MSc Project Management

Dissertation

The Influence of Educational Technology and an Analytical Study of it's Efficacy on the Education System in Al Ain

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ABSTRACT

Technological development has always been incorporated in facilitating education. Be it the "quill" of the middle-ages, the fountain pen and the ball pens of the 19th and 20th centuries or the latest development of electronic pen, all have been technological advances, on sticks dipped in color, used earlier in human history to record knowledge. Newer and recent technological advances, namely, films, televisions and projectors have all been utilized with varying degree of success in man's long quest of assisting and improving the edification process.

The IT induced technological tsunami which seems to have completely submerged modern society has not left the education sector unscathed. Schools, in the mad rush to be up-to-date, have been scampering to buy computers and other related equipment to implement and integrate ET within their existing teaching methods. Unfortunately, in the haste to integrate Educational Technology (ET) and to make the edification culture more relevant to the modern society, little consideration has been shown for appropriate planning, i.e. awareness level, homogenous distribution and overcoming reluctance.

The aim of this research is to look at the extent and efficacy of ET integration and implementation in the city of Al Ain. Additionally, the study aims to recognize any obstacles which might be hindering smooth ET integration in the traditional teaching system and recommend possible solutions.

Extensive surveys, to deepen understanding and interpretation of the results, were conducted among teachers, students, parents, schools and government organizations. The data, while dispelling certain stereotypes about lack of ET awareness, did show profound imbalance in ET distribution among different schools and underlined the need for extensive work in ET planning, teacher development courses, maintenance of equipment and other related issues.

It is hoped that the findings of the research, about the factors determining efficient ET implementation, will go a long way in changing schools' existing importance criteria of limiting ET incorporation only to the higher grades to giving attention to the lower grades as well. Even the Kinder Garten (KG), at the last rung of the school ladder, should not be deprived of ET as it is the building block of the whole educational edifice.

Dedication

This dissertation is dedicated to my parents, family and specially, my son ***Manea***, because I couldn't always be with him during his serious sickness and operation. I sincerely appreciate their undying love, constant patience, ceaseless encouragement and unwavering support.

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This dissertation would not have been possible without the assistance and support of a number of special individuals and institutions. I would like to use this opportunity to thank them for their unceasing support and encouragement.

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Chapter 1: Introduction

1.1: Background

Learning process starts from birth, when a hungry crying infant, trying to find his natural source of nourishment, looks around, gropes, and slowly learns how to find his/her mother's breast. This groping, experimenting and learning doesn't stop here, but rather is a constant process which continues throughout one's years till one meets his demise. Learning is a life long process of constant trying, experimenting, and deducing. "Education can be described as a process which equips the learner with knowledge, skills and experience at a level where insight and criticality are achieved". (Peters, 1966)

How humans learn

There are two ways humans learn, either through their own experiences as a "trial and error" method where from the result of their action they learn whether the action was beneficial or not, or they learn by listening and learning from someone who's had prior relevant experience. Early humans started the former way since there was no one to learn from. If something harmed or scared them, for example dangerous animals, lightning or a volcano, they avoided it; similarly if something or an action was found beneficial they tried using it or mastering it, for example, use of edible fruits or the use of fire. But humans quickly found out that there was a problem with this "trial and error" method, it only lasted till the person, who had learnt it, lived. Whatever was learned by the individual died with him and the others had to relearn again and again and again. There was no preservation of knowledge.

Birth of teaching institutions

Time passed and the hunter-gatherer culture gave way to settled life. People first started living together, in small families, in caves, and then in bigger settlements, near water sources, such as villages. Humans started transferring what they had learnt through their experience to their young ones. This transmission of learned knowledge (teaching) took care of the continuous relearning process and a slow process of preservation, dissemination and furthering of knowledge started. Gradually, as civilizations grew and matured, this didactic teaching concept became institutionalized, i.e. the untutored would be gathered at a special place and taught all the knowledge gathered through experience which was considered necessary for survival in a particular society. A new institution for the dissemination of education was being formed, the school. Schools, (places where knowledge is disseminated) with a teacher lecturing eager disciples, have been with us even before the time of early philosophers, namely, Plato and Aristotle. "The purpose of education in this society is to bring the kids up to be conversant with the most important ideas and the representation systems that are used to express them." (Kay, 1991).

Specialization in information dissemination

As civilizations evolved and humans got more experienced and gathered more information they had more knowledge to impart. Specialized schools divided according to age or ability, for teaching different disciplines had to be created. Schools catering to different age groups, ranging from early childhood to adolescence to adulthood, thus came into being. Knowledge gathering (attending schools) gained social importance. People having school knowledge were considered important because they had the collection of all the human experience. Accumulating knowledge provided power.

In fact, as societies continue to evolve and develop school knowledge or academic knowledge, as it came to be known later, was considered so important that certain societies made it compulsory for young people to attend schools for a particular period of time to be considered worthy individuals. Societies started evolving certain academic standards to judge the knowledge of a particular individual based on the number of years he/she had spent in particular academic institutions. A person without academic education was considered powerless. Knowledge itself had become power.

Incorporation of ET in the edification process:

Through out this long knowledge gathering human journey till present the basic mode/style of teaching has been more or less didactic in nature, i.e. one teacher standing in front of the class and enlightening knowledge seekers. As societies developed culturally as well as technologically, innovative and improved ways of performing tasks were developed leading to an improvement in the standard of life.

The Education process, like other facets of the human lives, equally benefited. Humans incorporated new found tools and technology in their quest of propagating and preserving knowledge and to make the overall edification process better. For example, the use of sticks – being used as pen – on land, gave way to colored stones and dyes used on cave walls, cliffs and later on leather to write and to write on. Later, as technology improved in the middle ages man started using quills and liquid ink leading to fountain and ball pens of the twentieth century. Films, television, projectors and the recent addition of computer aided education have all been important steps in this long saga of integrating technology in improved propagation of knowledge.

While Information Technology remains a relatively recent phenomenon, the promotion of educational reform resulting directly from classroom use of new tools and equipment has been around for more than a century. Efforts to reform education through computer infusion and the histories of deploying earlier audiovisual technologies such as film, radio, and television have been applied in many parts of the world. “The question is no longer whether to use technology in education institutions but how to use technology to change practice to reach

new goals—as a catalyst for change and as a tool in creating, implementing, managing, and communicating a new conception of teaching and learning, as well as the system that supports it" (Cradler & Bridgforth, 1996).

"Technology in schools has been cited as a means to improve learning, increase accountability, power school reform, decrease the digital divide, and provide the tools needed by today's students to become tomorrow's knowledge workers" (Bozeman, 1998); (Conte, 1997); (Glennan & Melmed, 1996); (Gooden, 1996); (Kerr, 1996); (Mehlinger, 1995); (Puma, Chaplin, & Pape, 2000); (Reich, 1991); (Sandholtz, Ringstaff, & Dwyer, 1997); (Thornburg, 1999) and(U.S. Department of Education Office of Educational Technology, 2000).

A close look at technologically leading nations clearly shows that Educational Technology (ET) is considered to be an indispensable part of the education delivery process. A 1998 study in the US concluded that implementing technology in schools was a top priority of the American public (Milken Exchange on Educational Technology, 1998). This is reinforced by the 2000 Phi Delta Kappa/Gallup poll findings that "69% of the American public believed technology has improved instruction in their local schools, and 82% indicated more should be invested in technology" (Rose & Meyer, 2001).

Educational Technology in Al Ain:

Although a number of private schools have been successfully operating, the educational process in Al-Ain is mainly government driven, as in other GCC countries and the government is keen on developing education. The provision of ET in Al-Ain, in response to a quickly changing technological environment, is currently undergoing rapid development and transformation. With nearly every facet of our lives being influenced by technology it seems only natural to add education to this growing list. There is growing realization that in an increasingly technology reliant world, Educational Technology (ET) programs designed to meet the needs of the demanding technological environment must be planned and coordinated efficiently.

Having extolled the benefits of technology it should be remembered that any technology is only as good as its use. Improper use will not only jeopardize the attainment of the desired benefits, but it, in fact, could harm the basic knowledge propagation process. ET should not be considered a magic potion to cure all our school troubles. "While technology is not the solution to every problem, we are unlikely to obtain the schools we want until we take greater advantage of the power of modern technology and its appeal to youth" (Mehlinger, 1995).

1.1.1: Traditional Education versus Non Traditional Education

Traditional education is generally defined as, "a long-established and generally accepted custom that is found in schools that society deems appropriate"(http://en.wikipedia.org/wiki/Educational_technology). Its only natural to

ask, what is this long-established custom? Traditionally, "Traditional Education" has been defined as teacher centered classrooms where students are matched by age and, as much as possible, by ability. Students learn through listening and observation. The teaching material is based on text books, lectures and individual written assignments and there is a respected distance between the teacher and the students.

Countering this traditional approach, critics recently have been advocating “alternate approaches” which emphasize student centered classes where teaching methods employ hands-on activities, student-led discovery, and group activities; instead of having independent subjects “alternate teaching methods” use integrated, interdisciplinary subjects or theme-based units. These methods also pay significant attention to social development, including teamwork, interpersonal relationships, and self-awareness with teachers working more as collaborators rather than an authoritarian figure (http://www.wikipedia.org).

Educators have been battling for the supremacy of one or the other mode of education since the early part of 20th century. Strong points in favor and against have been put forward by intellectual on both sides of the debate. As early as 1932, the Communist intellectual Antonio Gramsci, (Gramsci,1971) favored the traditional style to teaching against the, "paradoxical consequences of the new "democratic" education that stressed naturalistic approaches over hard work and the transmission of knowledge". (Hirsch, 1997) Gramsci wrote from jail (where he had been imprisoned by Mussolini) that "Previously pupils at least acquired a certain baggage of concrete facts. Now there will no longer be any baggage to put in order…. The most paradoxical aspect of it all is that this new type of school is advocated as being democratic, while in fact it is destined not merely to perpetuate social differences but to crystallize them in Chinese complexities."

On the other hand another prominent educational theorist of the era, Paulo Freire (Freire,1970) who like Gramsci, was interested in methods of educating the poor, but unlike Gramsci, rejected traditional subject matter and derided the "banking theory of schooling," which, in his contention, only provided children with a lot of "rote-learned" information. This conservative approach, according to Freire, numbed the critical faculties of students and preserved the oppressor class. Freire, not only demanded a change in the teaching content, but also in the methodology.

More recently, E.D. Hirsch, Jr. a strong advocate of traditional style of teaching with many successes in reintroducing traditional style of education in the USA under his belt, observed, "History has proved Gramsci a better prophet than Freire. Modern nations that have followed Gramscian principles have improved the condition and heightened the political, social, and economic power of their lower classes. By contrast, nations that have adopted the principles of Freire have failed to elevate the economic and social status of their most underprivileged citizens." (Hirsch, 1997)

Whatever way of edification process is chosen, the undeniable fact remains that in this increasingly technology dependent world, the most important sector of education, on which the foundation of the future success relies, can not fulfill its role if it is denied the technological aids in spreading knowledge. If there is a mandate to rethink the relationship between education and technology, it is not because technology – by itself – makes people smarter. Anyone who presents such an argument is simply hawking "the new thing." The real reason to rethink education around the question of technology is that the technology is here – and it is embedded in modern life: in appliances, communications systems and transportation systems. It is not going to go away. As a result, one simply cannot enjoy all of the opportunities afforded him in this new cultural moment unless he is literate in the ideas of his time and the technologies used to express them.

This study does not concentrate on the method (traditional or alternate) of education rather it looks at the role technology plays in helping any teaching method reach its full potential in furthering man's quest of equally and competently disseminating knowledge to all members of the society with an special focus on Al Ain. Coming to the area of research, i.e. Al-Ain, it becomes evident that the introduction of Educational Technology, unlike other parts of the world which have a long tradition of experiments with dispensation of education, has been a recent phenomenon. "The introduction of Educational Technology, unquestionably an important segment of the overall knowledge dissemination process in developed nations, is a new and un-chartered territory in the Gulf particularly in the UAE" (Ebrahim, 2000). Though experiments with the mode of education have been scarce but technology fortunately is not. Many studies have been conducted and different methods have been adopted for the induction of technology in local school system. The question is not whether ET is useful or not but why hasn't it caught on in all the schools and what is hampering its universal application?

1.1.2: E-Learning

The purpose of education is not just limited to bringing alphabetic and numeric literacy to the students but to developing well-rounded, literate citizens. For the healthy growth of a society it is imperative that its citizens develop a fluent understanding of the history of ideas. Referred to as "the spirit of the age", in the eighteenth century, education must make students strive to become fluent in the ideas of their own time. To succeed in becoming fluent in these ideas, learners must – as Apple Computer's Alan Kay suggests – understand and be able to manipulate the systems of representation that bring them to life. And to do that, learners must be social creatures, because learning only takes place when there is an exchange of ideas (Kay, 1991). As far as ET is concerned ***e-learning*** is facilitating the exchange of ideas on a global basis. When people talk about education these days the conversation frequently turns to modern technological advances and specifically to e-learning, but like everything else associated with the Internet, the term e-learning is subject to much mystification and hype.

What is e-learning? e-Learning is the use of network technology to design, deliver, select, administer, and extend learning (Masie,2003) Simply put, it is a means of becoming literate, involving new mechanisms for

communication: computer networks, multimedia, content portals, search engines, electronic libraries, distance learning, and web-enabled classrooms. E-learning is characterized by speed, technological transformation and mediated human interactions. E-learning has literally taken the class out of the school, through the virtual world of internet, and into the bedroom of every potential student, connecting learners, educators and the community on a global scale, and has forced us to rethink the purpose and architecture of our educational infrastructures in very fundamental ways.

Moreover, because of the mobility that is characteristic of e-learning, it has become embedded in many daily activities, and has the potential to completely revolutionize our understanding of the time and place for learning. In the accelerated new world where knowledge workers are frequently called upon to add to new skills, e-learning offers us new ways to think about designing and delivering education – not just between the ages of 5 and 18, but across the lifetime. E-learning has the capacity, as Merrill Lynch analyst Michael Moe has said, to replace "just-in-case" learning with "just-in-time" learning. (Michael, 1999) Admittedly, e-learning is not expected to replace the traditional classroom but it has considerable potential to change the purpose and function of the classroom.

Our fascination with e-learning and how it is transforming our ways of communication shouldn't lead us to ignore the fact that e-learning is merely a tool made possible by advancement in technology and is not to be confused with ET itself. As described earlier humans have been using technology to improve their learning and to preserve knowledge for a long time. All these devices were simply tools in our continuous struggle to find new efficient ways of propagating education. Computers and information technology only happen to be the latest, albeit a considerable, addition to this long list of tools and e-learning is just one component of this vast and varied tool. If there weren't any information technology there wouldn't be any internet, and if there weren't any internet there wouldn't be any e-learning. E-learning is merely a part of this vast field called Educational Technology**.**

1.1.3: Educational Technology (ET)

Technology has literally transformed modern everyday life, whether one is at home cooking, watching television, working, using recreational facilities & sports, needing medical assistance, communicating with loved ones or just enjoying a nice relaxing long drive, technology is found busy assisting and helping people lead a better, more productive and easier life. All these developments were only possible because of education and the tremendous influence technology has had in improving in its propagation and preservation. The absolute domination of IT on the current communication network has led to a complete transformation of the way humans interact with each other and gain knowledge (Uline, 1996). On the other hand, underlining the debate on ET's influence on education (Clark, 1994) emphatically declared, "media will never influence learning" demonstrating the contentious division of opinion on the efficacy of ET.

However, the reality is that like other modes of technology, ET, especially computers and computer-related peripherals, has grown tremendously and permeated all areas of education. Just as it is incomprehensible that anyone today would argue that banks, hospitals, or any industry should use less technology, similarly it is unfathomable for most young people (or for any one for that matter) to understand arguments that schools can exist without technology. For them, use of the Internet plays a major role in their relationships with their friends, their families, and their schools. "One thing teens and their parents agree is the enormous influence internet has had on teen life, but where as parents emphasize its academic benefits, teens prefer to focus on internet's social aspects." (Abd Al Aziz, 2003). It seems that IT and ET are here to stay.

Internet is becoming an increasingly vital information gathering tool in our information obsessed society. More people around the world are going online to conduct such day-to-day activities as personal correspondence, business transactions, research & information-gathering, and job searches. Each year, being digitally connected becomes ever more critical to economic & educational advancement and in community participation.

A large number of Al Ain schools regularly use the Internet to conduct daily activities thanks largely due to the MOE policy which stipulates that each school regardless of its grade should have internet access. AAEZ considers lack of access to these tools can act as a severe impediment for the advancement of educational institutions therefore, raising the level of digital inclusion by increasing the number of citizens using technological tools of the digital age is a vitally important national goal. Etisalat and the Al Ain Educational Zone (AAEZ) have signed an agreement to supply internet connection under the banner called "business one" costing each school AED. 500 per month.

The incredibly rapid growth of information, which likely would not have been possible without internet, has forced education experts to conclude that in future "Research centers with no computers would arouse suspicion about the comprehensiveness, accuracy, and currency of their information because science and mathematical information grows daily and much of that new information can only be found through the use of technology. In fact, very few would argue with the statement that computers are essential to the work of professional scientists and mathematicians" (Alderman, 1998)

Having realized that a society cannot have a significant and meaningful progress without a technologically assisted education system since the success of any nation depends on the quality of the education, it is easy to realize how important a role technological advancement in education can play for Al Ain in particular and the UAE in general. One just can't help but conclude that having technology to aid current methods of teaching is the only way towards educational development and eventual success in the modern world.

1.2: Problem statement

The purpose of this study on the influence of Educational Technology (ET) on Al- Ain city, is to assess its still partial implementation in different schools in the Al Ain Educational Zone (AAEZ) despite ET's established importance in the initial teaching process. The study further analyses the current requirement for ET; calculates the cost and the availability of funds needed; evaluates relevant previous work; recommends means to overcome any anticipated obstacles for its eventual successful implementation.

The study's problem statement is, "Lack of homogenous ET implementation and ET awareness in all Al Ain schools." In addition, this study will contribute in giving the decision makers in Al-Ain Education Zone (AAEZ) a comprehensive blueprint to further develop and assess the process of integrating traditional education with educational technology.

1.3: Aims and Objectives

Aim

To assess ET's limited implementation in different schools in the Al Ain Educational Zone (AAEZ) by analyzing the current requirement for ET; calculating the cost and the availability of funds needed; evaluating relevant previous work; recommending means to overcome any anticipated obstacles for its eventual successful implementation.

Objectives

1. Investigate the current requirement of ET in Al Ain schools.
2. Examine the suitability of the local environment to ET and evaluate local schools' ability to cope with the transition from the traditional teaching style to the technologically aided one.
3. Assess the gap between the "enthusiastic" and the "reluctant" potential ET users and develop sound argument about the advantages to overcome the resistance.
4. Determine an ideal learning environment for a balanced education.
5. Calculate the expected incurring costs together with required funds.
6. Recommend a process of implementation and any further needed application.

1.4: Research Questions

The following research questions will investigate the aims of the study.

1. What kind of existing ET hardware/infrastructure do the schools have?
2. Is the existing hardware actually being used or sitting idle?
3. What do the people associated with ET development in schools think about ET awareness, fears and barriers, and its implementation?
4. What is the current level of ET specific technical support provided in Al Ain schools?
5. What have the schools, possessing existing ET infrastructure, learned about the required resources, government assistance, obstacles and any other needs vital for ET implementation?

1.5: ET Situation in Al Ain

Before delving in depth in literature review about ET in general let's zoom in on Al Ain and look at the ET situation. Figure 1 show the location of Al Ain.

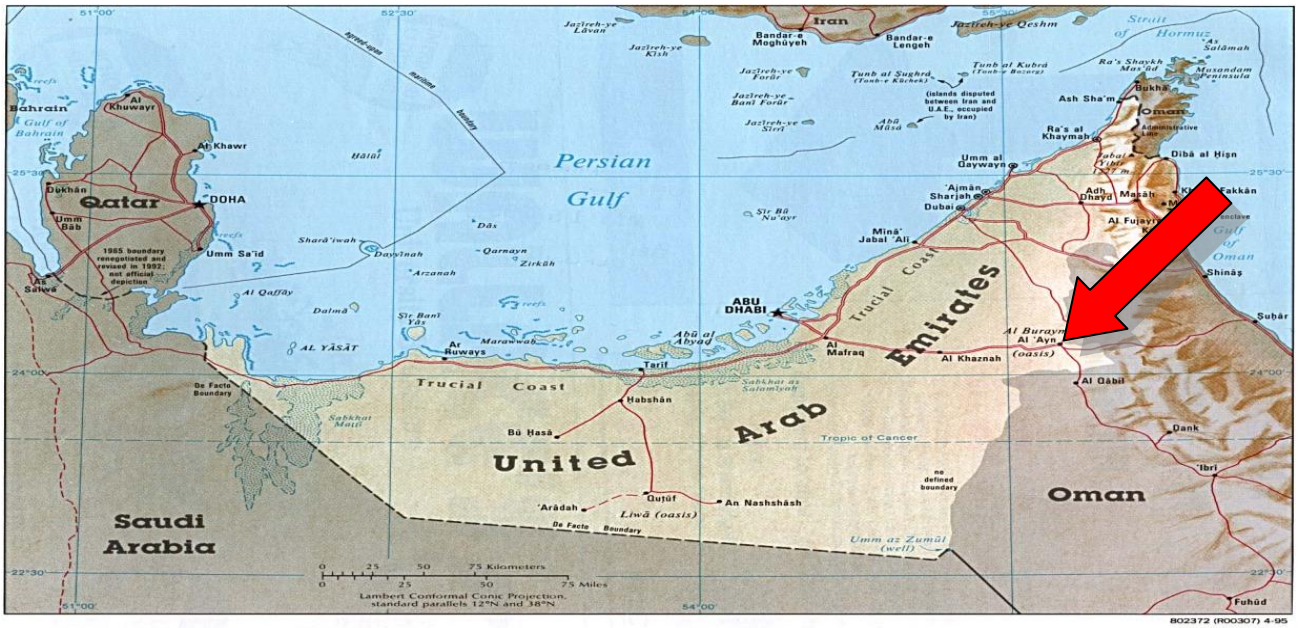


Figure 1: The UAE Map with the red arrow specifying Al Ain location

Despite an increasing national realization in the potential value of computers in education and its benefits in promoting educational technology, it seems that at least in Al Ain, the degree of change has not reached the expected or desired level. There had been tremendous initial interest among schools in upgrading themselves by adopting technology. A number of schools bought extensive amount of equipment and established extensive labs. Some schools in their eagerness not to be left behind even wanted more than they could possibly use. “Schools in their unbridled enthusiasm in getting ahead of each other in computer acquisition seem to have shunned prudence for “educational” glamour” (Zeid & Aid, 2003) During site visits it was found that a particular school although having only 28 rooms ordered and insisted on having 34 multimedia projectors. While it paints a rather dismal planning picture, nevertheless, evident enthusiasm was very encouraging. Expectations were high, “however, one fervently hopes and wishes that this zeal and zest will also produce the eventual progress and improvement in educational standard, the original objective of this enterprise”. (Zeid & Aid, 2003)

Although every school at present has ET equipment to a certain extent, a great disparity in the numbers of allocated PCs at different schools is evident. On one hand, some schools having only one or two PCs are being passed as ET integrated, while on the other, some, called "modern schools" are properly equipped, sporting state-of-the-art ET paraphernalia. This divide clearly demonstrates the transient ET integration phase Al Ain education

is currently passing through. The good news is that the government is taking keen interest and funds are readily available from the MOE and Abu Dhabi Education Council.

The significant technological disparity among schools has given rise to questions about the equality and quality of education being delivered at schools deprived of technological aids. “Technological disproportion has resulted in lopsided education with graduates from Educational Technology equipped schools having a better chance at landing better jobs and social standing.” (Abd Al Teef, 2005).

The social aspect of this ET imbalance among schools in Al Ain and people associated with schools is driven home when one realizes that having technology is perceived as keeping pace with time and being efficient. Schools having ET are generally considered better and enjoy a higher status than the schools which do not have ET. Schools without ET feel neglected and rightly complain about not having the same kind of standards as those of the schools benefiting from ET. Schools bare of technology not only give a forlorn look to the beholder, but also sow a deep sense of inferiority complex among the parents, students and teachers. Parents who send their children to technologically advance schools feel proud and satisfied that they are getting the best education for their children. In this technology driven world parents eagerly, and one would say rightly, want their children to have the edge when they finally graduate and enter the practical world (Adler, 1991).

Parents, whose children study in ET deprived schools, are always striving to provide the best education which means more coaching for their children to compete with students from better equipped schools. Inability to achieve this not only increases their frustration but also adds to the financial cost as private coaching doesn’t come cheap. Further more the time cost is enormous. Students have to devote more time and are deprived of their precious leisure time. This constant effort to keep up with the Jones inevitably takes it toll on the parents as well as their offspring resulting from bad behavior at school to mental or physical problems. Children under constant parental pressure behave aggressively and can suffer serious emotional problem as they grow into mature adults.

The consequences of social pressure are not just confined to parents and their children, teachers are affected by this technology imbalance too. They not only have to put up with the social stigma of teaching in an “ET deprived backward” school but they themselves start considering their schools as disadvantaged and underprivileged giving rise to inferiority complexes. The end result is increased resentment and job dissatisfaction with it's more devastating effect on the standard of education.

Summary

The importance of education can not be emphasized enough. What ever help it can receive from any quarter should be more than welcome. In this increasingly technologically dependent modern world it would be a great,

even criminal, disservice if education were denied the invaluable assistance Educational Technology can offer in efficient functioning of the knowledge transferring process.

This chapter explored education in general, its historical background and how it had repeatedly been facilitated by ET in its long evolutionary journey. Furthermore, the problem statement, aim and objectives of the research were enumerated and a clear study of the current ET situation in Al Ain was illustrated.

The next chapter reviewing the available literature will scrutinize what eminent scholars have believed and penned about ET objectives mentioned above.

Chapter 2: Literature Review

2.1: Educational Technology Awareness

This chapter consists of a review of relevant Educational Technology (ET) literature with a reference to ET awareness judged by its history, relevance to modern society, advantages & disadvantages, impact on the society and implementation. The literature review will let us know the extent of awareness, a key component towards integrating ET with the present school system.

A thorough look at ET history will give us a complete picture of global ET awareness and knowledge about how ET was promoted; later the local historical ET review will help in comparing and analyzing the situation. Learning from the world experience will help in coming to the right solution for ET implementation in Al Ain and to tackle any flaw or deficiency.

Understanding the relationship between Traditional Education and Educational Technology is also vital to compare and come to the best implementation arrangement. Once the relationship is determined only then a credible plan can be devised for ET's integration with the present education system.

A complete and comprehensive appreciation of ET awareness and a grasp of the relationship between Traditional Education and Educational Technology will be essential in analyzing ET's social impact and the pros and cons of ET implementation in Al Ain.

2.1.1: Defining Awareness

The awareness assessment, based on a survey in Al Ain, UAE, examined the AAEZ cadre's perceptions and awareness level about Educational Technologies, about the role of technology in education, and how the AAEZ cadre sees the technological problems that are faced by basic education school systems in Al Ain. A key concern of this part was to assess and determine the amount of ET awareness in Al Ain schools by looking in to what others said about awareness. Awareness, or more specifically ET awareness, means whether people in general have the knowledge about the technology and the expertise to operate it in a useful manner.

Many researches define awareness as a human's perception and cognitive reaction to a condition or event. Awareness does not necessarily imply understanding, just an ability to be conscious of, feel or perceive. In general, "awareness" may also refer to public or common knowledge or understanding about a social, scientific, or political issue, and hence many movements try to foster "awareness" of a given subject. Examples include ET awareness. (Adams, Foorman, Lundberg, & Beeler,1998); (McBride-Chang,1995)

According to (Ridley, Schutz, Glanz,& Weinstein, 1992) awareness includes:

1. Conscious identification of what you already know about ET.
2. Defining ET learning goal.
3. Considering available ET resources (e.g. textbooks, access to the library, access to a computer).
4. Considering ET task requirements (essay test, multiple choice, etc.).
5. Determining how ET performance will be evaluated.
6. Considering all parties motivation level.
7. Determining level of anxiety in ET's use.

The awareness and the use of computers in education open a new area of knowledge and offer a tool that has the potential to change some of the existing educational methods. Teacher is the key to the effective exploitation of this resource in the educational system. As computer use continues to increase in society, educators must also prepare for the use of computers within the classroom. This involves all levels of education. (McCannon & Crews, 2000)

Facilitating teachers planning process (Hizal, 1989) indicated that, the process of planning for technology awareness and use should consider the teachers' beliefs and knowledge about technology as it has a great bearing on the decisions they make about choosing strategies, procedures and materials for instruction.

School administrators and government authorities are advised by experts that the role of the ET decision maker, to increase the level of awareness, evolves from that of a giver of information to that of a facilitator of student learning. It is further made clear that new technologies already exist to help teachers complete that evolution. (Downs, Clark & Bennett, 1995)

Present research wants to assess how far Educational Technology has been effectively integrated in the current education system and how the use of technology can help in furthering the overall knowledge gathering process.

2.1.2: Definition and History of ET

Definition

Educational (or instructional) Technology (ET) has been defined in many ways. According to the Association for Educational Communications and Technology (AECT) "the theory and practice of design, development,

utilization, management and evaluation of processes and resources for learning" constitute instructional technology (Saettler, 1998). This definition corresponds an earlier one of (Saettler,1968), who proposed a definition that combined both the physical science (tool) concept with behavioral science ideas which include techniques for design, implementation, and assessment. However, "because such definitions are focused on instruction, critics have suggested they narrow the perspective of those seeking to understand the context of instructional materials in ways that preclude broader organizational, social, and systemic questions" (Kearsley, 1998).

Others have defined ET as "a physical tool specifically referring to digital technologies separate from the methodology of its use in education or the social value given to it". (Lerman, Mohun, & Oldenziel, 1997) Such a separation narrows the focus but allows a research on the interplay between object design and its social construction.

This study takes its inspiration from both (Saettler,1998) and (Kearsley,1998) in defining educational technology as digital information technologies in education, including workstations and servers, multimedia components, computer-controlled instruments, networking & telecommunications infrastructure, networked information and tools accessed through computers using specialized software and hardware.

History

As stated before, ET has been used as a means for furthering knowledge from the time man started using a twig to scribble on the ground to the twenty first century when he started using computer enhanced magnetic pens to directly write on the computer screens. Our enthrallment and absorption with the relationship of technology and education continues to this very day.

It becomes apparent when one looks at the local historical scene that, back in the eighties, there were no planned concerted efforts on part of any government or significant private organization to introduce computer aided educational technology in the UAE schools. "There were various individual efforts by certain schools (private) which, on their own, dabbled in introducing computer technology and established small rudimentary labs", (Technical Training Department,1996).

Concerted attempts at integrating computer aided Educational Technology with traditional education in the UAE in earnest started in the 1990s. In the early nineties the government started taking interest and AAEZ was among the first education zones to acquire Educational Technology to further its ambitions. "In the 80s educational technology in a majority of schools only consisted of having a TV, a VCR and at the most, rarely used data shows" (Technical Training Department, 2000).

“In 1995, **H.H. Sheikh Zayed** *(may God bless his soul)* took personal interest and under his supervision tens of computers and printers were donated to 15 selected male and female schools in Al Ain with win95 as their operating system,” (Ebrahim, 2001). This was a great start although the fact, that those computers were not for the exclusive use of teachers and students but were to be shared by administrators, teachers and students, somewhat hindered and restricted their overall benefit as time slots became a bone of contention. Nevertheless some schools even went as far as establishing their own computer labs but they had to do without the benefit of internet or networking, (Ahmed ,1997).

In the year 2002 the idea of "modern schools" was initiated by the offices of **H.H. Sheikh Zayed** in Abu Dhabi with the clear intention of integrating ET with the prevailing education system. “Several delegations were sent around the world to countries leading in Educational Technology, namely Singapore, Australia and Canada, to assess how technology had successfully been integrated in those countries and suggest how the same could best be done in the local context”, (Ebrahim, 2001). After the aforementioned recommendations by the concerned authorities, schools of different grades, equally divided among males and females, were selected from Al Ain. The idea was to make these schools competent building blocks, equipped with modern knowledge, to help in the future intellectual growth of the country. A sizable budget of AED two million was allocated to furnish and equip each selected school with complete educational technology paraphernalia. “The successful implementation of the proposal was a testimony to the government’s resolve in bringing UAE education at par with that of the international community.” (Ebrahim, 2001). Within a few years positive results started to be acknowledged. With the establishment of Abu Dhabi Educational Council in 2005, this initial successful experiment was broadened to cover all government owned schools in the Emirate of Abu Dhabi.

At present, largely due to the past effort, a majority of government schools already have necessary technological equipment; however, despite the availability of essential ET infrastructure a certain discrepancy in the level of technological competence among individual schools has emerged. It seems that the standards have not been kept uniform. Although AAEZ's IT section was given the authority to over see proper implementation and operation, it seems it was just overwhelmed with more work than it could handle. “Consequently a lot of inconsistency emerged in the use and operation of Educational Technology among different schools, with some schools having a much better standard than the others” (ADEC report, 2006).

Looking at the larger world wide picture of Educational Technology development, one learns that integrating computer aided educational technology with traditional education is not a recent phenomenon but one which goes back nearly 50 years. In the 1960s efforts were being made to advocate computer assisted instruction using main frame computers in the US the most technologically advanced country at that time, (Noble,1996). One has to remember it was more than two decades before personal computers became a rage.

Noble describes three phases of computer implementation. The first, as mentioned above, began in the 1960s with "computing proponents advocating mainframe-based, computer-assisted instruction and programming" (Nobel, 1996). However research rather than education was more military focused and as funds came form the defense department it had very little impact on the educational department and the public school system.

It was not until the 1980s that the second phase in the development ET in schools began. The second era started with the arrival of the personal computer (PCs). With the advent of PCs, technology became more accessible and interest in using computers soared. A renewed cycle began in the 1980s with the early PCs, including the Texas Instruments 80 and first Apple IIs. Surveys were done to assess the need and requirement to bring technology to the schools in a more scientific way. It was estimated that in 1982 when only 250,000 computers were being used in the schools the number tripled to one million in 1985 which further increased three times to more than 3.5 million in 1989. But even this rapid growth was found insufficient to cater to the vast number of schools in the main land USA, "with so few computers for the nearly 45 million students, technology had relatively little impact on day-to-day teaching and learning" (Anderson & Ronnkvist, 1999).

The initial euphoria, during the second period, had over blown the benefits of computer aided educational technology with everyone extolling the advent of a new computer age which will somehow change everything. (Noble, 1996) argued that the benefits of computing for these learning strategies using computers were oversold. The focus was more on computer literacy, with great hopes for instruction in BASIC programming or LOGO as pathways to improve cognitive skills (Papert, 1980).

The third era, according to (Noble, 1996) featuring multimedia and telecommunications, commenced in the mid 90's and is still going strong. (Nobel, 1996) further stipulates that this new era just like the previous one is being hailed as revolutionary and being backed by new claims and powerful corporate sponsors without any better prognosis for success.

The North Central Regional Educational Laboratory (NCREL) also divides the history of computer aided educational technology in three phases, but classifies early learning systems and personal computers into the initial phase that extends through the 1980s, followed by a stage of increased computing capabilities using productivity and multimedia software in the early 1990s, subsequently with a new period characterized by advanced telecommunications extending from the mid-1990s into the present (Valdez, 1999). According to (Anderson and Ronnkvist, 1999) this current period will be one of rapid growth in hardware deployment in schools because of decreasing costs of personal computers and the increased interest in the potential of telecommunications. For each phase, the NCREL report documented research studies that indicated a positive link between ET and improved student performance, noting additionally the changing methods of teaching and new options for learning activities (Valdez, 1999).

This analysis gets credence from such notable researchers as (Kerr, 1996) and (Cuban, 1993), who have contrasted earlier, limited-success audiovisual technology deployment efforts such as film and television with the present build-up for computers in schools. They contend that unlike earlier when the technologist had to tout the virtues of their technologies the newest educational technology is getting unprecedented support from parents, the business community, and particularly influential policymakers. As early as the 1980s, "computers were already deviating significantly from the pattern followed by earlier technologies. Much of the interest was coming bottom-up from teachers and students, not just top-down from administrators" (Starr, 1996). In a national public opinion poll conducted in the U.S.A for the Association for Supervision and Curriculum Development released in September 1998, respondents most frequently identified technology as the most important way in which schools had improved in the last 25 years (Association for Supervision and Curriculum Development, 1998).

2.1.3: Relationship among Teaching, Learning and ET

It is very difficult to measure what constitutes good technology, or for that matter, especially, good teaching. As far as good technology is concerned, going through the available literature, one encounters many publications extolling high quality computers and the funds obtained as measurement of technological brilliance; "however, the parameters for both these measures vary from subject area to subject area and, in any case, reflect past achievement rather than current performance," (Herman, 1994). The quality of teaching is even more difficult to assess. Most often, reliance is placed on feedback from students, "which may reflect the style of the teacher rather than the substance of learning" (Herman, 1994). "Although there might not yet be a definitive conclusion since it is becoming apparent that the type of learning that technology best enhances is difficult to quantify" (Johnson, 1996).

Increasingly it has been contented that attempts to find correlations between measures of teaching and measures of technology are futile. Experts assert that the stress on teaching is misplaced. The relationship suggested by (Humboldt, 2001) is between technology and learning. His emphasis is on the shared experience of the instructor and the student in exploring new material, not the transfer of a body of knowledge from one to the other. (Elton, 2001) has suggested that *student-centered* approaches to learning, such as problem-based learning, are the most likely to show a close link between learning and technology, but this has still to be shown empirically. If Elton is correct, it is particularly important for schools that those involved in student learning be also involved in using technology in education.

2.1.4: Relationship between ET & Traditional Education

As previously stated in chapter one, the function and utility of Educational Technology (ET) and Traditional Education (TE) are not adversarial. Traditional Education is dispensation of education in the traditional setting, i.e. a teacher dictating to eager learners. The role of technology is to supplement that role by allowing the teacher to offer more knowledge and awareness – through computer, internet and other communication facilities – so that the student is not only dependent on what is taught in the class but, with more knowledge on his finger tips, is able to ask questions and, in some cases, even question what he is being taught. Therefore it transpires that the role of Educational Technology (ET) is to assist the teaching process, as such, its relationship with Traditional Education (TE) is more of a supplementary and cooperative rather than an a competitive one. "Traditional Education can not be replaced but it can and should be streamlined with the use of up-to-date Educational Technological tools" (Mohammed, 1992).

Delving into the past work done on the influence of technology on education one finds scores of evidence to support the contention that technology is an integral and vital part of imparting education which should not be separated from the traditional way of teaching, rather it should complement it. This contention finds support from (Hattie and Marsh, 1996) who conducted a meta-analysis of studies of the technological/teaching link and were able to demonstrate full relationship. From this and similar findings, it is now being argued that ET can not and should not be separated from traditional education.

2.1.5: Advantages and Disadvantages of ET

Technology by itself cannot be classified as good or bad. The advantages or disadvantages lie in its use. Therefore constructive ET applications are enumerated under "Advantages" and misuses, impediments and complications in ET implementation under "Disadvantages".

Advantages

For the students

One of the most easily observable benefits of using ET is the "motivation" factor. Being on the cutting edge of technology development ET is enticing. It is easy to drive young minds to use something which is new and appealing, which in this case are, the modern Educational Technology tools. Students are curious, fascinated and have the enthusiastic will to learn. Technology proponents also point to this outcome in addition to others which, albeit difficult to measure (Herman, 1994), nevertheless are the force behind this derive to bring educational technology to schools. "It has been observed that the students become more curious and motivated by using ET resulting in their acquiring more knowledge than they would by using traditional means of education." (Ramathan, 2000)

ET greatly enhances the ability to work as a team. As ET does away with the need to physically sit together by keeping in contact through internet or other forms of advance communication, it enables students to work together in unique ways. “This continuous long distance interaction with its little niggles enhances their ability to work together and understanding each other's point of view better.” (Nasser, 1999).

The use of ET seems to encourage research, as another analyst observes, "Technology makes research much easier and at the same time a more enjoyable experience. Since every learning source is literally under the students' fingertips they are able to retrieve, sort, store and use data as they please." (Nadi, 2000) In a four year study of classrooms in eight schools, researchers found the most common effects were increased student motivation and performance improvements (Means, Olson, & Singh, 1995).

For the teachers

It's not only the students that are motivated but ET has been found quite inspiring for the teachers as well and their teaching methods are just as much affected by successful implementation and integration of educational technology. Since ET is the future of education, investing time in learning ET not only makes more practical sense as their chances of promotion increase, but also by using new methods which are more helpful, beneficial and productive they enliven their lectures and ensure better education.

The future payoffs of educating students for a knowledgeable, computer savvy society should more than compensate for the hard work done by the teachers. (Baker & O'Neil, 1994); (Mehlinger, 1995); (Thornburg, 1999) are also cited as contributing to the overall benefits of integrating ET. These observations have been acknowledged, researched and documented. In a review of research on technology and learning spanning the past 20 years, (Valdez,1999) documented not only consistent evidence of improved student achievement and motivation but increasing focus on changing practices of teaching and learning. “Early enthusiasm leads to experimentation with different methods to see which works well with a particular class which leads to enhancing teachers' capabilities of pursuing more constructivist classroom methods,” (Becker, 1999);(Jonassen, 2000); (Jonassen, 1998).

In the longest term study of technology in schools, the Apple Classrooms of Tomorrow (ACOT) Project evaluated ten years of classroom computing with similar results, documenting an emphasis on "changed teaching methods, restructured classrooms, and improved student and teacher attitudes," (Baker, Herman, & Gearhart, 1996); (Fisher, Dwyer, & Yocam, 1996); (Gooden, 1996); (Sandholz, 1997).

For the School administration

The third direct beneficiary of ET implementation at school are the administrators. “In addition to increased students motivation and drive the school administration immensely benefits through computers and related communication technology utilization. The extraordinary speed of data analysis greatly helps in the decision making process.” (Valdez, 1999). Vladez noted the implications of increased administrative efficiency and effectiveness at schools. Their report suggested that advanced computing power and telecommunications not only directly affect student learning, but also expand the ability for educators to rapidly process and analyze data, making it possible for school leaders to use data-driven decision-making for improving school programs. The result of this extended administrative capability is the potential to readily assess conditions for student learning and target problem areas.

Increased access to information and its timely analysis gives the administration a chance to not only improve learning conditions but also hold individuals, responsible for particular tasks, accountable. “By integrating disparate sources of information on the performance and operation of schools, technology also offers opportunities to improve the accountability and efficiency of school administration” (U.S. Department of Education Office of Educational Technology, 2000)

General advantages

In addition to the advantages enumerated above, using technology in school greatly increases communication among different parties, namely parents and teachers, administrators and teachers, administrators and suppliers, and among teachers, etc. This fast and efficient communication minimizes the chances of miscommunication. Parents can directly access the progress of their children, discuss children related issues with the teachers and more or less stay connected with the development of their most important investment from virtually anywhere.

However, for technology to be truly successful, schools need to maximize the effectiveness of their investment in technology by using it in a variety of ways. Effective technology use requires employing research and best practices to match technological software to the curriculum and the developmental needs of learners; to customize content area learning; to enrich learning experiences with communications and links to others beyond the school walls; to offer new learning opportunities, and to help learners see the value of learning by applying knowledge and skills to real-world tasks.

Disadvantages

Cost

Despite the obvious advantages the biggest hurdle in mass ET implementation in school has been the cost. There are a number of costing factors which need to be accounted for before ET can be successfully integrated with the

existing educational system, such as, purchasing, training, maintaining, upgrading, renewing, and contracting for software. All these factors require money.

Integrating ET is not confined to just buying a machine which will start functioning on its own. A number of linked accessories make for a worthwhile ET experience. Take the example of the internet, which in addition to the PC depends on the electricity, speed of the PCs, the networking, the IPCs and so one. Different kinds of software have to be loaded. It's not enough to buy a PC and consider the work finished, rather it is a continuous integration of different compatible electronic tools and incessant upgrading of the existing hardware. It is a costly proposition, albeit a necessary one, if our society has to compete with the world on an even keel.

Extra training

ET introduction, in a technically low skilled society, requires extra training for the teacher and the students for efficiently handling the equipment. Lack of training can become a serious impediment in competent class operation. If the teacher is not well trained to simultaneously run the sometimes complicated equipment and effectively conduct the class, (controlling the restless students is a complete job in itself), it can result in weakening teacher's role.

Lack of "reality touch"

An indirect disadvantage of ET introduction is that over dependence on computer in children's daily lives contributes to their losing the "reality touch". Violent games have made children immune to the real horror and destruction and their appalling consequences. Living in a virtual world of their own engrossed in brutal and violent games, children mimic the same vicious actions with complete and utter disregard to their consequences. They don't take life seriously. The horrific consequences are completely ignored. Lack of human or the reality touch is one of the biggest drawbacks of computer dominance and to a certain extent ET. Studies by noted psychologists Douglas Gentile and Craig Anderson indicate, it is likely that violent video games may have even stronger effects on children's aggression because the games are highly engaging and interactive, reward violent behavior, and children repeat these behaviors over and over as they play (Anderson & Gentile, 2003). It is a known fact among psychologists that active involvement, rewards and repetition increase learning.

2.1.6: Social Impact and Interest in ET

There is no denying the fact that technology has arrived and it is here to stay. It is seen everywhere. Whether you want to travel, relax in the privacy of your house by watching a good movie, or cook a nice meal, technology is busy making it easier, and some would say, a more enjoyable experience. This transformation, despite its relative novelty, has so completely dominated our lives that it seems hard to imagine, indeed for the younger people to believe, a world without mobile phones, blackberries, and laptops. From the kitchen to the office, at every facet of our lives technology rules and people gladly succumb.

Businesses Community

The business community has been at the forefront of embracing technological innovation and development. Businesses clearly realize that the growing web of the ever growing Internet is indispensable to their survival, because it empowers employees, and allows more efficient organization and information flow, both of which lead to increased productivity. John Chambers, the CEO of Cisco Systems reinforced this idea at the Fall 1997 Computer Dealers Exposition (COMDEX), when he clearly stated, "CEO's now realize the Internet will be their chief productivity tool over the next ten years, and may determine their businesses' survivability" (Hakala, 1997).

Education Community

On the other hand, ET's reception by the education community, at least in the beginning, was not as warm. The education community, based on bitter past ET experiences of adopting and integrating other products, namely, radio, film and television, viewed ET and its effectiveness in education with distrust. These technologies which were inducted with great fanfare promising revolutionary changes did not live up to the expectation. Since the education system has typically used technology in a rather non-systematic manner and in some cases has been quite resistant to the implementation of technology (Kerr, 1996) and (Hodas, 1993), it should not be surprising to find that there is still some controversy surrounding the quantification of technology's impact. (Swan and Mitrani, 1993).

Even as late as 1993, underscoring the large gulf between the business and the education community in embracing computer aided technology, (D'Ignazio, 1995) states, "businesses have been building electronic highways while education has been creating an electronic dirt road." (Peck & Dorricott, 1994) describe schools as "rumbling along, virtually unchanged by the presence of computers." Paving the "dirt road" will take effort but once properly done will become the "super highway" education needs.

Besides the above mentioned "bitter experience" there have been a number of reasons for this slow or cautious approach of the education community towards ET. The reasons "include the lack of time and resources required to conduct the necessary research as well as the lack of an understanding of how such research findings could be

used beneficially, for instance, to inform future implementations," (McKenzie, 1994) McKenzie also laments that "the most substantial research into student learning with technologies has examined performance on lower order tasks and basic skills. Too little work has been done measuring gains in higher order skills" (McKenzie,1994). He and many others who have written on this topic (Culp, Hawkins and Honey, 1999);(Riel, 1992);(Ehrmann, 1997) talk about large scale change and the accompanying need for careful planning (including the provision of professional development opportunities related to technology) to enable the maximum benefits for learners to occur.

It is heartening to see that these observations have not fallen on deaf ears and more and more it seems that education community has grown increasingly fond of and comfortable with the use of ET. Leading researchers are gushing on the importance of ET. "Computers have become the most sought after electronic devices in both homes and schools. They have captured the interest of the general public, and many parents believe they will improve their children's chances for success in school and in life." (Kook, 1997) Just as the general society has embraced technology, education is finally reciprocating in the same way. It is believed and hoped that the same enthusiasm will translate in the classroom and assist teachers in better and efficient dispensation of their duties.

In addition to the positive ET forecasts enumerated above, some analysts even go as far as to predict that ET will revolutionize the concept of the traditional single class room by bringing people and classrooms together on a global level. Computers connected to communication networks provide convenient access to vast amounts of data from essentially any field of study. According to (Kook, 1997), "The growth of communication networks will change the image of the classroom for the twenty-first century. The global classroom will be connected by networks that reach around the world and across subject areas." (Kook, 1997) This seems increasingly plausible and the increasing use of video conferencing shows that it is not a far fetched idea. Things are changing at such a rapid pace that everything seems possible. The idea of computer technology dramatically changing the nature of schooling may sound exaggerated until one realizes that computer technology has already dramatically changed the nature of work. "Computers have revolutionized such diverse workplaces as offices, stores, airlines, steel plants, hospitals, and the military." (Tyack & Cuban, 1995).

Admittedly education community has not turned to technology to the same degree as has the business community and it can be argued that the education system has not done an exemplary job of evaluating the impact of the technology it has implemented., however, it is safe to say the that lately the trend has changed. It will simply not be possible for schools or for any one for that matter, to resist the increasing influence of computer technology in our society. The market will grow increasingly insistent that schools prepare students to be the workers and consumers of a networked society. Educators and educational institutions will have to rise to this challenge or risk irrelevance.

2.2: Examining the need of Educational Technology

2.2.1: Defining the requirement.

Infrastructure Requirement

One cannot expect the computer to work by itself. "Expensive electronic equipment acquisition is only the first step towards attaining ET integration; a host of supplementary accessories when put together make Educational Technology a truly revolutionary experience." (Zeid & Aid, 2003) Through the years as technology has developed, the requirements for its proper use and function have also multiplied. Individually every computer needs power, software, internet connections with suitable speed, etc to make it work according to a particular setting. In schools, with many more people involved, the complexity naturally multiplies. For example, LAN network with active and passive devices, CE devices and powerful internet connections; output devices, such as, projectors, TV or videos are just a few of the stuff needed for proper utilization of ET in a modern school.

Good infrastructure is vital for housing and operating the equipment to its optimum level. It includes installing good quality cables crucial for fast information flow – better quality twisted pair wiring or the best "fiber-optic cables – suitable lab or class construction to house the equipment, convenient and ergonomically designed furniture, a whole new electricity set up, etc. "The school's telecommunications infrastructure must be designed to allow expansion and change in response to future technological needs." (Mohammed, 2003) "Environmental factors must also be considered as technology infrastructure is being planned. Proper circulation of clean air and temperature control are essential." (Caruba, 1984) When deciding where to locate hardware, student traffic patterns should be considered. Avoid placing equipment in congested areas (Mohammed, 2003)

It is obvious from the requirements described above that having ET in a school from installation to proper utilization with regular upgrades and maintenance entails a sizable price tag. It is very important that not only the initial cost of buying and installation is kept in mind but the more important running, up keep, and if need arises, repair costs should also not be ignored. Equipment once installed needs constant upgrade and care. Even a small hitch can stall the whole apparatus and consequently shut down the education process.

In addition to infrastructure, browsers and suitably fast internet connections are vital and integral parts of Educational Technology. Having slow internet connection can drag a class resulting in its not finishing in time and students not given proper education. This lack of productivity will result in student boredom and will shoot the whole idea of creating interest and enthusiasm for technology among the students.

ET has become the base of further education and research and the fast paced development in the electronic world exerts constant pressure to keep ET equipment up-to-date unless one wants to risk being left behind in the race of development. Having proper additional out put devices like projectors, TVs and Videos play a crucial part in creating the overall environment. Multimedia projectors, once considered suitable for only boardroom meetings have become a necessity in school classrooms.

Skills requirement

Having all the state of the art equipment in the world with the best infrastructure will be of no use if it is not used properly. One of the first questions that arise during discussions about ET is whether technology increases student achievement. The answer to this question is, "It depends on what you are going to do with them." (Viadero, 1997) According to Ted Hasselbring, a co-director of Vanderbilt University's Learning and Technology Center in Nashville, "It's kind of like asking, 'Are pencils effective?" There is a greater chance of misuse and waste of time & equipment then any possible benefit if the operators, i.e. teachers, are not trained. Untrained staff will waste precious time in learning the use of equipment which will inevitably lead to mistakes and can even ruin the very equipment. Therefore teachers having technological back ground and sound training are as indispensable as the equipment and internet connections and the other accessories mentioned earlier.

“In the past, new classroom technologies seemed to go through a cycle of high expectation - limited success - disappointment - and blame. The blame was sometimes assigned to logistical problems, but, more often it was laid at the feet of teachers. Earlier reformers underestimated the importance of the teacher's role in the classroom and tried to impose change from the top down. Little formal effort was made to support teachers who tried to implement new technologies.” (Kook, 1997) Teacher preparation programs are described by (Kook, 1997) as "the crucial issue to be addressed". The teacher of the future will depend on the computer for both personal productivity and for instructional activities. Kook lists thirty-three primary computer skills for teachers, ranging from navigating the Windows desktop environment, to using power point, to installing software. He suggests that these skills should be part of the required courses for prospective teachers and insists that in the next century "teacher education will be forced to accommodate a considerable amount of transformation to allow teachers to function effectively in the Information Age." (Kook, 1997)

Furthermore, training should be done *before* not *after* the installation of the equipment. Later training will only be a drain of precious funds resources because, while the operators are going through their training, precious equipment will lie wasted. It could prove fatal in the fast paced world of electronic development, where new technology is replacing old at an astronomical rate, as the equipment might lose its relevance and become obsolete by the time the staff and teachers are ready to make its full use.

Technology success in schools is directly related to its successful integration in the classroom. “Technology is integrated when it is used in a seamless manner to support and extend curriculum objectives and to engage students in meaningful learning. The use of technology in the classroom necessarily depends on the ability of the teacher to integrate it.” (Kent & McNergney, 1999) “It is not something one does separately; it is part of the daily activities taking place in the classroom….The primary goal is not to use the technology; rather, the goals are to engage students in meaningful learning and assess their understanding.” (Dias, 1999)

2.2.2 : A Suitable Environment

Learning environments

The "Learning environment" consists of “physical” as well as “relationship” environment. Learning environments in schools characteristically involve one or more adult teachers connected with a number of students, usually in well defined physical settings, i.e. it may be in a room, full of particular furniture and equipment. Curriculum materials such as books, videotapes, etc. may also be present. All these people interact and form a variety of relationships, creating "a system of interrelated factors that jointly affect learning in interaction with (but separately from) relevant individual and cultural differences." (Salomon, 1994) This is what (Wubbels, Brekelmans, and Hooymayers, 1991) term the “relationship dimension” in learning environments at school.

The curriculum is concurrently a part of the physical dimension and the relationship dimension of the learning environment. Physical, because students and teachers are focused on certain processes and content in the curriculum and have a relationship with that curriculum and the methodologies that are associated with conveying the curriculum. Students and teachers may have very different relationships with different components of the curriculum. For the majority of children the place of computers in learning is most likely to occur in the classroom, in the labs, and lately, for an increasing number, at home. Just like curriculum, computer is characterized as interactive and thus in addition to being a part of the physical aspect of the learning environment constitutes an important position in the relationship context as well. (Yamagata-Lynch, 2003); (Olson, 2000); (Rieber, 1994)

A "Constructivist" learning environment

The classroom learning environment provides a structure to describe the setting in schools within which learning is organized and the roles of the teacher and students are determined. However, only constructing a particular setting can not help achieve better learning if the aim, for which it was constructed, is ignored. This is dependent on the beliefs and actions of those responsible for setting up the environment, particularly the underlying

pedagogical philosophy of the teacher. Available literature leaves little doubt that the educational philosophy to which most educational leaders and researchers subscribe is that of "constructivism".

Although "There is no single definition of constructivism," (Glasersfeld, 1992) a common element found is that "knowledge is constructed out of personal sets of meaning or conceptual frameworks based on individual experiences encountered in relevant environments. People interact with their environment and as a result develop meanings to explain these interactions and to assist in negotiating future interactions.

According to (Perkins, 1992) "Central to the vision of constructivism is the notion of the organism as "active" - not just responding to stimuli, as in the behaviorist rubric, but engaging, grappling, and seeking to make sense of things. (Perkins, 1992) "An often misguided constructivism belief held among teachers is that all learning must be achieved entirely by discovery and that the teacher and curriculum materials have no place." (Perkins,1992) He describes two constructivist positions on teaching/learning paradigms as:

a. WIG constructivism (without the information)
b. BIG constructivism (beyond the information)

(Perkins, 1992) advocates that a blend of both approaches be employed. Unless a balance is kept the chances of quality learning diminish. In the context of using ET in schools (DeCorte, 1990) says, "a powerful computer learning environment is characterized by a good balance between discovery learning and personal exploration on one hand, and systematic instruction and guidance on the other, always taking into account the individual differences in abilities, needs, and motivation between students."

2.3: Resistance in Accepting ET

Schools' natural resistance to organizational change plays an important role in shaping their response to technological innovation. (Steven, 1993)

Since the last century numerous technological innovations, such as films, radio, television, and OHPs have been tried in schools all over the world to better the traditional edification process. These ET introductions initially started with great fan fare, with promises to revolutionize the existing education system, usually ended being barely tolerated and touched. A consistent teacher resistance pattern has appeared which seems to thwart ET acceptance in the classrooms. Technology proponents have found to their dismay that teachers can only be persuaded to use these tools only slightly, if at all. (Becker, 1994)

2.3.1: Obstacles and Reluctance.

Obstacles:

A study of articles bemoaning obstacles or resistance to successful realization of Educational Technology reveals strikingly similar arguments. Teachers specifically, their lack of training; physical barriers, such as, hardware and software and lack of time were continuous themes found in the literature review. Different classroom structures in the west and the east, in the context of multinational classes, were also highlighted as a hindrance for both teachers and students. It seems that resistance like a congenital disease spreads from one person to the other.

Teachers were paradoxically cited both as the facilitator and an obstacle. Informed and computer savvy teachers were hailed as facilitators, however a lack of awareness of ET on teachers' part was regarded as the biggest obstacle in ET implementation by a number of authors. “Teachers who are most successful at technology integration are those who are so comfortable with technology that they seamlessly know when to use it for student-focused learning and when to use direct instruction.” (Dwyer, 1994)

Furthermore, it transpires that the resistance is not just confined to teachers as it is generally assumed but extends to the physical environment they are working in and enlarges to the larger society in terms of social acceptance i.e. the support teachers get from other staff. Obstacles that fall within the social territory centered around support networks that were available to the teacher including support from administration, technical services and colleagues, as well as the overall school climate and various models of professional development. “While the role of the teacher was crucial in the success of integrating ET, the success of programs also depended highly on a support system.” (Bitner & Bitner 2002) Support, that was both ongoing and onsite, needed to be provided in technical and curriculum areas.

Very little or lack of previous training also worked as a deterrent in making ET a success in initial experiment. “Teachers were unprepared for using computers in their teaching except in the most basic forms of instruction.” (Loveless, 1996) Traditional teacher-student relationship was criticized and blamed by Loveless for slow pace of ET integration in the schools. To Loveless, non-voluntary nature of the teacher-student relationship, the immaturity of the workers and the management demands of large classrooms were the biggest hurdles. "Unless computers were configured in workstations, they did not mesh with the mechanics of group class work." (Loveless, 1996)

The physical hurdles had much to do with accessibility and infrastructure which included decisions about purchasing, locations of wiring drops, and decisions regarding the placement of computers in centralized labs versus placement of computer pods in classrooms. It was found that labs instead of being a facilitator acted as an inhibitor because going to a separate lab denied teachers the flexibility to decide when technology should be

incorporated into instruction and having a lab away from the class room may send students the message that computer are not important to learning or the activities in their classrooms. “Placing computers in centralized labs may provide students with equitable and efficient exposure to technology but severely limits technology’s accessibility for classroom instruction.” (Loveless, 1996)

Hardware and software were noted as designed to service *one user on one machine*, causing children to become observers instead of active participants. It remained a difficult task for the teacher to strike a balance between collective and individual needs and to come up with imaginative, educationally inclusive ways for groups of students to use a few computers in a single classroom. “Teacher's knowledge and training played a great role in determining the successful integration and effectiveness of technology.” (Bitner & Bitner, 2002) Once teachers developed skills, they could begin to find ways to integrate technology into their curriculum and demonstrate its use to others.

Lack of time to become familiar with ET resources was also identified as a top reason for lack of ET integration. “Rarely were teachers using technology to innovate, rather, they were using technology to sustain existing patterns of schooling,” (Conlon and Simpson, 2003). Other obstacles included lack of technical support, lack of role models, insufficient numbers of computers in classrooms, and that some teaching staff did not see the development of ET as a priority.

As far as students are concerned the very flexibility and pro-activity which Educational Technology brings was also expected a hindrance according to the common perception of Asian students among Western lecturers, as being less self-directed learners who defer more to the authority of the teacher and prefer more structured learning environments (Ballard & Clanchy, 1997); (Biggs, 1996); (Kelly & Tak, 1998); (Smith & Smith, 1999) While educational technologies, and the flexibility they bring, may be welcomed by Australian students, these observations would suggest that students from South East Asian countries may not be so comfortable with such innovations (Gunawardena, 1998); (Jensen, Christie and Baron, 1997). The educational systems in the Middle East and South East Asia mirror each other as far as class structure and a significant influence of western educated faculty is concerned.

This could prove a barrier not only for the students but for the teachers as well. (Joo, 1999) argues that: "Because the Internet promotes pro-active teaching and learning, it may affect the balance of power in countries where the educational system is centralized and authoritarian…. In societies where discipline and submission to authority is praised rather than individualism and freedom, teachers might feel too uncomfortable to take initiatives, to accept the scrutiny of peers, or to hand greater control to their students. Likewise, students accustomed to traditional methods may find it hard to adapt to active and innovating learning techniques".

Reluctance:

Reluctance to ET was found to be variable and came from all directions; people from every category including teachers, students, parents, school administrators, suppliers or others were found to be ET reluctant.

An extensive literature review revealed that, as was the case in obstacles, the teachers and their reluctance were considered the most important reluctance factors and attracted the most attention by the researchers. The position of the teachers who are ultimately responsible for integrating ET with traditional means of teaching warranted this concern on the researchers' part. It was unanimously agreed that integration and implementation of ET could only succeed if the teachers were comfortable with it. (Cialdini,1984)

According to (Patrascu, 1995), "A reluctant teacher is a teacher who doesn't want to and/or cannot accept change." Patrascu says that "there are different types of reluctant teachers. Teachers who don't want to change, teachers who don't understand the necessity of change, teachers who would like to change but don't, because of constraints, and teachers who try to change but aren't successful and so in turn give up" (Patrascu, 1995). In the case of the UAE, others, such as, students, parents, school administrators and AAEZ employees also demonstrate the reluctance patterns described by Patrascu.

Anything to do with computers might not normally be seen as inviting student reluctance but it is a common occurrence that students abhor obeying orders, such as, doing tasks given by their teachers. Reluctance on part of the students can also come from a situation unique to UAE and other Gulf countries. Students might have more power in how the class is conducted since most of the teachers are expatriates and cannot exert total control over the students. This sense of power, with the carelessness which naturally follows, can be a deterrent in making students interested in ET. Asking the students to pay more attention to the ET may be taken as another device to control them with extra computer work to be done at home, which may result in resistance.

It seems that the buck doesn't stop any where as far as the ET reluctance blame game is concerned. Wrong and negative use of technology creates ET reluctance among parents. The prevalence and easy access of objectionable material on the net makes parents weary of the internet. As reported by various school principals, parental reluctance arises from their supposed inability to control their children's access to these "bad sites".

Even some school administrators were found reluctant in using computers. A number of parents, students and teachers blamed lack of expertise in operating the state of the art equipment on part of the school administrators for this behavior.

2.3.2: Overcoming Resistance

Effective obstacles and reluctance management is crucial to dealing with resistance. Experts have found that managing and controlling these two factors is essential for meaningful and ultimately successful ET incorporation in school systems. Both reluctance and obstacles to Educational Technology have to be tackled if ET is to be implemented. (Octavian, 1995)

Overcoming the Obstacles:

Constructivist view of education which according to Marshall, is "the intrinsic need of the learner to make sense of the environment drives the learning, and instruction must be tailored to the developmental needs of participants." (Marshall, 1993) has often been cited as a cure to the teacher being the chief ET obstacle. Constructivist teachers are facilitators in their classrooms where students are actively engaged in exploration, invention and discovery. Collaborative and cooperative learning are favored in order to expose the learner to alternative viewpoints. (Pepi & Scheurman, 1996) found that "Unfortunately, electronic technologies often were not being used in ways consistent with constructivist principles of learning and no reason existed to believe they would be in the near future." (Pepi & Scheurman, 1996) Teachers were observed using technology as an instrument for classroom management and using it to keep students on task rather than because of evidence that technology aided in the construction of meaningful knowledge. "Computers should be used as facilitators of thinking and knowledge construction." (Jonassen, 1995) "Until our conceptions of learning are reformed, technologies would continue to be delivery vehicles and not tools to think with or to advance our conceptual understandings."(Jonassen, 1995)

Successful implementation also seemed to be associated with the teacher's awareness of the social dynamics of the school. Teachers, who were socially aware, knew where to go for support & resources and were sensitive to the needs and priorities of their colleagues were more likely to have success. Research confirmed that not only did the teacher's proficiency play a major role in successful implementation but that a teacher's knowledge of the enabling conditions to teach a specific technology was equally important. "Three factors, associated with the teacher that contributed significantly to the success of classroom technology innovations were technology proficiency, pedagogical compatibility, and social awareness." (Zhao, 2002)

For the teachers who complained of not having enough time and energy after a hard days work and future commitments, "Faculty members identified lack of time to learn new technologies as a leading barrier impeding their technology integration." (Vannatta, 2000), Vannatta recommends the implementation of a technology plan at a faculty of education where participants were education faculty members and pre-service teachers.

Role models have also been cited as a solution to successful ET integration. "The placement of role models in schools and the provisions of additional training would aid in a school's successful implementation of ET

integration." (Guha, 2003) It is advisable for school managements to take a leading role by implementing mandatory computer workshops and providing resources to help teachers become computer literate. Schools where administrators are a part of the support system and act as role models are more likely to have successful ET integration.

Experts argued that teachers needed to be assisted in overcoming their fears, concerns, and anxiety. Once teachers developed basic skills and overcame fear they would not only benefit from personal productivity but would also be ready to begin looking for ways to integrate technology into the curriculum. They further contend that models needed to be provided and motivational factors needed to be present along with a climate that allowed for experimentation without fear of failure.

On site support system with specialized training was proposed by researchers to overcome time management problem (Ertmer & Hruskocy, 1999). They performed an experiment based on building a collaborative, supportive social structure for participants. Students in grades one through five participated in "Tech Days" where they were trained in various technologies by university graduate students and faculty. It was argued that this approach to staff development also addressed other common barriers identified in literature. Issues related to ongoing assistance, attitudinal changes of traditional teacher roles and fear of technology were addressed by this form of professional development.

A healthy human interaction, in addition to on site support, played a vital part in further buttressing teachers. Researchers found that a flexible and responsive technical assistant, a supportive and informed administrative staff and people who could help the teacher understand and use the technology for his or her own classroom added to a healthy human infrastructure. "Social support was a highly predictive factor in innovative computer integration activities, in an environment where there was good technical and human support, innovative projects were successful." (Zhao, 2002) Modeling instructional use of technology through a greater focus on technology integration was also offered as a solution for more effective integration. "Research indicated that successful ET integration was based on identifying and overcoming the barriers which inhibited the role of the teacher combined with support systems that were available on-site." (Faison, 1996)

Overcoming the Reluctance:

Noted expert after expert has emphasized the necessity to provide best training to teachers in order to bring positive ET related changes to schools. (McKenzie, 1999) realizes that reluctant teachers have a rationale for their reluctance. "Little has been done to prepare reluctant technology users for the networked computers flooding into their rooms. Technology reluctant teachers have special needs, interests and learning styles that must be addressed with respect and ingenuity if they are expected to embrace the new technologies being placed in their classroom. This reluctant group of teachers will require a sustained three-year commitment of 15-60 hours annually of adult learning experiences tailored to special attitudes and preferences" (McKenzie, 1999).

According to McKenzie, “Adult learning usually involves the learner in activities that match that person’s preferences, interests, needs, style, and developmental readiness. If we shift school cultures to support adult learning, then professional development is experienced as a personal journey of growth and discovery that engages the learner on a daily basis. In the best cases, adult learning includes an emphasis upon self-direction, transformation and experience. One learns by doing and exploring…by trying, by failing, by changing and adapting strategies and by overcoming obstacles after many trials. One learns by teaming-sharing failures and successes as well as tricks and techniques that work. This approach to supporting teachers may actually generate a change in how classroom learning occurs.” (McKenzie, 2003)

(Tenbusch, 1998) states “Like students, teachers learn at different rates and have specific needs when it comes to acquiring new information and mastering new skills.” He emphasizes that skill building and offering incentives to teachers to induce them to devote time and energy to ET training courses are the key ingredients of a successful professional development program. According to (Tenbuch, 1998) such a program provides, "(1) rigorous training, usually consisting of several sessions instead of the usual one or two day work shops, in which teachers explore new ideas and materials; (2) follow-up consultation with mentors over an extended time period as teachers implement newly learned practices; (3) ongoing reflective conversation with colleagues doing the same job and implementing similar technology applications; and (4) observation of other teachers using exemplary techniques for incorporating technology in the classroom." (Tenbusch, 1998)

Incentives and rewards have also been recommended as a remedy for overcoming ET reluctance. Authors claim that teachers change their views of using technology as time-filler or a student reward to using it as a tool to accomplish a substantial learning outcome. “Teachers having an interest in ET are selected and trained at their convenience. Incentives and rewards are offered, like hiring release time, visits to view technology, and reimbursement for attending technology conferences.” (Schmid, Fesmire, & Lisner, 2001)

Strategies proposed by researchers to overcome overall reluctance.

1. Clarify the bottom line: gains in student performance.

Most reluctants have trouble relating to the inflated rhetoric of technology enthusiasts. They want to hear about the "bottom line." To win the reluctants, we must show measurable results. "They are not won over by talk of multimedia or fanciful virtual bike trips across Africa." (Becker, 1999)

2. Deliver a complete package.

Most learning opportunities associated with networks require a high degree of inventiveness. Conservative teachers are looking for excellent packages that have been tested, refined and perfected. They don't have time to "mess around."

3. Eliminate risk and surprise.

Surprises, disappointments and adventures, especially during class time are not popular among reluctant users. "They may sign up for white water rafting outside of school, but they would never select it as a model of instruction." (Becker, 1999) They must be supplied with experiences requiring little risk.

4. Speak their language.

The use of computer jargon is guaranteed to alienate the reluctants. ET proponents act as if everything from the past (like lecturing) is bad while any new, technology-rich experience (like surfing) is good. They use terms like "constructivist learning" and "student centered classrooms." Reluctants view this rhetoric with great suspicion.

5. Offer continual support.

Ongoing support is more important than classes and training. "The emotional dimensions of this challenge keep many reluctants from stepping into the technology game. They see networks crashing. They need the technology to work reliably, and they want someone by their side when anything goes wrong" (Moore, 1991).

6. Team support.

Some of the most impressive gains take place when teachers elect to work in small groups of mixed abilities and styles. The reluctant may be won over by the impressive discoveries realized while exploring with a group of peers, some of whom are more comfortable with computers.

7. Invoke reluctants' interest.

The biggest change occurs when someone "buys in." They are most apt to "buy in" when their personal passions and interests are at stake. "What's in it for me?"

8. Provide rewards and incentives.

Too little attention is paid to motivation. How can an educational zone spend a huge amount on ET while not giving teachers basic incentives to learn and to use new technologies? In too many schools teachers are expected to donate their own afternoons, evenings and weekends to the learning of new tools. This is serious work deserving full compensation and plenty of recognition.

9. Don't rely on ET experts alone to plan for reluctants.

ET advocates rarely sympathize with reluctants or understand their issues. Experts have different needs and far more tolerance for frustration. They rarely understand reluctants or how they learn. They find it difficult to design professional development for reluctants that works.

The challenges that exist are getting reluctant teachers to see the vital role that technology can play in the learning of their students, and getting these reluctant teachers the support they deserve through professional development programs. Too many times the teachers are left alone in trying to make sense of the ET tools at their disposal.

In our focus on overcoming teachers' ET reluctance it should not be forgotten that not only teachers but also students, school administrators, top management, etc. deserve the time and training to transfer new thoughts and

skills into their daily practice. As noted by (Faiz, 2005) Educational Technology resistance is an all pervasive ailment which needs to be taken care of on a comprehensive basis keeping all the participants in focus.

2.4: Implementation

2.4.1: Planning the Ideal Balance

It goes without saying that the bedrock on which the success or failure of any proposal stands is planning. Unless planned properly the chances of success of any enterprise diminish considerably. As far as ET adoption and integration is concerned the importance of planning has been recognized not only by individual researchers but by government institutions as well. "Effective change does not come without adequate planning, vision, professional development, evaluation measures, technology resources and new institutional modes of operating. All told, technology is a vital component of systemic reform leading to school improvement" (McNabb, Valdez, Nowakowski, & Hawkes, 1999). Even the US Education department proclaims “The use of technology requires planning, because without certain key ingredients (such as professional development and technical support), technology’s benefits will probably not be realized” (U.S. Department of Education, 1996).

However, even after more than three decades of computer usage in classrooms, formal technology planning process remains a relatively recent phenomenon for schools. In the early period of personal computers, (Pogrow, 1983), advised that "technology decisions should be a “conscious, highly participative process” in which computers were viewed as a “curricular device” rather than mere hardware". Pogrow emphasized choosing software for specific and appropriate instructional objectives. The purpose of these efforts was to improve student learning, increase efficiency of instruction, and reduce costs.

The initial period which passed without any significant effort being made about adequate planning according to, (William, Banks and Thomas, 1984), was more due to the bombardment of tall claims by the manufacturers, who touted their products as the only remedy to any present or future potential problem with education. They created a hype which awed everyone including the much respected and usually staid educational administrators and educationists. Not having enough knowledge to judge the vendors' claims itself the educational community believed everything and made hasty decisions without any adequate planning. This "no plan" approach was so prevalent that a 1985 study (Burns, 1996) showed that 85% of technology innovations reported through a national survey of school districts were unplanned.

Formal technology planning in ET implementation is an end of the millennium phenomenon in the US as well as here in the UAE. “In the past three years extensive planning has been seen from the government and reciprocated by private sector in bringing technology's use in the education department equal to that of the advance countries.” (Abd Al Aziz, 2003)

Internationally, the new planning trend started as telecommunications technologies improved and needed greater central coordination for network connectivity (Hawkins, 1996). USA took a leading role in ET planning because of the introduction of whole sale school reforms needing strategic planning. Industry took a lead in this regard and influenced the same in the education sector. "The increase in ET planning processes in education department mirrored trends in industry and government which revitalized formal planning after a period of disillusionment during the early 1980s." (Mintzberg, 1994)

But despite the government effort and private enthusiasm it soon became apparent that schools were having problems with ET integration and implementation and deficiencies were being sighted with technology planning in schools. "Research on planning suggested that schools are finding technology planning a challenge, with administrators having difficulties planning for technologies that they themselves do not fully understand and lacking any clear models for what should be included in the planning process according to the research by (Burns, 1996). A "model plan" was proposed to help cure this ailment and facilitate integrating technology into the curriculum, prioritizing and establishing timelines for technology acquisition, funding technology programs and evaluating the impact of technology investments. Even though model plans were developed, (Hunt, 1995) and (Brody, 1995) in their research found that the schools did not follow the prescriptive guides, "steps and procedures were neglected, political considerations ignored, or strategies disregarded" (Brody, 1995). As a result, the plans focused primarily on hardware acquisition issues and lacked the comprehensiveness required for a meaningful change.

Even though the general trend of ET planning was poor and hit many snags there were some silver linings. The teachers and administrators, in schools which had effective plans, "credited planning with successful expansion of Internet use" (Shoemaker, 1997). Shoemaker suggested that success was found where there were enthusiastic supporters and a technology plan which covered utilization, management, and access issues. But she also reported that even though "nearly every school is involved in some measure of technology planning, but a comprehensive database of the models of good design, development, utilization, management and evaluation of technology has not been developed" (Shoemaker, 1997). Positive relationships between planning and teachers' Internet use have been reported in two studies (Sherry, 2000); (Shoemaker, 1997). In the schools which failed in successful implementation of ET it was found that next to the hard ware issue, a majority of the people concerned cited poor planning as their number 1 issue (Keller, 2000). (Byrom, 1998) reported that success at ET implementation in low-income schools studied was related to the maturity and quality of their technology plans.

2.4.2: Homogenous Distribution

Homogenous or equal distribution of Educational Technology equipment ensures that all public schools, according to their needs, have an equal chance to benefit from the use of ET. In this research "equity" will refer to homogenous or equal distribution of ET.

When a school or education zone decides to implement ET into the curriculum, one of its overriding planning goals must be to create plans and policies for all members of the learning community to have equitable ET access and use. Appropriate funding and professional development represent the key means of supporting a homogenous and equitable distribution, access and use of technology to ensure fairness in technological distribution and to support meaningful learning for all students.

To achieve equitable distribution, (David, 1994) notes that technology must be properly distributed and readily accessible to teachers as well as students: "Access to technology requires that it be readily at hand for use as needed, not simply for uses that can be predicted in advance and squeezed into a fixed time slot. For example, teachers are far more likely to use video instruction when the choice and timing are under their control. Similarly, teachers and administrators are less likely to use telecommunication networks when they must go to a remote location to do so. Nor can students exploit the power of word processing if they must wait for their daily or weekly scheduled time in a lab. The technology must be readily accessible for use when it is needed." (Milone and Salpeter, 1996)

(The National Academy of Sciences and the National Academy of Engineering, 1995) emphasize the importance of technology in promoting educational opportunities for all students: "Technology deployed in education can help remove inequities between the schools of the inner city and the suburbs, between cities and rural districts.... Technology can become the force that equalizes the educational opportunities of all children regardless of location and social and economic circumstance".

(Jones, Valdez, Nowakowski, and Rasmussen, 1995) take the equal distribution to new heights and define it as "the goal of universal participation". They say, "Technology is a tool that gives everyone an equal chance to learn....Universal participation, as a policy goal, means that all students in all schools have the right to access and are active on the information highway in ways that support engaged learning. Inequities will be reduced because everyone will have equal access and equal opportunity to learn."

Ensuring equity means that all schools – regardless of location, gender, grades or physical limitations – have equal opportunities to participate in meaningful and authentic applications of educational technology. To realize the benefits of education technology, note (Kozma and Croninger, 1992), "teachers, school administrators, and policymakers [must] ensure that all students have access to these technologies, that the technologies are used effectively, and that other aspects of schooling also promote high levels of student learning".

Unlike (Atewell's, 2001) notion of two digital divides (access and use) in educational technology the research found that in the UAE Educational Technology distribution can be divided on three basis, namely, "location (rural or urban), gender (females and males) and grades (KG – 12)" (Mansour, 2002).
Educators may have differing opinions on other equity issues, such as whether all grade levels should receive the same technologies, whether certain technologies are more suitable to specific grade levels than others, what strategies for allocating computers and other technologies should be used, and whether a particular building has the space configurations and infrastructure capacity to accommodate certain technologies. (MacAdoo, 1994)

There is an increased probability of less computer use in rural schools a contention decision makers put forward while allocating reduced importance to rural areas. The same rationale is put forward in case of lower grades and KG schools. Decision makers judge distribution to schools according to the actual use and availability of relevant educational technology material, e.g. IT module based on Microsoft office taught from grade 7 onwards.

(Means, Olson, and Singh, 1995) note the importance of both quality and quantity of access: "Technology cannot become a useful support for students' work if they have access to it for only a few minutes a week. Technology-supported, project-based instruction requires a high degree of access to the tools of technology and to communication systems. Schools are faced with reality of a limited budget for equipment, telecommunications, and software, and they must make hard choices about how to get the most out of what they have."

From the American point of view (Stratulat, 1998);(MacAdoo, 1994); (Milone and Salpeter, 1996) equitable distribution of technological resources among and within institutions is another challenge for leaders. Regardless of the utopian vision of technology as a social leveler, the fact is that wealthier institutions have been able to make computer-related technology more conveniently available to their students, to purchase more frequent replacements and upgrades, and to provide better support services and training. Within institutions, some departments have been able to use grants and special funds to acquire and integrate information technology into their research and instruction. Consequently the gap between "haves" and "have-nots" has widened with schools, where the technological sophistication of the next generation of schoolteachers is determined, often being among the "have-nots." Planning at the campus and state levels needs to address these inequities on an on-going basis. The "have"/"have-not" gap has also widened at the individual level. Early access to technology, at home and at school has a lasting impact on children's capacity to effectively function later in their lives.

Just like the American educational institutions, schools here in the UAE, as indicated by some leading researchers(Abdullah, 2002), are also suffering from a lack of equitable distribution of educational resources but with slight differences. Despite very strong leadership at the top which has allocated the largest budget chunk to the ministry of education, poor planning and improper implementation has contributed to bringing inequity in ET equipment distribution. Lack of funding cannot be blamed for unequal distribution as besides a considerable budget yearly donations come from the Sheikhs for the educational zones all around UAE. Another UAE specific major obstacle to homogenous distribution of ET is the male dominated culture which gives preference to boys over girls. Furthermore, glory seekers in the government organizations, always hungering after attention, want ET in the areas where they are posted, which are usually cities. This helps satisfy their egos and keeps them in the limelight.

Unlike western schools, all schools in the UAE are government dependent and their needs including ET equipment are taken care of by the central government. Hence they do not suffer from direct cash deprivation, but at the same time, being government dependent they suffer from a loss of independence because they are hampered in making specific decisions suiting their particular needs as very little cash is distributed among schools. However, in certain cases, it has also been found that even the availability of cash in schools doesn't guarantee its proper use.

2.4.3: Cost Estimation

Technology integration in education is not an inexpensive proposition. ET funding is not a one time investment but needs constant maintenance and up gradation of its tools, software and accessories. Computer-rich schools and classrooms stress on a variety of elements, including emphasis on individualized instruction (learner-centered), curriculum frameworks with clearly articulated outcomes, ready access to computers, restructuring including block schedules, interdisciplinary classrooms with project-based learning, focused and ongoing development efforts within the school, more consultation among teachers, school outcomes described in rich ways beyond standardized achievement test scores, and per-pupil funding more than five times the national average. (Glennan & Melmed, 1996) For better or for worse the monetary issue has acquired greater importance than others in ET integration and implementation. "Economics, both money and resources in general, have more explanatory power in diffusion and adoption than research in education technology or learning." (Holloway, 1996)

The biggest portion of the apportioned budget for the integration of ET is taken up by the acquisition of the PCs themselves which amounts to nearly 50% of the total cost. Networking, with its added paraphernalia of passive and active components, takes another 10%. Add to this the cost of internet connections with suitable speeds, educational instruments such as active board, data show, TV, VCRs, etc and the cost soars. "The higher rate of spending as a factor in schools using technology suggests that access and cost issues may be more of a challenge to implementation than educational researchers and technology proponents have acknowledged." (Kolah, 2002)

2.4.4: A Blueprint

A blue print, or an ET blue print to be more precise, is a comprehensive guide written by researchers designed to help schools plan their ET integration and implementation. Schools or education zones can avoid the risks and uncertainties associated with ET incorporation in their existing education system by pursuing and modifying the guidelines according to their needs.

Many of the early examples of successful technology planning, along with a list of blue prints came from school administrators or academics who used personal experience as the basis for planning prescriptive—"the use of a single case study to induce a general process that continues in educational management literature into the present" (Baule, 1997); (Fries & Monahan, 1998); (Grady, 1983); (Jukes, 1996); (Splittgerber & Stirzaker, 1984); (Uebbing, 1995); (Vakos, 1986); (Williams, 1984).

At present, a large number of planning guides are available aimed at helping educators, including:

- Books by university professors and private consultants who have had planning experience with multiple schools and districts (Anderson, 1997); (*Guidebook for developing an effective instructional technology plan*, 1996); (Kimball & Sibley, 1998);
- Reports from private foundations and government agencies (Lemke & Coughlin, 1998); (North Central Regional Technology in Education Consortium, 1997); (Universal Service Administrative Company Schools and Libraries Division, 1999),
- Textbooks for school administrators (Lumley & Bailey, 1997); (Maurer & Davidson, 1998); (Picciano, 1998);
- Self-help toolkits (Brody, 1995), including several multimedia and online versions designed to facilitate the planning process (Compaq Computer Corporation, 1999); (Hoffman & Rossett, 1997); (North Central Regional Technology in Education Consortium, 1997).

Planning is not always a smooth and predictable process which is evident by the great variation among these planning guides raning from a step-by-step directions for ET implementation to philosophies of what the planning process should require. These resources are administrator inclined (Bush, 1995) in the sense that they take administrators' advice and ignore the actual users with specialized ET experience and expertise. (Picciano, 1998) sarcastically likens them to planning guides that would be found in corporations, requiring educators to assume planning responsibilities.

The presence of an extensive literature review pointing out the obstacles and hindrance in the initial phase of ET integration suggests that here in the UAE a blue print or a model plan is of the utmost importance. Al Ain Education Zone would be better off if it had its own blue print. This basic model plan, with slight modifications, should be implemented in every school depending on the school's location, age group, gender and grades. "A model plan is of paramount importance to bring a feasible and long lasting change in the traditional style of teaching in the UAE."(Zeid & Aid, 2003)

Having a blue print will be a tremendous boost to viable ET integration in Al Ain schools. The presence of a ready made plan will ensure that instead of devoting time to fresh planning and starting things from scratch, schools will have something ready made to work from. The availability and guidance of the blue print will help schools avoid the risks and the uncertainties and will not only save valuable money but also something more valuable called "time". UAE stands an excellent chance of successfully integrating ET with the present education system because education reform and development is the highest priority of the government.

The complexity real-world schools face with Educational Technology implementation is emphasized by the literature which when reviewed indicates multiple barriers to effective ET implementation. It has been observed

that despite government authorization and private enthusiasm, technology integration process and strategy as implemented in schools remains enigmatic in terms of best practices and long-term improvements. Initial apathy or confusion towards planning together with situational variables, emergent behaviors, unanticipated consequences, and insufficient attention to planning have all affected successful ET integration.

2.5: Research Hypotheses

Prior knowledge, experience, and observation combined with conducting introduction, examining the current situation, and learning lessons from other researchers in literature review gives us the basis to hypothesize that:

1. There is a lack of ET awareness among AAEZ cadre in Al-Ain
2. Schools are reluctant in incorporating ET due to a number of reasons.
3. ET is not implemented homogenously in Al-Ain schools.

Summary

This chapter looked at a vast quantity of available literature on Educational Technology and described the saga of ET's integration in various education systems. Emphasis was given to ET awareness, social importance with advantages & disadvantages, and ET's relationship with traditional education. A thorough analysis of ET need with an in-depth probing of requirement, environment and resistance was presented. Lastly, ET implementation was scrutinized at great length by inspecting homogenous distribution, blue print and cost.

Having a planning blue print was indicated as a vital prerequisite for successful strategic integration and implementation of ET in schools. Having said that, it is considered imperative that a thorough research is conducted to come to the right conclusions.

It brings the study to the next chapter named methodology which will determine the right course for designing opinion gathering methods and leading to correct analysis.

Chapter 3: Proposed Methodology

Now that the indicators have been developed, necessary data gathering methods have to be decided and applied. Different information or data gathering ways will be briefly explained in the next part called “methods of data collection”. Each method has its benefits and limitations; the key is to choose the right method(s) which suit the study and balance the needs with available resources. Questionnaire design, sample selection, their distribution and collection will be further explained in the sections proceeding methods of data collection.

(Creswell, 1998) defines **Methodology** as:

1. "the analysis of the principles of methods, rules, and postulates employed by a discipline",
2. "the systematic study of methods that are, can be, or have been applied within a discipline" or
3. "a particular procedure or set of procedures".

Methodology refers to more than a simple set of methods; rather it refers to the rationale and the philosophical assumptions that underlie a particular study. (Creswell,2003)

The practice of searching, locating and evaluating information simply referred to as "research", is a regularly employed every day process. One uses these skills when one buys a car, considers a prospective job opportunity, or decides upon a doctor to consult. In all cases one needs to find relevant information, organize it so that he/she can see what is most relevant to his/her needs, and come to a conclusion as to how one should proceed. Research skills, therefore, help us to enhance our thinking skills, and the clear expression of our thoughts leads to better writing skills.

The purpose or aim of this dissertation is to gain a deeper knowledge of ET integration in Al Ain schools and the reasons why, if it is useful, all schools are not equally benefiting from its fruits. It is anticipated that the study will lead to a better comprehension of any previous experiments' deficiencies and facilitate in devising a plan for a successful ET induction in the edification process in Al Ain. The questionnaires, the interviews, site observations, etc. were all designed and conducted keeping in view the needs described above.

3.1: Research Approach and strategy

Research Approach

The two methodological approaches clearly described by (Holme and Solvang, 1991) are qualitative and quantitative. Qualitative analysis needs face to face interviewing and direct observation. The qualitative approach does not only concentrate on statistics but by recording and analyzing such non-statistical things, such as, feelings and behavior digs deeper and presents a better description and understanding of the subject. The quantitative analysis, on the other hand, gathers, analyses, and measures statistical data to determining the connection between variables.

The selected approach for this thesis was an amalgamation of quantitative and qualitative methods. This union is appropriate since the aim is to gain a deeper understanding of the past efforts at ET integration and implementation in Al Ain schools and to analyze its effect on the educational system. Quantitatively, the questionnaire inquires about the PCs, the number of students per class, number of students per school, number of projectors, printers, etc. Opinions of the respondents, the obstacles they faced or might face, current situation, etc will be analyzed in the qualitative analysis.

Among many advantages of using multiple methods (Robson and Colin, 1998) cite 'triangulation' as the major benefit. According to (Saunders, Lewis and Thornhill, 2003), triangulation means “the use of two or more independent sources of data or data collection methods within one study in order to ensure that the data are telling you what you think they are telling you”. Moreover, (Robson and Colin, 1998) emphasize that using multi-methods suits different situations for gathering information about the research investigation in order to enhance its interpretability; therefore it enables the researcher to adopt flexible methods to cope with potential limitations which arise in using one research strategy and to benefit from the strength of each method. Thus, using multi-methods in the proposed study will provide a variety of data on the research subjects, a broad range of answers from respondents and the likelihood of some unintended outcomes. In other words, as a result of using multi-methods the comparative advantages of quantitative and qualitative methodologies will shift over time, helping to overcome the weaknesses of each individual method.

Research Strategy

The research strategy, as explained by (Saunders , 2000) is the plan describing the strategy the author will employ in answering the research questions. Research questions, therefore, assume paramount importance necessitating that the questionnaire be designed with an objective to provide comprehensive answers. In case of this study this was done and after designing process a pilot study was run by choosing 10 people from the chosen categories. Their observations were very helpful in curing the initial hiccups.

The first objective was to measure or give a clear idea about the current situation of ET in AAEZ schools. The aim was to meet all the key players involved in education in Al Ain, i.e. the teachers, students, administrators (AAEZ and schools principals), and parents. Before handing out the questionnaire the AAEZ and the school administrators were given a clear idea about the purpose and focus of the study. A strategic plan to select people having different perspectives was the most important step. Respondents from both urban and rural areas, private and government schools, males and females schools, schools that already have ET and schools that need it were selected.

The strategy to use different methods of data collection in this study, such as, interviews, personal meetings, site visits, questionnaire, etc was intended to get a holistic view of the whole situation and to get a better understanding of the subject. Since the study dealt with people of different back grounds, ages, and education level who might not be free to give more time because the survey was conducted during their working/studying hours. Time scheduling pressure therefore was a major issue. It was kept to a minimum possible frame. Authority from the AAEZ was a must since no one is allowed to just enter a school and start asking questions from everyone. All these hindrances demanded extra efforts from the researcher and were time consuming but proper planning took care of the uncertainties encountered in this research. Another major issue during strategy planning was how to design a questionnaire which could be effectively answered by all the respondents, namely, parents, students, teachers, and the school administrators. Proper interviewing and meetings, while designing the questionnaire, helped to keep these risks to a minimum.

3.2: Methods of Data Collection

The research method used for this project was the survey, which (Bryman and Bell, 2003) define as, a systematic way of collecting data by using questionnaires and semi-structured interviews to gather information on opinions, attitudes and other characteristics of respondents. Surveys can be used to amass large quantities of data about the research subjects in order to provide descriptions and explanations of causal relationships between the response and independent variables.

The survey aspect of this research project was conducted by using a questionnaire, defined as "a list of carefully structured questions, chosen after considerable testing, with a view to eliciting reliable responses from a chosen sample. The aim is to find out what a selected group of participants do, think or feel." (Hussey,J and Hussey,R 1997).

The first objective was to categorize the people involved in imparting and facilitating education in Al Ain. The division made the task of asking, recording and understanding each category's views, regarding ET integration in Al Ain school system, easier. Based on the data collected and the analysis made, deductions were made about how, lessons learned from past experience, could help make the future induction and integration of ET improve the system of ultimate imparting of education a successful process.

The quest of finding an ideal blend of integrating ET with traditional edification process required the views and opinions of: the teachers, students, parents, schools and AAEZ administrators, and educational partners. First the teachers were interviewed from a blend of grade 1 to 12 teachers from different schools because they are responsible for eventually using ET in their classes. The teachers are the real implementers of ET and it is their on-site observation and understanding which eventually matters the most. Having interviewed teachers the second and the ultimate beneficiaries of the whole ET implementation process, the students were questioned. Students were selected from the high school level since it was considered that they were knowledgeable and articulate enough to understand the questionnaire. Parents' opinions were taken afterwards. It is a fact, that having the best intentions for their progeny, parents are always interested in helping their children get ahead in the practical world. Parents are with their children the most and can offer valuable insights in helping use ET in novel ways. After the parents the administrators, both the AAEZ's and schools' were asked to give their opinions. The administrators are the planners and the decision makers. It is their decisions which are eventually translated into policy. Their authority and educational experience adds further weight to their judgment. Educational partners were also questioned. Although not directly associated with ET's use the role of suppliers, sponsors, and private institutes is, nevertheless, extremely vital. They are the ones who are responsible for ET supply, set up, support, training and maintenance.

It is expected that the research will bring to light the necessity of using Educational Technology in classrooms to assist traditional teaching and will demonstrate how ET can be used to achieve high teaching standards.
The methodologies employed were:

1) Discussion and workshop

Any segment of the society attached and benefiting with the educational process in Al Ain can't be ignored. Everyone's perspective is equally important since everybody, whether he/she is a school manager, teacher, student, parent, supplier, sponsor, or private institute owner, is interconnected and interdependent.

A group discussion involving frank and clear sharing of facts, information and views always helps in looking at the large picture since:

- everybody is considered equal
- everybody contributes
- there is no professional intimidation
- open views are encouraged

A Group discussion workshop bringing all groups on one platform would have been an ideal situation for a candid exchange of information to help come up with successful ET integration ideas, however, due to practical constraints, it was considered unfeasible. More practical approach, in addition to distributing individual questionnaires, was to arrange individual group meetings to get each group's views

The attendees were encouraged to participate but it was left to the individuals to decide how much, or how little, they wanted to say. The topics of the attendees were not to be restricted; the aim was to stimulate informal discussions among workshop participants.

2) Questionnaires and interviews

However, it is a reality that despite encouragement to candidly discuss and give views people sometimes avoid debate or because of public/peer pressure eagerly agree to arguments they don't really concur with. To avoid that and encourage candid response respondents were asked not to cite names on the questionnaires. (Saunders, 2003) defines the questionnaire as a technique used to collect data from selected people, who are asked to answer a written set of questions in order to gain information about their opinions, behavior and attributes. The interview, on the other hand, is defined as a technique conducted with a selected group, either face to face or by telephone, in order to gain data about feelings, thinking and personal perspectives. Moreover, using interviews allows the researcher to obtain detailed, in-depth evidence, exploring any issue that may arise during the interview and opening up new dimensions on the subject of the study (Smith, 2002). Questionnaires included both open and closed ended questions in addition to "Why" and "How" questions to elicit detailed response. A full description

of the questionnaire can be seen in the "Designing" section. Questionnaires greatly enhance our understanding of what is really required and in what particular areas ET can really make a difference. Table 1 illustrates the main advantages and disadvantages of the questionnaire which the researcher took into consideration while selecting the questionnaire methods.

Advantages	Disadvantages
1. Relatively simple method of collecting data. Novice researchers can design simple questionnaires.	1. Cannot probe a topic in depth without being lengthy.
2. Rapid and efficient method of gathering data.	2. Respondent can omit items without explanation, therefore data incomplete.
3. Can collect data from a widely scattered sample.	3. Most people express themselves better through the spoken word.
4. Analysis of data can be done quickly.	4. Amount of information limited by respondent's interest and attention.
5. Respondents can remain anonymous.	5. No opportunity for researcher to interact with respondents.

Table 1: Advantages and disadvantages of the questionnaire (Tesch and Renata, 1999)

There are different ways of structuring an interview, depending on the information which the author wants to adduce and what he wishes to achieve from the interview. For example, the structured interview is defined by (Saunders, Lewis and Thornhill, 2003) as a "data collection technique in which an interviewer physically meets the respondent, reads them the same set of questions in a predetermined order, and records his or her response to each." According to (Waliman, 2005), this type of interview is conducted to obtain specific answers to specific questions, which means that it is used with closed questions in order to be analyzed in a statistical way; therefore, it is generally adopted in quantitative research. Moreover, it is more formal and should be prepared carefully before the interview is conducted. An unstructured interview, by contrast, is defined as being conducted without any structure or written list of questions, in order to explore a situation and gather unpredictable information (Collis and Hussey, 2003).The three main advantages and disadvantages, as listed by (Robson and Colin, 1998), which the researcher will keep in mind while conducting the interviews.

Interviews were found extremely useful in gathering data, because some people were not willing to go through the questionnaire and were reluctant to give their views in open discussion.

Advantages

1- It is a flexible way of finding out more allowing an in depth analysis.

2- It is a useful technique to directly ask respondents and to get a broad range of answers.

3- It is useful a method at the exploratory stage of the study.

Disadvantages

1- It is time-consuming, because it requires careful preparation and arrangement to secure permission, access and the availability of interviewees.

2- Lack of standardization might affect the reliability of data collected from interviews.

3- Bias is hard to control and rule out.

3) Observation and expert walk-through (action research)

The research stands to lose its credibility and it would be a great disservice if a first hand observation were not made of what is being used in the name of technology and how it is being used in our educational centres. Without an actual experience of how technology is currently being used and what is needed to be done, one cannot realistically begin to suggest the alternatives. This was done through…

- Site visit to schools.
- Open meetings.
- Study of…
  - the percentage use of the computer labs,
  - the traffic in the network, and
  - the utilization of each device.

As the research advanced, in addition to the methodologies described above, whenever the situation required and the need arose, other methodologies were employed to suit the required condition such as:

- **Case studies**: A descriptive case study (Naoum,1998) using narrative, numerical data, personal opinion, direct quotations and photographs can be shown to buttress the reasons to invest in technical knowledge. Past efforts by schools and other educational zones in the UAE at ET integration and implementation were observed. This afforded a great chance to monitor how real people would perform in real life situations. Studying these cases not only greatly helped in understanding and adapting strategies to a particular environment but pointed out any bugs which might hinder future ET application.

- **Formal meeting**: Meeting people, who are directly in contact with children/students for extended period while the students are in a learning environment, such as, teachers, parents, schools manager's and private institutes owners, was crucially important, as it gave vital insight into the other perspective of what happens and how a child behaves and what he/she really needs while learning.

- **Online data collection**: It was like taking a leaf from the study's own contention. Technology was employed by gathering and evaluating whatever data was available with regard to the influence and effect

of ET on Al Ain education system and what if any effect had been observed. It greatly helped in efficient data gathering and analysis. Internet was also used for conducting surveys and questionnaires so that the subjects, such as, private institutes, suppliers and sponsors, could answer at their leisure. This underscored the research hypothesis citing ET's importance to education.

Fig.2 demonstrates how the research process developed through different stages. Here, it is shown how the theory developed into the hypothesis, and finally after an intensive research into recommendation which, if implemented, might result in changing the education environment in Al Ain and can give vital impetus to further research.

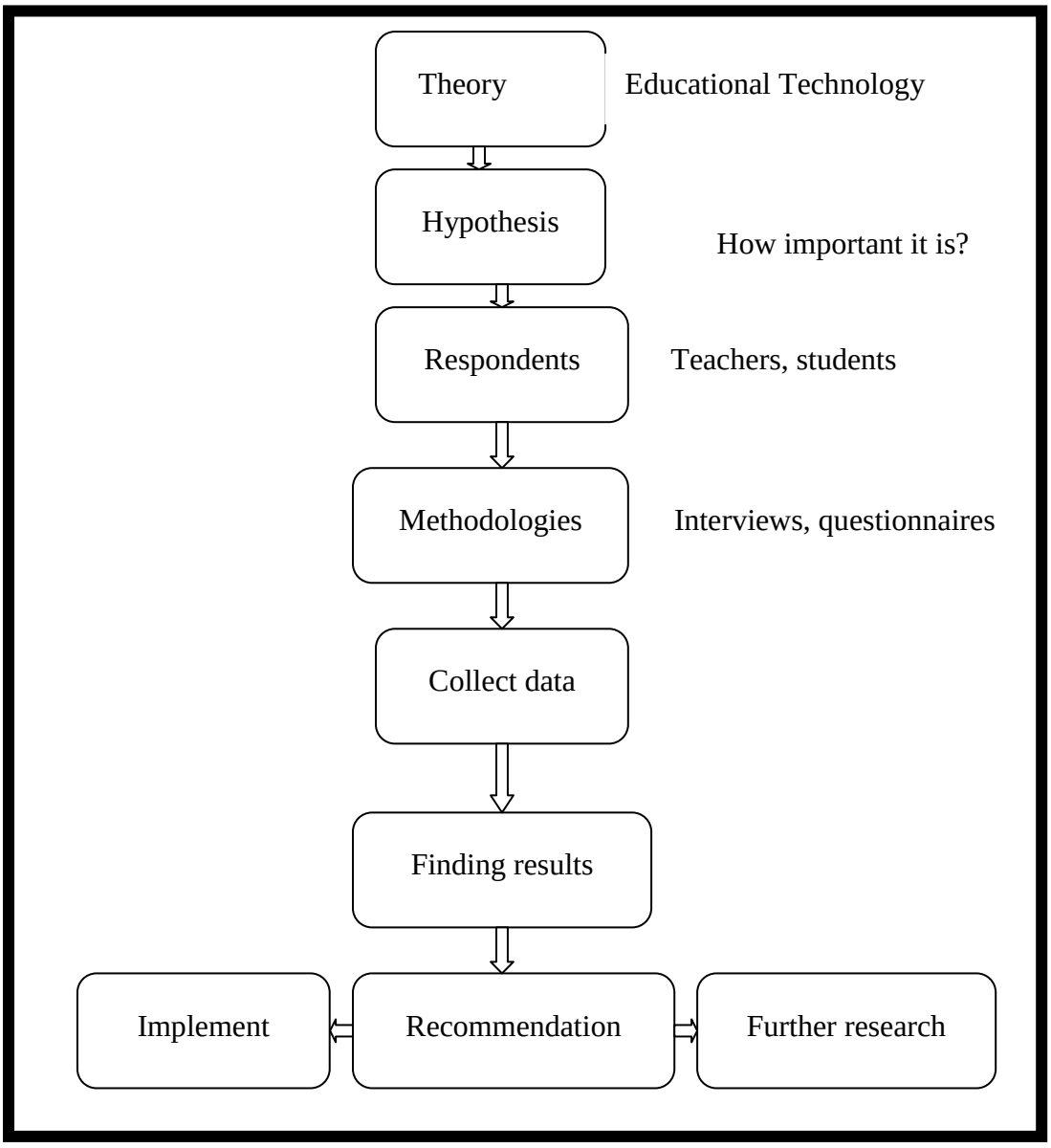


Figure 2: the steps followed to conduct the research

The aim was to provide guidelines to schools in implementing ET and improving the use of technological teaching aids. Project Management modules greatly helped in analyzing the current situation in local schools demonstrated in this research.

3.3: Designing

The first impression is the last impression. A positive response from the respondents is crucial to the success of any survey. Boredom or antipathy on part of the respondents will not elicit the right response and can jeopardize the whole research. The designing of the questionnaire was direct, less time consuming, and the questions were kept as few as possible. In short all efforts were made to make it as user friendly as possible. Appendix 1 and 2 show the English and Arabic questionnaires.

The questionnaire was divided in seven parts with questions designed to obtain a holistic view of ET in Al Ain. Questions probed and solicited respondents views about ET awareness, availability, implementation, use, obstacles, funds, etc.

Part 1: Categories

The first section of the questionnaire required only necessary personal information from the respondents by categorizing them in groups, such as, genders or age and gives the actual number of respondents replying to the questionnaire. Questionnaire was drafted as a multiple choice format so that the time required completing it could be kept to a minimum. Respondents were not required to give any identification as people are usually reluctant to identify themselves and it could have had an adverse effect on their response. The first section will help in meeting the requirement listed in section 3.4 which requires certain number of respondent from each category to be questioned. Regardless of their categories everyone was asked to answer the first section as shown in Fig 3.

Part one: Categories

1. **Nationality:** □ Local (Emarati) □ Non local (Expatriate)
2. **Gender:** □ Male □ Female
3. **Age:** □ Under 20 □ 20 – 40 □ Above 40
4. **Education:** □ High school □ College □ Bachelors or above
5. **Demographic:** □ Urban □ Rural
6. **School Type:** □ Public □ Privet
7. **School Gender Type:** □ Boys □ Girls □ Co-educational
8. **Category:** □ Student □ Teacher □ School Administration
   □ Parents □ AAEZ Employee □ Education Partner

Figure 3: Part 1 of the questionnaire defining the categories.

Part 2: School Administrators

The second part of the questionnaire was exclusively devoted to questioning school administrators in the Al Ain public schools system. School administrators' occupy a key position because they are directly responsible for introducing ET in their respective schools Their opinion carries weight as they know the environment and its limitations. Since only one category, i.e. the school administrators, is questioned, this part required the least number of questionnaires to be distributed and was the most cost effective. This part is mainly quantitative to illustrate the differences in the number of students, computers, and printers among schools. It also took into account the possibility of any further development planned for the future.

Part 2 also examined the availability of hardware and infrastructure. The first 7 questions are quantitative in nature as they take into account the school category, the number of students, computers, etc to help in analyzing any deficiency in the equipment and to develop future cost broadcasting strategy.

The rest of the questions from 8 – 11 are qualitative in nature and solicit school administrators' opinions regarding present and future ET integration needs as shown in Fig.4. An analysis of the questions in section 2 gives a clearly demonstrates whether ET is homogenously implemented in Al-Ain schools or not.

Part Two: School Administrator

1. **School category:** □ KG □ grade 1-5 □ grade 6-8 □ grade 9 -12
2. **Number of students:**
   Please write the exact number if you are sure _____.
   If you are not sure (please **circle** the appropriate number of Students).
   1-200 201-400 401-600 601 or above
3. **Number of available computers:**
   Please write the exact number if you are sure _____.
   If you are not sure (please **circle** the appropriate number of computers).
   1-25 26-50 50-75 76-100 101 or above
4. **Number of available projectors** (please **circle** the appropriate number).
   1-10 11-20 21-30 31-40
5. **Number of available printers:**
   1-5 6-10 11 or above
6. **Specify if one or more of the following are available(check Yes or No).**

A.	**Internet Service**	□ Yes	□ No
B.	**Server**	□ Yes	□ No
C.	**Network**	□ Yes	□ No
D.	**Email facility to employees**	□ Yes	□ No
E.	**Computers for Teachers**	□ Yes	□ No
F.	**Computers in classes**	□ Yes	□ No
G.	**Video Conference room**	□ Yes	□ No
H.	**Education Software**	□ Yes	□ No
I.	**Science Lab**	□ Yes	□ No
J.	**Active Board**	□ Yes	□ No
K.	**Copying Center**	□ Yes	□ No
L.	**Technology specific budget**	□ Yes	□ No
M.	**Technicians**	□ Yes	□ No

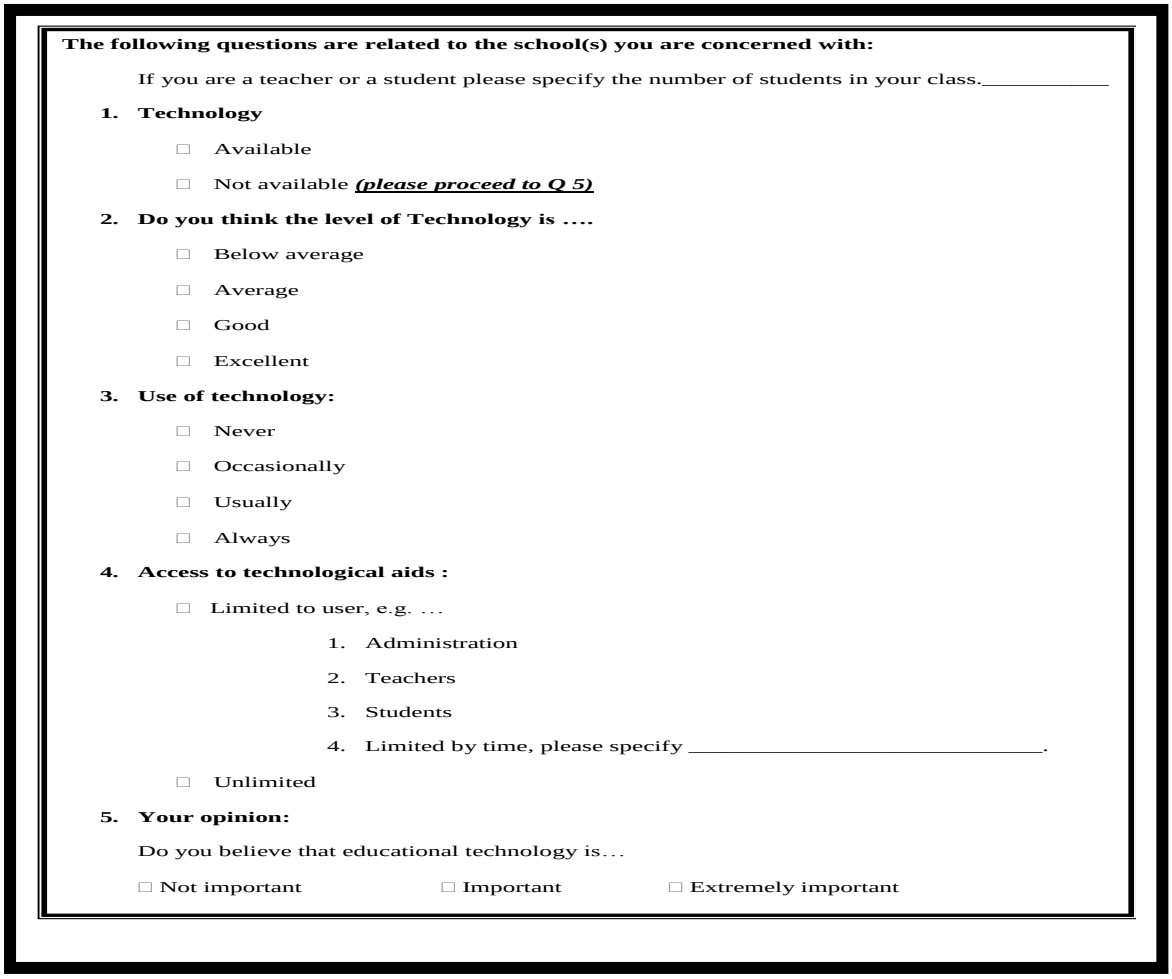
7. What percentage of your teachers are using the Internet? Below 30% 31-70% above 71%
8. Tick the major issue facing our school in terms of hardware and software is:
   Funding Training Maintenance human factor Timing to use Suppliers
9. You expect to have _____ computers per classroom by the year 2010.
10. Does your school's infrastructure support the integration of technological aids? (Yes / No)
11. What minimum amount of fund will be needed for purchasing and supporting technological equipment and maintaining it? Below 250,000 AED 250,000 – 500,000 Above 500,000

Part 3: General Questions

The third part was more or less qualitative in nature as it sought to get respondents' view about the availability of Educational Technology and whether the respondent considered ET important or not. This is the only part where the respondent could avoid answering questions if the first answer is "Not Available". Part 3 showed the availability of basic ET equipment in Al Ain schools without specifying exactly what equipment the respondent was talking about. This part answers whether the existing ET equipment is actually being used or not and how it is being used.

An analysis of the replies of the respondents helped in ascertaining the awareness and the reluctance of the schools towards ET. For Example, in certain cases even if the computers were available they were kept locked and were inaccessible to the users.

Part three could be described as a warm-up part as it was here that the research started questioning people in general. In this part minimum respondent confusion was expected because the questions were closed, easy, and direct as shown in Fig.5.



The following questions are related to the school(s) you are concerned with:

If you are a teacher or a student please specify the number of students in your class._____

1. **Technology**
   - □ Available
   - □ Not available ***(please proceed to Q 5)***
2. **Do you think the level of Technology is ....**
   - □ Below average
   - □ Average
   - □ Good
   - □ Excellent
3. **Use of technology:**
   - □ Never
   - □ Occasionally
   - □ Usually
   - □ Always
4. **Access to technological aids :**
   - □ Limited to user, e.g. ...
     1. Administration
     2. Teachers
     3. Students
     4. Limited by time, please specify _____.
   - □ Unlimited
5. **Your opinion:**

Do you believe that educational technology is...

□ Not important □ Important □ Extremely important

Figure 5: Part 3 of the questionnaire examining the availability of technology

Part 4: Agree / Disagree Questions:

The fourth part of the questionnaire, shown in figure 6, was designed to inquire the prevailing views regarding ET. It dealt with people's opinions about ET development in schools, their perceptions about its success or otherwise, and their hopes and fears. This part judged respondents' preferences by using a "5-point Likert" type questions format with 1 being the weakest (disagreement) and 5 being the strongest (complete agreement). All the respondents were asked to answer questions depending on their knowledge and area of expertise / association. In case of non applicability of any question the corresponding preference section was asked to be left

blank. This part, in addition to ascertaining people's awareness, answered questions about the existing and required resources as well.

Part Four: Agree Disagree Questions

Please indicate how strongly or otherwise you agree with the following statements on a scale of 1 – 5; 1 being the weakest and 5 being the strongest. Circle the appropriate response: Answer according to your involvement and knowledge. Leave blank if don't know

A	**ET, General interest**	
1	There is strong interest among students in TE in school	1 2 3 4 5
2	There is strong interest among teachers in TE in school	1 2 3 4 5
3	There is strong interest among parents in TE in school	1 2 3 4 5
4	There is strong interest among school administration in TE in school	1 2 3 4 5
5	The school environment helps the student and the teacher to use technology.	1 2 3 4 5
6	Computer lab can be used by both students and teachers	1 2 3 4 5
B	**Funds and barriers in TE implementation**	
1	My school has an ongoing budget for funding technology initiatives.	1 2 3 4 5
2	The school is able to budget funds for training and support.	1 2 3 4 5
3	The school has been successful in obtaining government funds to support technology.	1 2 3 4 5
4	My school has been comparatively successful in purchasing technology.	1 2 3 4 5
5	Technology purchases have forced budget cuts in other programs and services.	1 2 3 4 5
6	Financing is the greatest barrier in achieving my school's technological goals.	1 2 3 4 5
7	There were many unanticipated barriers to implementing the technology plan .	1 2 3 4 5
C	**ET Implementation**	
1	There is strong leadership for implementing technology in my school.	1 2 3 4 5
2	Decision-making about technology in my school is highly centralized.	1 2 3 4 5
3	The technology plan for the school has been effective.	1 2 3 4 5
4	There is general agreement among us about what our school wants to do with technology.	1 2 3 4 5
5	The school has been successful in deploying hardware and software.	1 2 3 4 5
6	The educational Software are available and are easy to use	1 2 3 4 5
7	The school has been successful at meeting the overall goals of the TE technology.	1 2 3 4 5
8	Implementation of TE in my school is better than other neighborhood schools.	1 2 3 4 5
D	**ET Propagation**	
1	The school regularly distributes information about what is happening with technology in my school.	1 2 3 4 5
E	**ET and Teachers**	
1	Teachers are qualified to use technology in teaching	1 2 3 4 5
2	Teachers have easy access to the technological equipment that they need.	1 2 3 4 5
3	Teachers use computers regularly for class management functions (attendance, grading, etc.).	1 2 3 4 5
4	Teachers are regularly consulted about technology decisions.	1 2 3 4 5
5	Teachers are doing better than average in implementing technology in the classroom.	1 2 3 4 5
6	Teacher Training Programs for TE have been successfully implemented	1 2 3 4 5
7	The school tries various teaching strategies incorporating the use of technology	1 2 3 4 5
F	**ET and Students**	
1	Students have access to computers	1 2 3 4 5
2	Students are able to use a learning system to build skills and assess progress.	1 2 3 4 5
3	Students have opportunities to use a wide range of technological equipment.	1 2 3 4 5
4	The school provides activities to use technology.	1 2 3 4 5
5	Technology use is part of ongoing classroom routines.	1 2 3 4 5
6	The school has been successful in implementing technology standards for students.	1 2 3 4 5
7	The students can communicate through E-mail	1 2 3 4 5
G	**ET and Parents**	
1	Parents take an active interest in the availability of TE in school	1 2 3 4 5
2	Parents encourage their children to use technology at home.	1 2 3 4 5
H	**ET maintenance**	
1	Equipment is regularly maintained.	1 2 3 4 5
2	The school has experienced staff required for maintenance.	1 2 3 4 5

Figure 6: Part 4 of the questionnaire using a "5-point Likert" type questions

Part 5: Check all that apply:

The fifth part took "awareness asking questions" to a more personal level. In addition to probing respondents' awareness, as had been done in the fourth part, the questions in the fifth narrowed down to personal awareness, use and context of the respondents.

Part 5, as shown in fig. 7, gave respondents the freedom to skip any question that didn't wasn't applicable because some, such as, parents or suppliers might not be using ET in educational context.

Part Five: Check all that apply.

____ I am familiar with my school's technological education (TE).
____ I consider myself knowledgeable about technology in general.
____ I am a member of my school technological education committee.
____ I helped planning the school's technological education requirement.
____ I use technological aids in my work.
____ I have received training in technology before I started using it.
____ My school has technology education.
____ I think technology is important for education.
____ I prefer education with technological aids.
____ I prefer education without technological aids.
____ Teachers resist using technology in my school.
____ Students resist using technology in my school.
____ Parents resist using technology in my school.
____ School Administrators resist using technology in my school.
____ Each classroom in my school has one or more computers
____ My school has one or more computer labs.
____ My school library has one or more computers.
____ Purchased hardware and software is distributed equally among the buildings and classrooms.

Figure 7: Part 5 of the questionnaire "check all that apply", checking the personal opinion

Part 6: Fill in appropriate blanks:

Besides the multiple choice queries, part six also carried questions requiring detailed answers. Part six which is shown in figure 8 inquired respondents' opinions about the standard and level of ET support provided in their schools. Questions regarding internet connections, web pages, e-mail accounts were followed up by explanatory questions asking respondents detailed views about the reasons why some schools had ET and some didn't.

This part attempted to answer lack of homogenous ET implementation in Al-Ain schools.

Part Six: Fill in the appropriate blanks.

1. How much technology support does your school provide teachers? (support = training, resources, equipment)
   □ Excellent □ Average □ Below Average
   □ None
2. Do you feel the support offered is sufficient?
   □Yes
   □No

3. What percentage of your classrooms are hooked up to the Internet? (Please circle)?
   25% 50% 75% 100%

4. Does your school have written guidelines related to the technological skills that teachers are expected to have to perform effectively in the classroom? _____ Yes _____ No

5. Does your school have written guidelines related to the technological skills that students are expected to have? _____ Yes _____ No

6. Does every administrator in your school have a school e-mail account? _____ Yes _____ No

7. Does every teacher in your school have a school e-mail account? _____ Yes _____ No

8. Does your school have a web page? _____ Yes _____ No

9. What do you consider to be the top "technology priority" in your school: (check one)
   _____ To have a variety of technological equipment
   _____ To have educational software
   _____ Internet access
   _____ Maintenance

10. What are the reasons behind this anomaly that some schools have full technological solution and some don't?
    The Distribution is fair AAEZ School administration
    School infrastructure Administration reasons Other, Please specify ……

Figure 8: Part 6 of the questionnaire, "fill in the appropriate blanks", inquiring individual opinions about schools

Part 7: Please write short answers or circle the appropriate option:

Having more exploratory and few multiple choice questions, part seven inquired about the need of government aid in promoting ET on school campuses. Focusing on schools' previous ET integration experience, part seven asked their views about how lessons learned from previous experience could help in future ET implementation process; inquired the reasons of unequal ET competence in schools and asked for recommendations and suggestions, etc.

Part seven, as shown in figure 9, tried to find the answer to what schools which already had ET infrastructure had learned about required essential resources, government assistance, obstacles, etc. It also helped in understanding the reasons why in the past ET could not have been homogenously implemented among schools.

Part Seven: Please write short answers or circle the appropriate option (continue on the back if you need more space)

1. Do you think your school needs a government-approved technology plan? Why? Yes No

A)----------

B)----------

C)----------

2. The major issues facing your school in terms of hardware and software are:

A)----------

B)----------

C)----------

3. What lessons have you learned as a result of implementing Educational Technology?

A)----------

B)----------

C)----------

4. Are there any ways that you think the AAEZ could help with issues of educational technology?

A)----------

B)----------

C)----------

5. What do you think are the biggest obstacles facing technology implementation in Al Ain schools?

A)----------

B)----------

C)----------

6. What are the reasons behind not using technology in the schools?(please circle)

Unavailability of time lack of training Schedule pressure lack of Education Material

Lack of Maintenance Others? Please specify……

7. Who do you think is responsible to supply the schools with technology?

Abu Dhabi educational council Ministry of Education AAEZ

Private Sector Others like …….

8. Do you think that a student from a school which has technology differs positively from a student who has never used technology in higher education?

Very much little Not very much

9. Do both these high school students in question 8 have equal opportunity when looking for job?

Yes No

10. If your school implements technology in the future, what kind of action will you take?

Use it Resist and not use Leave the job Ask for training

11. Recommendation and suggestions for implementing TE in Al Ain.

A)----------

B)----------

C)----------

12. Would training and other forms of support be helpful to change your reaction? Why Yes No

A)----------

B)----------

C)----------

13. A minimum of ___ computers per classroom would be ideal to improve learning.

14. An ideal ratio is ___ computers per ___ students.

15. Do you believe that the ET equipments are allocated fairly among the rural and urban schools? Yes No

16. Do you believe that AAEZ, MOE and ADEC are doing their best for ET propagation among schools? Yes /No

17. Any additional comments or remarks on the subject of the research.

A)----------

B)----------

C)----------

3.4: Sample Selection

The sample selection, as shown in figure 10, was distributed according to the importance of each category; which was calculated according to the use, the involvement, and the purchase of ET among other reasons.

The bar chart (Fig. 10) shows all the categories sampled and interviewed in Al Ain education system, namely, the teachers, students, school administrators, AAEZ employees, parents, education partners, and others. A brief description of the sampled categories is given below.

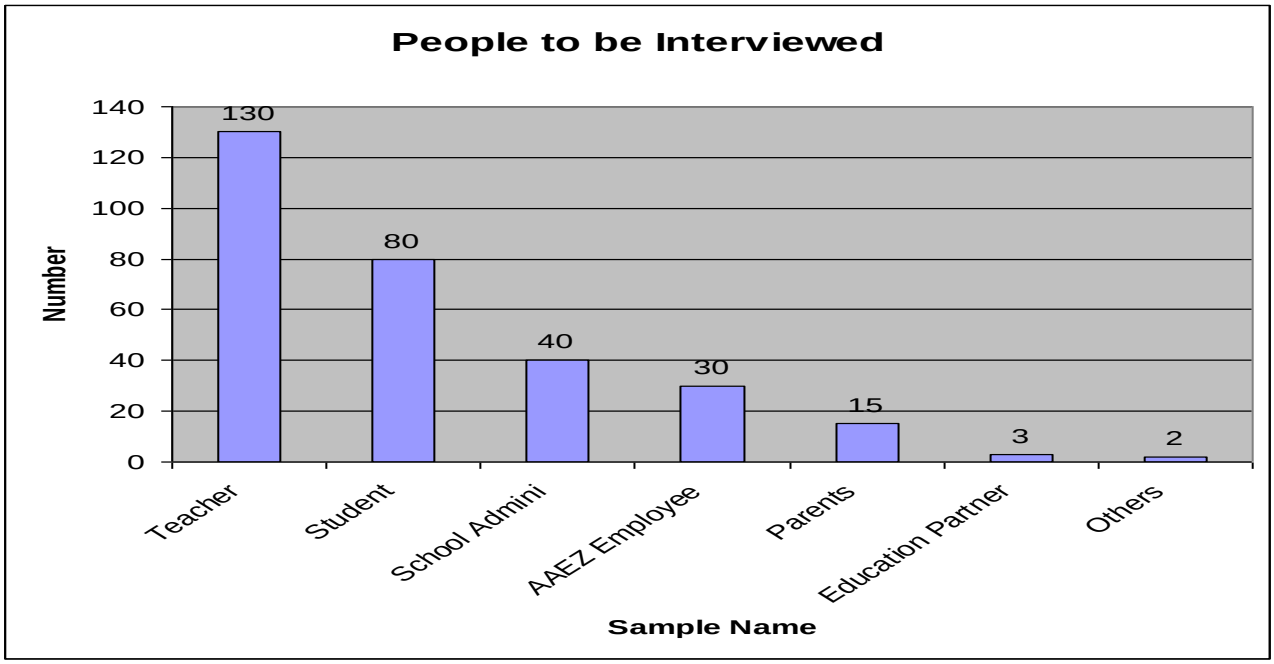


Figure 10: The number of people to be interviewed

3.4.1: AAEZ Employees

The survey included the AAEZ staff because of their obvious association with the formulation of the education policy and its implementation. Nearly 30 respondents from different departments ranging from finance to HR were asked to respond to a number of questions asking factual information and their personal opinion taking into account their experience and observation in the implementation of ET in schools all across Al Ain. The researcher personally went to each department and handed in the questionnaires to clarify any ambiguity in respondents' minds.

AAEZ is the controller of employment for the schools hence it is supposed to select the people who have the ability to use ET properly. It is AAEZ's duty to support the schools with ET software and to build specific programs for the schools for their database.

Easily accessible location made going to respective AAEZ officials and conducting the survey much easier since all of them were conveniently housed in one building in downtown Al Ain, (figure 11 show the building picture).

Figure 11: AAEZ building located in downtown Al Ain

The hierarchy of the AAEZ (shown in appendix 3) starts from a director overseeing the management, legal affairs and public and media departments. He is assisted in this task by the Deputy Director for Administration and Financial Affairs, Deputy Director for Private and Quality Education and Deputy Director for Education Affairs. Total number of employees working for AAEZ is 300 out of which 10% were asked to respond to the questions in the questionnaires.

All financial issues and big projects related to education come through AAEZ; AAEZ plays a crucial role in ET acquisition and implementation for any public school. The department assigned this responsibility is the IT department at the AAEZ.

As far as implementation of ET is concerned the IT section at the AAEZ is the most important because it is this sections which is supposed to work as a consultant with the schools and to support them with carrying out ET implementation; AAEZ entrusts its IT department to give total support to the schools and whatever products are bought by the schools or recommended by any authority have to be scrutinized by this section.

AAEZ is the link between the school and the public sponsor, in this case the MOE or Abu Dhabi Education Council (ADEC), and private sponsors like the Red Crescent. One of its major duties is to advise the top management/sheikhs about what is really happening in the schools. As far as ET is concerned, the AAEZ is responsible for equal distribution of resources among all public schools and to make sure that the money allocated for ET or any particular project is used for that particular project and not wasted. Furthermore being a government organization and the large size of its contracts puts AAEZ in an ideal position to use its power on companies and suppliers to comply with their contract promises and not unnecessarily create hurdles and make any unreasonable delays.

It should be noted that it is the policy of AAEZ that all schools should have internet account (business one) to keep them abreast of the latest developments in technological fields. In addition, all private IT training centers also operate under the supervision of AAEZ which evaluates and keeps a record of their employee's qualification and education to make sure that the right standard of education is maintained.

Out of the total workforce of 300, 30 (10%) individuals were selected for this survey. The respondents were carefully chosen from different departments, positions and responsibilities and different levels of education to correctly and adequately represent the point of view of the AAEZ. To save time and avoid danger of repetition of opinion 30 was considered to be an appropriate number.

3.4.2: Schools Administration

School administrators are in an ideal place to judge the pros and cons of any educational experiment involving students or teachers since it is they who are entrusted with its implementation. School administrators of 40 schools out of 540 were chosen to respond to a number of general and specific questions regarding implementation of ET in their respective schools. Based on their previous experience and observation at other schools, they were first asked to give (in the first part of the questionnaire with closed ended questions) their opinion, and (later with open ended question) suggestions to help learn the reasons for ET's apparent failure of implementing ET in AL Ain schools and eventually helping devise an improved plan to successfully implement ET in schools across Al Ain.

The school administrator is in a unique position as he or she acts as the link between the schools (comprising students, teachers, etc) and the AAEZ. It is his job to adequately keep the AAEZ informed about the particular needs of the teachers, students and the school's requirements. In case of ET implementation in addition to the needs and requirements it is the administrators' job to keep AAEZ informed about any positive or negative outcome of any of its decisions. Simultaneously if the policies of the AAEZ are incorrectly conveyed to the teachers and students then misunderstandings can be created and the whole system runs the risk of breaking down. If the message is not communicated correctly the link will break and the whole implementation process could be curtailed.

Even though they might have low or no technical back ground school administrators, besides the teachers, are the most important people since it is they who decide when and how ET is implemented in their schools. Any resistance on their part, in the initial phase of the ET implementation process, can doom the project from the start and is crucial to overcome. Schools administrators having a technical background this are an additional help and can certainly prove an added boon in proper implementation of ET in schools.

School administrators being responsible for implementing any new technology are the ones who make or break any new technology implementation. School administrators are the ones who supervise the teachers and check the actual use of ET in the classes. Any success in implementing ET will have to have their complete consent and contribution.

40 school administrators were chosen to represent a total of 540. This relatively large proportion of administrators (around 15%) was selected to get a better understanding of the actual needs and wants of the schools. The research could not afford to ignore, because of the importance of the project, even a small seemingly insignificant suggestion as it could have had a lasting effect on the success of the whole endeavor.

It is for the above and other reasons that part 2 of the questionnaire was specifically designed to get the opinion and views of the administrators keeping in mind their unique and important position in the education system.

3.4.3: Teachers

When you are conducting a survey regarding the use, benefits, and implementation of Educational Technology you can't ignore one of the most important part of the edification process, the teachers. It is the teacher who will have to use the ET to better the learning process making his opinion the most important since he has the education and the experience to understand the intricacies of the technology and the needs of the students. A diligent and conscientious teacher can greatly help a researcher who is trying to learn the deficiencies of any previous educational endeavor and can come up with practical solutions to overcome shortcomings.

The end users, of any Educational Technology introduced in the educational process, are the students and the teachers, and it is the teachers who decide the most important "how" that technology will be actually put into practice. Proper utilization (%age of use) of any Educational Technology and the level of productivity, for instance, the computer could might as well be used only a typing device or, to its full potential as an educational enhancing instrument, depend on the teachers.

Teachers play an important role in the maintenance of the ET equipment as well. The longevity of these electronic educational devices, which are directly under the supervision of the teachers, mainly depends on their use. Proper and careful use can substantially increase ET equipment's life resulting in lessening the maintenance burdens.

Teachers are the most important players in achieving successful ET integration; they play a vital part in any planning involving the implementation of any new technology because the testing phase is supervised and controlled by them; they are the ones who decide monitoring, controlling, distribution and scheduling of ET equipment so that the classes are conducted smoothly and not turned into a mess, jeopardizing the whole process. It is the teachers who are the key players to evaluate the risks of using new technology, such as, internet access. They are in an ideal place to know whether internet is being used or abused by the students.

130 teachers from 140 schools were asked to answer the questionnaires. Teachers made up around 50% of all the people interviewed. A larger sample of teachers was chosen keeping in mind their importance for ET implementation. This relative high number greatly helped in obtaining a clear idea about any ET obstacles and resistance in Al Ain schools.

3.4.4: Students

Students are the very reason for conducting this whole exercise. It is for them that the whole education system had been established in the first place. In this IT driven modern world, where young people are surprisingly more knowledgeable in certain aspects of technology than their elders, it would be a great mistake if students' opinions were not taken into account. They are the end users who can better judge whether they are benefiting or not, i.e. how helpful is the Educational Technology in making them more aware and understand lessons better. As previously stated ET integration in the education process is for the students’ advantage and their opinion should be taken into account and not refused just because they are perceived as young and immature.

80 students from 140 schools were chosen to answer the questionnaires. As previously done with the teachers the students were briefed in groups to facilitate the answering process. Older students from grade eight onwards were selected for the survey. In selecting the students care was taken to keep gender representation equal. Students from higher grades were chosen because they could understand and respond to the questions asked.

Students from both urban and rural areas were selected because of the differences in the environment and their needs. Unlike teachers, more time was expected to be spent with the students as it was assumed that they would need longer to understand the questionnaire and write their replies. The time estimated for the high school students to finish the questionnaire was 20 minutes where as for the teachers it was 15 minutes.

The reason for sampling comparatively less percentage of students than teachers lies in the fact that the survey to a large extent was limited to older students from grade eight onwards. It was assumed that students from higher classes would have the knowledge, understanding and the skill to appropriately respond to the questions.

It was very important to get the opinion of both urban and rural students because of the differences between their environment and access and level of awareness as far as technology is concerned. Rural students, unlike urban students, have their own particular needs which need to be looked at and taken care of.

3.4.5: Parents

The most concerned, apprehensive and keen among the whole sample selection were the parents. It is the parents who are most eager to see their offspring get the best education, graduate with flying colors, and make a happy and prosperous practical life. Their whole lives revolve around the wellbeing of their children. Who better than the parents to question about what was good for the education of their children?

A random sample of 15 parents was taken as was practically possible. The parents, although not the decision makers in the ET integration and implementation process, nevertheless, wield great power as to what kind of ET equipment the students are getting at home. They are actively involved in helping their children complete their

school projects and homework. Their opinion and advice matter because they can better the education process by encouraging their children to take more interest in the latest or school suggested ET equipment.

3.4.6: Educational partners

ET implementation in schools means that electronic machines will assist people and like all the other man made machines, there are good and bad qualities in ET equipment too. It is the job of the suppliers to make sure that the right kind of equipment is supplied. This not usually acknowledged but very important responsibility lies in the hands of the suppliers, maintenance technicians, and software & hardware engineers. They are important because they are the ones who first make sure that the schools get the best and the latest technology and then keep it functioning to its optimal capacity. Some of these suppliers have had previous jobs related to education which makes them ideal observers as education needs people who care for the education and are not in this business only for money.

5 educational partners were selected for this survey. Their input was of extreme importance in deciding the best ET software and hardware and when and where to go for maintenance, support, contract, and training.

3.5: Distribution and results collection

Distribution

The questionnaire distribution, based on location, was divided in two areas, urban and rural. The numbers of sample selection distribution shown in the Fig 10 were based on the chart shown in appendix 4.

Urban:

The urban part of the region was chosen for the first stage. It was easier to conduct the survey in the city as everything was within easy reach and the data was readily available. Questionnaires were distributed among the students, teachers, and the administrators of different schools along with the AAEZ officials. Group and face to face meetings were conducted to explain the research's purpose and to get respondents' opinions.

Distribution started with one female school in the city. Respondents were given three days to fill the questionnaires. The first school was treated as a pilot study to help avoid creating any misunderstanding or possible conflict and to find and rectify any lingering problems.

2 male schools, 2 female schools and 1 KG school were chosen as a sample. The sample comprised of high schools and primary schools. From the high schools, students' together with the administrators' and teachers' views were collected. While only the administrators' and the teachers' were sampled from the primary schools. After the public schools private schools were visited. Two private schools were selected and the opinion of administrators, teachers and students were taken.

Parents were chosen based on the recommendation of the AAEZ officials and the respective schools. Their recommendation went a long way in locating willing individuals and in conducting a successful survey.

At the AAEZ, located in downtown Al Ain, a whole day was devoted for the distribution of questionnaires and the respondents were given a week to reply.

Rural

The rural part of the research region was tackled in the second stage. It took longer than the first stage as villages are situated at quite a considerable distance from each other and it took longer traveling time to reach each school and conduct the research. Nevertheless, students, teachers, and administrators at rural schools were visited and, as was done at the urban schools, group meetings with questions and answer sessions were held to explain the purpose of the research and get respondents' opinions.

Four rural schools, two male and two female, were selected to bring the number equal to schools chosen in the city in order to keep the research as representative and fair as possible. No private school was found in the rural area, ostensibly owing to commercial reasons.

Rural parental replies, since the researcher also comes from a rural background, depended on the personal relationships they had with the researcher. It resulted in a more open and frank response.

The researcher conducted site visits by visiting classes and computer labs in sampled schools to get a first hand knowledge of how the classes were being conducted and how ET, if present, was being utilized. Working hours were counted to check how much time was devoted to the computers. The availability of internet access was checked and the information regarding data transfer between students and teachers was also taken into consideration.

In the third stage parents and educational partners such as, suppliers, hardware & software technicians, and members of the society in general were contacted. Here guidance from schools and the AAEZ officials was extremely beneficial in helping choose who to contact and to interview. Respondents were met in person and explained the purpose of the research, as much as possible, but where circumstances made a face to face meeting impossible, respondents were contacted through other sources, for example, through their children or e-mails.

Result collection

In case of the AAEZ officials the distribution, answering, and collection of the questionnaires took a week. It took and extended period of because all the officials had to be individually briefed. Frequent unavailability of many respondents (due to meetings and other engagements) also contributed to undue delay.

The Researcher himself went to each school to get the valuable opinion of administrators and to answer any of their questions in case of any confusion or ambiguity. The whole process, from questionnaire distribution to collection, took 2 weeks to complete as it was impossible to cover more than 2 schools a day. Teachers were briefed in groups about the intention of the research and were requested to answer the questions to the best of their knowledge. Upon learning the nature of research, the researcher was pleasantly surprised to see, that a vast majority of teachers were enthusiastic to give their views and opinions. Just like the teachers the questionnaire was explained to students in groups. Again as seen among teachers great enthusiasm was evident, which was not only encouraging but also understandable, as it is the youth which is always the first to embrace any change.

The parents, on the other hand, were visited on an individual basis. The advice of the AAEZ and respective schools proved valuable in contacting willing individuals. The researcher explained the nature of the research,

and gave parents two days to answer questions at their leisure. Parents, understandably worried and eager for their children not to miss any development which could hinder the progress of their progeny, came up with valuable contributions.

The educational partners, due to their hectic schedules, were contacted on telephone and individual appointments were made. E-mail was used to brief them about the survey and they were given three days to reply.

Summary

This chapter described designing methodologies and sample selection employed in examining Educational Technology in Al Ain public schools. The theoretical and methodological framework about the previous, current and future ET integration among schools in Al Ain was looked at and described. Data collection process was explained in detail. The achieved results of the data analysis are covered in the next chapter in more detail.

Chapter 4: Data Analysis and Results

4.1: Survey Response

This chapter covers the analysis of data, proceeding through a test of each of the hypotheses outlined in Chapter 2 and the objectives enumerated in Chapter 1 which were required to answer the five primary research questions related to analyzing ET influence and its efficacy on Al Ain education system. Seven parts of the questionnaire, along with different methodologies, for each of the five research questions and three research hypotheses, have been carried out. The data are described, statistically processed, findings are detailed, and additional material from qualitative resources is outlined as appropriate. Part 1 of the questionnaire, however, does not focus on ET but rather primarily concentrates on gathering information about the respondents.

4.1.1: Respondents

The chart below (Fig. 12) shows the actual number of AAEZ cadres who responded to a questionnaire asking about ET use and integration. The total number of the actual respondents was 330, 30 greater than the expected number of 300 as shown in Fig.9. The biggest respondent group was the teachers. A total of 130 teachers were expected and unexpectedly a greater number, i.e. 154 responded. The feedback was that the teachers were greatly interested in ET propagation and successful implementation. The same response was seen among the students and the school administrators, where the actual numbers responded were significantly greater than the numbers expected once again highlighting students' willingness to actively participate in ET implementation. These extra responses were not ignored and deserved to be taken into account because the respondents were found to be genuinely interested in the exercise, wanted ET integration and had given their valuable time and attention for this survey exercise. Appendix 5 shows a typical sample of Arabic responses.

The lower than expected response, as far as the AAEZ officials are concerned, was greatly due to the limitation which explicitly stated "late response time" on part of the AAEZ officials. These, late responses due to a number of reasons, forced the research to be limited to the actual 28 responses against the expected 30. The lower

collection, however, did not significantly affect the outcome of the research since the questionnaires were distributed equally among different departments ensuring fair and equal representation. Our focus, in addition to the top management, were three departments directly related to ET, which were HR, responsible for employing technicians and teachers with IT background; Finance, responsible for funding & company contracts, and finally IT, responsible for support, maintenance and evaluation.

The lower response of the parents and educational partners was largely due to their lack of understanding of the whole picture and less involvement in school matters. These problems came to light when incomplete questionnaires were returned resulting in a slightly lower response of 13 than an expected of number of 15 from parents and 3 out of expected 5 from the educational partners, as shown in Fig. 12.

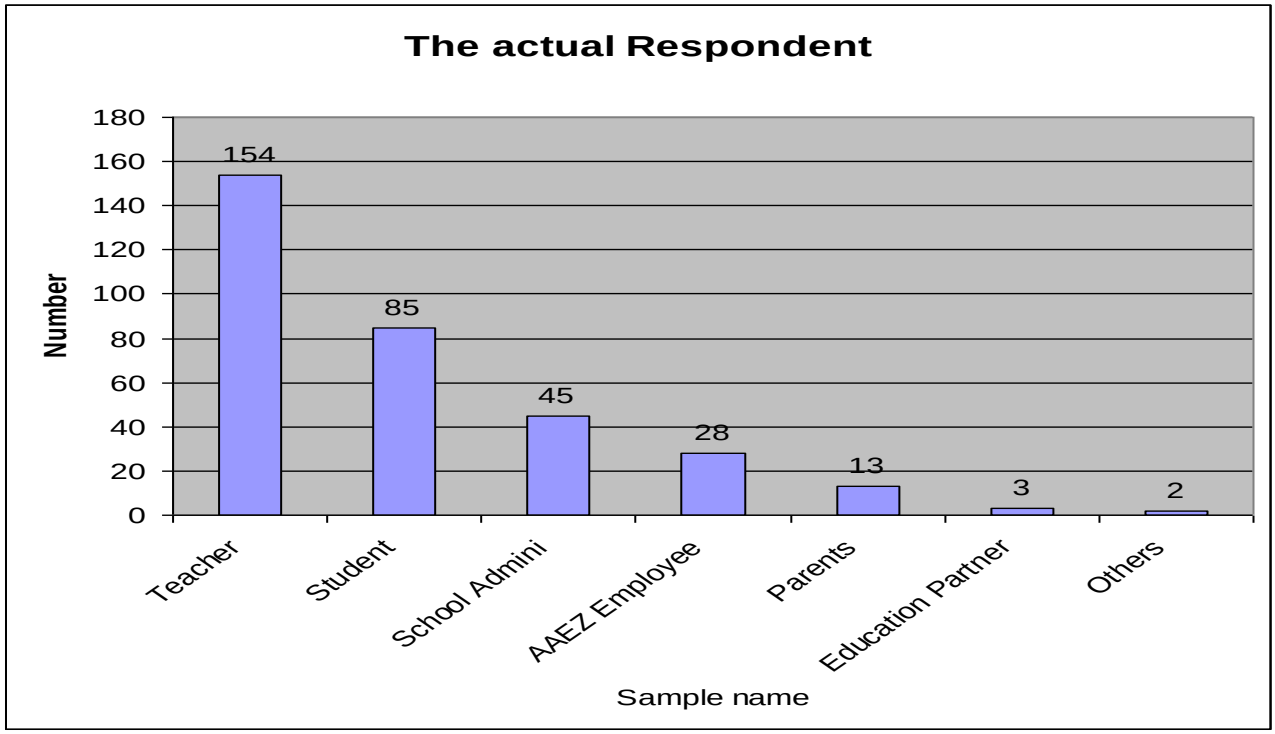


Figure12: The actual response of the interviewees

Nationality

With its vast expatriate population the "nationality" issue draws prominence in the UAE. Figure 13 depicts nationality distribution in two parts, Emiratis and Expatriates. A significantly higher representation of “locals” in the bar chart (Fig.13) highlights the fruits of Emiratization, (the government's drive of replacing expatriate workers with Emiratis), of the local education system especially among AAEZ employees, school administrators and teachers respectively. Another reason for better local representation, i.e. 57% was due to more willingness to

answer the survey questions on the Emiratis' part, owing to a higher feeling of responsibility. Higher local representation assumes especially more significance and points towards the strong empathy the Emiratis have for ET, when the actual number of local teachers is taken into account which, according to AAEZ records of the year 2007, is no more than 30% of the total number of largely female teachers.

Higher local representation was also attributed to an increased participation of local students due to government's policy of restricting admission in public schools to locals. Non local students can only be admitted if…

- they had already been studying in public schools before the application of the aforesaid policy
- whose parents work in rural areas
- they can not afford private schools expenses
- whose parent/s work/s in public schools

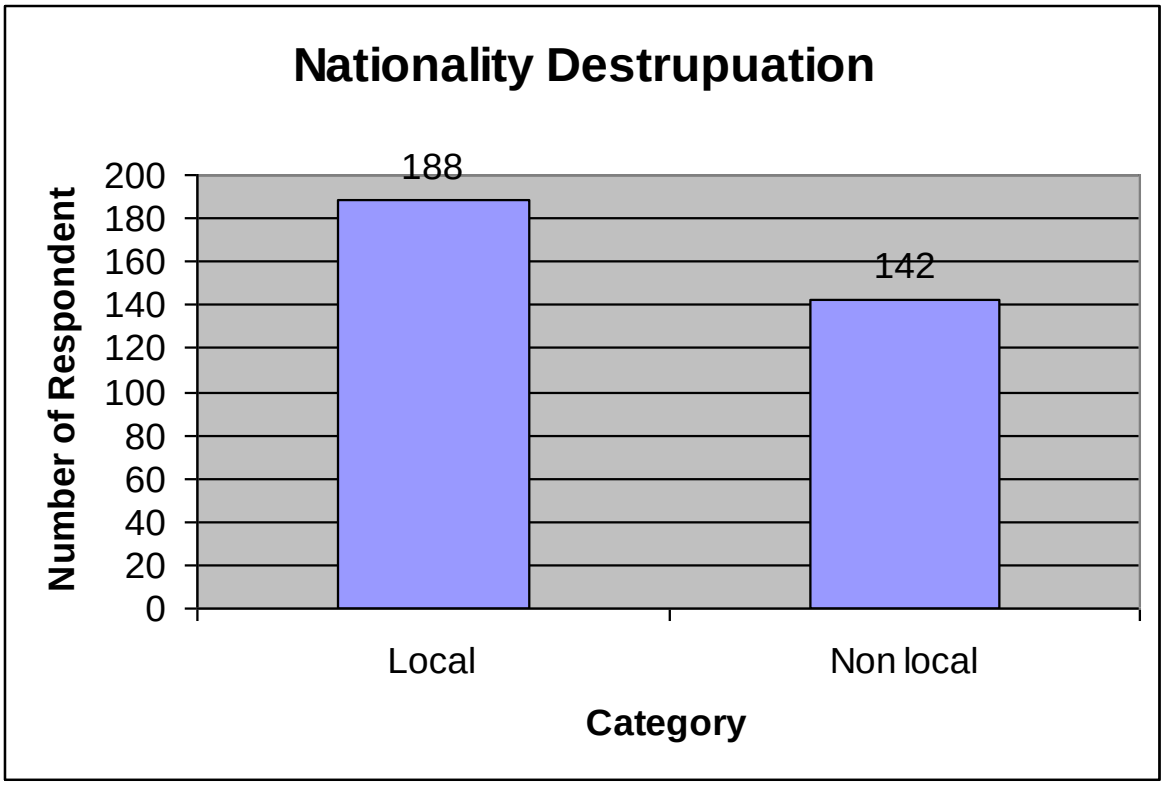


Figure 13: Respondents' nationality distribution. UAE nationals are specified as "Locals" and expatriates as "Non locals".

Gender

Higher representation of male respondents was attributed to the religious and cultural practices. The UAE culture does not look approvingly at free mingling of males and females. Consequently, females, due to various personal, family or cultural reasons, were difficult to approach and were not easily accessible owing to individual or even school reluctance. However the fact that 144 females were contacted and they responded, positively testifies to tenacity of the researcher and the hard work employed in getting the feminine view.

Males, on the other hand, not burdened by any cultural or social taboos, were far easily accessible and generally more willing to respond, as shown in Fig. 14.

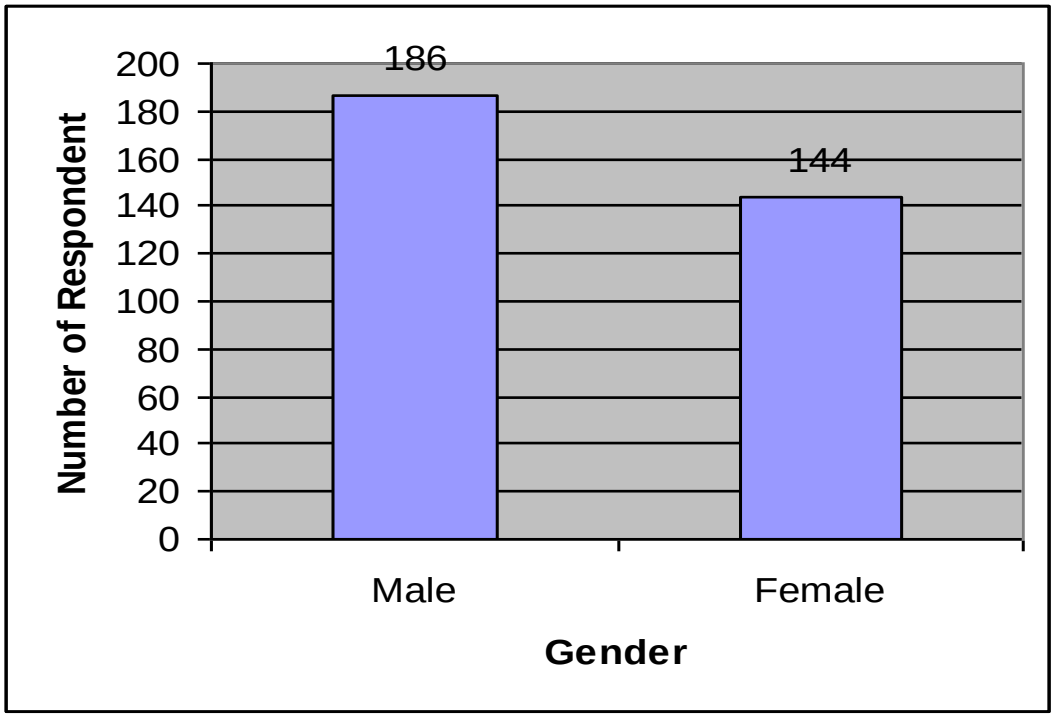


Figure 14: Interviewee responses based on gender.

Age

The age factor was taken into account in question three of part 1. The bar chart was divided in three categories, namely, under 20, 20 – 40 and 40 and above. A vast majority, i.e. 53% of the respondents, fell in the middle category of 20 – 40 years as shown in Fig. 15. Out of the other two – the "20 and under" and "40 and above" – the under 20 category, exactly equaling the total number of students questioned, was completely comprised of students. While the 40 and above category, 21% of the total, comprised of teachers, school administrators, parents and others. MOE's policy of not keeping any employee over 60 in the education field contributed to the response drop in "40 and above" category. Towering over the other two, the 20 – 40 category represents the recent overwhelming entry of Emiratis in the educational work force.

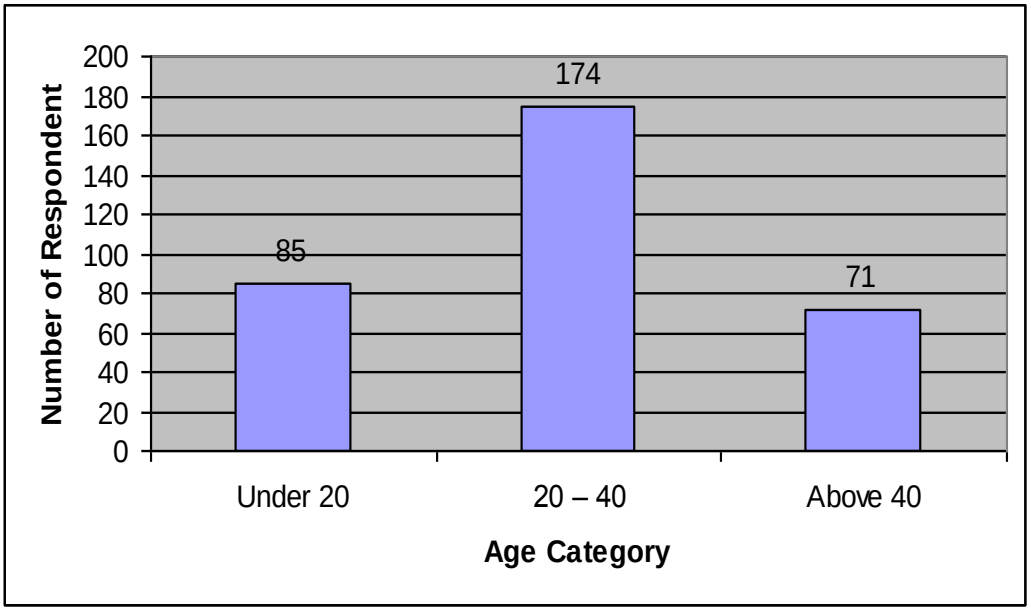


Figure 15: Interviewees responses in three categories based on their ages

Education

The anomaly of having 96 high school graduates as seen in Fig. 16, which is significantly higher than the total number of 85 students questioned, can be explained on the fact that in addition to the parents, a minority of the AAEZ employees and school administrators also fell under high school category. The very high percentage of nearly 61% of bachelors or above testifies to high number of teachers questioned.

The low number of college graduate teachers, associated with AAEZ for a long time, is due to the fact that each year non local college graduates, who had been employed in the past, when there was a shortage of local bachelor's degree graduates, are being replaced by mainly local bachelor degree holders.

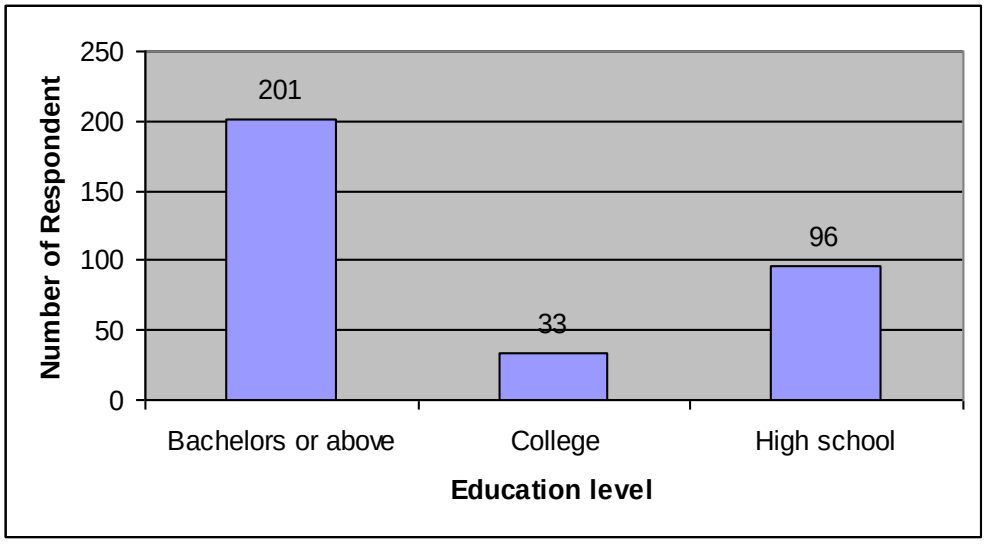


Figure 16: Education level of respondents in three categories

Demographic

The stark demographic difference in the number of rural and urban respondents, 194 urban and 102 rural, shown in Fig. 17, is attributed to the presence of higher number of schools in the city than the villages. Further more, sparse and vastly scattered rural population also made survey conduction an extremely difficult task. Another striking factor, which might have contributed to the low rural response, is the mistrust country people have developed with answering questionnaires. Having previously answered a lot of government initiated studies pledging unfulfilled promises, has turned them extremely cynical. Overcoming the suspicion, even with the low number of respondents, was a big achievement.

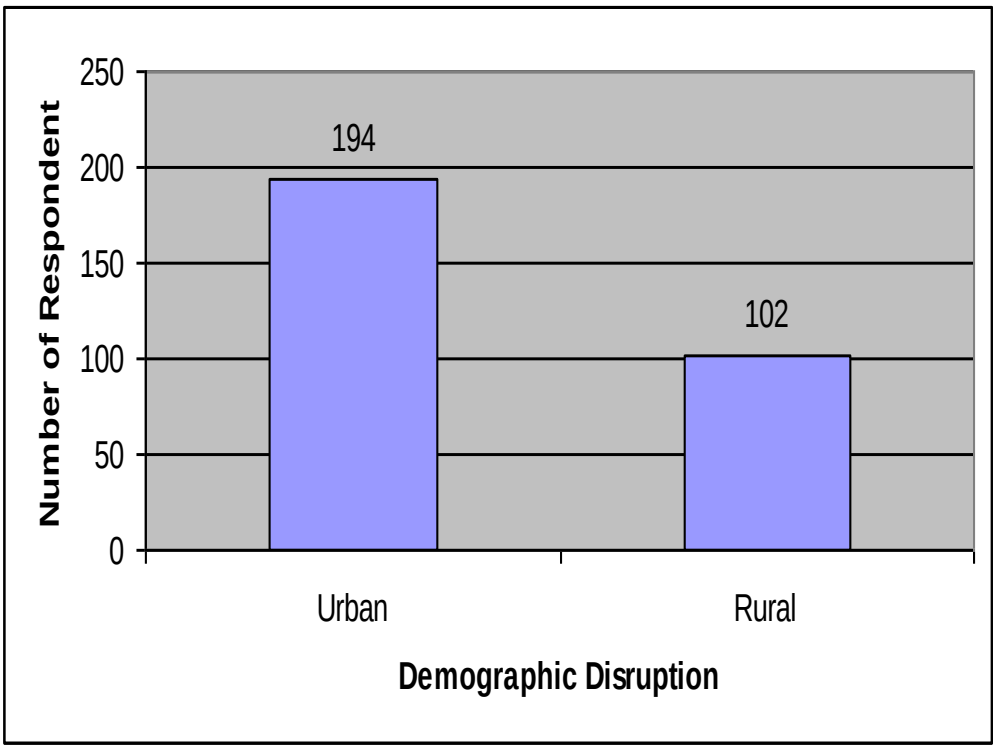


Figure 17: Demographic, "urban" refers to the city and "rural" to area at a half-hour drive from down town Al Ain.

School Type

Since the research is about public school system, precedence was given to public schools over private schools because, although private schools also come under the supervision of AAEZ, they have their own funding resources. Almost all government grants are reserved for public schools. 268 out of a total of 287 respondents visited were from different public schools and only 19 were from private schools as shown in Figure 18.

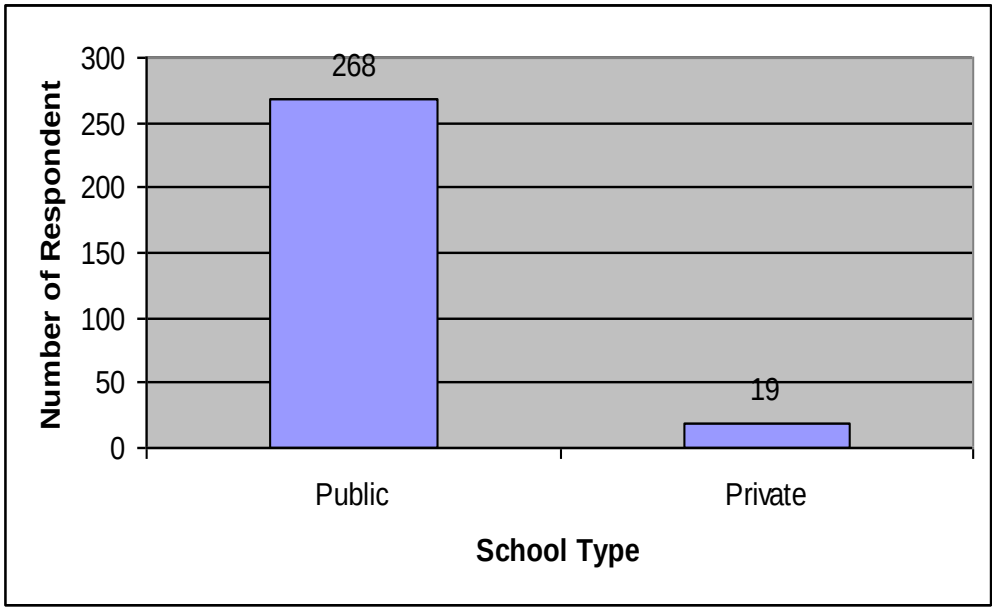


Figure 18: "School type" referring to government sponsored public schools a, "public" and privately run schools as, "private".

School Gender Type

The discrepancy in the number of girls and boys schools visited was, as explained earlier in figure 14, due to the strong conservative cultural and religious adherence; getting permission to visit girls' schools was not an easy task. Belying the actual gender population distribution, which shows that more girls are admitted in public schools than boys, the survey was severely hampered by restriction imposed in visiting female schools contributing to this incongruity and resulted in the researcher's interviewing more than 61% boy and only 33% girl respondents. 17 co-educational schools, which were all private were also visited to benefit from the views of ET experienced private schools and to get a better picture of ET implementation in all Al Ain schools (Fig. 19).

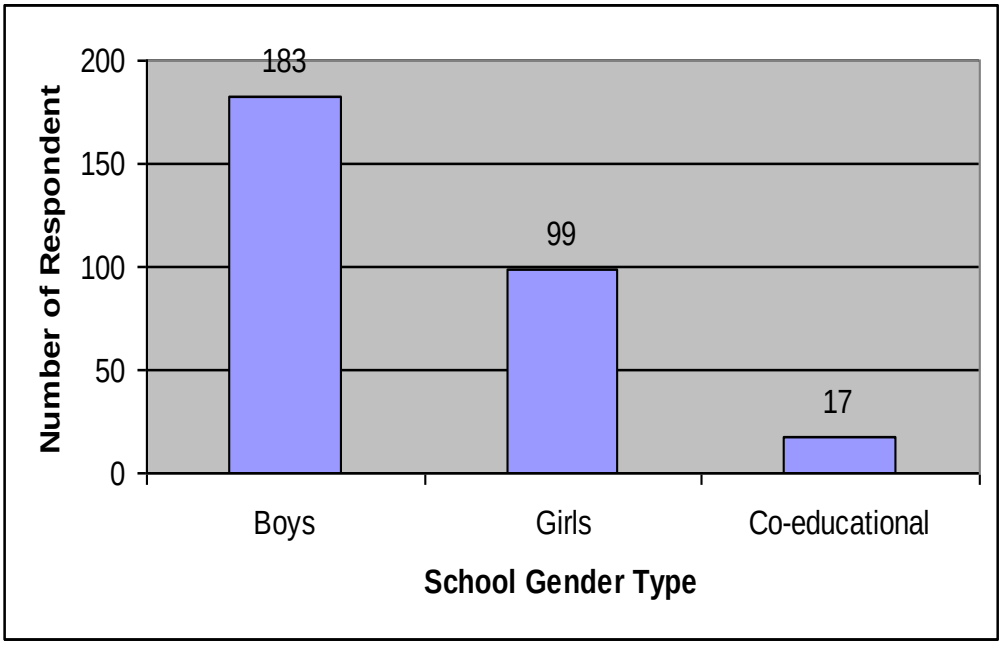


Figure 19: "School Gender Type" referring to all-boy schools as "Boys", all-girl schools, as "girls" and mixed as, "co-educational".

4.1.2: Respondent Category Distribution

Looking more specifically at question 8, which asks the respondents to specify their category – teachers, student, school administrators, AAEZ employees, parents, educational partners, and others – in part one, will help in better analyzing the questionnaire and allow better understanding of the answers. It will further help decision makers to be able to know exactly how these questions are divided among different categories, shown in the pie charts below, and know exactly the reason behind it. It will also inform about who the respondents are and in which group they fall in. (for more details please consult tables provided in appendix 6)

A comparison of question 1 based on categories stipulated in question 8.

The first question divides the respondents in two groups putting Emiratis in "local" and expatriates in "non-local group. The first pie chart, (Fig. 20), representing local group, shows an overwhelming dominance of teachers and students at 32% followed by the school administrators at 17%, the AAEZ employees at 11% and the parents at 7%. The second pie chart, (Fig. 21), which illustrates non local division, demonstrates a high number of teachers, making up 64% (96 teachers out of a total of 154 questioned) of the total representation, precede students at 17%, school administrators at 10%, AAEZ employees at 5% and parents at 2%.

By comparing the local and non local division among all 7 categories, it becomes clear that the percentage of non-local teachers is twice more than that of locals by hefty margin of 32%. Local student population, however, is more than double the non-local students.

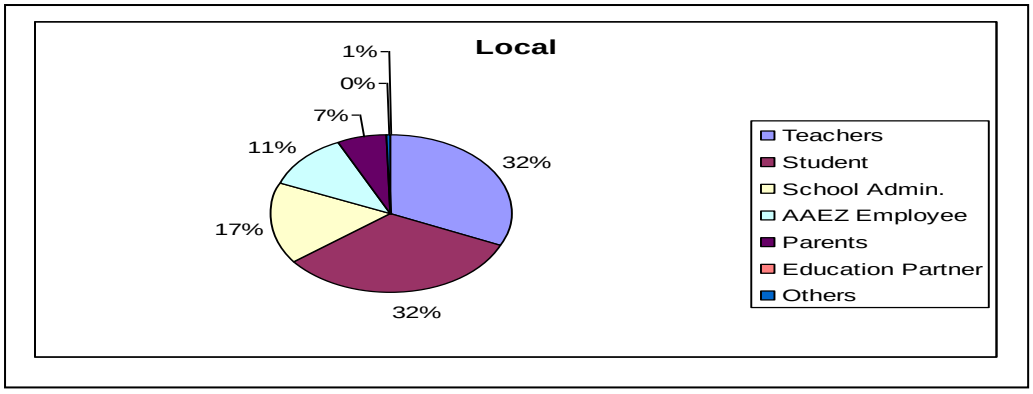


Figure 20: Shows the category distribution among Emiratis

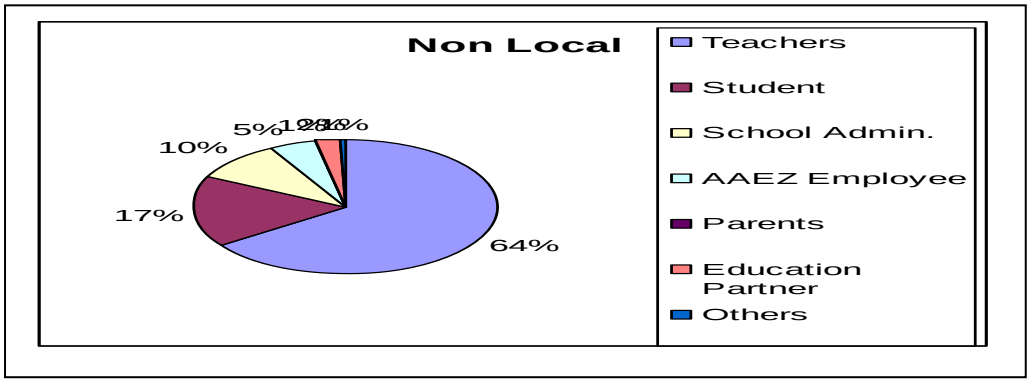


Figure 21: Shows the category distribution among the expatriates

A comparison of question 2 based on categories stipulated in question 8.

The representation patterns in all the categories among the males and females (Figs. 22& 23) shows remarkable similarities from teachers to AAEZ employees except in the male and female parent representation. It is observed that, except for the female parents, the number of females among the respondents is lower in all the other categories by a difference of nearly 60% for the males and 40% for the females. As repeatedly pointed out earlier, free access to females is very difficult in UAE considering the religious and cultural background. However, the number of women polled was more than the expectation and shows a healthy, and a surprisingly pleasant, change from the past. Higher number of female parent respondents testifies to the fact that women are taking keen interest in the education of their children, a very healthy trend for the future of the nation. Other than that, teachers 47% males and 44% female teachers, 26% male and 25% female students, 14% each of the male and female school administration, and 8% male and 9%female AAEZ employees show an uncanny similarity in representation patterns and proves that women have taken great strides and are studying and working more as far as the education field is concerned.

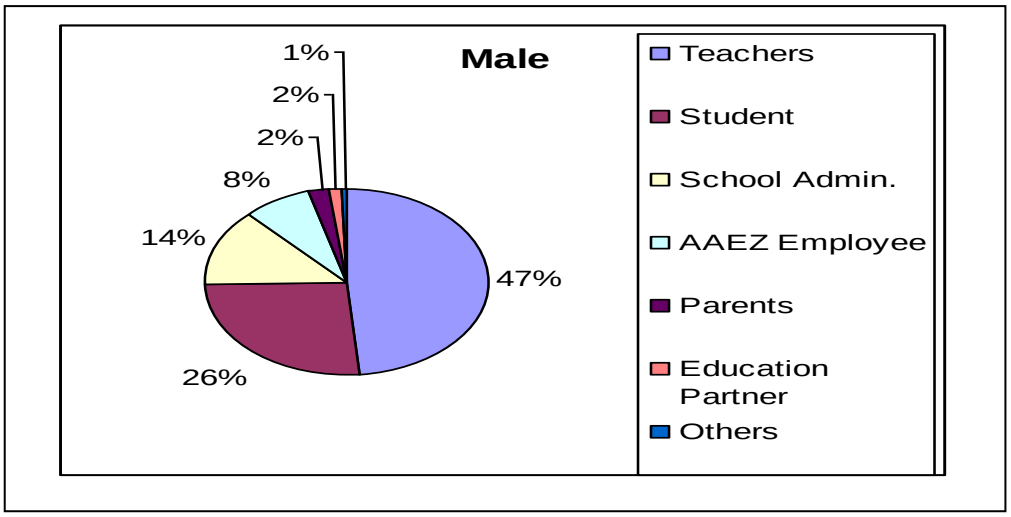


Figure 22: Shows the category distribution among males

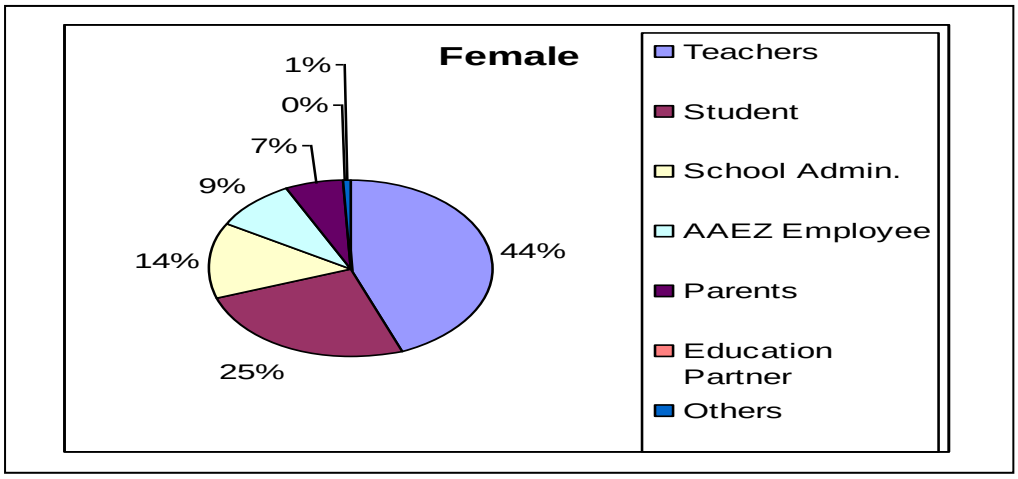


Figure 23: Shows the category distribution among females

A comparison of question 3 based on categories stipulated in question 8.

Question 3, soliciting responses based on age differences, was divided in three sets. The "20 or under" age group, which completely comprised of students, has not been depicted here, as 100% students, out of a total of 85, fell in that age bracket. The 20 – 40 age bracket was more representative of the number of categories questioned in the survey, but as expected was dominated by the teachers which made up nearly 60% of this group, followed by the school administration and AAEZ employees at 18% and 15% respectively. All of the 13 parents questioned also fell in this category making 7% of this age group as shown in Figure 25. Since there were no students and parents in the above 40 age bracket, as shown in Fig 25, it was almost completely dominated by remaining teachers and the AAEZ officials, comprising 76 and 20 percent respectively.

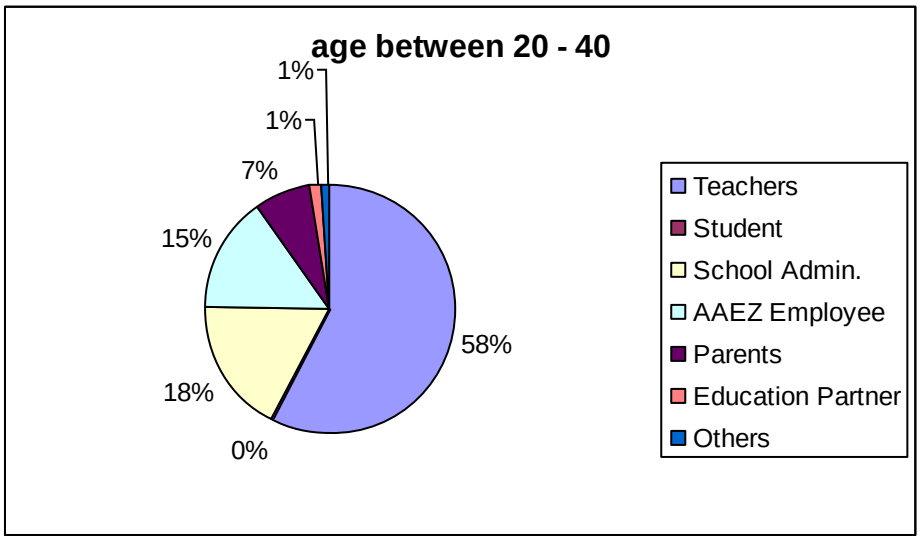


Figure 24: 20 – 40 depicts the 2nd age group according to the categories

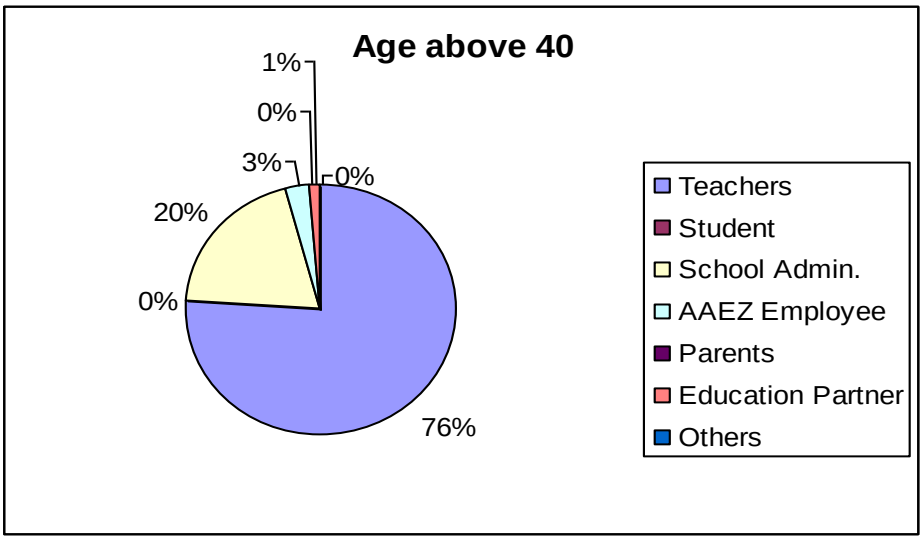


Figure 25: 40 or above depicts the 3rd age group based on the categories

A comparison of question 4 based on categories stipulated in question 8.

Question 4, asking questions from respondents separated on the basis of education differences, was divided in three sets. The data, as depicted in figures 26, 27 and 28, in the three education groups called, "high school", "college", and "Bachelor's or above" was predictable. Nearly 90% of the "High school" group was made up by students. All the students and some of the old employees of the AAEZ (8% of the "high school" group) not conforming to the new policy of a minimum college diploma are represented in this category. The college group was evenly divided among teachers 37%, school administrators 27%, AAEZ employees 15%, and parents 18%. Although dominated by the teachers and school administrators, it actually represents a very small minority, only 12 out of 154 of the actual teachers questioned and 9 out of 45 of the school administrators. As expected the bulk of the "Bachelor's or above" group was made up by 142 out of 154 teachers and 36 out of the 45 school administrators surveyed with the AAEZ employees and the parents making up the rest of this group.

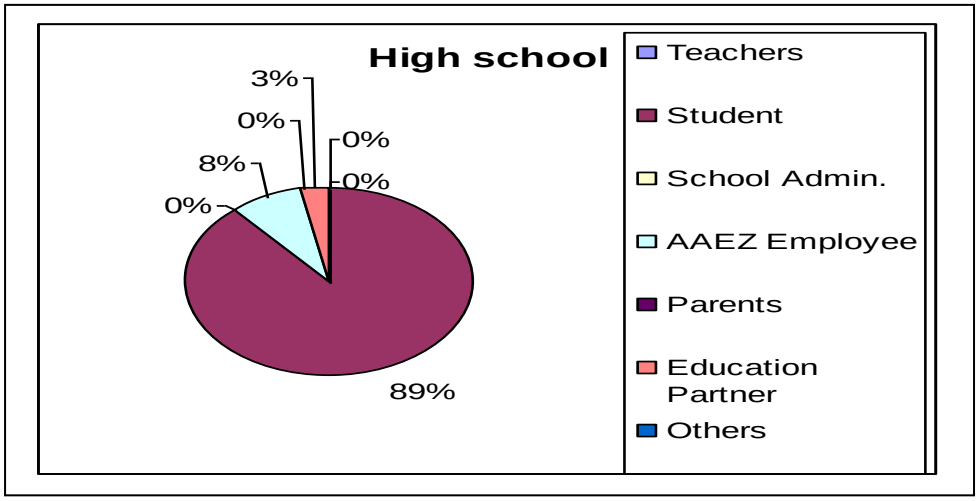


Figure 26: shows the division of categories based on "High School".

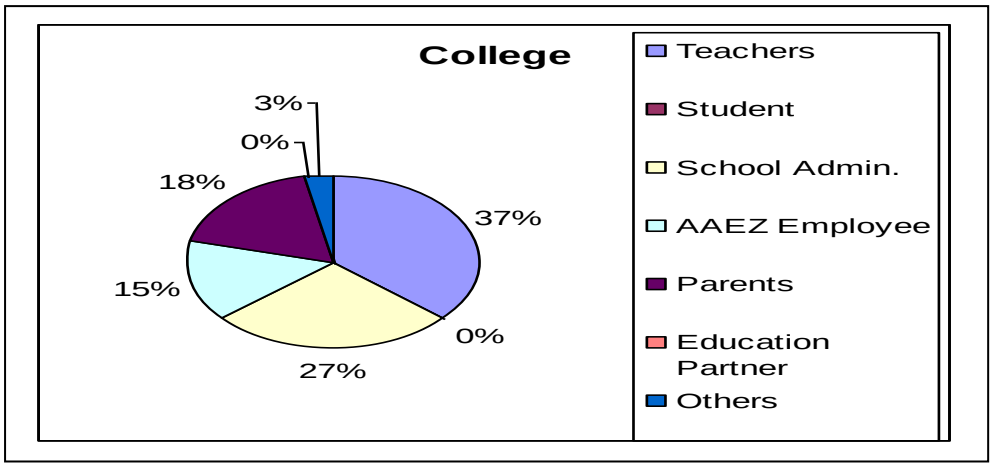


Figure 27: shows the division of categories based on "College".

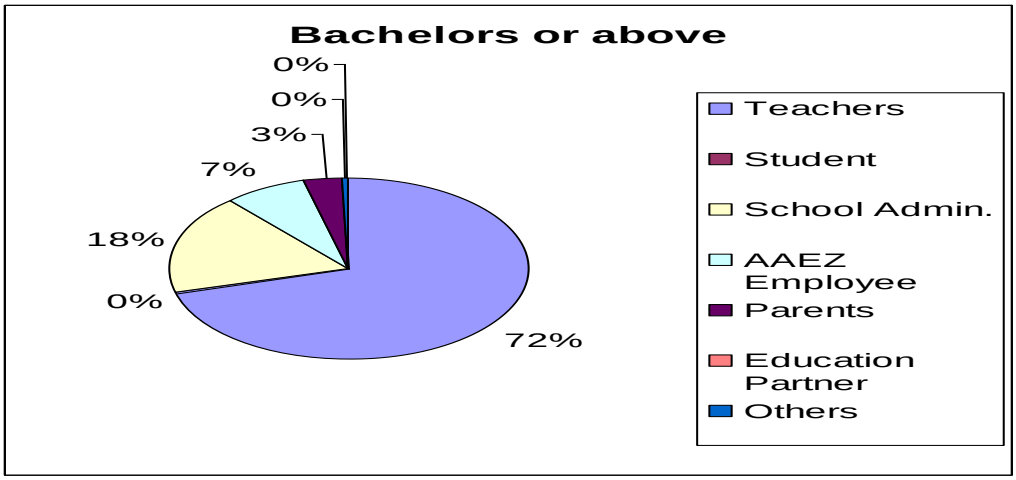


Figure 28: shows the division of categories based on "Bachelor and above".

A comparison of question 5 based on categories stipulated in question 8.

The rural and urban divide, surprisingly, is not as stark as might have been expected. A formidable teacher representation of 42%, followed by 29% students and 17% school administrators make up most of the rural pie chart (Fig. 29). A comparatively similar pattern of 50% teachers, 24% students, and 12% school administrators dominate the urban pie chart (Fig. 30) But this outcome is not representative of the actual number of respondents questioned under these categories which is low in the rural areas. Less than 50% of the total teachers questioned, i.e. 47 out of 154; nearly 40% of the total students questioned, 33 out of 85; and nearly the same percentage of the school administrators, 19 out of 45 actually represented the rural areas.

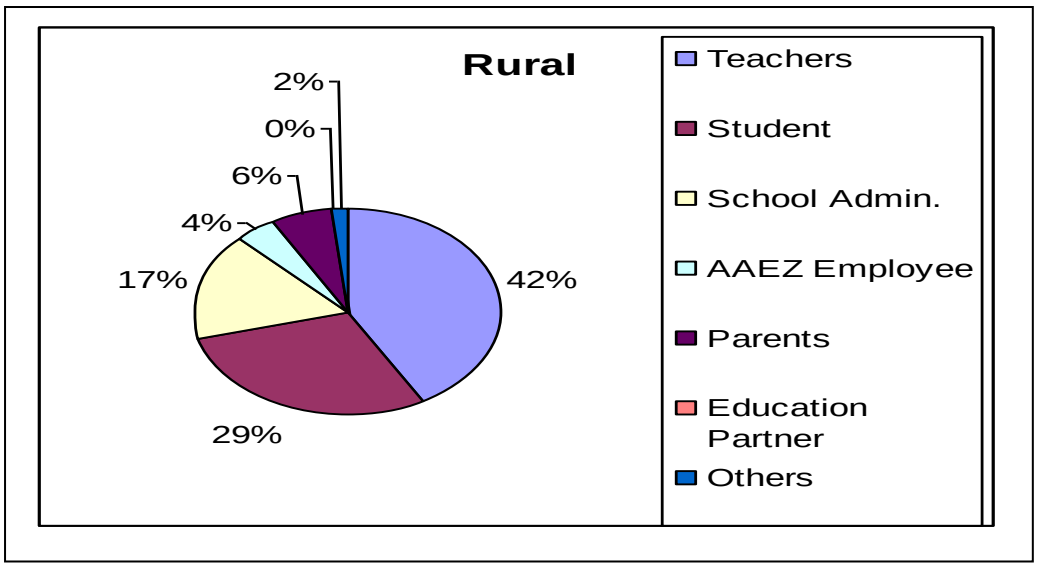


Figure 29: Depicts rural category distribution

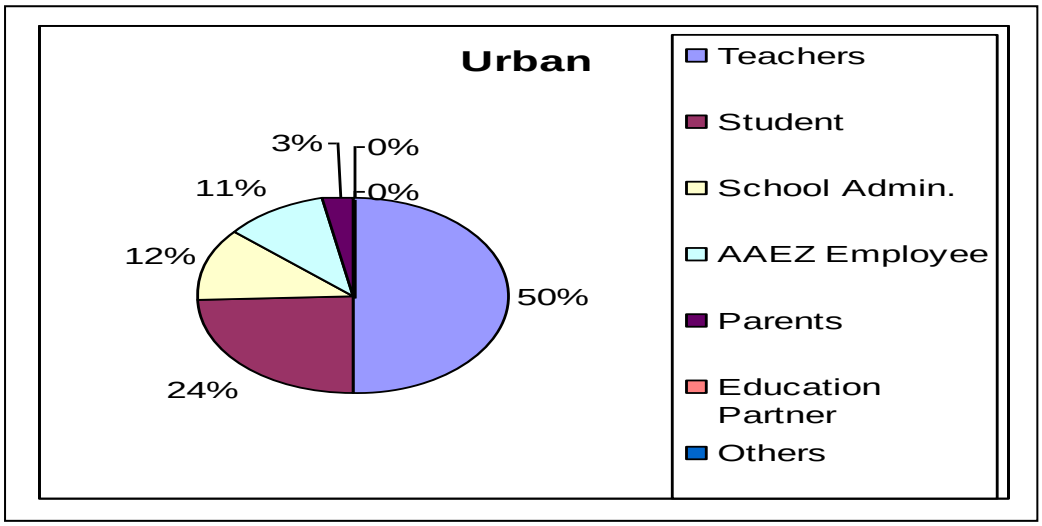


Figure 30: Depicts urban category distribution

A comparison of question 6 based on categories stipulated in question 8.

Since the focus of the research was public school ET implementation, therefore only 2, out of a total of 13 schools surveyed, were private. Private schools were included in the research to draw a clear picture of the differences between public and private schools and to learn from their experiences. Besides the original 13, whenever possible, site visits at other schools were also conducted. to draw a clear picture of the differences between public and private schools. A comparison of figures 31 & 32, depicting public and private schools, reveals a very similar representation of teachers, students and school administrators. However, as was the case in urban / rural (Figs.29&30) pie charts, these representation do not illustrate the actual number of teachers, students, and school administrators questioned, which was very low for private as compared to public schools. Only 9 out of a total of 154 teachers questioned came from private schools, similarly 4 out of a total of 85 students, and 3 out of a total of 45 school administrators represented private schools.

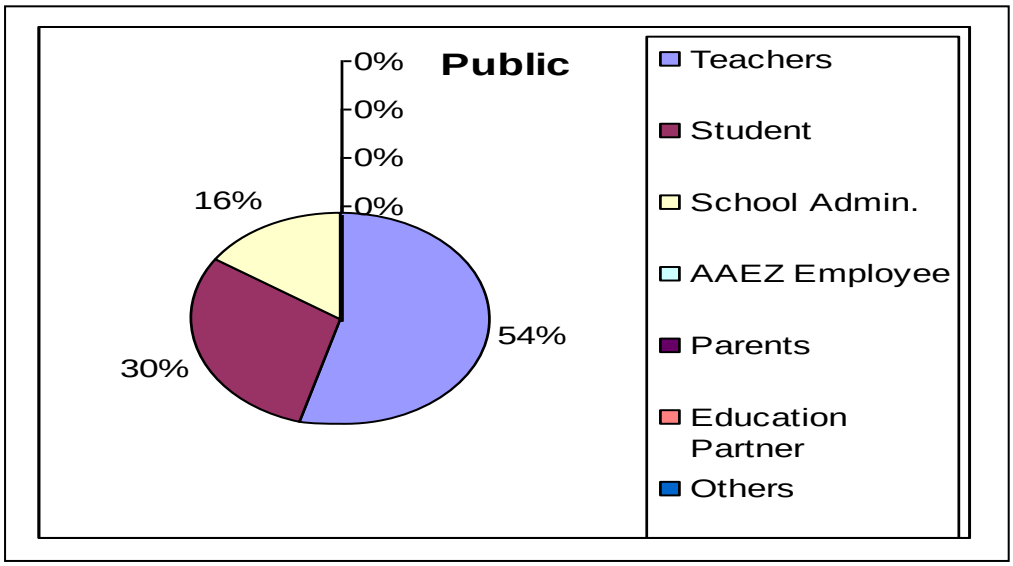


Figure 31: "Public" pie chart depicts category division in government sponsored schools

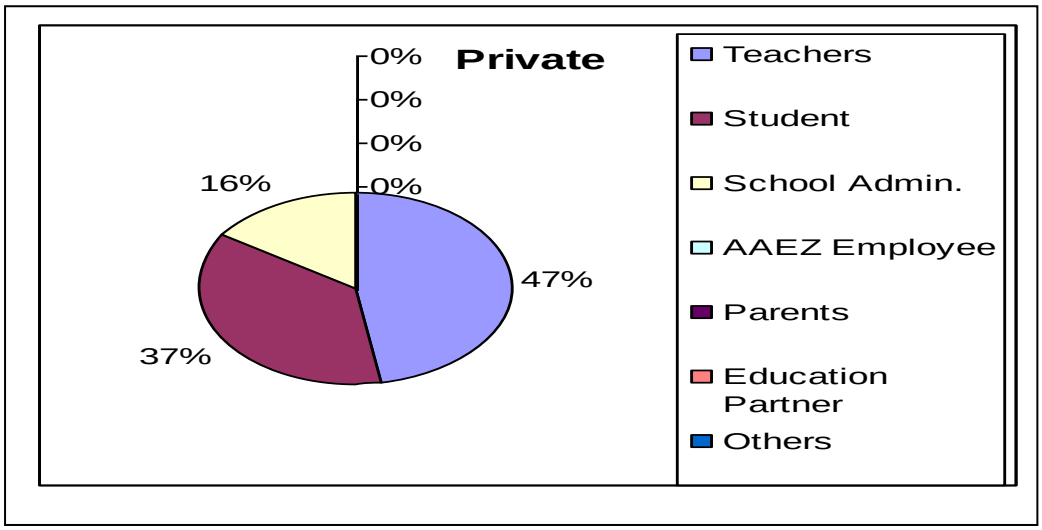


Figure 32: "Private" pie chart depicts category division in private schools

A comparison of question 7 based on categories stipulated in question 8.

The last category based on school gender was divided into boys, girls and co-educational schools. More teachers from the boys school, 59%, and less from the girls, 44%, (Figs. 33 & 34), does not represent actual numbers but is indicative of the same religio/cultural mindset which looks down upon male and female interaction and makes approaching and questioning females difficult. The pie chart on co-educational schools (Fig. 35), which were all private, only shows the opinion of 7 teachers and 5 school administrators.

The Researcher did not solicit any reply from AAEZ employees and educational partners because the question specifically asks about school gender and doesn't concern them. The parents, however, in case of having more than one child were asked to leave the option empty.

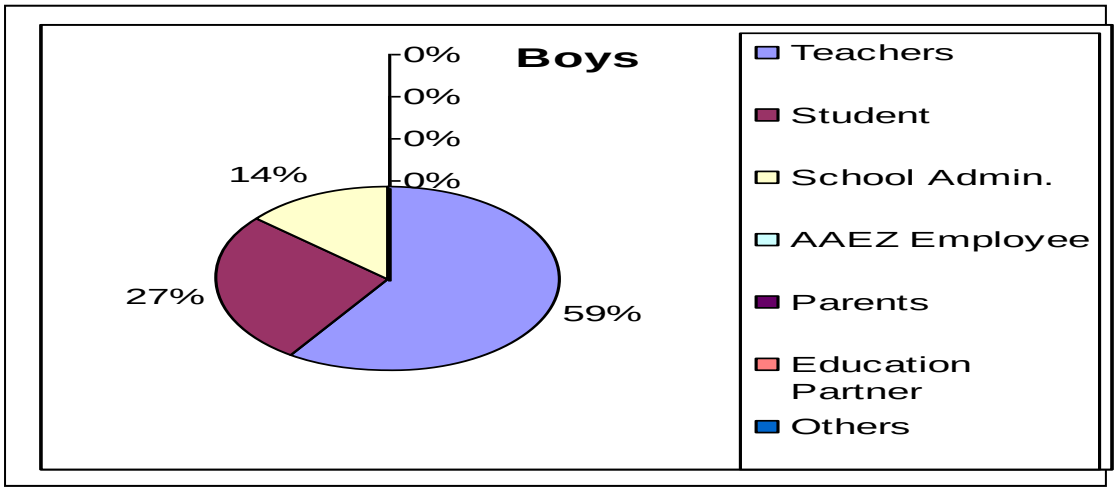


Figure 33: The pie chart depicts category division among boy schools

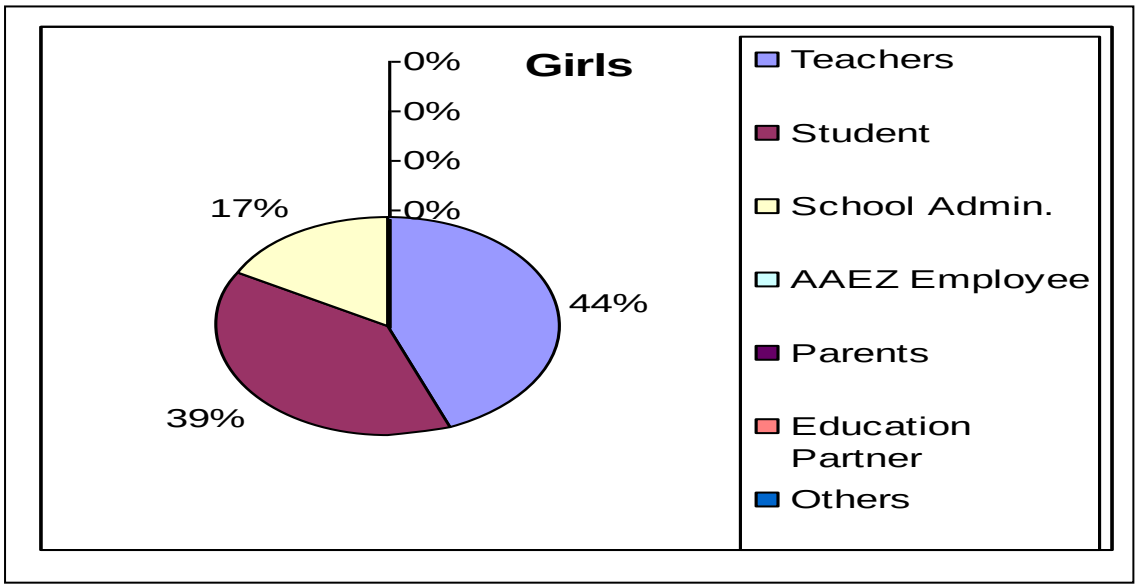


Figure 34: The pie chart depicts category division among girl schools

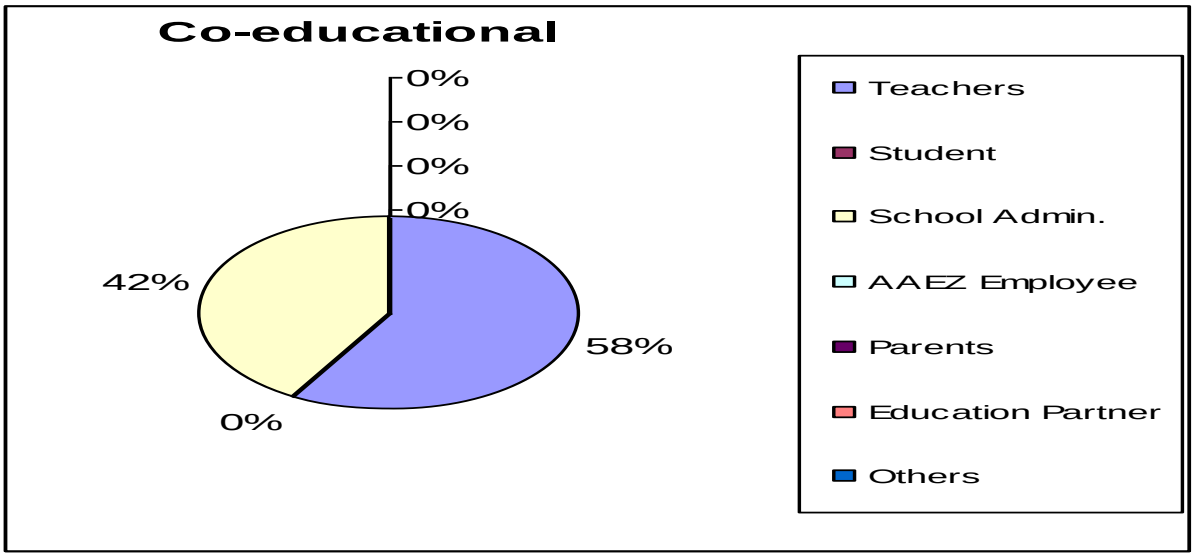


Figure 35: Co-educational category division is depicted in the above pie chart.

4.2: Data Analysis

4.2.1: Overview

A part by part and question by question illustration and analysis of the respondents' replies will comprise "overview" section. Every question and the reasons behind the replies will be scrutinized and examine. In this explanation only the responses of the survey are being described and there is no indulgence in any discussions and analyses with respect to objective questions and hypotheses as these parts have been elucidated in detail in the designing phase of the methodology.

Part 2

Part 2, solely aiming at the school administrators, helps in looking at the big ET picture by examining the present infrastructure and the preparation and future strategies in administrators' minds. A total of 45 administrators from 11 different public schools from the rural and urban parts of Al Ain were questioned. These school administrators included school managers, assistants, secretaries, supervisors, student advisors, etc. Part 2, which constitutes both, quantitative and qualitative questions, mainly inquires about the existing ET infrastructure at the selected schools and how much of it is being used. It also looks into any hurdles in ET implementation, administrators' opinions about future ET integration and necessary funding for purchase and maintenance.

Question No 1:

The first question looks at the number of respondents representing schools according to their grades. The UAE education system divides schools in four categories, i.e. KG (Kinder Garten) for children from age 3 to 5; grades 1 – 5 for the students from ages 6 to 10; grades 6 – 8 for 11 to 13and grades 9 – 12 (high school) for 14 – 17 years age bracket.

The importance to be aware of the school grades is extremely vital for the planner because ET supplies depend on grades; a KG school, for example, obviously needs different software than a high school.

Figure 36 shows that primary and high schools were more willing to respond than KG and secondary schools illustrating their eagerness for embracing ET.

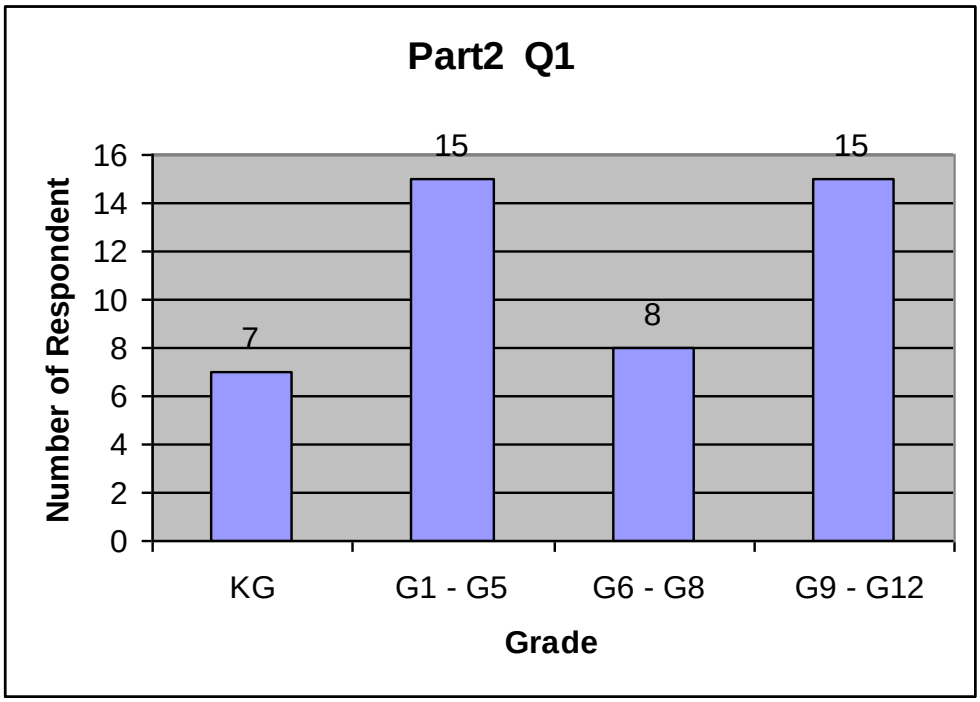


Figure 36: Schools administrators' responses according to their respective school grades

Question 2

Question 2, (Fig. 37) inquiring about the number of students per school, was divided in four categories, namely, 1-200, 201-400, 401-600, and 601or above. The 401 – 600 represented the largest number of respondents followed by 201-400 and very few (only 4) described their student population between 1-200, showing healthy attendance at schools.

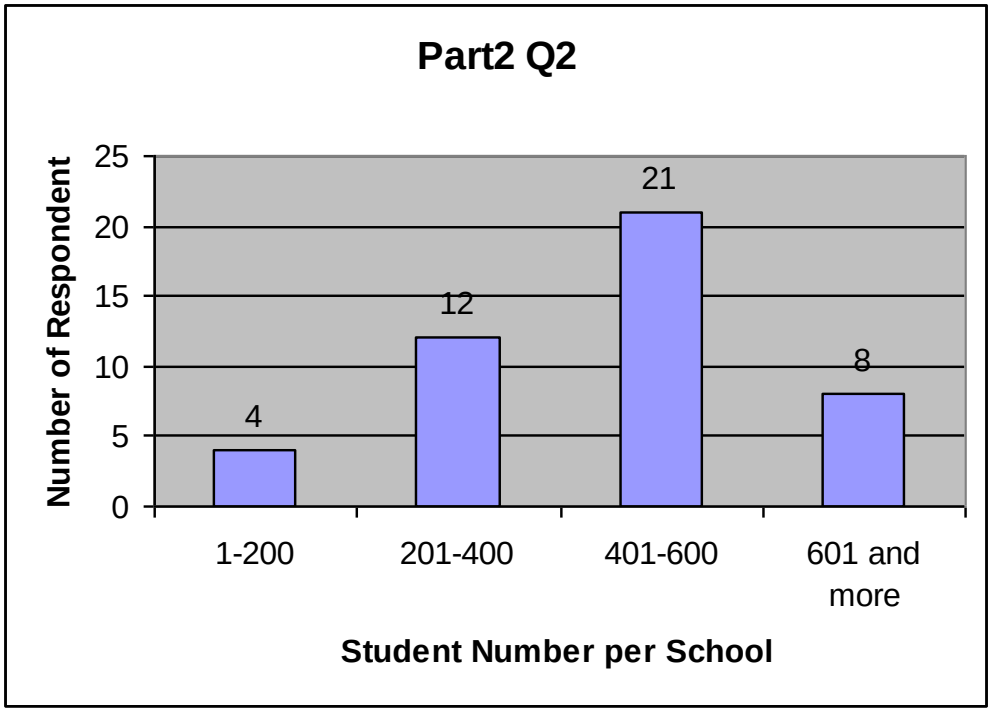


Figure 37: Schools administrators' responses based on the number of student per school.

Question 3

With question 3, the research starts inspecting present school ET infrastructure by asking about the number of PCs available in the schools. Schools were asked to give the exact number or choose one of the five options shown in figure 38. The data that emerges reveals that, although there was obvious discrepancy in the number of PCs among different schools, every school had computers. The availability of computers testifies to ET awareness among schools although the inequality in distribution needs to be further investigated.

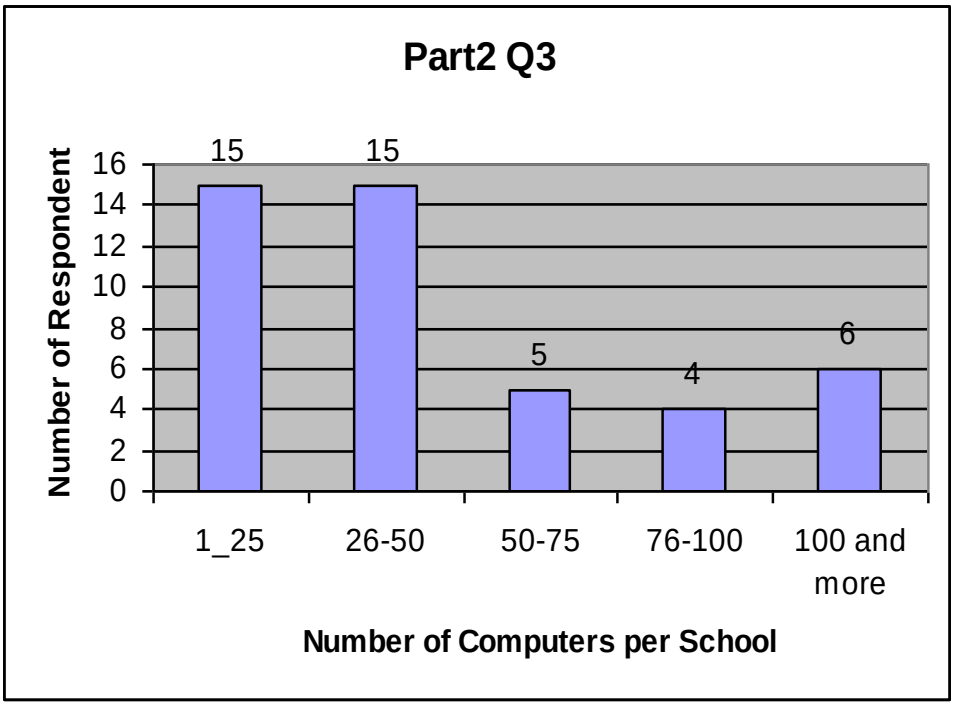


Figure 38: Schools administrators' responses based on the number of computers per school.

Question 4

Projectors are often over looked as only a peripheral accessory, but in fact it is as important an instrument as the computer itself. As far as the availability of projectors (Fig. 39) is concerned, the research revealed that one fourth of the administrators questioned admitted not having them. On the other hand, Nearly a third had less than 10 projectors per school. The evidence that three fourth of the schools claimed to have projectors was very encouraging but it sill fall short of the global standard that each class should be furnished with one projector. The somewhat healthy projector number provides further credence to earlier analysis of educational aids awareness among schools.

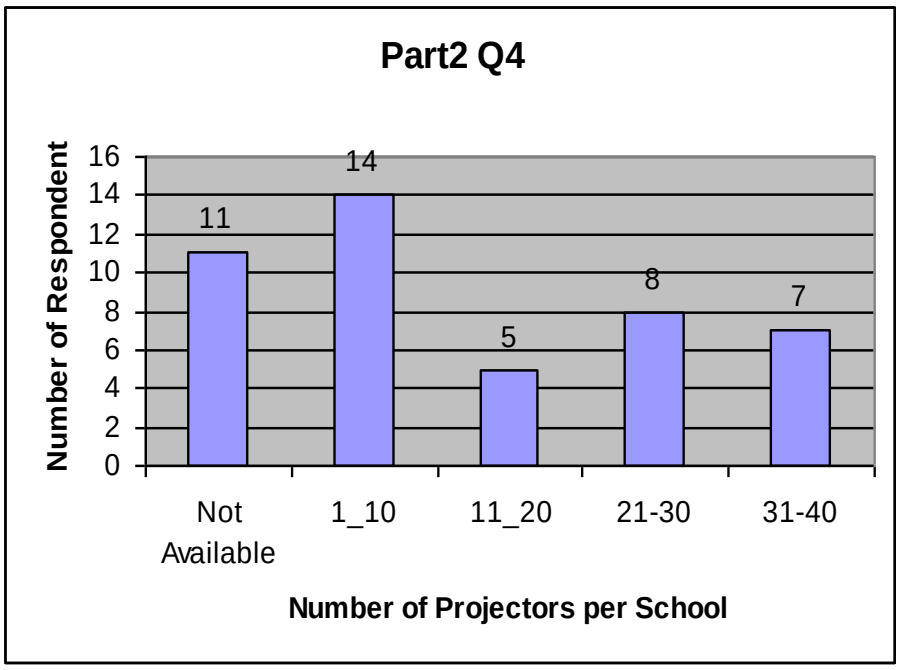


Figure 39: Schools administrators' responses based on the number of projectors per school.

Question 5

Affirmative answers to the inquiries about the number of available printers were obviously understandable as all schools claimed the availability of computers. The fact, as shown in figure 40, that most of them had 15 or more underscored their frequent use.

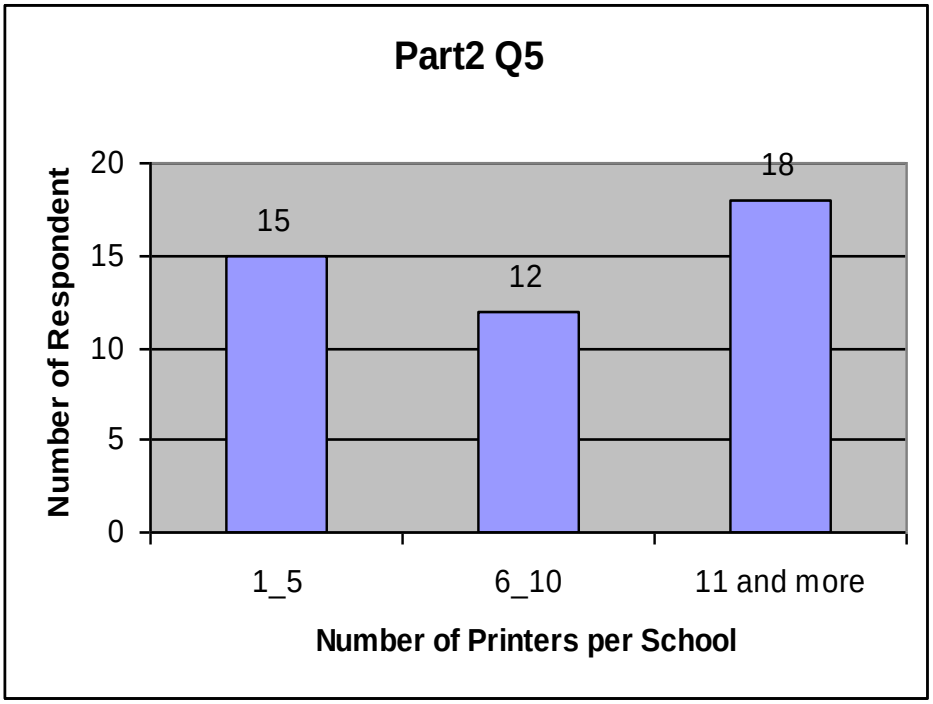


Figure 40: Schools administrators' responses based on the number of printers per school.

Question 6

Question 6 (Fig. 41) focused on a number of ET related items from the availability of internet service (A) to the presence of technicians for maintenance and services. As far as the presence of the infrastructure was concerned, an overwhelming majority of the respondents replied in Yes. The availability of server(C) and computers in classes(F), video conference room (G), Education software (H), had more or less equal Yes and No answers. But the availability of active board (J), Copying Center (K), Technology specific budget (L) and Technicians drew more "Nos" than "Yeses". The responses to this comprehensive question draw attention to the fact that although schools are generally aware of ET, the scope of their awareness needs to be broadened so that they could enjoy an all-embracing ET experience.

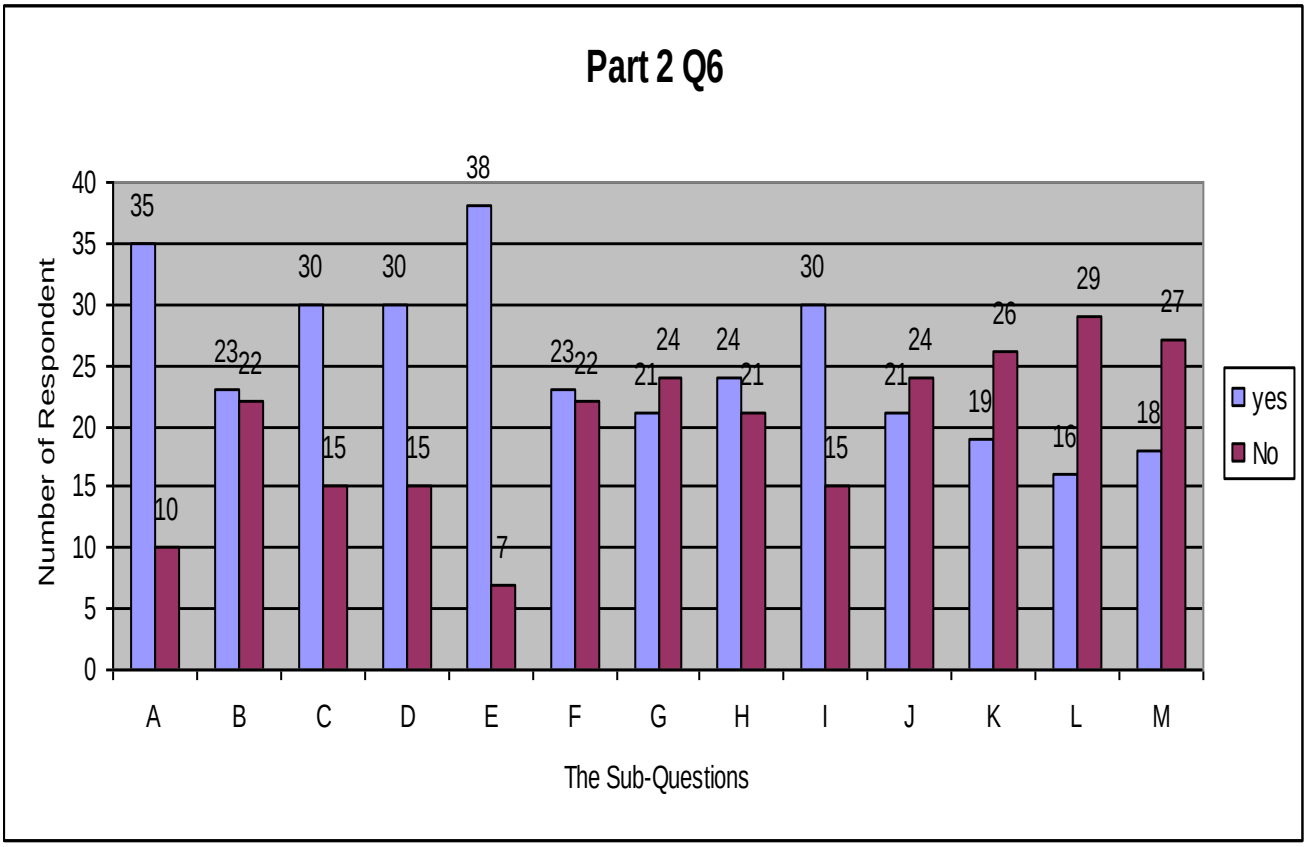


Figure 41: Depicts school administrators' responses to a set of sub-questions

Question 7

When questioned about the actual use schools show significant disparity. The percentage of teachers using internet facilities shows a enormous variation among schools. 19 school administrators admitted that only 30% or less teachers at their school use computers while nearly the same number claimed that 71% or more use internet services. Very few, around 7, circled 31 – 70% for internet use. The lack of homogeneity and disparity in ET use among schools was unmistakably evident in figure 42.

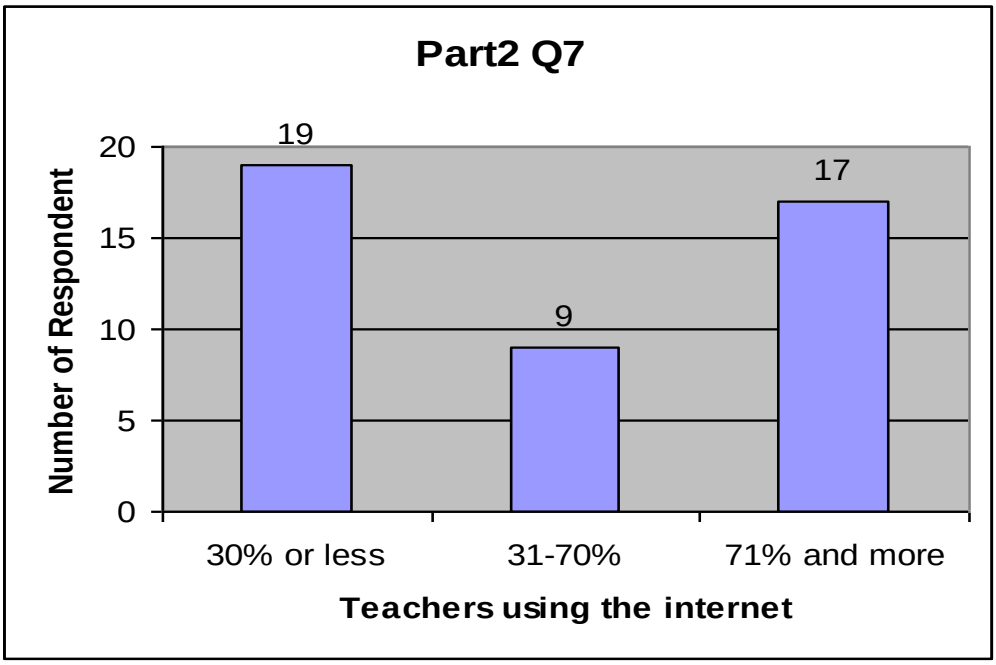


Figure 42: Depicting school administrators' response to percentage of teachers using internet

Question 8

The biggest hardware or software issue facing the school according to the school administrators was maintenance, human factor and funding. The human factor, as shown in figure 43, refers to the demand by the schools owners or beneficiaries to demand their rights and measures whether they are working hard to get them, namely, ET implementation. It also refers to any school resistance obstructing ET hardware and software implementation.

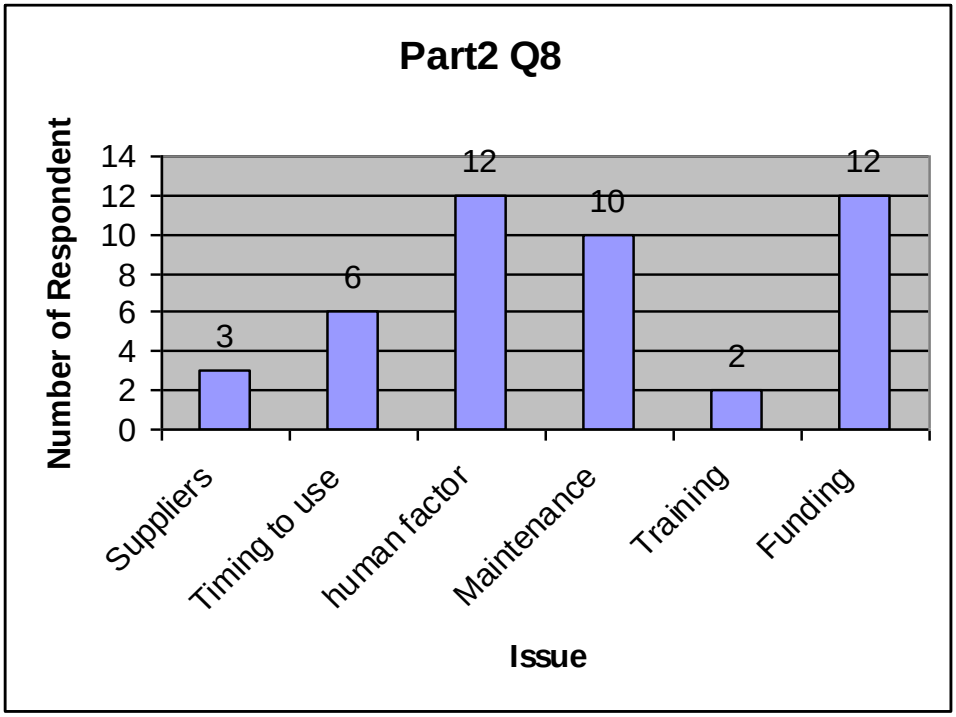


Figure 43: School administrators' response to various hardware and software issues

Question 9

Nearly all the school administrators, who were questioned about their future expectation regarding the number of computers in their respective schools by the year 2010, answered positively. The average of their answers came up to 100 PCs with the highest expectation at 150 PCs/school and the lowest not lower than 50 PCs/school.

Question 10

As far as existing school infrastructure supporting ET integration and implementation was concerned the “yeas” and the “nays” were more or less equally divided (Fig. 44). A slight majority of 23 school administrators (out of a total of 45) said that their schools had the infrastructure to start ET implementation as compared to 21 who testified the opposite. Incidentally school administrators claiming that their schools were adequately equipped predominantly represented urban schools.

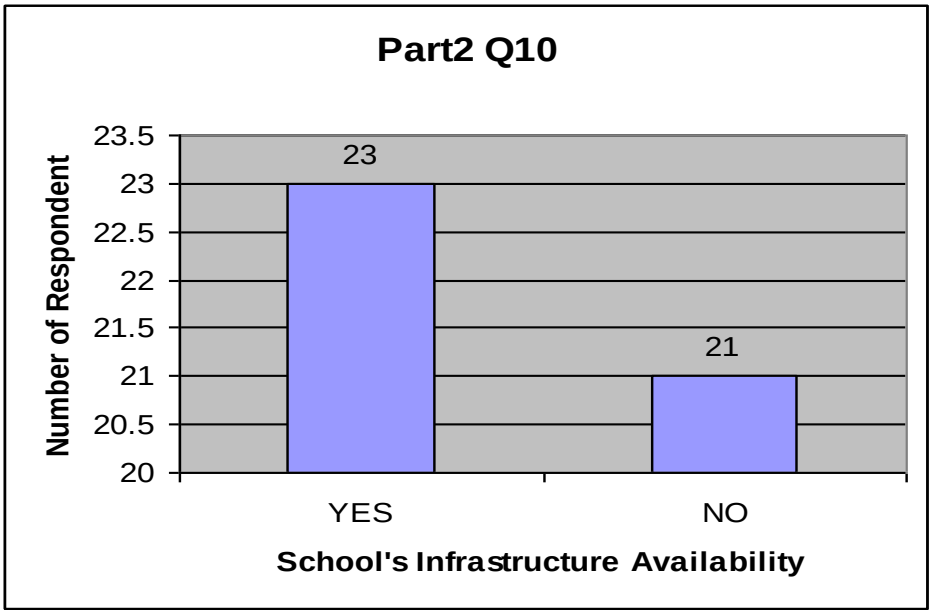


Figure 44: School administrators' response to school infrastructure availability**.**

Question 11

ET being a costly but necessary proposition was not lost on the school administrators. When asked about the minimum fund needed for purchasing and supporting ET in schools a substantial number of more than 21 administrators went for AED 250,000 – 500,000 option. More than 12 school administrators chose the 500,000 or above option and only 9 went for 250,000 or below showing that ET implementation is not an inexpensive alternative (Fig. 45).

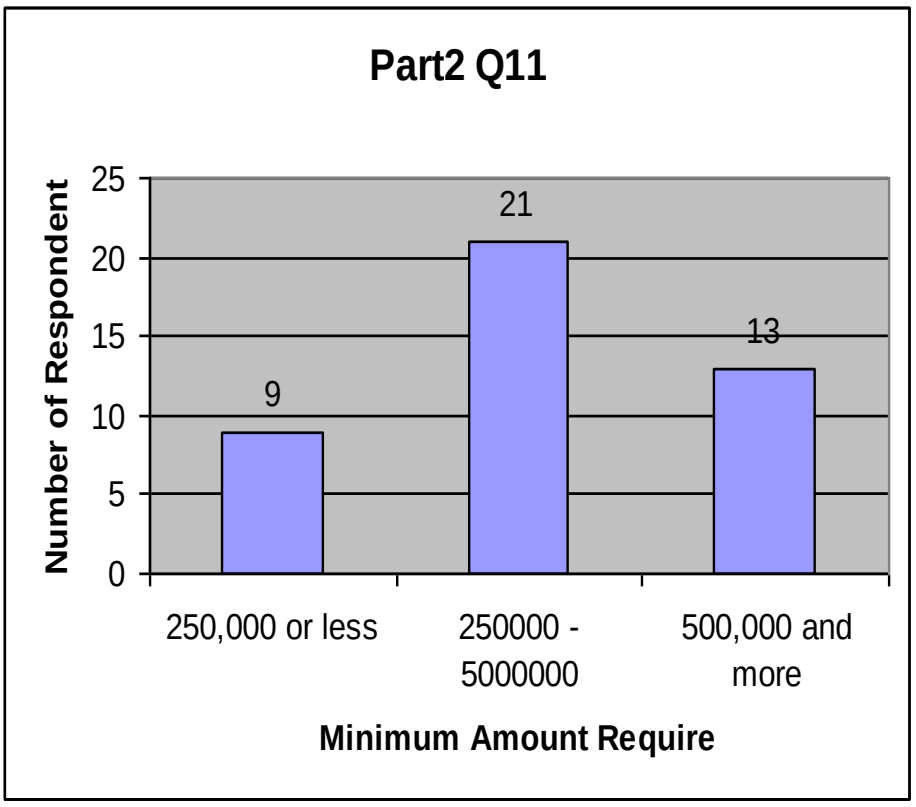


Figure 45: School administrators' response to minimum requirement for ET purchase.

Part 3

Part 3 primarily looked at the actual utilization of existing ET tools, the availability of ET and its use in schools. All categories from teachers – parents were encouraged to answer the questions to help look at the situation from all angles. It is hoped that this multi-faceted approach will facilitate in devising a comprehensive solution covering all aspects.

Question 1:
As seen in the part 2, and evident from figure 46, the availability of technology was not an issue. Here again it can be observed that very few respondents complained of not having computers or related technology at their schools.

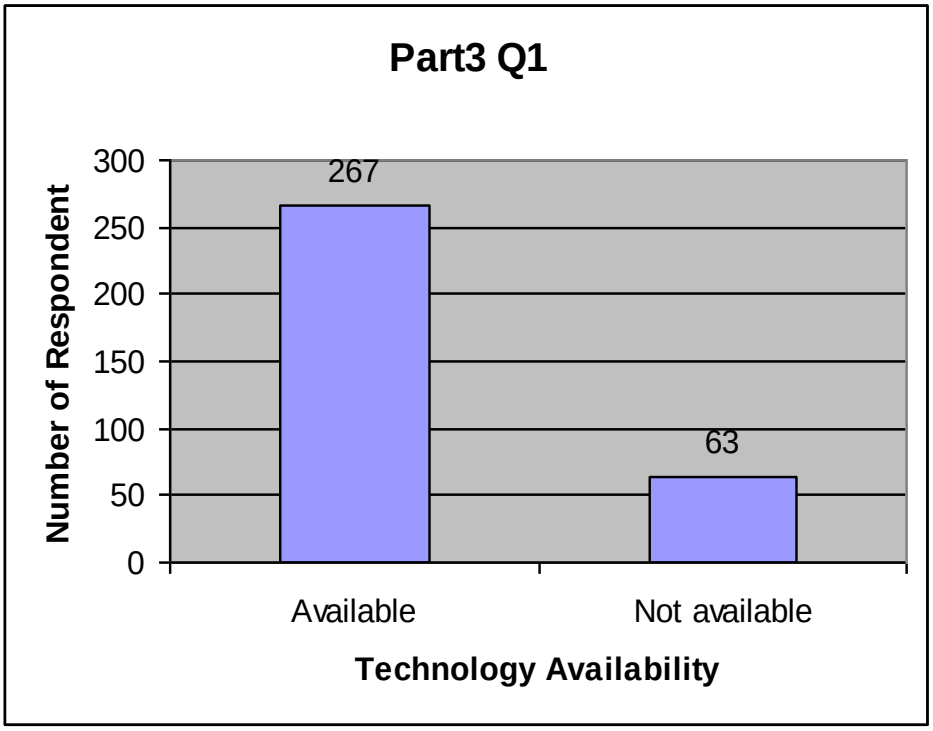


Figure 46: Respondents opinion about technology availability

Question 2:
Although most schools had computers but, a less uniform picture was revealed (Fig. 47), when respondents were specifically asked about the quality or the level of technology at their schools. Nearly 90 respondents said that the facilities were excellent and about nearly the same number claimed that they were average. Nearly 60 professed ET facilities at their schools to be good and less than 30 called them below average. This discrepancy once again demonstrates a considerable the lack of homogeneity in ET implementation.

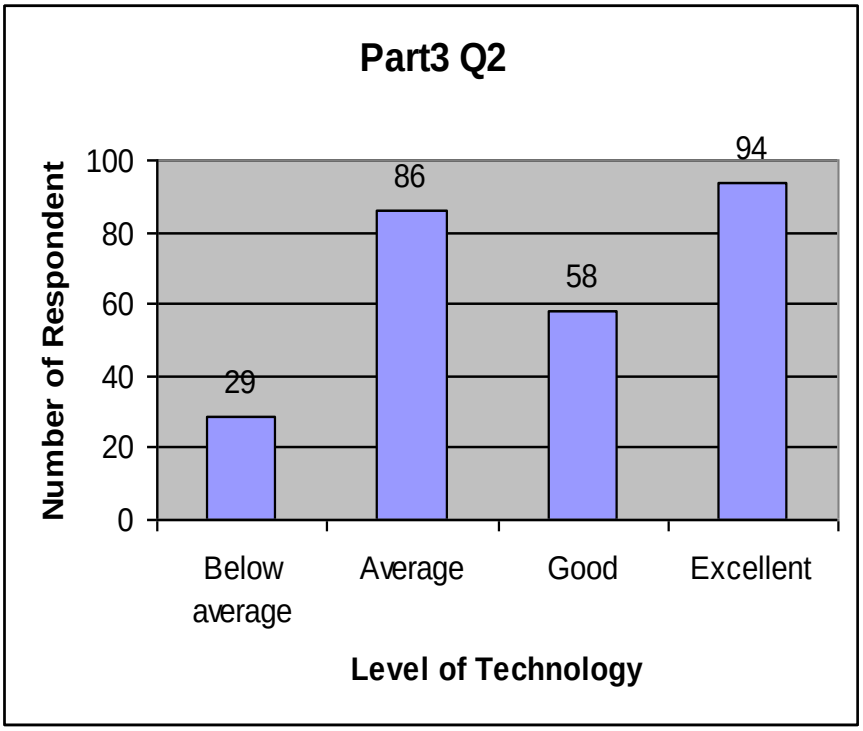


Figure 47: Respondents opinion about the level of available technology

Question 3:

The data about actual use of technology mostly testified to occasional or usual use. More than 200 respondents answered in "usually" or "occasionally" and some (21) even answered as "never". The smallest number (20) said that the schools they are related to "always" used technology. Granted that the perception of use might be different in different minds but this certainly is not a rosy picture as it exhibits apparent apathy and indifference to the proper use of available resources, as shown in figure 48.

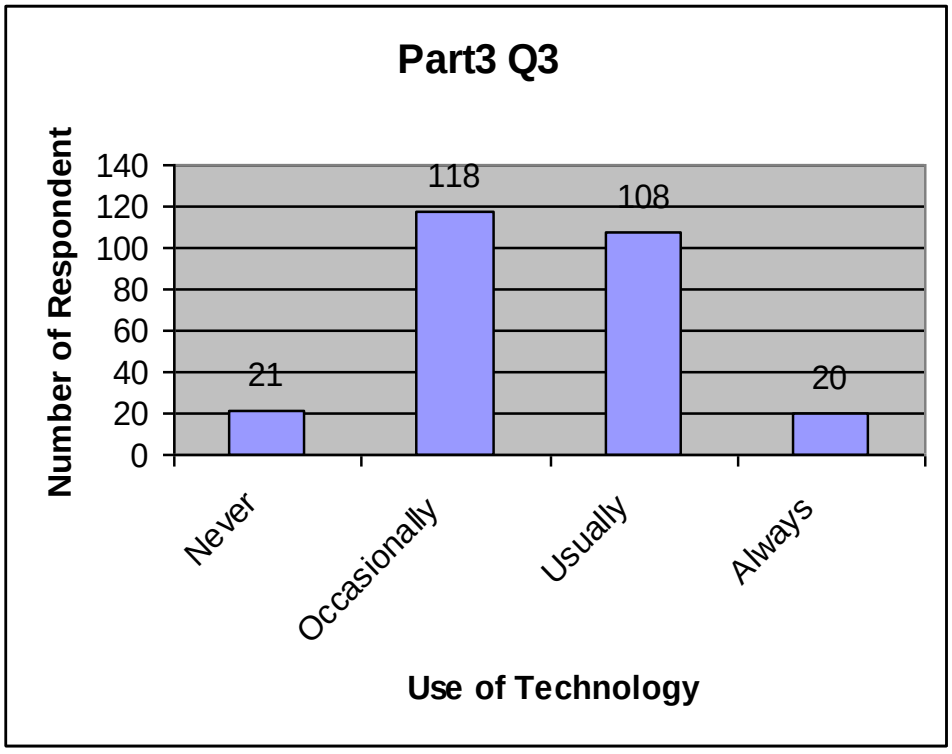


Figure 48: Respondents opinion about the use of available technology

Question 4:

Question 4, inquiring about the access to technology, is divided in two parts, "limited" and "unlimited". The "limited" is further divided into 4 categories, namely, administration, teachers, students, and others.

The discrepancy between the bar chart and the total respondents can be explained by the fact that some of the respondents only checked the box in front of "limited" without specifying the subgroup. Therefore a separate "bar" for "limited" was created in the bar chart below (Fig. 49). 208 respondents ticked "limited" where as 122 ticked the "un-limited". Among the limited the highest number were the teachers (72), "limited by time" (55), students (49) and the administrators (48). A very small minority which did not specify any subgroup was 13. The healthy number of 122 in favor of the "unlimited" access to technological aids shows a very encouraging trend as long as ET integration and implementation is concerned.

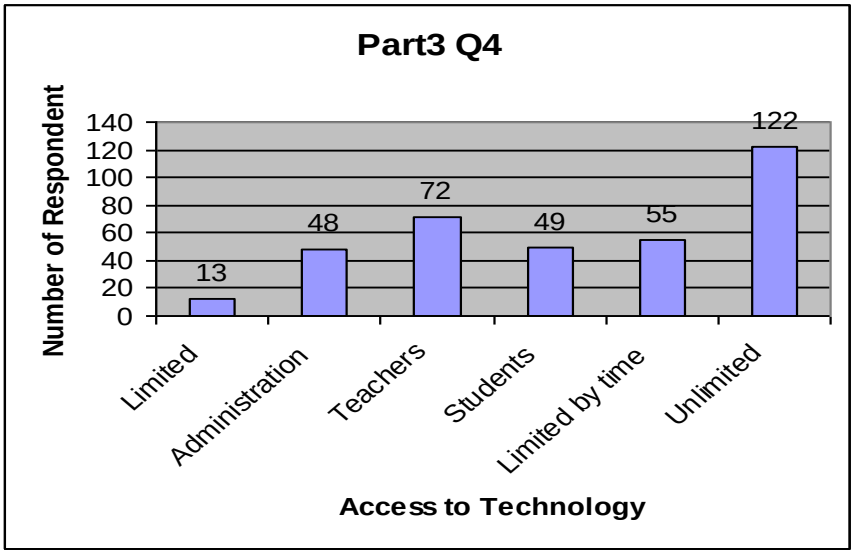


Figure 49: Respondents opinion about the access to available technology

Question 5:

Even after the rather discouraging response about the use of technology in question 3 it was pleasant to see that people in general regarded ET to be extremely important as evident in figure 50. This bodes well for the future of ET in UAE.

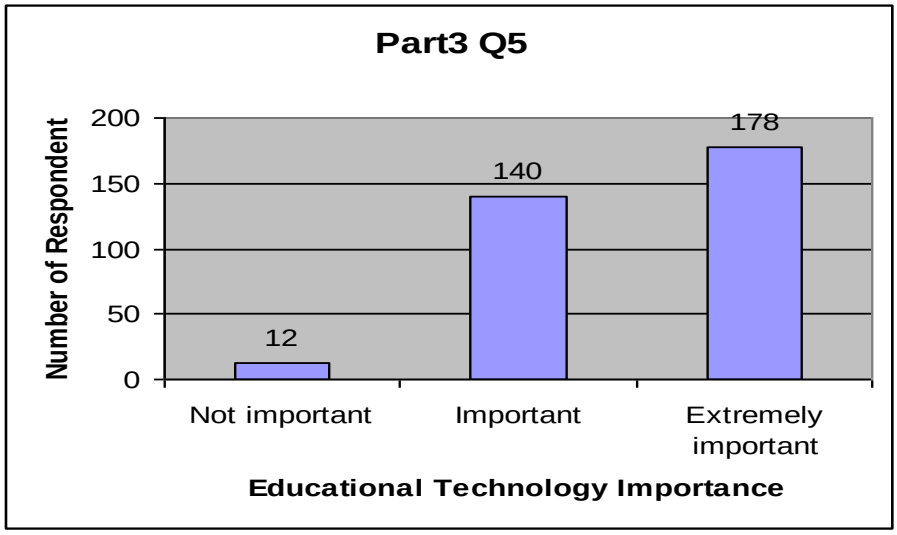


Figure 50: Respondents opinion about the importance of Educational technology

Part 4

Part four divided into eight sections looks at general perceptions about ET among the citizens of Al Ain. A 5-point Likert-type scale (1=strongly disagree, 2=disagree, 3=average, 4=agree and 5=strongly agree) is used to gauge the extent of interest. It inquires about what the people see as important and what barriers they feel are hindering ET implementation; the standard of teaching using ET along with parental interest in encouraging their offspring in using technology is also questioned in part 4. As fewer answers were expected in some sections it was made clear during the distribution that the respondents should respond according to their knowledge.

Section A:

The first section called “ET, General Interest” shows that out of the four categories, students, teachers, parents and school administrators the latter are far ahead of the others with 144 "5s" followed by students with 112 , parents 91, and in the end teachers with 88 "5s". School environment and the use of computer labs also registered high proportion of 5s.

Section B:

Section B, Funds and barriers in ET implementation, had seven questions. Availability of school funding for ongoing projects achieved the highest, i.e. 131 "5s", closely followed by state funding to support technology at 128 "5s". Unanticipated barriers scored 108 and the ability of school to budget funds for training and support got 100 "5s". Questions about comparative success in purchasing technology, financing as the greatest barrier and technology purchases affecting other programs were closely bunched at 98, 97 and 89 "5s".

Section C:

This section asked about ET implementation. Successful deployment of hardware and software, the success of the school ET plan and regarding one's own school's ET implementation better were the leaders at 126, 120 & 116 "5s" respectively. General agreement with school's ET policy, easy availability of software and school's success in meeting ET goals all registered 108 "5s". Strong leadership registered exactly 100 "5s" and a low response of only 63 "5s" to question asking about highly centralized ET decision making policy was a well come sign that besides the top management others are also being consulted in this regard.

Section D:

This section asking only one question about regular distribution of information of about what is happening in the schools elicited 108 "5s", 62 "4s", 60 "3s", 35 "2s" and 53"1s".

Section E:

Section E was devoted to questions about teachers. Qualification, better than average use of ET in the classrooms, regular use of ET for class management, having easy access to needed ET equipment and school's role in trying new teaching strategies got 130, 121, 117, 113 and 110 "5s" respectively. Consultations with teachers about ET decisions and the successful implementation of teacher training programs got 97, and 90 "5s" emphasizing that work needs to be done in the two categories.

Section F:

Questions dedicated to students role made up section F. Here, one suddenly sees a drop in 100s. Only access to computers, and ET's use in classroom routines managed 110 and 100 "5s". Student email communication, school's success in implementing ET standards and opportunities to students to use a wide range of ET equipment only managed 96, 94 and 83 "5s" respectively. The least preferred were provision of activities to help use ET and use of ET to build skills and assess progress which only got, 73 and 75 "5s".

Section G:

Questions about parents did not exhibit a rosy picture. Active parental interest in promoting availability of ET in schools elicited 81 "5s" and encouraging their children to use ET at home barely managed 76.

Section H:

As far as the maintenance of existing ET equipment was concerned, question asking about regular maintenance got 117 "5s" but the availability of experienced maintenance staff which only managed 69 "5s", highlighted a dire need to hire professional maintenance personnel.

	5	4	3	2	1
A					
1	112	67	98	21	20
2	88	101	58	25	46
3	91	72	61	45	49
4	144	63	50	17	44
5	123	68	51	26	50
6	129	50	49	29	61
B					
1	131	57	57	33	40
2	100	71	56	30	61
3	128	73	48	30	42
4	98	72	65	38	45
5	89	63	65	32	69
6	97	51	43	28	99
7	108	48	55	45	62
C					
1	100	57	92	34	35
2	63	39	50	56	110
3	120	72	60	32	34
4	108	74	59	24	53
5	126	60	71	21	40
6	108	60	68	37	45
7	108	76	70	23	41
8	116	62	53	33	54
D					
1	108	62	60	35	53
E					
1	130	82	59	25	22
2	113	74	60	31	40
3	117	55	53	26	67
4	97	62	63	39	57
5	121	79	54	31	33
6	90	75	67	32	54
7	110	67	61	31	49
F					
1	110	51	51	35	71
2	75	78	75	40	50
3	83	50	80	33	72
4	73	81	57	47	60
5	100	56	50	40	72
6	94	71	63	37	53
7	96	40	59	43	80
G					
1	81	70	61	44	62
2	76	70	68	38	66
H					
1	117	60	50	40	51
2	69	67	39	45	98

Table 2: Depicts respondents' opinion about the extent of interest in ET on a 5-point Likert-type scale in part 4

Part 5

From the general perceptions about ET among the citizens of Al Ain in part 4, the questionnaire in part 5, now turns to look at individual interest and opinions regarding educational technology. Looking from a distance the larger picture looks quite encouraging as demonstrated in Table 3. A large number of people have training, use ET, consider ET important and are familiar with ET in their schools. Most of the schools have ET infrastructure such as labs. The most encouraging part is a very low "resistance factor" among all the users of ET, whether they are students, teachers, parents, or school administrators. In fact the number of respondents who claimed to use ET was a very healthy 232 out of the 330 respondents questioned.

Questions	Respondents
1____I am familiar with my school's educational technology (ET).	184
2____ I consider myself knowledgeable about technology in general.	204
3____ I am a member of my school educational technology committee.	69
4____ I helped planning the school's educational technology requirement.	58
5____ I use technological aids in my work.	232
6____ I have received training in technology before I started using it.	209
7____ My school has technology education.	184
8____ I think technology is important for education.	243
9____ I prefer education with technological aids.	244
10____ I prefer education without technological aids.	19
11____ Teachers resist using technology in my school.	29
12____ Students resist using technology in my school.	26
13____ Parents resist using technology in my school.	26
14____ School Administrators resist using technology in my school.	23
15____ Each classroom in my school has one or more computers	152
16____ My school has one or more computer labs.	230
17____ My school library has one or more computers.	109
18____ Purchased hardware and software is distributed equally among the buildings and classrooms.	144

Table 3: Respondents' personal opinion in part 5

Part 6

Question 1:

The technology support provided to the teachers is more above-average than below. 100 respondents answered excellent and 140 called the support provided to the teachers as average. The effort on part of the schools (Fig. 51) to help their teachers be familiar with and use ET is very heartening and augurs well for the future.

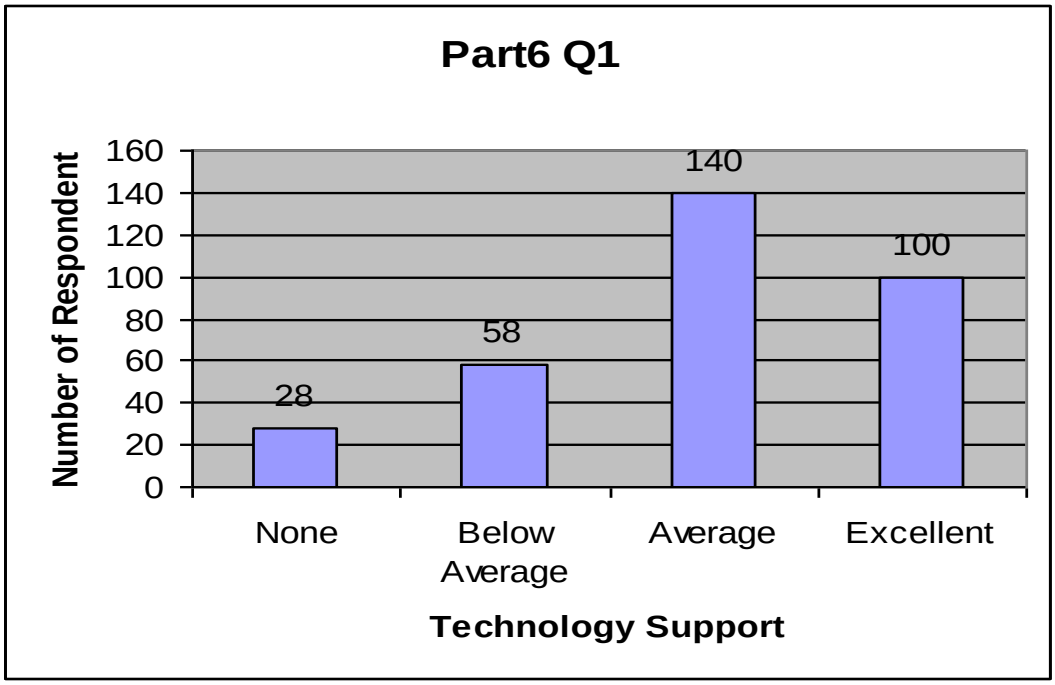


Figure 51: Depicts respondents' collective opinion about available technology support

Question 3

However, when asked about the percentage of classes hooked to internet the picture was not so rosy. 139 respondents out of a total of 330 outright denied having any internet connections in their classrooms, 52 claimed to have 25%, 37 believed that 50% and 29 believed that 75% of their classes had internet connections. Only 69 claimed to have 100% of their classes having internet connectivity (Fig. 52).

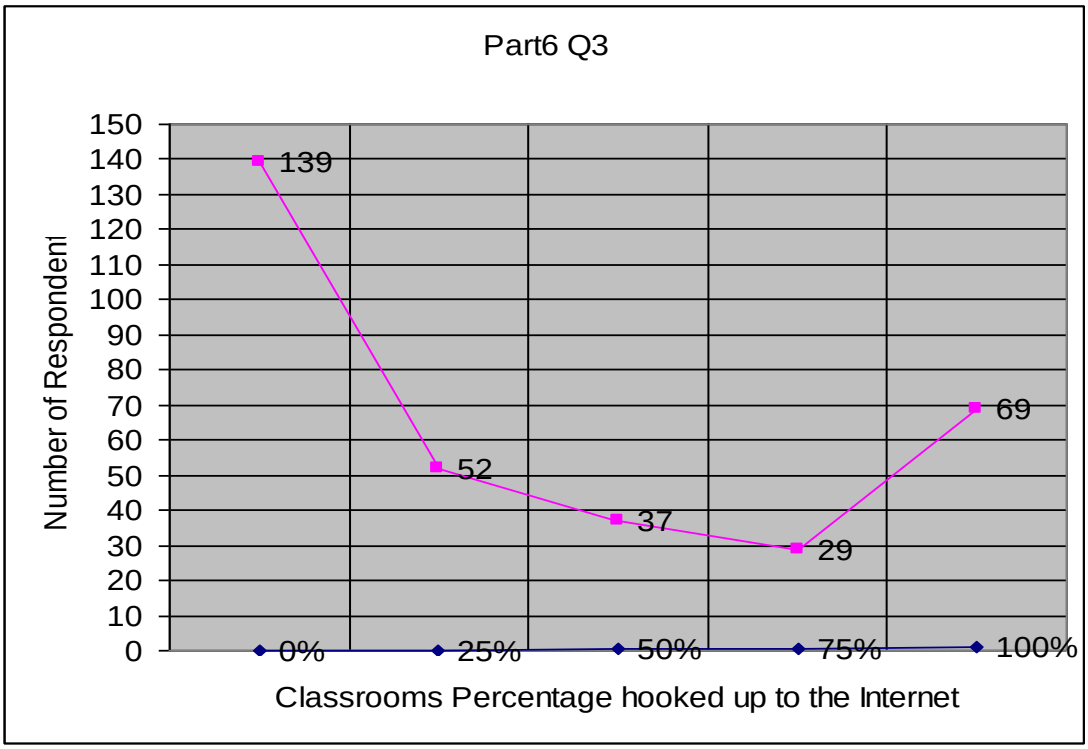


Figure 52: Depicts respondents' collective opinion about the percentage of classrooms hooked up to the internet

Question 9:

Having a variety of ET equipment (160 respondents) and to a large extent ET software (102 respondents), as shown in figure 53, is at the top of the priority list of the general respondents. Only around 60 respondents mark maintenance as their top priority and an even lower number of 42 thinks that internet access deserves to be their schools' Educational Technology priority.

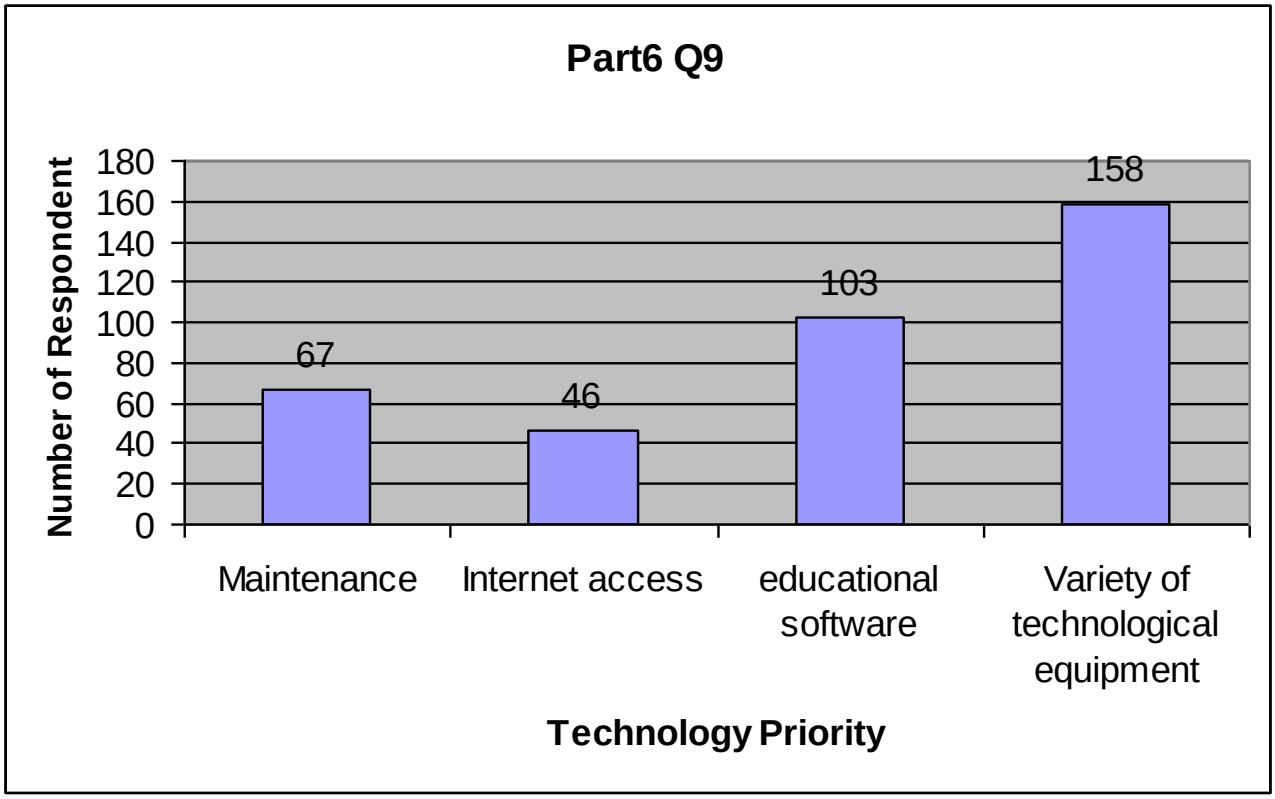


Figure 53: Depicts respondents' collective opinion about the scale of ET equipment importance.

Question 10:

Most respondents (Fig. 54) blamed the school administrations and infrastructure along with the AAEZ to be the main culprit when responding to reasons behind lack of homogeneity in the number of ET equipment among schools. It implies that the primary need for homogenous ET integration and implementation dearly needs the schools administration's willingness to provide the necessary infrastructure and AAEZ's active participation and encouragement.

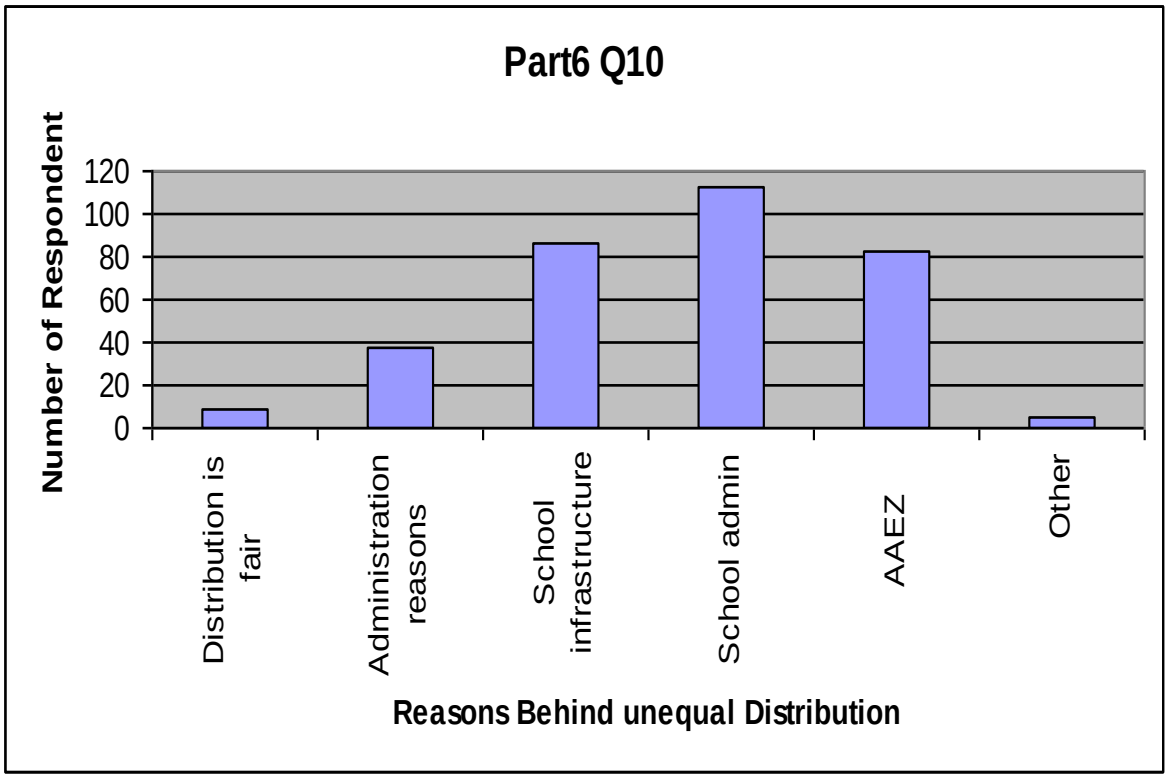


Figure 54: Depicts respondents' collective opinion about the lack of homogenous ET distribution

Question 2, 4, 5, 6, 7, and 8:

The answers to questions about sufficient school support, expected teachers and students ET skills, school administrators and teachers having e-mail accounts, and schools having their own web pages drew very similar responses, as shown in figure 55, with a considerable majority replying in negative.

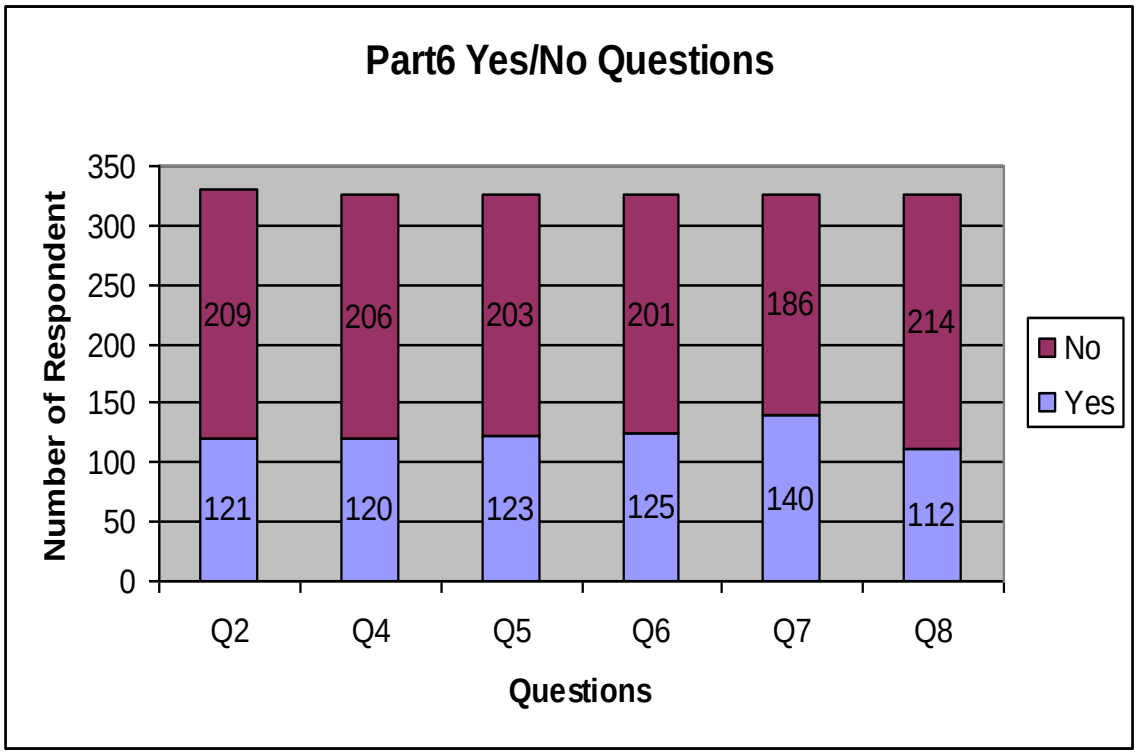


Figure 55: Respondents' opinion about available school support on a yes/no format

Part 7

Question 1

The first question in Part 7, asking respondents' opinion about government approved technology plan prompted a substantial majority of 60% to reply with an emphatic yes. ET implementation being a costly enterprise cost aversion was cited as the biggest advantage. Alluding to the importance of homogeneity and uniformity for ET's use all over Al Ain, the respondents claimed that it would only be possible with a government approved plan. They suggested that there should be a single policy or a "blue print" so that homogeneity to ET use could be achieved. Some cited government's participation as necessary because ET planning requires allocating enormous resources which are beyond the capabilities of many school's administration. Providing a good foundation, being up-to-date, and elimination of personal interest and bias were also cited as reason for government involvement in ET planning.

In contrast, others said that they didn't want an approved government technology plan because according to them it would force them to fall in the dreaded bureaucratic routine of getting government's approval all the time which sometimes could result in years just to get budgetary approval for proposed projects. They also maintained that it would be fair if everybody were involved. They claimed that the government was not aware of what was exactly happening in the schools and lacked the precise knowledge of their needs. They strongly contested government's involvement saying that this would make the schools dependent on and follow dictation, a complete negation of what "not to do" where education and learning is concerned. They claimed that it would take away their right to plan and learn by themselves.

Question 2

Drawing on the respondents' experiences regarding particular hardware and software issues confronting their schools, the research learned that issues involving money took the top priority. The constant rise in prices of new and better software, high expenditure due to constant upgrading and updating of hardware & software entailing soaring expenditure, high cost of maintenance of existing hardware were mentioned as the most importance as hurdles. These were followed, in a descending order, by training of staff to guarantee proper use and the lack of availability of trained technicians to ensure appropriate maintenance. The emphasis on training draws one's attention to the need to make the right use of existing and future ET equipment certain. Lying later in the list of hardware and software issues, but not less important by any means, were designing and administration issues, software contract renewal time and cost, lack of internet service and slow computer speed.

Pointing out the general social perception and indifference to ET, not enough time allocated to computer classes, lack of general awareness, out dated equipment, student apathy towards ET, improper distribution of ET equipment and destruction of expensive ET equipment on students' part were also cited as serious problems.

Question 3

Lessons learnt regarding ET implementation also drew heavily on respondents' previous encounter with ET prompting obvious and at the same time intriguing responses. Being able to observe and understand what was going on and realizing the actual needs was a favorite one. Another expected lesson learned, according to the respondents, was that it was easy to store and retrieve information. Technology not only made the work easier, more efficient and more professional, but it also helped in making adjustments in learning from changing circumstances. Among the in-class lessons learned were, easy lesson delivery by making information distribution easier, more efficient and more attractive to get the attention of the students. ET's use demanded less effort (by proficient users) but efficient delivery on teacher's part. A pertinent case regarding the attractiveness of lessons cited by one respondent was the case of "power point" making the lessons more attractive. Usage multimedia features, such as slides and picture, can make the lessons more attractive and easily understandable. Another related lesson was that being able to organize the work in a systematic way improved the skills of the teachers and at the same time made it easy for the students to learn. Other in-class lessons were, transformation of normal books to electronic ones, facilitating continuous training and researching, and more importantly getting the chance to get out of the mundane boredom of routine classes.

E-mail use helped in users being able to be constantly updated with the latest developments all over the world; e-mail also helped in establishing better contact between teachers and students and more importantly between teachers and parents. Parents were able to check the progress of their children any time they wanted and consult teachers. Moreover it was also learned that the knowledge gained from ET implementation and on-site observation gave the schools the confidence to allocate appropriate budget and expertise to make future ET implementation successful.

Question 4

Coming to ET implementation in Al Ain and specifically referring to the steps AAEZ could take to improve and assist with ET development, independent minded respondents suggested that AAEZ can care more about ET education by giving funds to the schools for their special ET needs; others wanted a more direct support from AAEZ by supplying schools with equipment and material, but both advocated equal and fair distributing of technology among all schools. It was suggested that the AAEZ could become a consultant in better ET use by visiting schools and guiding proper ET use, encouraging schools to implement ET and support schools when ever they encounter any ET related problems, such as, with maintenance or with dealers. Many respondents were of the view that AAEZ could make a positive contribution to ET development in Al Ain by making ET training mandatory, preparing software, training technicians for proper maintenance, and by holding conferences about ET's importance to boost ET awareness among schools staff and students. More specifically, it was proposed that the AAEZ could look at the particular needs of individual schools by increasing the length of computer period,

connecting schools through a network and hiring administrators who, not only have the right IT background but also have the students' and society's benefit in mind.

Other suggestions for the AAEZ included encouraging parents to create ET awareness among their children, finding quick solution to maintenance problems by observing and learning lessons from other educational zones, giving awards to schools showing progress, and distributing ET related educational software. In the end the most important step, according to the respondents, for the AAEZ would be not to forget to follow the progress of ET development by visiting schools and keeping itself updated on ET implementation.

Question 5

As far as the biggest obstacles obstructing ET implementation were concerned the respondents blamed the incessant improvements and changes in technology which necessitated a continuous need for upgrading the software & the hardware and maintaining ET equipment, other wise the equipment would inevitably become obsolete. It is not only the equipment which needs constant updating but the user too. A pertinent example cited was the regular flow of newer versions of "Microsoft Office" which requires constant effort on users' part to up date themselves on fresh features. Another recurring obstacle, also mentioned in other questions, was lack of technical assistance. Besides the above mentioned hurdles late discovery of improper use of ET equipment, for example, lack of suitable equipment according to students' grade, and budget were also blamed in hindering successful ET implementation.

Furthermore, too many responsibilities on staff's shoulders coupled with a lack of encouragement from the administration were also cited as impediments obstructing smooth ET integration. Interestingly, advance age of teachers and high charges of training institutes were also considered barriers. Natural elements were also held responsible for their part in destroying and damaging ET equipment e.g. schools, resuming activities after the long summer break, often found that the heat and the humidity had taken their toll on computers and related ET equipment.

Question 6

Reasons for not using ET even when it is available were numerous and nearly all of them were blamed. "Unavailability of time", "lack of training" and "school pressure" were cited by more than 80 respondents. Surprisingly "lack of education material" was cited by more than 100 respondents as shown in figure 56.

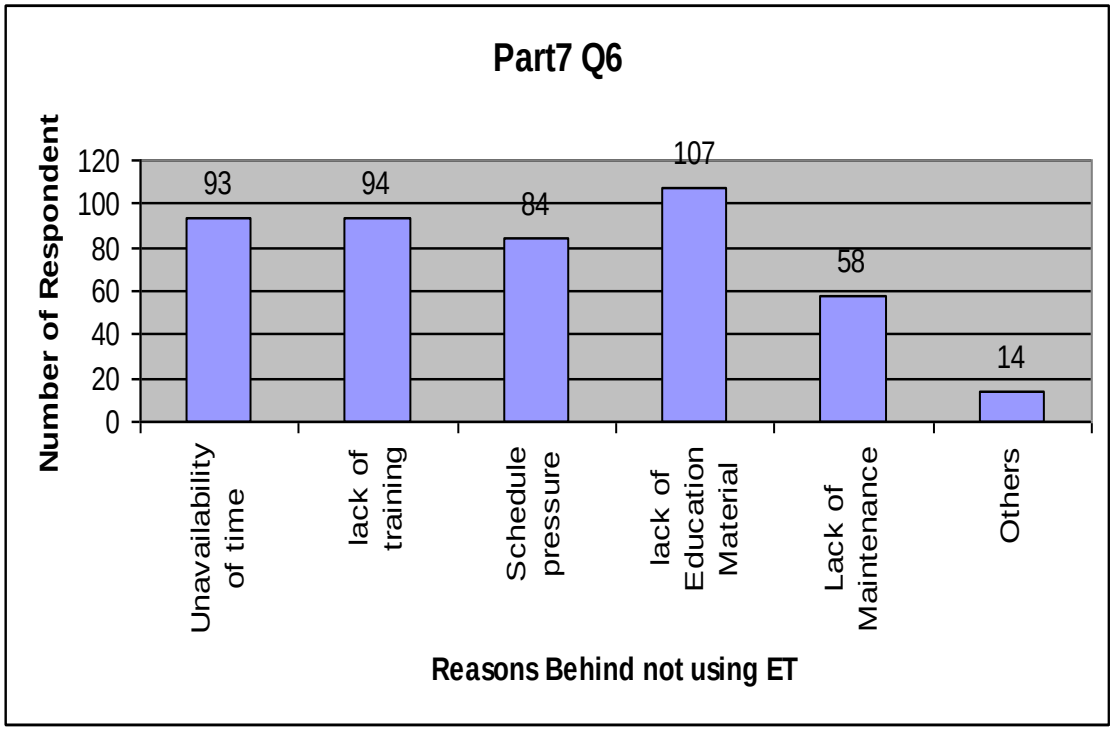


Figure 56: Respondents' opinion of the reasons behind not using ET

Question 7:

When questioned to name the organization responsible for supplying schools with technology, least responsibility was placed on AAEZ from among the government organizations (Fig. 57). Only 60 respondents held AAEZ accountable. On the other hand, 120 held MOE, and 170 held ADEC accountable for ET supply to schools. Private sector, understandably since the schools were public, was only cited by 18 respondents.

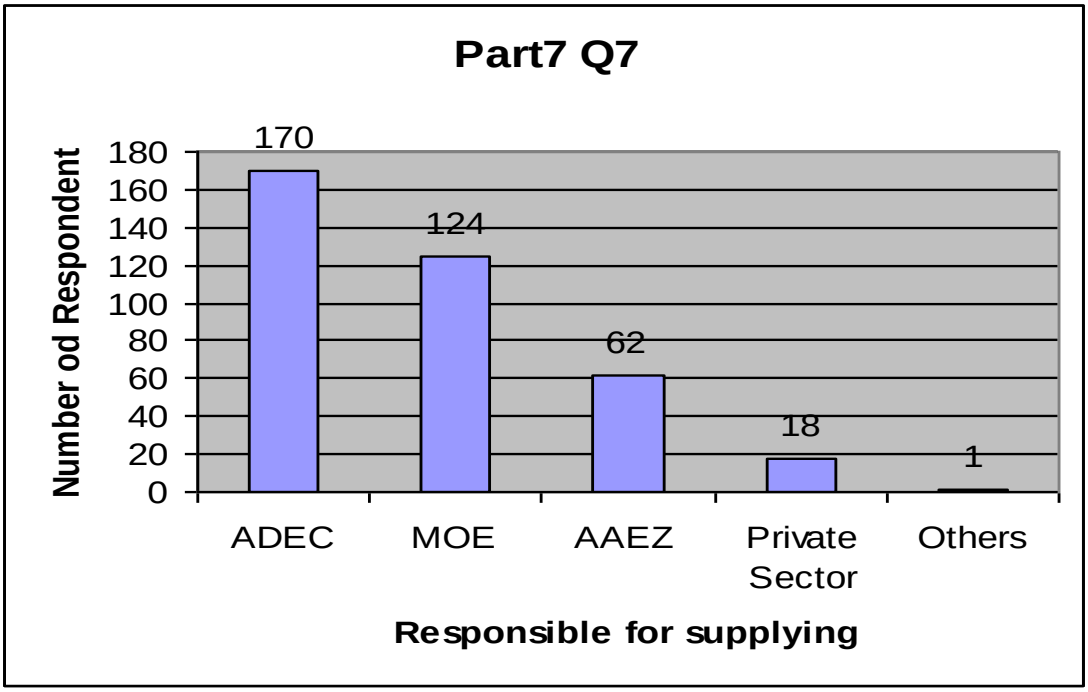


Figure 57: Respondents' opinion about the responsibility for providing ET

Question 8:

The importance of ET in education was high lighted by the fact that when asked to compare the difference between a student graduating from ET integrated school and the other from ET "deprived" school a substantial majority of 200 replied with "very much" (Fig. 58). The implication being that the ET trained student "differs positively" from the one having no ET background.

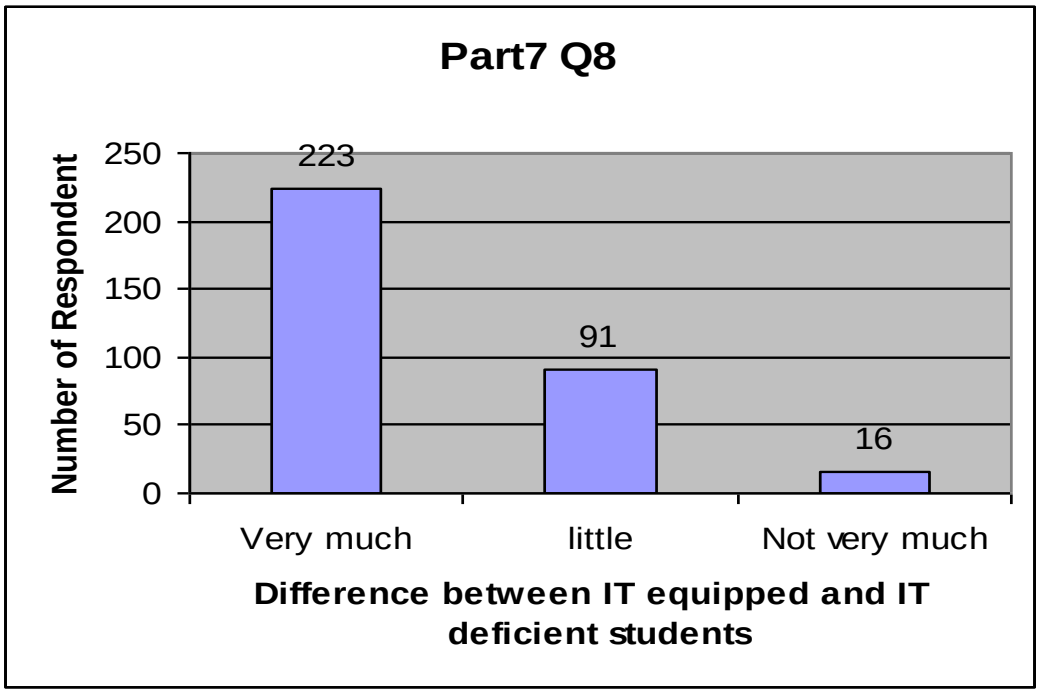


Figure 58: Respondents' response to differences between IT equipped school students and IT deficient schools students

Question 10:

Contrary to present practice of not using the existing technology, when asked whether they will use ET if implemented nearly 200 replied with a resounding yes. A more encouraging aspect, as shown in figure 59, was that another 100 positively replied that they would ask for extra training which shows a keenness and realization of the importance of ET in education.

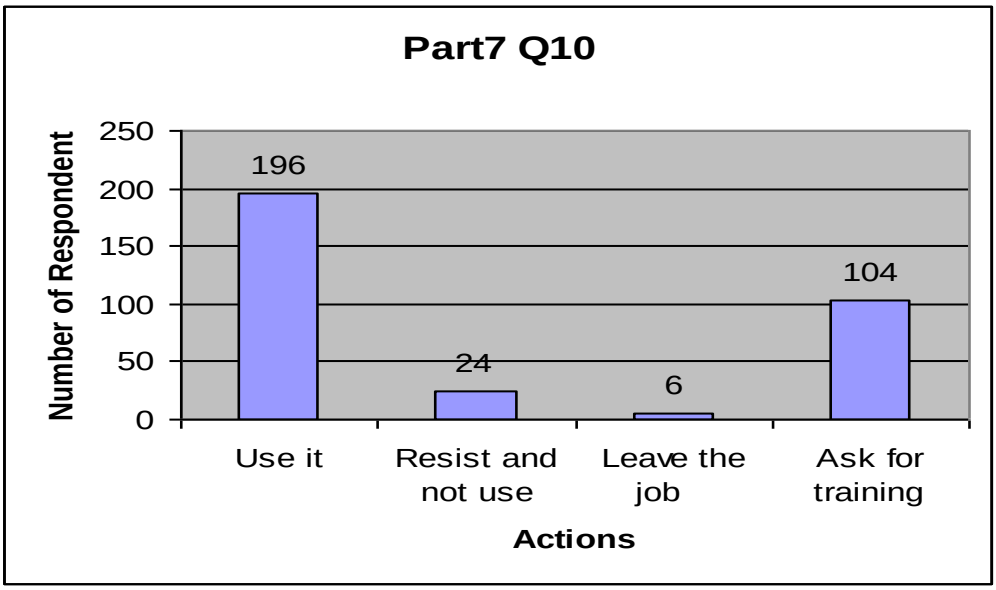


Figure 59: Respondents' opinion about personal action in case of ET implementation

Question 11

As far as the recommendations and suggestion for the implementation of ET in UAE schools was concerned some said the planning, regardless of their location or grades should cover all schools uniformly. Others suggested that the ET should be implemented by equal distribution of PCs. People, especially the ones from the rural areas, said that the current ET equipment distribution is not fair. Rural areas feel neglected by the perceived bias attached to urban areas as far as ET equipment distribution is concerned. They claimed that in fact the rural areas deserved more PCs than the urban, because unlike the city where the students can go to other places to practice or use computer skills, rural areas do not have these facilities, restricting the students to only schools or homes for computer use.

Some suggested that the AAEZ should take active action against the companies which are not following their maintenance promises, whenever there is a malfunction the computers are left not working for weeks on ends forcing the schools to divert money from the budget allocated for other uses to computer maintenance, restricting other development projects. There was a strong contention that the current thinking of allocating computers according to their grades should be changed to the total number of the students in a school and also keeping in mind the percentage of locals and non locals, because rural areas claimed that number of their students, which are entirely local, is very high and the necessary consideration is not given to these areas.

Question 12

Emphasizing the importance of training and other support an overwhelming 75% answered in affirmative. Respondents whole heartedly agreed with the idea of training and support, whether it came from the AAEZ or the school top management. They said that only training and support will encourage and ensure proper use. To make the idea of constant personal improvement popular they said that the training should be free and mandatory. Referring to other forms of support they hinted at employee assistants to help them become familiar with the equipment.

Since lack of motivation and individual needs are precisely the reasons behind the refusal or non acceptance of ET it was suggested that conferences driving home the universal concept of ET's importance should be held to stimulate and encourage teachers' use of ET. The importance of ET in this increasingly shrinking and communication dependent world should be a constant reminder and the teachers should be encouraged to believe in themselves and make time available for ET use and training. Propositions promoting open discussions and holding the project management courses to convince reluctant users also got a nod from many respondents. Another worthy contribution from a respondent, to judge teachers' ability and computer use, was allocating a part in the annual evaluation process to ET.

In their zeal some respondents even went as far as chastisement and said that punishment, such as, ignoring people who don't follow, forcing ET's use, or eventual dismissal as a last resort should also be used. In the end, there was unanimity in the contention that holding frequent ET training sessions be made mandatory to ensure ET development and use.

On the other hand, the nay sayers, who were close to 60 in number and near their retirement age, completely negated the idea of training and other support without giving any reasons.

Question 13

When asked about the minimum number of computers per class room the answers varied from 1 and 2 for a class of 20. If the number of students increased to 25 it should be 3 computers per class room. The idea was to have the teacher use computer as a teaching aid connected with the ever-present multimedia projector. If the students wanted extra practice they could always go to the computer labs.

Question 14

Question 14 asked about the ideal ratio of computers and students. The answer, 20 per student, matched with the one given for the previous question (question 13). It would be impossible to accommodate as many computers as there are students in a class because the labs are designed to cater to these eventualities.

Question 9

Referring to the comparison between two students coming from ET integrated and ET deprived schools and their job prospects in the real world, question 9 asked whether they had equal opportunity when looking for work, more than two third answered in negative (Fig. 60).

Question 15

The rural and urban divide became more apparent (Fig. 60) when more than two thirds of the respondents replied "No" to the question asking whether the ET equipment were distributed fairly among rural and urban schools.

Question 16

As seen above in question 7, (Fig.60) more than two thirds respondents, when asked whether the government departments, namely, AAEZ, MOE, and ADEC are doing enough for ET propagation, responded with "NO".

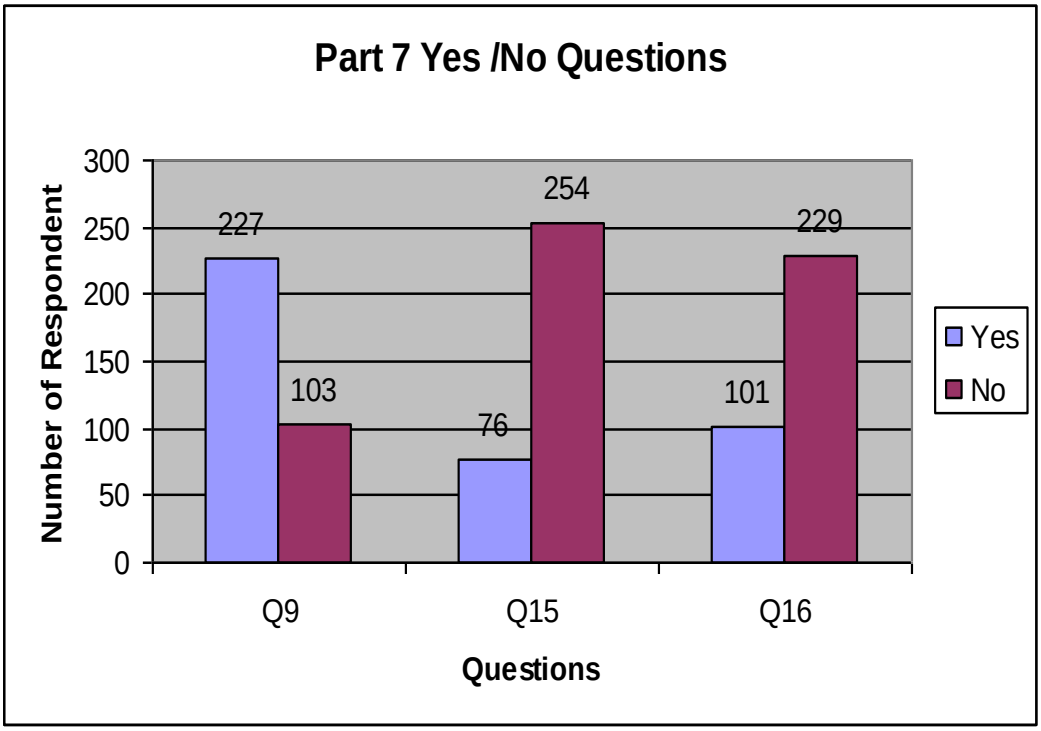


Figure 60: Respondents' level of satisfaction about ET deprived and ET integrated schools, rural and urban divide and available departmental support on a yes/no format.

Question 17

Some of the respondents complained rather amusingly about the length of the survey. However, a large number were happy and expressed hope that the results of the research would be heeded and would bear fruit. Others encouraged the researcher with their positive remarks. There were some comments advocating wide distribution by suggesting that the distribution should cover all the schools. Still others suggested that MOE and ADEC, being responsible for formulating policy, should have been included in this survey and should be included in any future survey of this kind. A few felt that the questions deserved a longer response time and there wasn't enough time to do justice to the questions.

4.2.2: Hypothesis 1 Lack of ET awareness

The questionnaire was composed of seven parts. During the design stage of the questionnaire two parts, 3 and 5, were reserved to judge ET awareness among AAEZ employees using multiple methodological techniques, such as, interviews, e-mails, site visits, etc. However, while doing the research for chapter 2 (literature review) it became clear that to measure the level of awareness among schools staff (school administrators, teachers, and students), their involvement in ET integration and implementation process, such as, planning, purchasing, usage, and maintenance, has to be examined. In other words the awareness determining factors are: first, planning, which includes participation, setting the requirements, and evaluating the quality; second, purchasing, which includes funding, contracting, and selecting the right supplier; third, usage, which includes utilization percentage of ET equipment, the actual use for education purposes and training; and fourth, maintenance, which includes

employing technicians, setting the standards and policy to deal with faults, and upgrading the existing ET equipment.

The analyzing process will firstly present the respondents' views regarding the hypotheses and later on, consulting chapter 2 as a guide, will compare the actual finings of the questionnaire with the literature review to discover the validity of the hypotheses.

The research revealed that the teachers are generally aware of the importance of ET's use in education, have the knowledge to use and are using ET to a limited extent in their schools. It was found that a very insignificant minority of just 2% regarded ET's use in education as "not important", where as, 98% considered it as "important or extremely important".

The awareness determining factors will be described below:
Purchasing**:** According to (Raiffa, 1982) purchasing is an art that has to be practiced and learnt. Seen in that light, the AAEZ stands in good light. After more than 15 years of ET introduction in the UAE, the purchaser (AAEZ and schools) now have the knowledge and experience of the right equipment to purchase and the best dealer to deal with. This observation also takes authenticity from the research by the respondents' quick, fast, and decisive way of replying to the questions, regardless of their categories, and shows a clear understanding of when, where and how to purchase. The understanding has led to determining a "basic standard" of evaluating any proposed solution from the supplier. The research further exposes the increasing awareness and discerning ability of the schools in choosing their equipment and supplier. The mater is not just limited to monetary concerns, as had been the case before when the cheaper solution was preferred, but has progressed to choosing the quality and right equipment according to schools' needs. Numerous funding sources, question 7, part 7, point towards a healthy pro technology environment where ET can flourish and grow.

Planning: The basic element of planning is setting the requirement and then finding the best way to fulfill that requirement (Hancock, 1997). In the context of ET integration the best people to decide the need are the end users the teachers and the students, as shown in part 7 question 10. Previously this very important segment of the computer users was not included in planning and there was a huge gap between the planner, the MOE and the end users, students & teachers, which only ended in the ET equipment sitting idle and collecting dust in the stores.

An important element of planning is to benefit from your previous mistakes by running Post Project Review (PPR) as shown in question 3, part 7. To judge the right ET equipment quality, planning requires several alternative options. In recent years, several hardware and software companies and suppliers have opened their branches in Al Ain, giving the planners the opportunity to select from several brands and services. The AAEZ

cadre has the ability to judge and evaluate these companies and has the expertise to assess the budgetary prices, by using the internet, even before the quotation is tabled.

Usage: The pervasiveness of web technology in our social life makes ET a powerful and an ideal tool for assisting teachers in their classes. Marshall discovered strong support that ET complements what a great teacher does naturally, extends his reach and broadens students' horizons. He further stresses the need to understand the environment in which the technology is used and considers it, along with the learner, the teacher and the content, to be the recipe for success. (Marshall, 2002)

By individual observation and using techniques to measure the utilization of ET equipment and examining the questionnaire responses, the researcher concluded that the use of the available ET equipment was frequent (question 3 part 3) as 226 respondents confirmed “occasional” or “usual” use of ET in their schools. Site visits allowed the researcher to see the actual use where it was being used for power point presentation, as a conduit between the teachers and the students, for video presentation, and assigning homework. Moreover it was observed that internet was being used to keep contact with the parents, appraising them of their children’s progress and attendance, and communicating with schools both in the UAE and abroad. Training constitutes an important part of the whole utilization process because unless operated by properly trained staff the equipment can’t be used to its optimum use. The response to teacher Training question (part 4, section E) on a 5-point Likert-type scale (1=very unimportant; 5=very important) although registering 90 responses as “5” was rather evenly divided. To provide training AAEZ has opened its own training center called the Technical Training Center (TTC) where AAEZ staff can take technical courses at subsidized costs.

Another training center catering to English and administration courses has also been established. Several contracts have been made with private international institutes in Al Ain, Abu Dhabi, and Dubai to allow teachers, administrators to improve themselves, by taking Abu Dhabi Educational Council’s (ADEC) subsidized courses. AAEZ has an annual training policy with the allocated budget which stipulates that each employee should take at least two courses per educational year.

Maintenance: Students are aware of importance of using ET in education. And they are willing to use ET, e.g research, e-mails, chatting and others, to help them better their education. The proper use of ET was one of the major obstacles facing schools in the late 90s, where the students accidentally or deliberately destroyed or damaged come of the ET equipment. But the destructive generation has passed and the new one is more ET savvy. But you can still see some of the negative impacts of the past destructive generation when you visit schools and you find big iron doors in the computer labs.

4.2.3: Hypothesis 2 Schools' Reluctance

Implementing ET in the schools need the involvement of all AAEZ cadre, be they administrators, teachers or students. If one of those participants lags behind the whole process can be jeopardized.
According to chapters 1 and 2 the reasons behind the apparent reluctance to ET were lack of knowledge, fear of training and job loss, dedicating extra efforts, devotion of time and money, all were impediments in smooth ET integration.

Proper preparation, good presentation, coming directly to point, are the factors which increase or decrease reluctance. What happened in the past in some schools was that the end user had no right to select and the ET equipment came directly with an executive order from the top. The forced implementation served to increase reluctance on the users' part. Participation from the teachers and students, taking their opinions, giving them the right to accept or refuse particular ET equipment and letting them decide the better way to use are the only way to stimulate acceptance. (Meisalo and Tella, 1987).

Previous contention attributed ET reluctance in the UAE to a number of reasons, ranging from, high number of expatriates in education field and the immaturity of the students with both (teachers & students) already burdened with exhausting tasks, e.g. homework and project assignments, extra checking, lesson planning and next day preparation. These activities were considered to be too over whelming to allow for the time and energy needed to think of something as intimidating as ET implementation.

Reluctance is hard to measure as no one would out rightly come out and say that he/she is against certain question. (Makrakis, 1988) To effectively measure the reluctance on the respondents' part questions were narrowed from general to specific during the designing of the questionnaire. For example, questions 1 & 2, in part six of the questionnaire mainly measure reluctance by asking the interviewees about the support they feel their schools provide and whether it is sufficient or not.

Regardless of what was mentioned above, the analysis of the respondents' replies revealed a completely surprising result, showing exactly the opposite outcome as the majority of the participants were found to be greatly supporting the ET implementation idea. Further investigation revealed the reason behind this support. From the administrators point of view it was thought that using computers will make the task easier to handle by reducing the paperwork, making communication easy, and if need be, will even allow personal research. Having IT, where it shows, casts a good light on the modernity of the school as people perceive IT with progressiveness, which is good for the business. By easing the load, IT allows more time to be devoted to other tasks thus maximizing the use of available resources.

From teachers' point of view, using ET in the schools opens new doors to improve their knowledge by letting them master technical skills which will serve them in making the classes a more worthwhile experience; it also allows the teachers the opportunity to look for new jobs, and increases their overall confidence. When the administration spends money on the teachers to help them develop themselves it instills a feeling of indebtedness which is reciprocated by the teachers in more loyalty and devotion. They become more willing to work and to exercise what they get trained for. (Zhihui, 1996) For several years education was a routine work, there was too much monotony which fueled demotivation and negligence of responsibility. ET equipment, for teachers, is like a life saver from the everyday mundane monotony and boredom. ET also increases competition among teachers in education process and training courses as evaluation becomes easy for the administration.

Power point presentations, research and uploading research on school's website (some teachers even build their own software and distribute with their names stamped), communication with students through e-mails, sending and receiving on-line home assignments, have all served to increase healthy competition among teachers and schools which is good for everyone. It's important for teachers to have good scores in training courses, such as, ICDL, IC3, MOSE, etc. because it might have a bearing on their promotion which makes them motivated to work hard. Besides increasing their skills ET also offers social benefits for the teachers. A majority of the teachers in the UAE are expatriates with many staying alone in the UAE. IT is their only cheap and reliable source of communication with their families outside UAE.

From the students' point of view, as most of their entertainment is now IT driven, like on-line video games, etc., computers are not associated with work but with having fun. In addition to providing amusement computers also open new education fields as well job opportunities after students finish high school. Furthermore, the UAE schools, by going on-line have sort of aligned themselves with the students in order to convince their parent to purchase personal home computers. Students now have a credible alibi to support their contention to talk their parents into buying computers. In the classroom using ET makes the lectures more interesting by the use of power point, videos and multimedia fueling interest and better understanding.

Having and assignments involving ET use has a positive influence on the family togetherness as well. It has even been seen that families get close when they help their children do their projects, such as observed by the researcher that a power point presentation assignment about Sheikh Zayed (may God bless his soul) assigned to a first grade student made the whole family come together and share their information. Sitting together and working on the projects brings parents and children closer and the whole family gets enjoyment as well as knowledge.

In schools power point presentations are usually distributed in the beginning of each lecture which guarantees that every student has a copy. Power point also helps students in exams by making revision easy and interesting

at the end of the term. Teachers have reported that passing rate has increased since students started using power point presentations, which are easier to store, handle and take notes on the hard copy.

The number of education related awards in the UAE has trebled during the twenty first century with intention to motivate and challenge the participants. Awards, such as, the best teacher, student, principal have all been found extremely inspiring and are excellent incentive for the participants to work harder and give their best. Adding ET to the growing list of awards will not only help in overcoming the resistance but will also stimulate adoption of ET on a large scale.

Looking at the questionnaire it is easy to see that enough evidence was found during the research to refute the second hypotheses, "*Schools are reluctant in incorporating ET due to a number of reasons"*.
The implementation section C in part 4 of the questionnaire, asking various questions about the implementation of ET, dispels any notion of schools' reluctance in implementing ET. Part four of the questionnaire gives a very clear picture of the amount of reluctance on the schools' part. Questions about strong leadership backing ET implementation, success in deploying hard and software, availability of education software, and meeting ET goals all drew overwhelming support from the respondents questioned. It was observed that "5" was a favorite among respondents replying to a 5-point Likert-type scale (1=strongly disagree, 2=disagree, 3=average, 4=agree and 5=strongly agree). Part E, composed of questions about ET and teachers, also shows a favorable tilt for "5" when the replies to teachers and their ET competence, access, use in class, trying new strategies, are checked.

Question 8 and 9 in part five asking whether technology was important for education and about their personal preference to ET's use in education received the highest positive responses, which were 243 and 244 out of a total of 330 people interviewed. This was in stark contrast to the 19 affirmative responses to question 10 which asked whether they preferred education without technological aids. Similar response was witnessed in questions 11 – 14 which inquired whether teachers, students, parents and school administrators (in that order) resisted using technology. The response was 29, 26, 26 and 23 votes respectively out of a total of 330 high lighting the interest of the parties questioned about.

The first question in part six asks about the technology support, such as, training, resources, and ET equipment the school provides and whether the respondents feel that it is "excellent", "average" or "below average". It was found that one third or 33% of the interviewees responded with "excellent" and 50% circled "average" which indicates that 83 percent of the people surveyed responded positively. The second question, inquiring about their opinion of whether the support is sufficient or not, resulted in more than double replying "Yes" as compared to "No". Questions 4 and 5, asking about school guidelines for teachers and students, received double positive than negative responses. The availability of well distributed guideline testifies to the school administration's interest in promoting ET.

In part seven the responses to question 6 inquiring the reasons behind not using ET in schools received an equal distribution of responses among the five categories, "unavailability of time", lack of training, schedule pressure, lack of education material, lack of maintenance of 93, 94, 84, 107, and 58 respectively. This equal distribution shows the reality of situation and the care of the respondents while answering question. The answer to question 10, asking what action would the respondent take if their school implemented ET, was an eye opener and testified to the interest of the interviewees. An overwhelming majority of 196 responded to the option "use it" and another 104 to "ask for training" as opposed to only 6 ticking "leave the job".

The nearly 95% response to this survey by itself is an evidence of lack of resistance on part of the interviewees. The designing of the questions was deliberately long, tedious and time consuming testing respondents' patience. The meticulous care with which the questions were answered shows that respondents were willing to reply even though they had to devote time. It was significantly obvious when they replied to information questions – not popular among interviewees – asking detailed answers. More details regarding details to the responses can be found in section 4.2.1.

4.2.4: Hypothesis 3 Homogenous Implementation

By conducting the literature review and by observation on site visits it was found that distribution can be divided, specifically in the case of the UAE, on three basis: location (rural or urban), gender (females and males) and grades (KG – 12).

It is obvious by looking around the world that when the question of distribution of resources arises, urban areas usually take preference over rural areas. (International Technology Education Association. 1996) The feeling of deprivation and in some cases acceptance of the status quo among the residents of rural areas defines the rivalry between the two. Al Ain, not being an exception to this world wide phenomenon, suffers from the same infliction. Rural areas in Al Ain are situated from 30 kilometers, such as, Um Ghafa, Mazyed and Remah to as far as 150 kilometers, such as, Al Qha, Al Wagan and Nahel. This large area demands special consideration while planning.

Location plays a key role in determining distribution preference as it is easier to supply schools in the city than 150 kilometers away in a remote village. Another problem associated with distance is the reluctance of suppliers to go to rectify just one fault and their preference to wait for more faults to accumulate to make the travel, in their opinion, worthwhile. This practice leaves the equipment un-operational for longer periods of time. Furthermore, implementing ET in rural areas costs much more and consumes more time than urban, when the costs of

transportation, providing government utility services and availability of spare parts, such as, ink cartridges needed to be stored in the schools, are counted.

The top management, for its part, also prefers cities over rural areas. They consider coordinating, supplying, maintaining and transporting over long distances just another headache. They prefer cities as it is much easier and less bothersome.

City school principals and parents have more influence and better personal relation ships with H.E. Sheikhs and government top management to get a better leverage when asking for ET equipment over their rural counterparts. The rural area principals, on the other hand, just hear "Inshallah" when go and demand their ET requirements and, in some case, even have had to answer questions like, "On whom have you left your school running?" or "Are the schools running by themselves?"

As far as gender is concerned giving preference to males over females can result in unequal distribution of the ET equipment. Females are not considered as important as males when the local social perspective is taken into account. This is due to the patriarchal male dominance in the society usually found in different degrees all over the world. (DeVillar and Faltis, 1991) The top management and decision makers are usually males and city dwellers who naturally show preference for their own gender and location. Cultural considerations, limiting female role only to marriage and house hold activities, completely ignore her most important role regarding child rearing. It is the same woman who will better bring her children up if she is armed with the latest education. On the other hand, a new phenomenon is taking root where it is seen that preference for females is taken to such an extreme that whole balance tilts towards females. More concentration on higher grades than lower also augments the imbalance in ET equipment distribution.

People, who prefer that high schools should have more ET equipment than lower grades, forget that it is these lower grade students who will be attending high schools later. In addition, it is observed that high school students have more distractions and are developing new interests like driving and hanging out with friends, while the students in lower grades are tied to their homes using computers and watching TV which makes them more disposed to using ET. High school education, because of its work load and narrow time frame of three years (grade 9 – 12), leaves little extra time for the students to indulge in activities demanding additional time which results in the possibility of the students' may or may not using the computer. Where as, schools have 12 years to build an interest in computers and other ET related equipment among the lower grades. (Kennedy, 1996)

The contention that, *"ET is not implemented homogenously in Al-Ain schools"*, unfortunately, was seconded by this study's findings. It was found that more city schools were equipped with ET than the village schools. Even

among the city schools it was found the higher grade schools were better taken care of than the lower grade schools, but fortunately, the ET equipment division on gender lines was found to be balanced.

The findings of this study, while backing up our previous contention of judging distribution on three categories, namely, location, grades, and gender, completely dispel the third "gender" category for being responsible for a lack of homogenous ET distribution in Al Ain. It was found that, at least, on gender lines there was a complete balance in ET distribution among Al Ain schools.
The evidence taken from the questionnaires will demonstrate the authenticity of the above discussed hypotheses.

The lack of homogeneity in ET distribution was underlined by the answer to question 1 in part 3, which asked about the availability of technology in respective schools. 63 respondents, almost all of them rural, ticked "not available". It underlines the shortage of ET equipment and supply to the rural areas.

Question 15 and 17 asking about having a computer in each classroom and library received a positive reply from only one third of the total respondents, while question 16, asking whether their schools had one or two labs registered a high of 230 nearly two thirds supported by the female schools.

Question 3 in part six of the questionnaire asking about the "percentage of classrooms hooked to internet", received a shocking reply. Almost half circled "0%" despite the MOE policy clearly stipulating that every school should have internet connection and they do. It shows that despite having the internet connection it is not being utilized properly by having a homogenous distribution.
Question 10 in part six which specifically asked the reasons as to "why some schools have ET and some don't", received only 9 replies out of 330 claiming that the distribution was fair. School administrators and infrastructure, AAEZ and other administration reason were blamed respectively for this improper distribution.

Question 2 part seven asks about the "hardware and software issues facing the schools". One of the replies held "money problem" among others responsible for this situation, one of which is the improper distribution of ET equipment.

Answers to questions 7 and 16 of part seven asking about the opinion of the respondents about "who they consider responsible for ET supply to schools" and "if they are doing their best", showed ADEC and MOE as the ones being held accountable for ET distribution among schools, where as more than two thirds of the respondents believed that the organizations are doing their best. The other third consisting of rural areas and low grade school did not concur with the popular view and answered in negative.

Considering all the facts illustrated above the condition of KG students in rural areas who lie at the lowest rung of the priority ladder can be clearly visualized.

4.3: Findings of the Survey

The research questions that form the basis of the research have been fully discussed previously and the objectives stipulated in chapter 1 will now be exclusively discussed according to the result findings received from the respondents.

In the previous result analysis the intention was to find whether the hypotheses listed in chapter 2 lived up to the expectations or whether the actual results gave a completely new picture. The study found that the people associated with education were aware of the importance of ET in teaching and, in some cases, even had experience of using these devices. But awareness by itself can't buy a single computer for the schools, therefore it is suggested that now is the time for the AAEZ to take advantage of this awareness. As far as reluctance was concerned, it was found that, contrary to previous thinking, there was very little disinclination not to use ET. The over whelming eagerness to use ET underscores how far ET has come in Al Ain and, as stated above, existence of awareness and lack of reluctance provide a golden chance for the AAEZ to capitalize and make ET implementation a successful reality. Distribution of ET equipment among schools revealed that there was an imbalance in computer and ET equipment distribution as far as location and grades were concerned but the encouraging aspect was that no inequality on gender lines was found. There was complete fairness in the distribution of ET equipment among male and female schools.

The focus of this report is to provide, the AAEZ and people who care about education in Al Ain, the results of the data gathered from the respondents.

As a refresher it would be pertinent to remember that the aim of the study, followed by a list of objectives to achieve the same, was stipulated in the first chapter. A number of research questions based on the objectives were designed to make the basis of the conduct of the research and a questionnaire (chapter 3), based on these research questions, was designed and distributed among the respondents. Now, an objective oriented critical analyses of the data collected from the respondents will be discussed.

Investigating the requirement of ET among Al Ain schools the study found that there is a definite requirement of ET in AL Ain schools. No school claimed to have complete ET infrastructure. (Appendix 7 shows pictures from different school) The requirement in ascending order, was PCs with a complete network and software, projectors, printers & photocopiers, laptops, VCRs, internet connections and servers. (Appendix 8 shows computer lab image from some schools) The traditional PC distribution areas were administration, teachers, class rooms,

computer labs and libraries. As far as PC distribution was concerned it was found that more preference was given to the administration followed by the faculty, the labs and the class rooms respectively. Besides the PCs the teachers and the administrators demanded an increase in internet working hours which, according to them, are below the average option of 30% given in the questionnaire.

Training & support, maintenance, time scheduling were other requirements mentioned by the interviewers. Incorporating technology in education is a continuous process comprising supplying, training, maintaining and upgrading. (Hill, 2003) Training was the most in demand requirement after software and hardware but with certain conditions, such as, low cost courses, evening classes, equal opportunity for training and especially proper discretion in choosing courses which add to the quality. Support demand was a varied one, which included, infrastructure support, hierarchical support in providing enough time and space, and peer support. Most complaints were about lack of maintenance and time. The maintenance demand was 2 x 24 x 7 (i.e. the technicians should respond within two hours of the call and be ready twenty four hours a day seven days a week).

(Eric, 1997) says that the students are best stimulated when good resources and suitable environment are available. In addition to the needs enumerated above the requirement for suitable buildings to house ET equipment, procuring of appropriate furniture, providing adequate spacing and hiring qualified teachers were cited by the respondents. As will be taken up while discussing the environment objective, the old schools were found to be incapable of handling ET equipment for a number of reasons. Firstly, the buildings were not designed and lacked extensive wiring. Secondly, the furniture and spacing were not up to the ET requirement and, most importantly noted by the students and the administrators, the paucity of qualified teachers for optimum use of ET equipment and capability for further training.

The fuel for advancing the use of new technology, assistive technology, media, and materials in the education of children and youth can only be achieved if the finances are enough to meet the costs for buying modern computers, high quality educational software, training teachers, and providing affordable internet connections to the schools. (National Research Council, 1999) ET implementation is not an inexpensive proposition. Funding always takes center stage and predictably, it was a major requirement of the interviewers. According to the respondents different resources, such as, Sheikhs, Government, the MOE, ADEC, and the AAEZ should come forward on their own or should be tapped, to get the life giving funding crucial for procuring ET equipment, installation, upgrading, maintenance, etc. A sequential look at the requirement would put the funding at the top of the priority list followed by the need of purchasing crucial hardware and software, then by training and maintenance. All these findings should be considered by a planner confronted with ET implementation. (Stephen D. Sugarman, 2002); (Marguerite and Paul, 1994)

According to the Situated Learning theory developed by (Greeno, Moore and Smith, 1993) learning depends on, and is influenced by, the situation in which the learning takes place. The situation is created by the properties of the learning environment and the characteristics of the learners. The "characteristics of the learners that enable them to engage in activities" (Greeno, Moore and Smith, 1993) are called abilities. The second objective of examining the suitability of the local environment for ET implementation mainly focuses on transforming phases from traditional way of teaching to the modern technology assisted teaching style. This was judged by analyzing the high level of awareness, low reluctance among the local environment, willingness to use on part of the users and top management support.

The level of awareness which was found to be considerably high has been fully discussed in chapter 4, where it was concluded that people in Al Ain, contrary to popular belief, are ready to move from the traditional educational style to an ET driven system.

The belief that reluctance would be high among the schools was pleasantly refuted by the findings. On the contrary it was found that not only the school administration was enthusiastic about ET implementation but the teachers and the students were equally thrilled by this idea. The analysis of ET awareness at schools provided the proof that the first objective requirement was fulfilled as the study found schools to be as enthusiastic and as willing to transform to a technologically aided education system.

The slight gap observed between the reluctant and the enthusiastic ET users, listed in objective three, can be bridged by employing specific training, keeping up a high level of maintenance, by encouragement and motivation on part of the top management and more importantly by allowing free time to the users to participate in using ET equipment.

By overcoming reluctance and capitalizing on the current awareness, enthusiasm and support, effective ET implementation is possible which will work as a springboard to take the local education system, and consequently the UAE, to educational excellence.

The fourth objective of determining an ideal learning environment was analyzed by taking into account chapter 2 and examining both the physical and the relationship environments among Al Ain schools. The schools which were built in the last five years, i.e. newly established modern schools, were found to have adequate air conditioned classrooms, fast connectivity, proper spacing and ducting in addition to other necessities. Old schools, on the other hand, were suffering from over crowding, lack of connectivity, and civil work. Extra funding will be required to overcome the above listed obstacles, to renovate old schools and to make them compatible with the modern ones.

As far as relationship environment, consisting of an adult teacher with a number of students, is concerned it was found to be good. The interaction between the students and the teachers was harmonious and friendly. Teachers took interest in what students were doing and guided them accordingly and the students, on their part, showed respect and regard for their teachers. The relationship between the schools and the parents, which was confined to monthly parent-teacher meetings, was also cemented when the schools opened an account on their web site for individual parents to check their progeny's attendance and grades online. Relationships among all parties, especially in the urban areas, seem to be in harmony with all parties listening and supporting each other. However, schools in the rural areas are experiencing frictions between students on one hand and teachers and administrators on the other which has even resulted in destruction of ET equipment by the students.

Calculating expected costs to achieve objective one, i.e. requirement will be explored in three scenarios taking only un-equipped or ill equipped schools in consideration. The first and the worst scenario is that the intended schools needing funding are old and un-equipped; the second comprises half equipped old or new schools; the third and the best scenario involves new but not equipped schools. This categorizing does not discriminate against grade, gender or location. The researcher believes that KG schools are as important as high schools and should be equipped with PCs, although admittedly, in lesser quantity than high schools. If it is assumed that a typical high school, with 600 students, should have 100 PCs, as is the norm in a well equipped school according to historical data, experience and observation, with 5 PCs devoted to the administrators, 20 for the teachers, 50 for two labs and 25 distributed among the class rooms, it doesn't mean that the lower grades should not have computers, albeit in low numbers, but not be completely deprived of the PCs.

Admittedly, PCs make the core of the whole ET implementation process, but only purchasing and installing PCs does not necessarily implement ET in schools. ET implementation needs other, equally vital, paraphernalia like printers, projectors, internet connections, network, servers, etc all of which add to the cost of ET implementation.

Taking the best scenario of new but un-equipped schools in consideration, the study estimates that the minimum required funding would be AED.1.5 million. The middle case scenario, comprising half equipped old / new schools would, according to the research, need an extra AED. 500,000 to renovate buildings and upgrade old equipment. The last and the most expensive case scenario, involving old and un-equipped schools, would need at least AED.3 million which includes building new classrooms and labs.

Summary

To summarize, it can safely be declared that the study has investigated all the research questions with an analytical study of the hypotheses leading to meeting its objectives. This will contribute in giving the decision makers in Al Ain Education Zone a comprehensive blueprint to further develop and assess the process of

integrating traditional education with Educational Technology. A set of recommendation, the sixth and the last objective, will be listed in the next chapter.

Chapter 5: Recommendation and Conclusion

5.1: Recommendation

"In today's world, it isn't *what* you know but rather what you *can* know – and how fast you can know something new. Technology is a non-negotiable tool in the process and a competitive advantage in terms of the speed at which we access that which is new." (Marshal, 2002). This saying by Marshall should be the goal for the AAEZ to achieve for better ET implementation.

The study suggests that a cohesive plan – blue print – should be formulated by inviting planners from the government (Abu Dhabi local government, MOE, ADEC) and schools to join hands and come up with a mutually satisfactory comprehensive planning blueprint. This blue print will not only provide essential ET implementation guidance to new schools but will also facilitate them in devising their own plans.

An obligatory minimum computer requirement for each school should be standard and could easily be met by having a state of the art computer lab equaling the average number of students per classes. This distribution does not essentially need to be equal as schools differ in sizes and the numbers of pupils but this step will greatly assist in bringing homogeneity to the number of PCs in different schools. The use of these labs should be made mandatory and shared fairly among teachers and classes with school principals keeping an eye on their proper use.

The AAEZ, especially its IT section, and the school principals should be held responsible for impropriety in ET equipment maintenance. If a school doesn't have appropriately trained staff or the ET equipment is not maintained suitably, responsible people should be asked and, if found guilty of negligence, appropriately penalized. A blue print for ET equipment utilization and preservation should be designed by the AAEZ or any relevant government organization to guide schools on proper use and maintenance of ET equipment. An all-inclusive blue print will not only help in keeping the expensive equipment in operational order but will also bring uniformity to ET's use among all the schools.

Furthermore, areas should be divided among master technicians entrusted with the task of looking after ET equipment of multiple schools. The responsibility of managing these technicians should be put on the shoulders of the school principals and the IT section managers of the AAEZ with active communication between them to

preempt any misunderstanding as well as for maintaining better control. Al Ain has 144 schools and the study ascertains that 4 technicians – 2 males and 2 females – can easily maintain all the ET equipment housed among these schools with an average salary cost, as has already been applied in Qatar, for the locals AED 40,000, and for the expatriates AED 12,000 per month.

A strong policy on part of the AAEZ should be implemented to manage suppliers by binding them to signed contracts specifying their site duties. Suppliers should be compelled to abide by the terms of these contracts leaving all personal relations aside. Only those suppliers should be selected who enjoy a good reputation, have proper maintenance engineers and maintain an office in Al Ain. Not only should their services be annually measured and rewarded, but in case of any unauthorized manipulation, stringent punitive action should also be taken against the offenders. These penalizing actions should be executed in an ascending order, starting with monetary penalties to taking them to the court. Contracts obligating companies to fulfill their after sales pledges can go a long way in keeping the equipment safe and ready for use.

The AAEZ should also monitor, supervise, and give tasks to schools to use ET. Any improper use by the users (students, teachers, others) should be covered by a penalty policy which ought to be applied equally to all school members. The use of computers, for example, should be scheduled for a maximum and minimum time period and the schedule should be monitored so that it is not monopolized by a single individual or a group. This practice will also deter any overzealous principal to over react or abuse his authority.

More concentration should be focused on rural areas. These remote and far-flung areas should get more support than the city schools because of obstructions they face in ET procurement, maintenance and supplies due to long distances involved. Parents of rural students should be encouraged to buy PCs with internet connections at home.

Unlike the usual practice of starting something with a bang and then letting it die with a whimper, ET awareness programs among schools should be conducted on a regular and continuous basis to keep it alive. Seminars on ET's benefits, awards to high achievers, competitions among schools and students to conduct research should also be encouraged. Awards should be given to high achievers – whether students or teachers – to encouraging them to put extra effort. All these efforts will bring the longevity needed to make ET a permanent feature in the edification process.

When procuring ET equipment priority should not be given to the cheapest solution as it is not always the best. Quality procedures, at par with global standards, should be followed in obtaining the best ET equipment. Government allocated ET budget should not be wasted to meet obligations and the original ET plan be strictly abided by. Besides government grants, schools should themselves start finding ways to raise funds to meet any eventualities.

Project management methods and techniques should be applied to overcome any resistance, such as, the Hygiene and motivation theory by Fredrick Herzberg which emphasizes hygiene and organizational environment at schools and that teachers should be trained into their jobs in order to develop intrinsic motivation to overcome resistance. The five goals of Hierarchy of needs, stipulated by Abraham Maslow, should also be applied in management-teacher relationship by implementing a school management reward system. Acceptance of ET can only grow if resistance to its use is countered with campaigns publicizing the positives.

School infrastructure, from the construction of the classrooms to lab designs, should be completely overhauled. The study suggests that in designing new schools IT experts with a background in networking should be included to help in designing an ET friendly infrastructure. With their knowledge they can guide, for example, in selecting the server room, IDFs, wiring, ducting & connections, etc.

Fully equipped “computer lab caravan” should be introduced in schools experiencing difficulty in constructing labs either due to space deficiency, or civil work/ connectivity hindrances. This will not be very expensive as the "computer lab caravan" can be indigenously built. Laptop trolleys can also be used to bring PCs in the class rooms as had been used in Abu Dhabi Educational Zone with great success where the laptop trolleys were supplied by Emitac.

Existing AAEZ practice of establishing training centers should be continued. People should be encouraged to join these centers by allowing free courses or mandatory low cost courses. Education experts from all over the world should be brought here to give lectures to AAEZ staff. The fact that ET equipment can only be effectively used by trained and experienced personnel makes training imperative for the current untrained employees. A minimum of two annual courses should be allocated to each employee.

Current hiring procedure, requiring a computer driving license from candidates applying for jobs in the education field, should also be continued. This employment practice should not only be carried on, but also be supplemented with a regular training program. Interviewers having an IT background should be part of the recruitment committee. It is further suggested that part of the interview should involve a power point lecture.

For employees, not comfortable or reluctant in using ET, mandatory training classes should be arranged with a notification that any lack of improvement can result in dismissal. The MOE or ADEC should arrange visits to developed countries taking the actual users – teachers, students, school principles – instead of top officials. People who are not able to report back or give an open lecture should be kept at home.

The phenomenon of starting new policies or ideas from scratch, with out taking into consideration the work done by their predecessors, by newly appointed school principals or AAEZ directors should be discouraged. This behavior should be strongly condemned as it leads to confusion and indifference among subordinates. These incoming officials, by starting afresh and not benefiting from the work of their predecessors, are not only hampering their own progress but also the whole department's.

A recommended solution for supplying Schools with ET Equipments was shown in Appendix 9.

5.2: Future Advance Research

The results of this study open the door for further investigation and the Author wishes to encourage others to join in the search for an instrument to measure ET integration and its efficacy. It may be worthwhile to conduct similar research in all educational zones in the UAE to have a broader perspective of the extent of influence of Educational Technology on a country wide scale.

The scope of the research may be broadened by including more schools and increasing the number of interviewees which might lead to a whole set of new recommendations for better implementation of ET in the UAE schools.

During the survey it was discovered that the MOE and ADEC were held accountable for many of the perceived deficiencies by the respondents. Since the MOE and the ADEC were not included in this research it would be a good idea to include them in any future research to get their input and have a balanced analysis of the situation.

Putting the recommendations into action in the real world will let future researchers evaluate the suggestions' applicability and analyze their far reaching effects.

5.3: Research Limitation

One of the biggest limitations of the study was that a major portion of the useful research regarding Al Ain was done in Arabic which needed to be translated very carefully, a tedious and time consuming operation. Majority of the respondents approached were not familiar with English therefore all the questionnaires had to be translated from English to Arabic and care had to be maintained that the translation did not result in any significant change in the meaning of the questions. After the collection, all the data had to be carefully translated back to English and recorded. The care employed while translating questions, had to be observed in translating the Arabic

answers into English as well. This back and forth translation phase was the biggest hurdle which had to be crossed carefully and required a lot of time and effort from the researcher.

Another limitation was a scarcity of research on the subject matter (specifically Al Ain) in Arabic and in English. What ever research had been done was kept in the MOE library in Dubai and, since taking the hard copy out of the library was not permitted, one literally had to do the research in the library. The lack of relevant research literature and difficulty in accessing the extremely limited material exceptionally restricted any secondary research on the researcher's part and, at the same time, made primary research gathering more crucial and important. On the other hand, information gained from scrutinizing overseas research and studies was very valuable.

Taking AAEZ's approval on distributing questionnaires among the respondents in different schools was another issue which acted as a limitation. A list of the schools had to be submitted to the AAEZ and one had to wait for their approval letter. The letter had to be shown to the schools before seeking the schools' approval. The process, although understandable, was time consuming.

Finally, the late response time from the respondents really delayed the whole data gathering and analysis process. People, parents, other partners, or the AAEZ officials, were found busy in meetings, other engagements and sometimes were simply not present at the agreed time of the distribution or data gathering. The research explanation had to be repeated and respondents had to be constantly reminded for data collection.

Another limitation was limited the scope of the research area. Even though the research area covers the scope of the present research still it was not broad as the study was limited to a specific area, i.e. Al Ain.

Deciphering hand writing became an obstacle as many of the information seeking questions required detailed answers. While analyzing the interview, questionnaires, and observation, it sometimes became quite difficult to work out what the respondents had written. As no answer could be neglected, interpreting the real meaning became a time consuming job. Even researcher's own note sometimes became illegible due to the speed of the speakers and the need to translate at the same time which eventually led to the use of a hand held tape recorder.

There was great variance in the way respondents replied to the questions. Some were not forthright and very diplomatic which somewhat muddled the meaning of their replies. Others were found to be quite pessimistic and too focused on a negative view; while some (private schools) in their optimistic enthusiasm exaggerated the actual number of ET equipment and in certain cases avoided telling the truth which was evident from the great variance found in their replies.

Cultural background also affected some of the replies of the respondents, such as, the difficulty in accessing and interviewing females and the tendency of the UAE locals to avoid criticism, which might have had some bearing on their answers.

The difficulty in getting past statistical information regarding the number of ET equipment in the AAEZ during the study should not have happened. Any researcher has the right to access information, which is not confidential, for his research. All past research should be accessible on-line for the future researchers to benefit from.

5.4: Conclusion

Every school has the right and the capability to benefit from the full range of educational advantages that flow from the effective use of technology with strategic planning, adequate funding and clear aims. (Brush, 1998); (Byrom, 1998)

After going through an extensive Educational Technology Literature Review about ET's influence and conducting the survey to ascertain how far ET has been integrated in our educational system and what needs to be done it was felt that ET integration had a bright future in Al Ain. Despite the presence of some obstacles and a little resistance, it was observed that the number of ET equipment was fair. Although it was observed that awareness about the importance of ET in Al Ain, especially among people related to education, was wide spread but it was also noted that more constructive practical steps need to be taken for a smooth and all encompassing ET integration.

The aim of this study, to understand and analyze the extent of ET awareness among AAEZ staff and any obstacles standing in ET's proper implementation, was accomplished. Given the findings reported in this study, it can be argued that ET implementation in Al Ain has grown out of its teething phase and, with proper guidance and care, has the potential to grow into a strong and able bodied adult.

The study findings brought forth the ET planning challenges facing schools and the potential schools have for successful implementation as they further their efforts to infuse technology into learning and teaching. While examined by multiple techniques and within varied contexts, ET implementation was shown to be effective when supported by school administration and teachers. Better results were achieved when schools focused on buying the ET equipment according to their needs and their capabilities. ET implementation plans were shown to be less effective when confronted by high level of resistance.

The distinguishing feature of this research, in addition to its novelty and opening new research avenues, is its focus on a small area – Al Ain. The limitation of the research location was a plus point and it added to its advantage as it allowed better focus, improved understanding and enhanced analysis of the problem. The study can easily be a guide or taken as a model for further research for any city within the GCC regarding ET implementation.

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