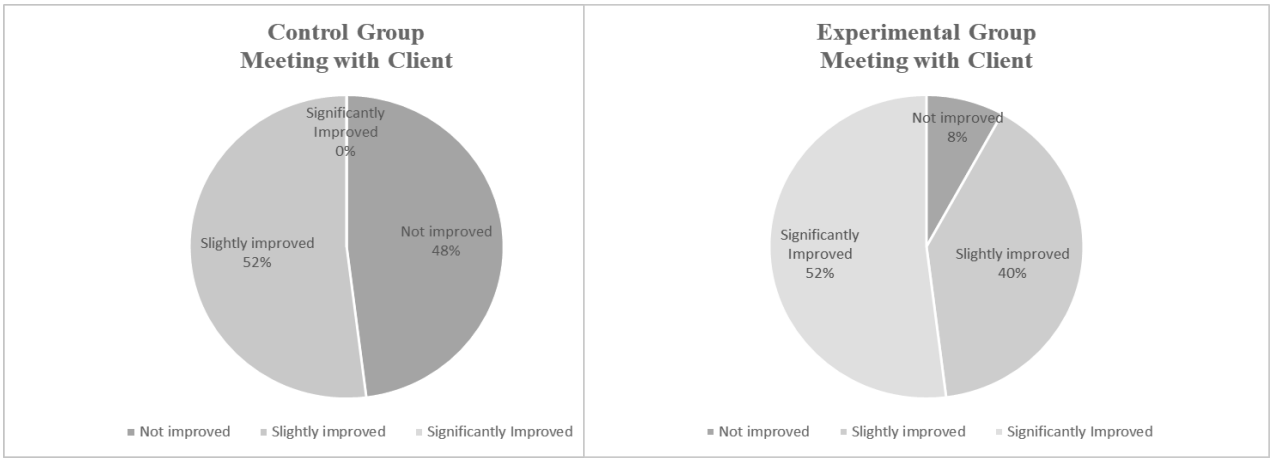

Figure 4. 31-Post-test Comparison over Meeting with the Client

The graphical representation of performance in meeting with client is given in figure 4.31 where better performance of Experimental Group is clearly indicated.

4.4.14 Result and Analysis: Negotiation with Clients

The same topics that were changed for the meeting with clients had the contents to tackle with negotiation sessions with clients in software industry. The topic of 'Cross Cultural' was also very helpful which was modified in accordance to the international clientage that Pakistani software industry frequently has to contend with. Once again, the book recommended in this course: 'A Guide to Customer Service Skills for the Service Desk Professional' was exactly what students wanted. But this was part of the novel course only.

Control Group Evaluation
Parameter:13. Negotiation with Client

Summary

Not improved	**15**
Slightly improved	**10**
Significantly Improved	**0**

Table 4.61

Post-test Performance over Negotiation with the Client: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										
Slightly improved																√	√	√	√	√	√	√	√	√	√
Significantly Improved																									

Experimental Group Evaluation
Parameter:13. Negotiation with Client

Summary

Not improved	**0**
Slightly improved	**6**
Significantly Improved	**19**

Table 4.62

Post-test Performance over Negotiation with the Client: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved																									
Slightly improved																				√	√	√	√	√	√
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						

In this parameter, both groups showed improvements. The Control Group could not improve significantly but 40% subjects showed some improvement where as 60% did not improve at all. Table 4.61 and table 4.62 display the stats of subjects' performance.

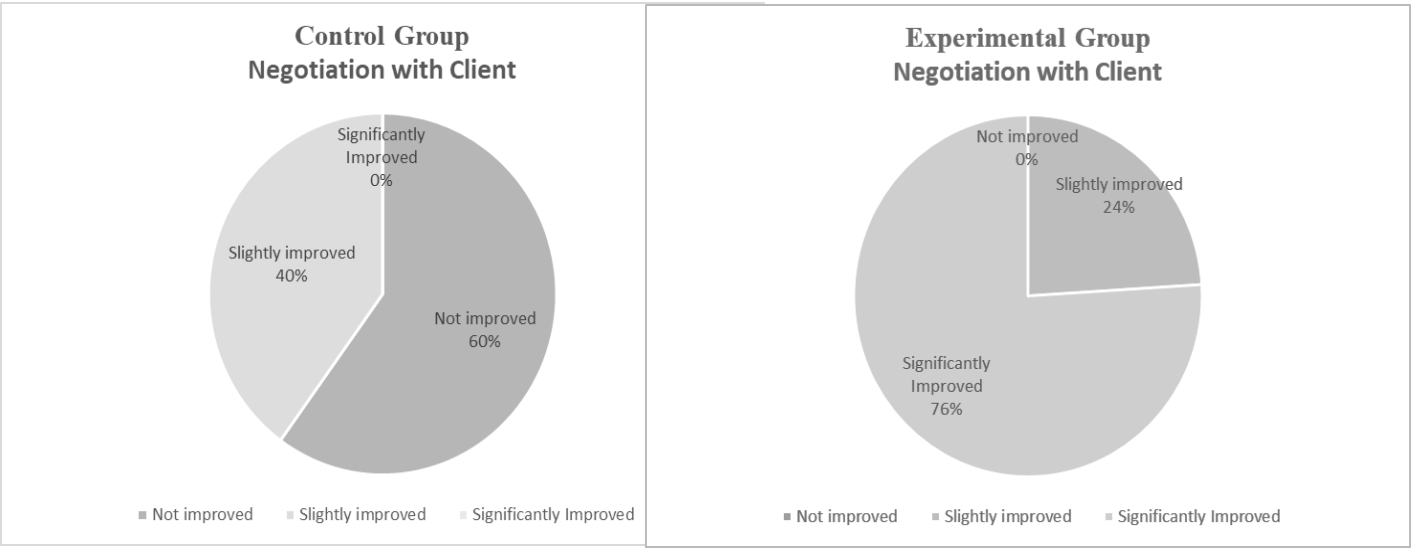

Figure 4. 32-Post-test comparison over negotiation with the client

As per Figure 4.32, Experimental Group demonstrated significant improvement in 76% subjects and remaining 24% subjects also improved but to a lesser degree. No one went unimproved. Another clear cut dominant performance by the Experimental Group was noted due to the novel course outline.

4.4.15 Result and Analysis: Technical Support

Technical support is generally provided through written (emails, chat etc) or verbal (phone, tele conference, video conference etc) in IT industry. Lack of English proficiency was the major problem while talking to the international clients but overall, the skill to talk to clients over technical assistance required some guidelines apart from just command over English language.

Control Group Evaluation
Parameter:14. Technical Support

Summary

Not improved	**20**
Slightly improved	**5**
Significantly Improved	**0**

Table 4.63

Post-test Performance over Technical Support: Control Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√						√	√	√	√	√
Slightly improved																√	√	√	√	√					
Significantly Improved																									

Experimental Group Evaluation
Parameter:14. Technical Support

Summary

Not improved	**0**
Slightly improved	**10**
Significantly Improved	**15**

Table 4.64

Post-test Performance over Technical Support: Experimental Group

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved																									
Slightly improved																√	√	√	√	√	√	√	√	√	√
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										

Technical support was not a part of the old course outline and its effects were evident in the post-test analysis. Tables 4.63 and 4.64 show how majority of the subjects in Control Group failed to improve at all whereas the Experimental Group benefitted from the changed outline and all of its subjects improved.

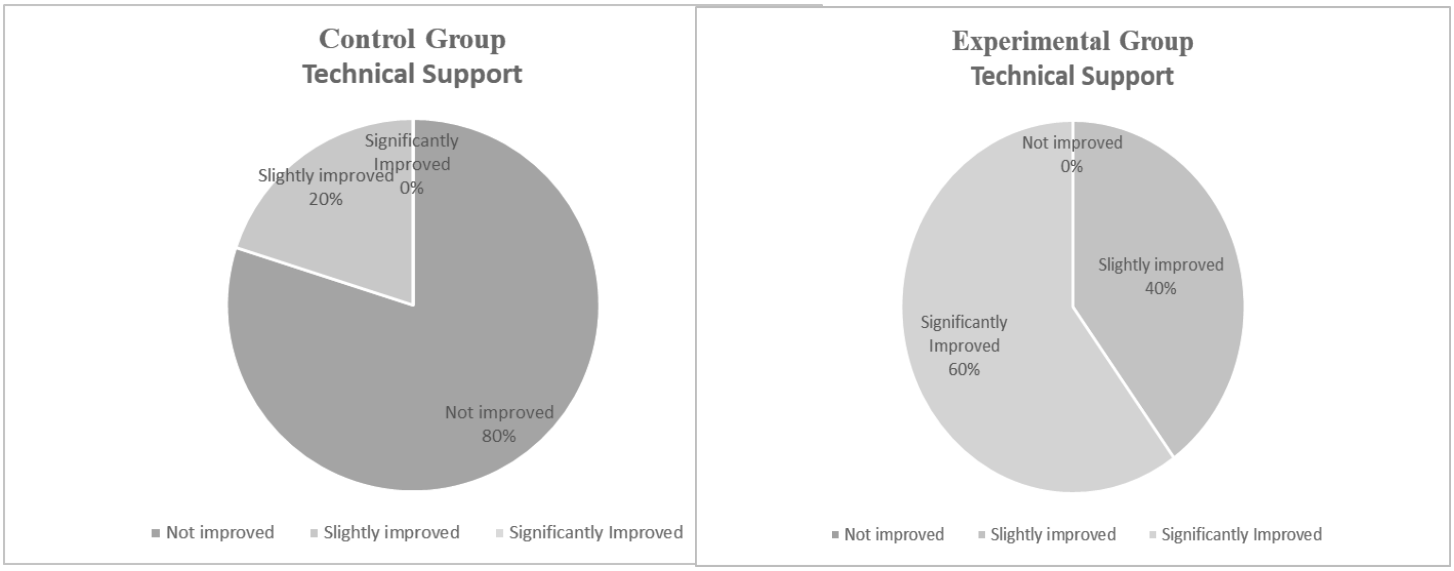

Figure 4. 33-Post-test comparison over technical support

The book 'A Guide to Customer Service Skills for the Service Desk Professional' was again the main contributor in the novel course which resulted in gaining good evaluation for the Experimental Group which obtained 60% significant improvements and 40% slightly improvements as shown in Figure 4.33. The Control Group performed very poor and 80% subjects were marked unimproved and only 20% subjects getting some improvement.

4.4.16 Result and Analysis: Conference Calls

Video Conferencing is one of the offerings of IT that has to be used by developers and other IT professionals. The support for improving performance in video conference came with the topics of 'Communication Challenges in Today's World/Work Place', 'Strategies for Successful Interpersonal Communication in a Software House' and 'Communication through Technologies' for the Experimental Group only.

Control Group Evaluation
Parameter:15. Communication using Digital Media

Summary

Not improved	**5**
Slightly improved	**17**
Significantly Improved	**3**

Table 4.65

Post-test Performance over Communication using Digital Media: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√																				
Slightly improved									√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Significantly Improved						√	√	√																	

Experimental Group Evaluation
Parameter:15. Communication using Digital Media

Summary

Not improved	**0**
Slightly improved	**4**
Significantly Improved	**21**

Table 4.66

Post-test Performance over Communication using Digital Media: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																									
Slightly improved																√	√	√	√						
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					√	√	√	√	√	√

As per Table 4.65, Control Group managed little bit out of this parameter test. But the Experimental Group took lion's share once again. The comparative chart shows 84% subjects from Experimental Group scoring highest rating of significant improvement whereas only 16% were marked slightly yet improved.

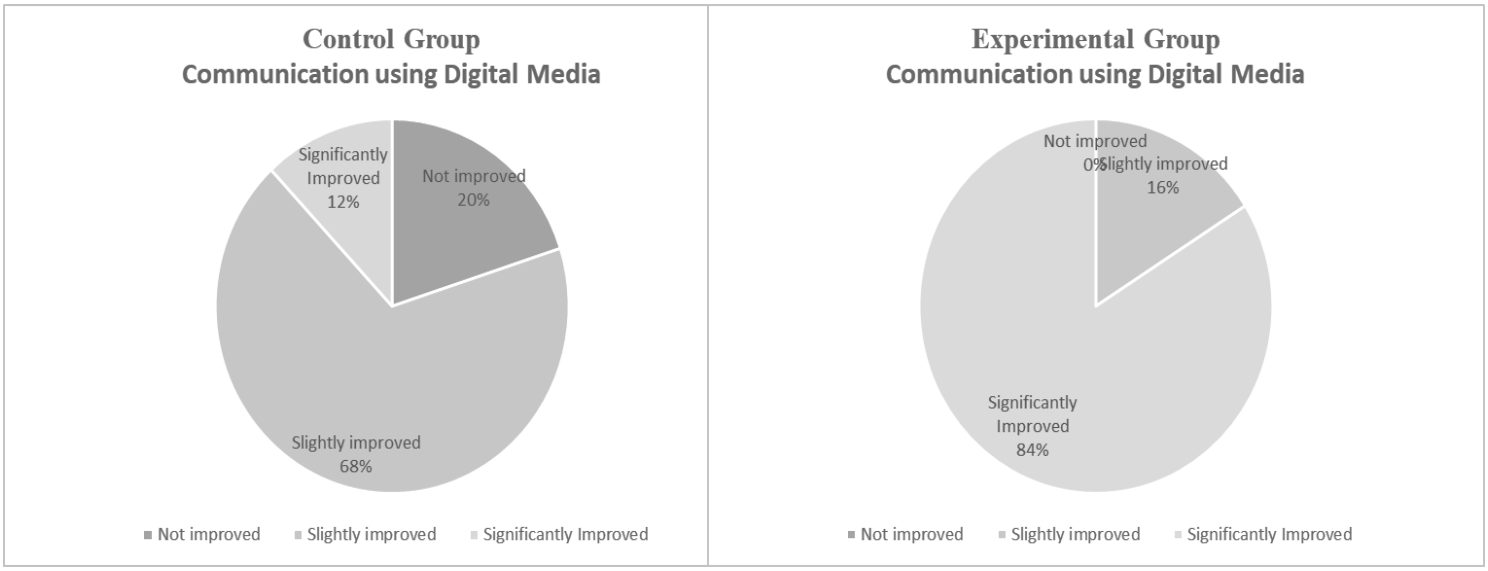

Figure 4. 34-Post-test comparison over communication using digital media

The Control Group was not up to the mark as shown in Figure 4.34 where not they were outclassed by the Experimental Group but their majority (68%) could manage only slight improvement. 20% subjects did not improve and 12% managed to get highest rank of Good which is presented in table 4.66.

4.4.17 Result and Analysis: Communication on Social Network

The communication method on social network is not like conventional communication and requires proper mentoring. Topics like 'Communication Challenges in Today's World/Work Place', 'Strategies for Successful Interpersonal Communication in a Software House' and 'Communication through Technologies' were focusing on modern modes of communication and their digital environment. These provided enough material and training to the students to improve their skill-set but these were mot made available in the old course outline.

Control Group Evaluation
Parameter:16. Communication on Social Network

Summary

Not improved	**14**
Slightly improved	**11**
Significantly Improved	**0**

Table 4.67

Post-test Performance over Communication on Social Network: *Control Group*

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√											
Slightly improved															√	√	√	√	√	√	√	√	√	√	√
Significantly Improved																									

Experimental Group Evaluation
Parameter:16. Communication on Social Network

Summary

Not improved	**0**
Slightly improved	**4**
Significantly Improved	**21**

Table 4.68

Post-test Performance over Communication on Social Network: *Experimental Group*

Evaluation	**Subjects**																								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Not improved																									
Slightly improved																√	√	√	√						
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					√	√	√	√	√	√

Table 4.67 shows that most of the subjects in the Control Group failed to get any positive out of their old course but all the subjects of Experimental Group improved somewhat according to table 4.68.

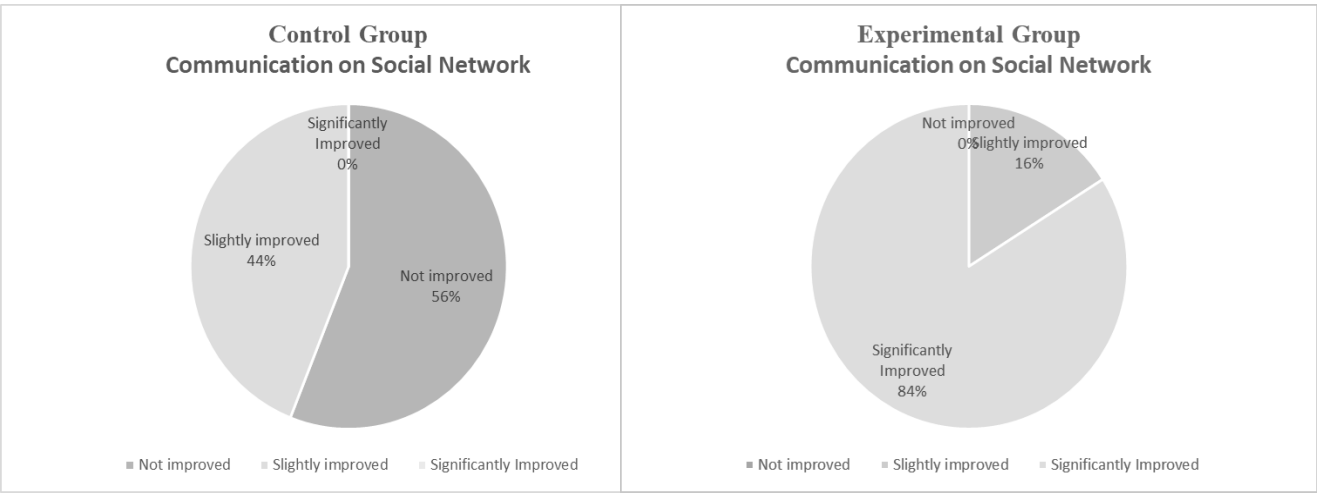

Figure 4. 35-Post-test comparison over communication on social network

Figure 4.35 shows that almost all the subjects of the Experimental Group were improved significantly. This made 84% of the subjects and remaining 16% subjects improved slightly against the Control Group whose 56% subjects could not improve at all and 44% subjects improving a little. No one could show major improvement.

4.4.18 Result and Analysis: Business Promotion on Social Media

The business promotion strategies sound like part of marketing and advertising course in a business program. With the world going for hybridization, these business terms are now part of almost every field and software industry makes special space for such needs. 'Communication through Technologies' is section that covers these sub – topics. The rhetoric section is also focused on software industry. The book titled 'A Guide to Customer Service Skills for the Service Desk Professional' is also comprehensive enough to help student understand the needs and strategies for business promotion and appropriate language to be used on social media. The old course lacks this topic explicitly although, it is taught in generic way.

Control Group Evaluation
Parameter:17. Business Promotion on social media
Summary

Not improved	**14**
Slightly improved	**11**
Significantly Improved	**0**

Table 4.69

Post-test Performance over Business Promotion on Social Media: Control Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			
Slightly improved																							√	√	√
Significantly Improved																									

Experimental Group Evaluation

Parameter:17. Business Promotion on social media

Summary

Not improved	**1**
Slightly improved	**8**
Significantly Improved	**16**

Table 4.70

Post-test Performance over Business Promotion on Social Media: Experimental Group

Evaluation	Subjects																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Not improved																√									
Slightly improved																	√	√	√	√	√	√	√	√	
Significantly Improved	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√										√

Table 4.69 shows that 14 subjects could not improve at all and 11 subjects were slightly improved. Whereas only one subject from Experimental Group failed to improve. 8 subjects were improved slightly and 16 subjects demonstrated major improvements shown in table 4.70.

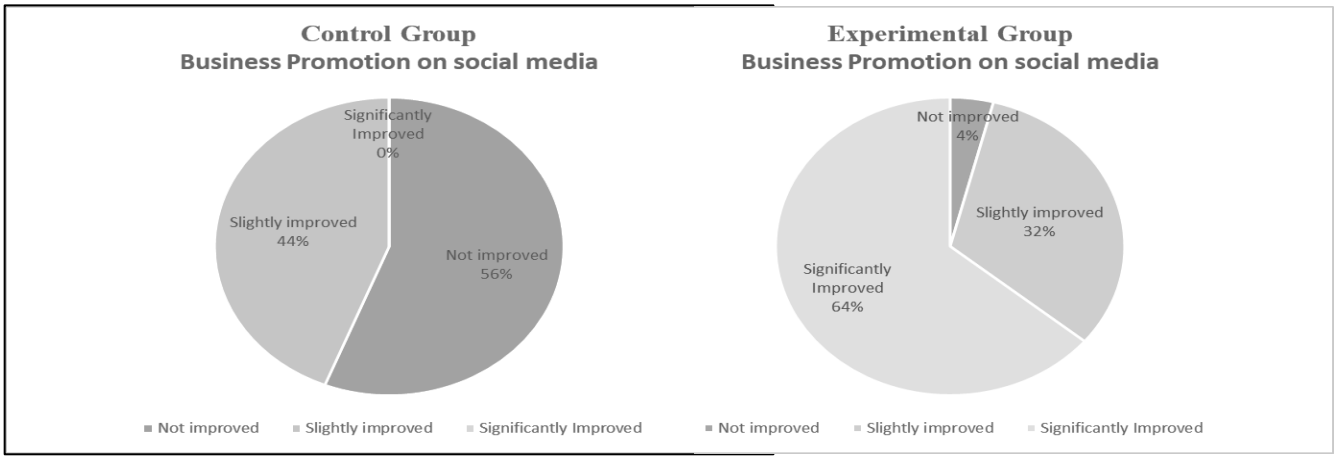

Figure 4. 36-Post-test comparison over business promotion on social media

Figure 4.36 compares the two groups with Control Group losing again by a large margin. No one from this group could improve much and only 44% were improved slightly. 56% left without any improvements. In contrast to this, Experimental Group took away significant improvement for 64% subjects and 32% for low level of improvement. 4% subjects could not improve in this group.

4.5 Conclusion

This chapter covers the entire experiment's data and its comprehensive analysis. The pre-test phase results were quantified using questionnaire I. Both groups obtained similar evaluation and their performances were at almost same level. In post-test, experimental group outperformed the control group by a significant margin. A very thorough analysis of each parameter over which students were evaluated was given in this chapter and rationale for inclusion of the parameter was also discussed. This data was used for further statistical analysis and generating the final results.

CHAPTER 5

RESULTS

Introduction

This chapter contains the consolidated results of the pre-test phase and post-test phase of the Control and Experimental Group. The results are presented in tabular as well as graphical form. Comparisons are made for both groups on individual basis: Pre-test performance versus Post-test performance and then Post-test performance of Control group versus the Post-test performance of Experimental Group.

5.1 Consolidated Result:

The group-wise consolidated results are presented below:

5.1.1 Pre-test Results versus Post-test Results: Control Group

The pre-test results of Control Group were compared with the Post-test results of the same group to check whether the old / conventional course brought any improvement in the group or not after the treatment phase. The tabular comparisons with all parameters are given in the table 5.1:

Table 5.1
Pre-test Results versus Post-test Results: Control Group

		CONTROL Group (Old Course)					
Sr	**Document Type**	**Weak**	**Fair**	**Good**	**Not improved 'Weak'**	**Slightly improved 'Fair'**	**Significantly Improved 'Good'**
		1	**2**	**3**	**1**	**2**	**3**
1	Technical Specifications	**18**	**7**	**0**	**5**	**18**	**2**
2	Memo	**25**	**0**	**0**	**0**	**10**	**15**
3	Letter	**10**	**10**	**5**	**0**	**0**	**25**
4	Preparing & Presenting Agenda	**25**	**0**	**0**	**10**	**15**	**0**
5	Preparing Minutes	**25**	**0**	**0**	**10**	**15**	**0**
6	Project Proposal Presentation	**20**	**5**	**0**	**20**	**5**	**0**
7	Presenting Manuals	**22**	**3**	**0**	**20**	**5**	**0**
8	Technical Specifications	**15**	**9**	**1**	**15**	**5**	**0**
9	Tender	**25**	**0**	**0**	**25**	**0**	**0**

10	Bids	**25**	**0**	**0**	**25**	**0**	**0**
11	Project Introduction	**10**	**15**	**0**	**5**	**15**	**5**
12	Meeting with Client	**12**	**7**	**6**	**12**	**13**	**0**
13	Negotiation with Client	**15**	**5**	**5**	**15**	**10**	**0**
14	Technical Support	**20**	**5**	**0**	**20**	**5**	**0**
15	Communication using Digital Media	**19**	**4**	**2**	**5**	**17**	**3**
16	Communication on Social Network	**14**	**11**	**0**	**14**	**11**	**0**
17	Business Promotion on social media	**22**	**3**	**0**	**22**	**3**	**0**

The comparison in table 5.1 shows that the treatment variable worked well for the control group and improvements were made by the subjects against most of the parameters.

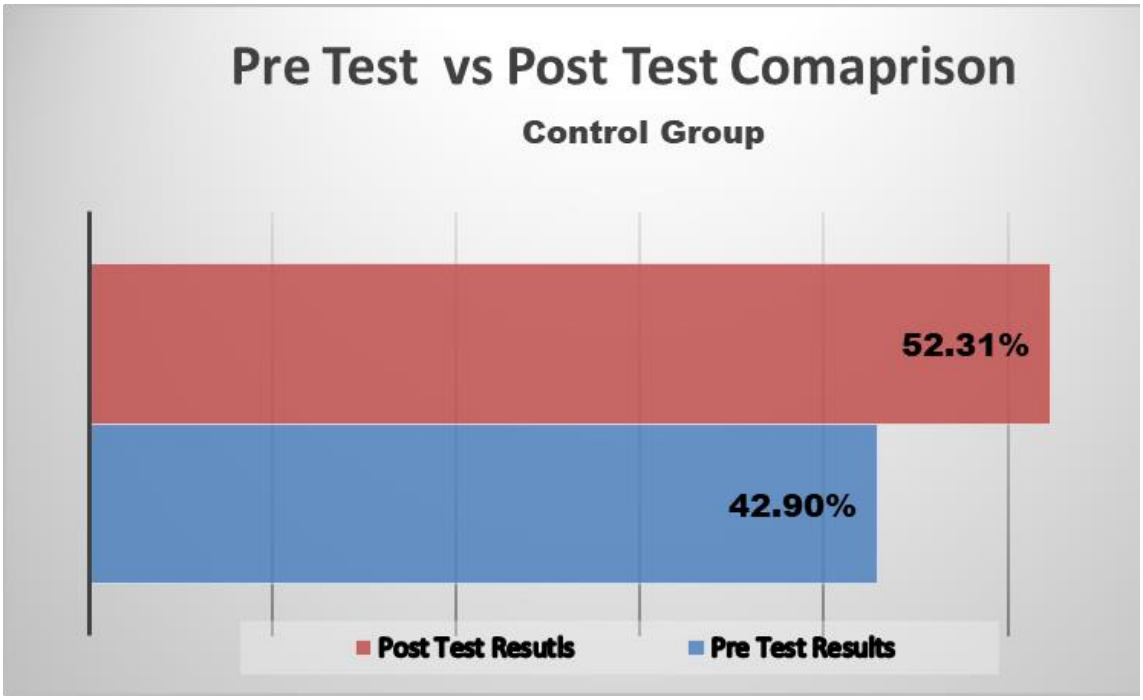

Figure 5. 1-Pre-test vs post-test comparison; control group

The bar graph in Figure 5.1 shows how the two performances were fared against each other. The overall score in Post-test results was improved by almost 10% which was good improvement.

5.1.2 Pre-test Results versus Post-test Results: Experimental Group

In Experimental Group, the comparative scores between subjects' pre-test performance and post-test performance is given in table 5.2:

Table 5.2
Pre-test Results versus Post-test Results: Experimental Group

		EXPERIMENTAL Group (new course)					
Sr	**Document Type**	**Weak**	**Fair**	**Good**	**Not improved 'Weak'**	**Slightly improved 'Fair'**	**Significantly Improved 'Good'**
		1	**2**	**3**	**1**	**2**	**3**
1	Technical Specifications	**19**	**6**	**0**	**0**	**15**	**10**
2	Memo	**25**	**0**	**0**	**0**	**5**	**20**
3	Letter	**8**	**12**	**5**	**0**	**0**	**25**
4	Preparing & Presenting Agenda	**25**	**0**	**0**	**3**	**7**	**15**
5	Preparing Minutes	**25**	**0**	**0**	**0**	**13**	**12**
6	Project Proposal Presentation	**20**	**4**	**1**	**0**	**10**	**15**
7	Presenting Manuals	**18**	**7**	**0**	**0**	**10**	**15**
8	Technical Specifications	**13**	**12**	**0**	**0**	**8**	**17**
9	Tender	**25**	**0**	**0**	**0**	**12**	**13**
10	Bids	**25**	**0**	**0**	**0**	**12**	**13**
11	Project Introduction	**13**	**12**	**0**	**2**	**15**	**8**
12	Meeting with Client	**15**	**5**	**5**	**2**	**10**	**13**
13	Negotiation with Client	**12**	**8**	**5**	**0**	**6**	**19**
14	Technical Support	**17**	**8**	**0**	**0**	**10**	**15**
15	Communication using Digital Media	**21**	**2**	**2**	**0**	**4**	**21**
16	Communication on Social Network	**10**	**15**	**0**	**0**	**4**	**21**
17	Business Promotion on social media	**20**	**4**	**1**	**1**	**8**	**16**

The performance difference between the two phases i.e. pre-test and post-test was expected to be significant. The difference was exactly as per expectations. However, a very encouraging aspect was the major numbers in the ‘Good’ category in the post-test

evaluation phase. The bar graph in Figure 5.2 describes it much clearer.

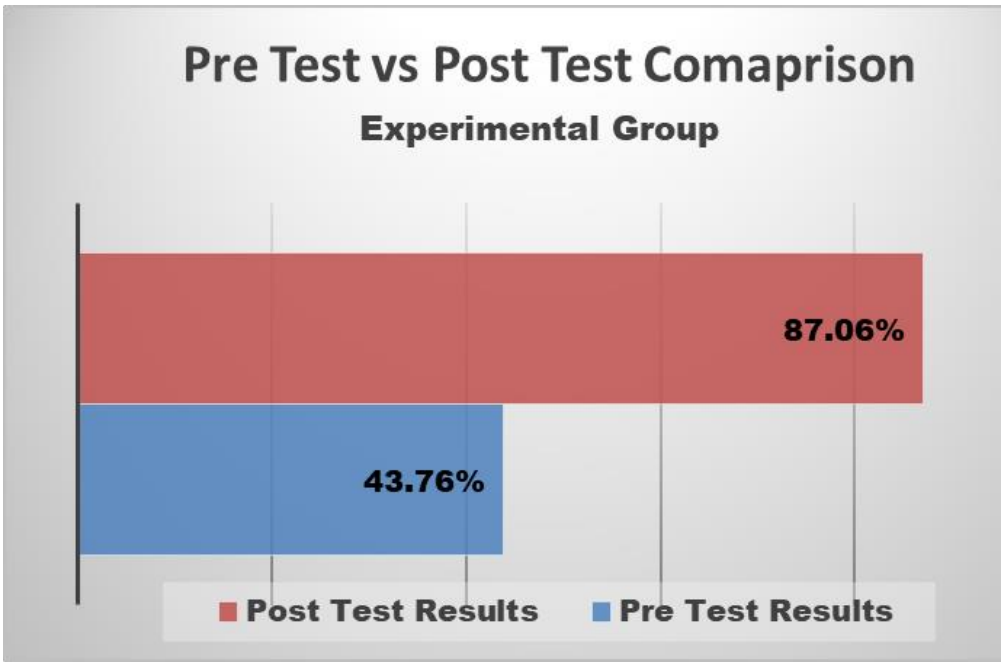

Figure 5. 2-Pre-test vs post-test comparison; experimental group

The comparison between performances of Experimental Group subjects in Pre-test and Post-test phases drew very high level of improvements in the post-test phase with almost doubling the score. The percentage score of the subjects was 43.76% at Pre-test stage. After the treatment with novel course outline, the percentage rose to 87.0%.

5.2 Post-test Results Control Group versus Experimental Group

The overall result was quantified on basis of responses being given marks between '1' and '3' for all the subjects in each group and against all the 17 parameters (variables). The consolidated result for both groups are shown in table 5.3:

Table 5.3
Post-test Results Control Group versus Experimental Group

		CONTROL Group (Old Course)			**EXPERIMENTAL Group (new course)**		
Sr	**Document Type**	**Not improved**	**Slightly improved**	**Significantly Improved**	**Not improved**	**Slightly improved**	**Significantly Improved**
		1	**2**	**3**	**1**	**2**	**3**
1	Technical Specifications	**5**	**18**	**2**	**0**	**15**	**10**
2	Memo	**0**	**10**	**15**	**0**	**5**	**20**
3	Letter	**0**	**0**	**25**	**0**	**0**	**25**

4	Preparing & Presenting Agenda	**10**	**15**	**0**	**3**	**7**	**15**
5	Preparing Minutes	**10**	**15**	**0**	**0**	**13**	**12**
6	Project Proposal Presentation	**20**	**5**	**0**	**0**	**10**	**15**
7	Presenting Manuals	**20**	**5**	**0**	**0**	**10**	**15**
8	Technical Specifications	**15**	**5**	**0**	**0**	**8**	**17**
9	Tender	**25**	**0**	**0**	**0**	**12**	**13**
10	Bids	**25**	**0**	**0**	**0**	**12**	**13**
11	Project Introduction	**5**	**15**	**5**	**2**	**15**	**8**
12	Meeting with Client	**12**	**13**	**0**	**2**	**10**	**13**
13	Negotiation with Client	**15**	**10**	**0**	**0**	**6**	**19**
14	Technical Support	**20**	**5**	**0**	**0**	**10**	**15**
15	Communication using Digital Media	**5**	**17**	**3**	**0**	**4**	**21**
16	Communication on Social Network	**14**	**11**	**0**	**0**	**4**	**21**
17	Business Promotion on social media	**22**	**3**	**0**	**1**	**8**	**16**
	Average	**52.47%**	**34.59%**	**11.76%**	**1.88%**	**35.06%**	**63.06%**

The table shows that 52.47% students in Control Group were marked ‘not improved’ as compared to 1.88% from experimental group. This was the major difference that went in favor of the novel course based treatment which was given to experimental group. The ‘slight improvement’ option was awarded to 34.59% of control group against 35.06% of experimental group which was almost equal. But in case of ‘significant improvement’, difference in comparison was again prominent as only 11.76% subjects of control students got highest grading in comparison to experimental group’s 63.06% subjects who were deemed to have improved significantly higher than their counterparts.

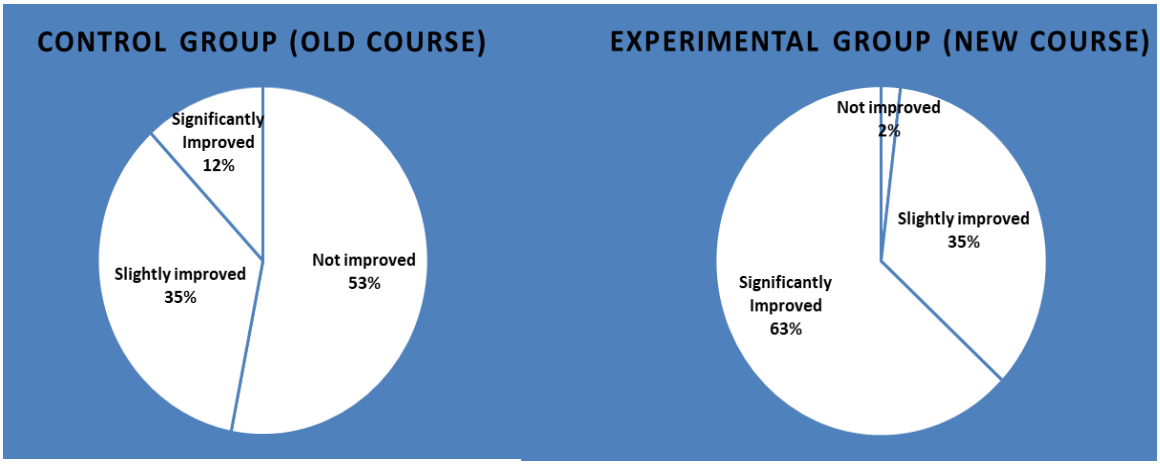

Figure 5. 3-Post-test comparison; control group vs experimental group

The above pie chart in Figure 5.3 comparison shows how the grading of control group and experimental group was formed out of scale of 100.

Table 5.4
Post-test Results out of 75 marks

Sr	Parameters	CONTROL Group (Old Course)	EXPERIMENTAL Group (new course)
		Score	
1	Technical Specifications	**47**	**60**
2	Memo	**65**	**70**
3	Letter	**75**	**75**
4	Preparing & Presenting Agenda	**40**	**62**
5	Preparing Minutes	**40**	**62**
6	Project Proposal Presentation	**30**	**65**
7	Presenting Manuals	**30**	**65**
8	Technical Specifications	**25**	**67**
9	Tender	**25**	**63**
10	Bids	**25**	**63**
11	Project Introduction	**50**	**56**
12	Meeting with Client	**38**	**61**
13	Negotiation with Client	**35**	**69**
14	Technical Support	**30**	**65**
15	Communication using Digital Media	**48**	**71**
16	Communication on Social Network	**36**	**71**
17	Business Promotion on social media	**28**	**65**
	Average Score	**42/75**	**69/75**

On the whole, the control group students got average 42 marks out of 75 whereas experimental group's students obtained average 69 marks out of 75 as depicted in table 5.4. These results are presented in graphical form in Figure 5.4.

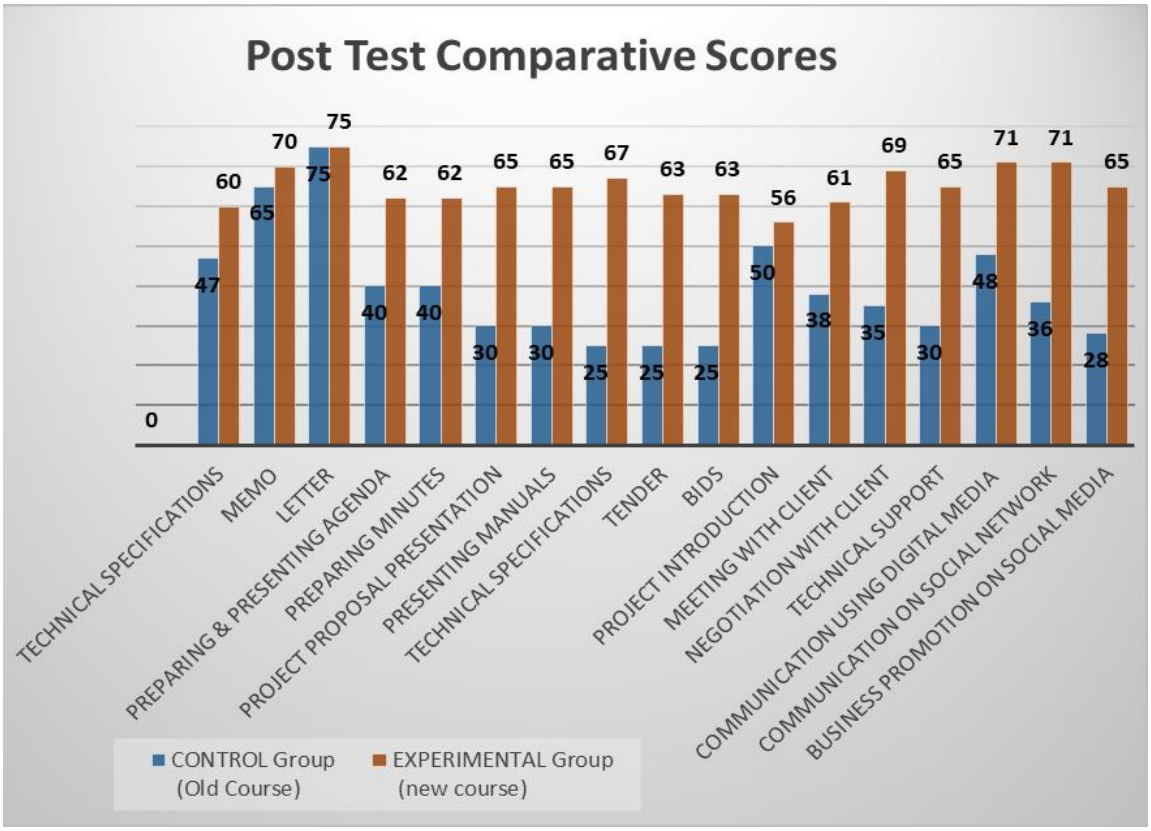

Figure 5. 4-Post-test detailed comparison; control group vs experimental group

5.3 Complete Comparison

A complete comparison between the performances of both groups at their pre-test and post-test phases is given in the bar graph in Figure 5.5.

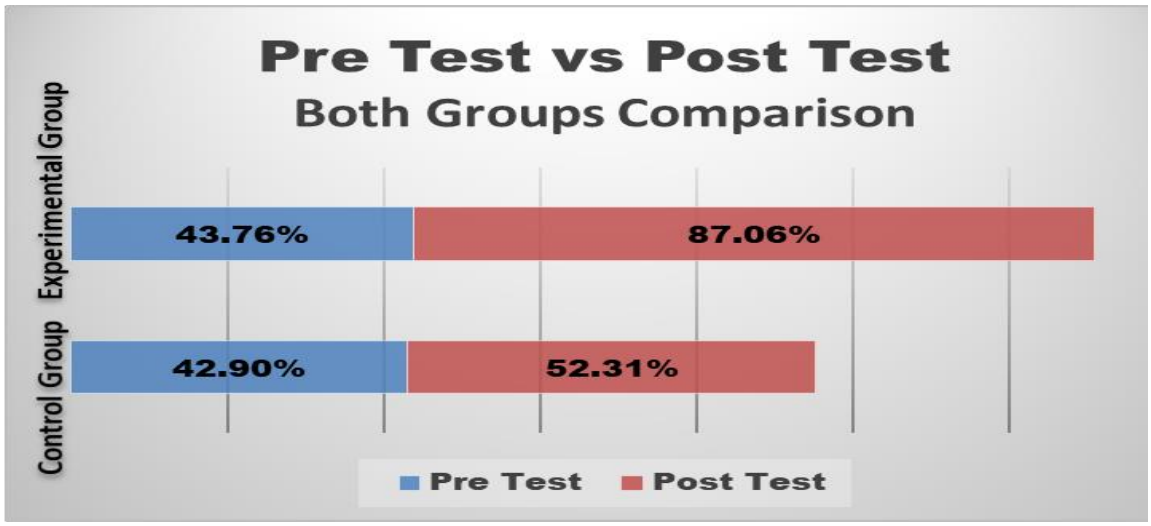

Figure 5. 5-Pre-test vs post-test cumulative comparison; control group vs experimental group

The graph in figure 5.5 shows how the two groups performed at the beginning of the experiment and then, after the treatment phase, their performance is gauged again. The first part of the bar shows the evaluation results at pre-test stage in which Control Group obtained 42.90% marks against the Experimental Group's score of 43.76%. The results were very close and proved the two groups to be at same academic level with respect to English proficiency. The close results validated the homogeneity between the two groups after which experiment was proceeded. In the treatment phase, Control Group was treated with old course outline and Experimental Group was taught with novel outline. Both groups showed improvements with Control Group scoring 52.31% marks which was almost a 10% improvement. The Experimental Group showed improvement by almost doubling the score that it obtained in pre-test. The new score of Experimental Group was 87.06%. The mutual comparison between the two groups' post-test evaluation from this perspective showed that Experimental Group outclassed the Control Group by around 35% which was very big margin.

5.4 T TEST

A t-test is used to determine if there is any significant difference between the mean values of performance of the two groups in the study. It is a statistical test and it helps in hypothesis testing (Kenton, 2019). The final value of 'p' determines whether the null hypothesis can be rejected or not. The rejection of null hypothesis means that the alternative hypothesis is true.

T-test was performed on the consolidated result with the help of built-in function of 't-test' in Microsoft Excel. The results yielded following data:

Table 5.5
t-test result: comparison of control and experimental group

	Control Group	*Experimental Group*
Mean	39.23529412	65.29412
Variance	201.0661765	22.72059
Observations	17	17
Pearson Correlation	0.366017903	
degree of freedom	16	
P(T<=t) two-tail	4.43854E-07	

The mean value calculated was 39.23 for Control Group and 65.29 for the experimental group. The value of variance was 201.06 for control group and 22.72 for experimental group. This value showed how far away the value from the mean was. In case experimental group, lower value of variance (22.7) meant that the overall performance difference against different parameters were very low which was a positive sign as given in table 5.5.

5.4.1 Statistical Significance

The t-value, p-value and other components are main indicators in the t-test but it is the p-value which truly indicates the statistical significance of the difference whereas the t-value is an intermediate step. The p-value determines the probability that the null hypothesis is true or not. A low p-value shows that the effect is large or that the result is of major theoretical, clinical or practical importance. Whereas a non-significant result, suggests not to reject the null hypothesis, is evidence that the null hypothesis is true

Therefore the most significant value in the test for this study was the value of 'p'. As a rule of thumb, a 'p' value smaller than 0.05 i.e. $p < .05$, has a very clear cut meaning that the null hypothesis against which the study was carried out, can be rejected. When a study is termed statistically significant, it implies that the same can be generalized on a larger or broader population of interest.

In general, the cutoff value for significance is alpha of 0.05. In this study, any value below 0.05 for 'p' would term the null hypothesis rejected and the alternative hypothesis would be accepted and the result would be significant where as any value above 0.05 would go in favor of null hypothesis i.e. there was no significant difference between the two groups' performances.

5.4.2 The 'p' Value

The final verdict came with respect to value of alpha (0.05). The value of 'p' was found to be '4.43854E-07' or 4.43×10^{-7}. Since the value of 'p' was below 0.05 (alpha value), the hypothesis 1 (research / alternate hypothesis) was deemed correct as per t-test and the null hypothesis was therefore rejected. The very small value of 'p' indicated significant difference between the two groups.

5.4.3 Pearson's correlation coefficient

Pearson's correlation coefficient (r) is a measure of the strength of the association between the two variables. A value between 0.3 and 0.7 (-0.3 and -0.7) indicate a moderate positive (negative) linear relationship.

In this study, the Pearson Correlation value was 0.366. The value indicated that both groups were having positive linear relation. The value was below 0.5 which meant one groups' learning was not as high as the other one.

Although both groups showed improvements after the treatment but the t-test proved that the experimental group that went through treatment using novel course outline of communication skills performed much better than the control group which got treatment using old course outline.

Thus hypothesis 1 was proved to be correct which stated that novel course outline would bring much higher improvement in the subjects and the null hypothesis was proven wrong and therefore rejected.

In the end, both of the research objectives were achieved. The effectiveness of the novel course outline was found to be very high against old course outline. Also, the contents that were needed to be added in the new course outline were identified and their impact was also observed in the experiment.

5.5 Summary of Results

The comparison between Pre-test and Post performances of both groups showed improvements thus proving the fact that both course outlines, used in the treatment phase were effective. However, the Post-test performance comparisons between the two groups indicated that the improvement in performance between the two groups was separated by a very big margin. Also, the t-test indicated that both groups showed improvements but the Experimental Group showed enough improvement as compared to Control Group which termed the experiment successful.

5.6 Conclusion

This chapter provides complete results and their statistical analysis. In order to find out the significance level of the improvement in performances, t-test was applied using MS Excel. The value of 'p' was taken as the deciding factor for accepting the research hypothesis. Since the value of 'p', obtained in the t-test, was well below 0.5, the null hypothesis was rejected and alternate / research hypothesis was accepted. Also, the Pearson's correlation coefficient value of 0.366 indicated that both groups showed improvements although the level of improvement was widely apart. This value showed that the control group was also showed positive signs.

CHAPTER 6

CONCLUSION

Introduction

This chapter contains final conclusion and closing remarks on the entire study. The entire study is once again briefly gone through along with results and findings in this chapter.

6.1 Summary

The computer science graduates from NUML have earned very good reputation at workplace and their technical skills have been admired by the employers according to survey. The one area where they have not been able to showcase their talent is their communication skills. The research was based on two main objectives of knowing the problems that IT graduates face at workplace due to communication skills and the requirements that must be made in communication skills course for BSCS students to improve their performance at workplace.

The research questions were based on the two research objectives: whether the new outline worked successfully in improving graduates performance or not.

The second research issue was based on exploring what were the communication weaknesses in IT graduates working in software house and which contents needed to be incorporated in the course outline of communication skills.

For the first part of the research, Target Need analysis was conducted to prepare new course outline. Then 50 graduates of NUML computer science department were given questionnaire. These students were from NUML only which was the first delimitation. Upon getting the response in questionnaire, the most frequent tasks which required both communication skills and technical knowledge were identified, then a group of eight employers from software houses in Islamabad and Rawalpindi were invited. Their feedback over the employees' performance was obtained against same parameters through questionnaire. Then the employers were interviewed to discuss the real problem in the light of the two questionnaires' results. The interviews further clarified the situation. There were

some weak areas already identified by the employers. In the surveys, it seemed as if such tasks were not frequently faced by the IT professionals but in interviews, it became clear that the tasks were very frequently occurring in the office but computer science graduates were considered inappropriate due to lack of communications skills. The overall findings were used to pick the topics that needed to be included in the course contents of 'communication skills'. This completed the background for the experiment.

Next up, the experiment phase started with formation of two groups of students. These groups were the control group (consisting of 25 students from BSSE degree program) and experimental group (consisting of 25 students from BSCS program). These groups were selected on basis homogenous based on several parameters as described in chapter three in detail. The pre – test was performed over two hour duration.

Then the treatment was performed on the two groups with novel course outline being offered to the group of students of BSCS degree program (experimental group), and at the same time, current course of communication skills was offered to group of BSSE students (controlled group). After the test, the two groups were evaluated by the panel of employers/managers of software house. The evaluation of both the groups was performed using questionnaire and then t-test was performed on the quantified results to check the hypothesis whether novel outline would bring better results for graduates at workplace or not. The t – test results showed substantial improvements in students in the experimental group, mainly their communication skills and confidence. Whereas the controlled group students were not as good as their counter parts and they lacked skills similar to what were pointed out by the employers at the beginning of the study.

The main contributor towards improvements in the experimental group students was the modified course of communication skills. The major part of study stood slightly different from previous studies was the change in course contents to improve the effectiveness of communication course where as mostly, previous works were on the teaching methodologies.

Secondly, the course was not a complete English for Specific Purposes (ESP) course. There had been cases where graduates couldn't compete in the relevant field and had to adopt completely different field to get settled in job or business. Therefore a

complete ESP course was not advisable. This experimental course was mix of communication skills (generic) and ESP for computer science graduates.

Third and final aspect of innovation was the input criteria for course contents. The suggestions were obtained by feedback from graduates working in software house and then the employers who identified the weak areas where they wanted improvements. Previously, the weak areas were obtained from feedback of either of them. Finally, this study was applied on computer science field and it was on Pakistani students.

6.2 Findings

The findings of the research are given below:

i. The old course outline followed in NUML for computer science students produced around 10% improvement in the Control Group in the Post-test as compared to its Pre-test score i.e. 42.90% to 52.31%.

ii. The novel course outline which was implemented in treatment phase on Experimental Group which showed 42% improvement in the Experimental Group in the post-test as compared with its performance in Pre-test i.e improvement from 43.76% to 87.06%.

iii. The comparative scores between the two groups indicated that the improvement in performance of Experimental Group, which was 43%, was much higher than the improvement in performance of the Control Group which was 10%.

iv. As per test results (applied on Post-test results and analysis), the improvement in performance of the Experimental Group was significant enough to term the experiment successful.

v. Although both course outlines proved their worth, the big margin of improvement in Experimental group as compared to Control Group proved hypothesis 1 to be correct stating that the novel course outline would be more effective for the course of communication skills for computer science students

vi. The Null Hypothesis, stating that subjects/students would not get much benefit from the novel outline was proven wrong.

vii. The topics added in the novel course outline were proven to be effective for the computer science students.

viii. An ESP based course was indeed required by computer science students for better communication in their professional life.

ix. In any course of language in any field at university level, English for Specific Purposes should be considered to be included as a generic course may be good but it may not be as effective as an ESP based course would be.

6.3 Conclusion

Finally, it is concluded that the Pakistani students are improving in general English but they are still deficient in specific form of English that relates to their field of study and eventually their jobs or business. A course which is mix of ESP and communication skills is need for university students of each degree program. The students of BSCS program were offered communication skills course which was modified according to needs of IT work place. The course was not truly an ESP course but it had the similar ingredients and the course was designed for computer science students in Pakistan. The experimental group that underwent tailor made course returned very encouraging stats by the evaluators who observed much more improvements in experimental group. The improvements were gauged by not only the performance of the subjects but also their will and confidence to undertake the responsibilities which previous graduates and even the control group student were not much confident to do.

With such positive results, it can be concluded that English language courses need little bit of customization at university level and the course should be tailored according to the field of study of that particular degree program. Also, the need for English linguist should be made mandatory in National Curriculum Revision Committee (NCRC) meetings.

6.4 Recommendations

This study was to prove that ESP course has to be indulged into communication skills course for better performance of the graduates in workplace. However, the course outline designed for computer science students will not work effectively for students in other fields of study like medical, mass communication, business students etc. The outline has to be modified to some extent for each field. Research needs to be conducted to identify

weaknesses in the graduates in each field of study. One field's research results will not serve the purpose for other fields.

Secondly, improvement in method for finding the deficiencies in the current course can be made in future. This study relied on questionnaires and interviews. The evaluators were the employers/managers from software houses. Ex-students who were working in the software houses were also included in the feedback to identify the weaknesses. Weakness identification can also be improved further.

Finally, this study took into account, the employers and employees (graduates in computer science) of Islamabad and Rawalpindi only. In future, more cities which are geographically distant apart can be brought under consideration for the experiment to add versatility in the respondents. This can be argued that the language dominance and social flavor of each province in Pakistan is different from each other and some weaknesses identified in Islamabad and Rawalpindi employees may differ from the weakness exhibited in graduates from other cities of Pakistan.

If NCRC wants to extend the benefits of ESP for Pakistani students, then the course of Technical & Business Writing can also be considered for such a study and then revise under ESP for computer science students of Pakistan to make it more effective like communication skills course.

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Appendix A

Communication Skills	
Course Code:	EG-213
Credit Hours:	3+0
Pre-Requisite:	None
Recommended Book(s):	• Effective Business Communication by H.A.Murphy • Business Communication by Bovee • Business Communication: Strategies and Skills by Mary Munter • History of Language by Alfred Avon

Course Objectives:

This course aims at providing students with a sound base of communication skills and prepares them for both oral and written communication. Students will learn to communicate professionally and competently in an International language with equal ease and will also get trained in both inter and intra personal communication.

Course Outline:

Language:

- History of Language
- Language as Knowledge Base Process
- Language for Describing Objects and Procedures
- World's Major Languages
- Impact of Language in a Social and Business Life

Communication:

- Theories of Communication
- Internal and External Communication
- One way/Two way/Upward/and Downward Communication
- Communication in Organization Settings
- Communication Challenges in Today's World/Work Place

Communicating in Teams:

- Strategies for Team Communication
- Resolving Team Conflicts
- Characteristics of Effective Teams
- Strategies for Successful Interpersonal Communication

Communication & the Global Context:

- Importance of Communication Across Cultures
- How to Improve Across Cultures Communication
- Improving Intercultural Sensitivity
- International Communication

Job Search Communication:

- Planning Career/Building toward a Career

- Self Assessment
- Market Assessment
- Writing Resume
- Writing Cover letter
- Standard Parts of Letters
- Optional Parts of Letters

Communication through Technologies:

- Challenges to the Organization Made by New Technologies
- Oral Communication (Video Conference, Mobile , Microphone)
- Written Communication (Emails, Chat, SMS, Fax)

Meetings:

- Types of Meetings
- Purpose of Meetings
- Arrangement before Meetings
- Strategies to Run a Meeting Effectively/Chairing Meetings
- Participating in Meetings
- Answering Questions
- Panel Discussions

Interviews:

- Taking and Giving Interviews
- Understanding the Interview Process
- Types of Interviews
- Purpose of Interviews
- Preparations before the Interviews
- During the Interviews
- Ending of an Interview
- Questions That Can Be Asked by Both Interviewer and Interviewee
- Media Interviews

Rhetoric:

- Definition
- Steps to Be a Rhetorician
- Importance of Rhetoric
- Rhetoric in Writing
- Rhetoric in Speech

Business Communication and Ethical Context:

- Background to Ethical Context
- Ethical Situations
- Ethics as a Communication Issue
- Ethics and Corporations
- Influence on Personal Ethics

Appendix B

Communication Skills	
Course Code:	EG-213
Credit Hours:	3+0
Pre-Requisite:	None
Recommended Book(s):	• Effective Business Communication by H.A.Murphy • Business Communication by Bovee • Business Communication: Strategies and Skills by Mary Munter • History of Language by Alfred Avon A Guide to Customer Service Skills for the Service Desk Professional by Donna Knapp 4th Edition • Communication Skills for Technical Students by T.M. Farhathullah, Orient Blackswan, 2002

Course Objectives:

This course aims at providing students with a sound base of communication skills and prepares them for both oral
and written communication. Students will learn to communicate professionally and competently in an International
language with equal ease and will also get trained in both inter and intra personal communication when it comes to Software House environment in Pakistan or abroad.

Course Outline:

Language:

- History of Language (may be skipped to make space for others)
- Language as Knowledge Base Process
- Language for Describing Objects and Procedures (in CS)
- World's Major Languages (where IT is flourishing)
- Impact of Language in a Social, Business Life and Computer Science Industry

Communication:

- Theories of Communication
- Internal and External Communication
- One way/Two way/Upward/and Downward Communication
- Communication in Organization Settings
- Communication Challenges in Today's World/Work Place (software House)

Communicating in Teams:

- Strategies for Team Communication
- Resolving Team Conflicts
- Characteristics of Effective Teams
- Strategies for Successful Interpersonal Communication (ALL as per SW House)

Communication & the Global Context: (CS Context)

- Importance of Communication Across Cultures;
  May be replaced with Importance of Communication in Software Industry
- How to Improve Across Cultures Communication
  w.r.t Software Industry
- Improving Intercultural Sensitivity
  (may be skipped)
- International Communication
  may be replaced with Communication with International Clients in a Software House
- Art of Writing for Winning Technical Projects

Appendix C

Interview Questions for Employers / Evaluators

Course Outline Preparation

Sr#	Question
1	What are the main strengths and weaknesses w.r.t communication skills, of NUML CS graduates working in your organization?
2	Do you feel that improving command on English language will improve performance of employees in a software house
3	Do you think NUML graduates in your software house can fulfill the needs in communication skills of the industry?
4	Are NUML CS graduates good enough to verbally express their thoughts, ideas and issues in English?
5	Are NUML CS graduates good enough to express in writing, their thoughts, ideas and issues in English?
6	How often do have you observed NUML Graduates communicating in English apart from formal meetings?
7	Which part of the language is most difficult for NUML graduates? Mark all that apply: a. grammar b. vocabulary c. speaking d. writing e. listening f. reading
8	In what situations do NUML graduates run into problems with English? Mark all that apply: a. the manager asks them to do something new b. manager needs to explain a new problem to the team c. team members have to write something to international clients. d. International clients communicate with the team members directly.
9	Do you believe that improving English would make job easier for your employees?
10	What skills would be most useful? Mark all that apply: a. understand spoken English, like instructions & announcements b. understand written English like memos, explanations of procedures, orders etc , c. to ask questions and report problems (speaking) d. write in English
11	What language skill is most important to you? Mark all that apply: a. that employees can understand commands b. that employees can report a problem c. that employees can ask for help d. that employees can explain things
12	Do you feel ESP version of English in place of General English would be useful for CS graduates in Pakistan?
13	Which tasks are most common in a software house that require high proficiency in English?
14	Suggest what would you like NUML CS students to learn in their English language course w.r.t to software industry?

Appendix D

Interview Questions for Employers / Evaluators

(Evaluation of Subjects)

Sr#	Questions
1	Are subjects able to write and demonstrate technical specifications of a software?
2	Can subjects prepare memos?
3	Can subjects write letters to higher ups or other organizations / clients etc?
4	Can subjects prepare agenda points of a meeting and present them to their team leads?
5	Can subjects prepare meeting minutes?
6	For a software project, can subjects effectively present its proposal?
7	Can subjects present software's manuals before client?
8	Can subjects identify and write technical specifications of a software?
9	Can subjects prepare Tender document for a software project, hardware procurement or networking solutions?
10	Can subjects prepare Bids for a software project, hardware procurement or networking solutions?
11	Can subjects effectively write down project introduction that covers all its major functionalities?
12	Can subjects communicate with international clients in a formal meeting environment?
13	Can subjects negotiate with national and international clients over cost or any dispute in a formal way?
14	Can subjects provide technical support for software or network solutions to national and international clients in oral and written forms?
15	Are subjects capable of using digital media for communicating with the clients in formal way?
16	Can subjects use social network effectively for business purposes?
17	Can subjects prepare effective and correct written and oral materials for business promotion on different types of social media?

Appendix E

National University of Modern Languages

Faculty of Languages

Section I Biodata

Name: _____

Designation: _____

Experience: _____

Company: _____

Will you be available for both phases of evaluation of students: **Yes / No**

Do you have NUML graduates working in your software house: **Yes / No**

Have you reviewed Communication Skills course outline: **Yes / No**

Section II Speaking Skills

How frequently do you feel, the employees have to speak / present the following at job:

Sr	Document Type	Never 1	Sometimes 2	Often 3	Vey Often 4	Always 5
1	Email					
2	Memo					
3	Letter					
4	Agenda					
5	Minutes					
6	Technical Report					
7	Proposal					
8	Manuals					
9	Technical Specifications					
10	Tender					
11	Bids					
12	Project Introduction					

Section III Writing Skills

How frequently do you feel, the employees have to write / prepare the following at job:

Sr	Document Type	Never 1	Sometimes 2	Often 3	Vey Often 4	Always 5
1	Email					
2	Memo					
3	Letter					
4	Agenda					
5	Minutes					
6	Technical Report					
7	Proposal					
8	Manuals					
9	Technical Specifications					
10	Tender					
11	Bids					
12	Project Introduction					
13	Presentation					
14	Meeting with Client					
15	Negotiation with Client					
16	Technical Support					
17	Video Conference					
18	Conference Calls					
19	Communication on Social Network					
20	Business Promotion on social media					

Topics you feel should be added in the Communication Skills course (if any) _____

Signature: