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CONTENTS.....	i
FROM EDITORS.....	iii
FOREWORD.....	viii
ARTICLES.....	1-141
THE EFFECTS OF MNEMONIC KEY WORD METHOD ON SCIENCE LESSONS: ACCESS AND ATTITUDE OF STUDENTS.....	1
Güngör KESKİNKILIÇ, Ali Murat SÜNBÜL, TURKEY	
MATHEMATICAL MODEL FOR THE ANALYSIS OF EXPERT ASSESSMENTS IN EDUCATION.....	9
Sharif E. GUSEYNOV, Alexander V. BEREZHNOY, LATVIA	
IMPLEMENTATION OF DESIGN-BASED RESEARCH METHODOLOGY INTO SCIENCE TEACHERS' TRAINING.....	19
Josef TRNA, Eva TRNOVA, CZECH REPUBLIC	
PROBLEM SOLVING IN ELEMENTARY MATHEMATICS CURRICULUM.....	29
Yaşar BAYKUL, Ersen YAZICI, TURKEY	
ANALYSIS OF STUDENTS' SCHOOL RESULTS AND PERFORMANCE IN ENGINEERING PROGRAMS – A CASE STUDY.....	38
Ahmed IMRAN, Mohamed NASOR, Fahar G. HAYATI, UNITED ARAB EMIRATES	
THE INFLUENCE OF PEER AND SELF-ASSESSMENT ON LEARNING AND METACOGNITIVE KNOWLEDGE: CONSEQUENTIAL VALIDITY	44
İrfan YURDABAKAN, Müge OLGUN, TURKEY	
READING ASSESSMENT TECHNIQUES AMONG SELECTED SECONDARY SCHOOL TEACHERS IN PAKISTAN: CURRENT TRENDS AND PRACTICES.....	58
Imran KHAN, MALAYSIA	
DISCIPLINE VERSUS PUNISHMENT: WHICH WAY FOR EDUCATORS IN SOUTH AFRICAN SCHOOLS?.....	76
Cosmas MAPHOSA, REPUBLIC OF SOUTH AFRICA	
THE INVESTIGATION OF PARENTS' ATTITUDE TOWARD INCLUSIVE EDUCATION FOR SLOW LEARNERS.....	88
Ali Akbar ARJMANDNIA, Keivan KAKABARAEI, IRAN	
ROLE AND FUNCTION OF META COMMUNICATION CONCEPT AS NONVERBAL COMMUNICATION IN TEACHING EFL	96
Ilknur ISTIFCI, Ugur DEMIRAY, TURKEY	
JOB SATISFACTION OF TECHNOLOGY AND DESIGN EDUCATION TEACHERS IN TURKEY (ANKARA CASE).....	112
Zeki KAYA, H. Guclu YAVUZCAN, Mahmut IZCILER, Serap TUFEKCI ASLIM, TURKEY	



A STUDY OF LEARNING-THINKING STYLE OF SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT	115
Parveen SHARMA, Neetu, INDIA	
TEACHER DEVELOPMENT THROUGH OPEN AND DISTANCE LEARNING: THE CASE FOR ZIMBABWE.....	124
Caleb KANGAI, Richard BUKALIYA, ZIMBABWE	

Dear IJONTE Readers,

IJONTE appears on your screen now as Volume 2, Number: 4. In this issue it publishes 13 articles. And this time, 27 authors from 9 different countries are placed. These are Czech Republic, India, Iran, Latvia, Malaysia, Republic of South Africa, Turkey, United Arab Emirates and Zimbabwe.

The first article is from TURKEY on "THE EFFECTS OF MNEMONIC KEY WORD METHOD ON SCIENCE LESSONS: ACCESS AND ATTITUDE OF STUDENTS" written by Güngör KESKİNKILIÇ and Ali Murat SÜNBÜL from Selcuk University, Education Faculty, Konya. The aim of this research is to define the affect of Keyword Mnemonics in 6th class Science Lesson on the students' achievements and their attitudes. Treatment started with the application of achievement and attitude pretests for the experiment and control groups. Afterwards, while keyword mnemonics were used for the experiment groups, traditional method was used for the control groups during the courses. At the end of the courses the achievement and attitude post test was applied to each group. At the end of the research it is seen that the students who were trained by using the key word mnemonics had higher achievements than the ones trained by using the traditional method. A significant difference was not found between the control group and the experiment group in terms of attitude points.

The second article is on "MATHEMATICAL MODEL FOR THE ANALYSIS OF EXPERT ASSESSMENTS IN EDUCATION" written by Sharif E. GUSEYNOV and Alexander V. BEREZHNOY again from University of Liepaja, Riga, LATVIA. In this article we develop and study mathematical model for the analysis of the educational numerical expert evaluations that characterize both the educational and psychological levels of student training (scholars and/or students) required in order to continue their further studies successfully. To solve the constructed mathematical model an iterative algorithm is developed. Besides, it is proved that algorithm convergence as well as its convergence rate is determined. A numerical experiment illustrating how an iterative algorithm function is implemented was conducted. The obtained results show that by means of using the developed model as well as algorithm required for finding its solution there could be ranked both the true ratings of students based on the overall expert evaluations and the experts themselves in two ways – using the levels of "objectivity" and "coherence".

The third article is from CZECH REPUBLIC. It is on "IMPLEMENTATION OF DESIGN-BASED RESEARCH METHODOLOGY INTO SCIENCE TEACHERS' TRAINING", conducted by Josef TRNA and Eva TRNOVA from Masaryk University, Brno. Teachers need research-based innovative educational methods for the upgrading of their teaching. The motivation of students and teachers in science education is the core of up to date teaching/learning. A very urgent task for educational research is to find appropriate educational methods and tools which have to be implemented into teachers' training and then in teaching/learning science. Design-based research is a new trend in educational research. The used methodology can be described as a cycle: analysis of a practical problem, development of solutions, iterative testing of solutions, reflection and implementation. This methodology was implemented into pre-service and in-service science teachers' training. An action research, which is close to the design-based research methodology, was presented to teachers for their development of teaching. We present the research outcomes of the implementation of the design-based research methodology into pre-service primary science teachers' training. Used teaching content is a hands-on experimentation with everyday objects.

The fourth article which is entitled as “PROBLEM SOLVING IN ELEMENTARY MATHEMATICS CURRICULUM” written by Yaşar BAYKUL from Antalya, TURKEY, Ersen YAZICI from Selçuk University, Education Faculty, Konya, TURKEY. The aim of this study is to investigate the effects of Year 6 Elementary Mathematics Curriculum on problem solving. The study had an experimental design and consisted of a total of 120 students in experimental (60) and control (60) groups. The results of students’ problem solving performances indicated some prominent findings. First of all, students in the experimental group were more successful at problem solving than the control group students. Second, although neither group achieved a satisfactory success level (≤ 0.75), the results of students in the experimental group were more homogeneous. Similar results were observed in problem solving stages as well. For all steps of problem solving (understanding the problem, devising a plan, carrying out the plan and looking back at work), the success rates of the students in the experimental group were higher than that of the students in the control group. These results suggested that instead of teaching problem solving as a separate subject, it should be taught as a process interwoven into the whole mathematics instruction where all themes include problem solving activities. Therefore, students’ problem solving skills can be improved. Furthermore, there was evidence that the students’ ability to use problem solving strategies was enhanced in this way.

The fifth article which is entitled as “ANALYSIS OF STUDENTS’ SCHOOL RESULTS AND PERFORMANCE IN ENGINEERING PROGRAMS – A CASE STUDY” written by Ahmed IMRAN, Mohamed NASOR and Fahar G. HAYATI again from Ajman University of Science and Technology, Ajman, UNITED ARAB EMIRATES. Retention and performance of students in engineering programs has been a topic of concern globally. Various factors involved need to be investigated and understood. The present case study analyzes relationship between students’ school results and their performance in engineering programs. Statistical data from three campuses of Ajman University of Science and Technology, UAE, were used for 3 undergraduate engineering programs. Data for 661 students, with a minimum school score of 70%, enrolled over ten years were investigated. From the students group with ‘high’ performance in school, 53%, 46% and 1% performed ‘high’, ‘medium’ and ‘low’ in their programs, respectively. From students near ‘minimum’ score in school, 6%, 87% and 7% performed ‘high’, ‘medium’ and ‘low’ in their programs, respectively. The analysis suggests that students with relatively ‘high’ scores in school may not maintain their performance in engineering programs, while students with relatively ‘low’ scores in school could improve significantly. Further investigations are recommended.

The sixth article arrived from TURKEY, which is prepared on “THE INFLUENCE OF PEER AND SELF-ASSESSMENT ON LEARNING AND METACOGNITIVE KNOWLEDGE: CONSEQUENTIAL VALIDITY” written by İrfan YURDABAKAN from Dokuz Eylül University, Faculty of Education, İzmir. Müge OLGUN from İşıkkent Education Campus, İzmir. The validity of peer and self-assessment is discussed under the title consequential validity. One of the important reasons is the conception of what influence the peer and self-assessment practices in group works would have on learning and metacognitive knowledge levels of students. This study aims to identify the influence of peer and self-assessment methods used during group work studies on students’ learning and metacognitive knowledge levels. For treatment-control group, pre-post test design was used in this research. The results of the study revealed that learning and metacognitive knowledge levels in the treatment group were higher than those in the control group.

The seventh article came from University Sains Malaysia, School of Languages, Pulau Penang, MALAYSIA. Article is titled as “READING ASSESSMENT TECHNIQUES AMONG SELECTED SECONDARY SCHOOL TEACHERS IN PAKISTAN: CURRENT TRENDS AND PRACTICES”, written by Imran KHAN. The paper discusses and reports the reading assessment practices of secondary school teachers to ascertain EFL/ESL learners’ English reading performance at the secondary school level in Pakistan. This exploratory study was designed primarily to examine what specific reading assessment technique is preferred and brought into practice by secondary school teachers in an assessment of grade 10 students’ reading comprehension. Keeping in view the aforesaid

issue, the study was conducted in one urban district of Pakistan's densely populated city Karachi. To do so, samples were gathered from three different groups of teachers as private boys, girls, and co-educational schools. In this exploratory study, (N =120) teachers had participated who were affiliated from different private non-elitist schools. The survey instrument was developed based on the suggested methods and assessment techniques for reading comprehension by Alderson (2000). The results yielded from data were analyzed and reported through mean, rank order and percentage study. The primary findings revealed and indicated that 'multiple-choice' is considered at the top and most generally practiced followed by 'short-answer', 'close-ended', and 'subjective method' of reading assessment techniques among secondary school teachers.

The eighth article arrived again from REPUBLIC OF SOUTH AFRICA and was written on "DISCIPLINE VERSUS PUNISHMENT: WHICH WAY FOR EDUCATORS IN SOUTH AFRICAN SCHOOLS?" by Cosmas MAPHOSA in University of KwaZulu Natal, Durban. The study is part of a larger study on the management of learner indiscipline in schools. The study sought to establish educators' insights on the disciplinary measures used to deal with minor and major forms of indiscipline in selected South African schools. Available literature points to the realization that educators use mostly punitive disciplinary measures to deal with learner indiscipline in schools. There was a need to establish the situation on the ground. The study was a descriptive survey that utilised a combination of quantitative and qualitative approaches. It looked into insights of 125 educators selected from 15 independent schools in one educational district in the Eastern Cape Province of South Africa. Data were collected mainly thorough a semi-structured questionnaire administered on educators as well as interviews. The SPSS version 17 software was used to analyse quantitative data while content analysis was used to analyse qualitative data. It emerged from the study that that from the educators' point of view educators mostly employed punitive disciplinary measures when dealing with both minor and major forms of indiscipline. The study concludes that educators still viewed disciplining learners as synonymous to punishing them. The study recommends the establishment of staff development workshops to equip educators with skills to embrace supportive, proactive and cooperative disciplinary measures when dealing with learner indiscipline.

Article nine is on "THE INVESTIGATION OF PARENTS' ATTITUDE TOWARD INCLUSIVE EDUCATION FOR SLOW LEARNERS" which is written by Ali Akbar ARJMANDNIA, University of Tehran, Tehran and Keivan KAKABARAEI, Islamic Azad University of Kermanshah, Kermanshah, IRAN. The purpose of this research was to investigate the effective factors on attitude of parents that have slow learning children in regular schools toward educational integration. 204 available parents in Arak were used (all of parents that have slow learning child). In this correlational research, questionnaire of assessing attitude was prepared by researchers. Researchers used the statistical parameters such as regression analysis for analyzing data. Results showed that the attitude of the parents was positive toward educational integration. The relation between parents' attitude and their age, the number of children's friends, and their academic grade was significant. Parents were dissatisfied with poor facilities in classrooms and school size. They approve teachers' supportive and sympatric relation with their children. So regression analysis showed that relation of other variables with parents' attitude was not significant. The other results are presented in the article.

The tenth article is titled as "ROLE AND FUNCTION OF META COMMUNICATION CONCEPT AS NONVERBAL COMMUNICATION IN TEACHING EFL" from TURKEY and was written Ilknur ISTIFCI and Ugur DEMIRAY, Anadolu University, Eskisehir. This paper examines and focuses on some issues and questions related to effective use of meta communication concept as nonverbal communication in teaching English as a foreign language by giving some language tips on how to teach meta-communicative items in the foreign language class. "Meta Communication" is the process between message designers when they are talking about the learning process, as distinguished from their articulation of the "substantive" learning, itself. Like verbal communication, nonverbal communication exists in a context, and that context determines to a large extent the meanings of any nonverbal behaviors. The same nonverbal behavior may have a totally different meaning when it occurs in another context. It is also important to mention culture in teaching meta-communication as the nonverbal behaviors are generally culture specific. Thus, there can be misunderstandings in communication. It is essential to remember that the meta-

communication which accompanies any message is very powerful. The receiver will use these clues to help them to interpret what you mean, but more importantly they will often take the meaning from the meta-communication rather than from the words themselves, particularly when what you are saying conflicts with what you are doing. Hence, understanding or interpreting nonverbal messages accurately is especially important for second/foreign language (L2) learners whose comprehension skill is more limited. Thus, this paper aims to demonstrate authentic uses of meta-communication by showing some visual and written materials to be used in class to increase students' awareness of the target language.

The eleventh article is titled as "JOB SATISFACTION OF TECHNOLOGY AND DESIGN EDUCATION TEACHERS IN TURKEY (ANKARA CASE)" from TURKEY and was written Zeki KAYA, H. Güçlü YAVUZCAN, Mahmut İZCİLER and Serap TUFEKÇİ ASLIM, Gazi University, Ankara. This paper studies whether job satisfaction levels of technology and design teachers will have an influence on both the organizational success and societal development. The basic aims of the study are to identify the job satisfaction levels of technology and design teachers in primary schools in Ankara and to suggest ways to improve job satisfaction. The study is a descriptive research. Job satisfaction measurement tool was administered to eighty one technology and design teachers. Technology and design teachers are found to have least job satisfaction score in regard to their profession. Attempts to improve job satisfaction may focus on the dimension of job itself. "Regarded as important and being respected" may contribute to satisfaction.

Article twelve arrived from INDIA. The subject of the article is "A STUDY OF LEARNING-THINKING STYLE OF SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT" and written by Parveen SHARMA from Hindu College of Education, Haryana and Neetu from Lt.M.S. College of Education HR. The styles depend upon cerebral dominance of an individual in retaining and processing different modes of information in his own style of learning and thinking. This study attempted to find out the relationship and significance of difference between academic achievement and learning-thinking style of secondary school students. The study was delimited to class Xth students only. The purpose of present study was to see whether there is a relationship between academic achievement and learning-thinking style of secondary school students or not. Normative Survey method was applied for conduction of the study. The population for the research includes students of secondary class of different areas. Mean and Pearson's Product Moment Correlation ('r') are the statistical technique which helped in the analysis and interpretation of the result. The collected data was analysed and interpreted on the basis of hypothesis. It has been found that learning-thinking style and academic achievement of secondary school students are positively and significantly related to each other. Students having high academic achievement are better for teaching. It can be said that academic achievement is a factor which influence the learning-thinking style of secondary school students. It can also be concluded that male and female secondary school students are not different in respect to their academic achievement whereas they are different in respect to their learning-thinking style.

The last article is from ZIMBABWE . It is entitled as "TEACHER DEVELOPMENT THROUGH OPEN AND DISTANCE LEARNING: THE CASE FOR ZIMBABWE" and written by Caleb KANGAI and Richard BUKALIYA from Zimbabwe Open University, Marondera. This article that is a case study of distance teacher education at the Zimbabwe Open University, is part of an ongoing longitudinal study the two researchers are undertaking at the Zimbabwe Open University (ZOU) concerning issues of quality and effectiveness in open and distance learning (ODL). The article argues that distance teacher education has the potential to solve the current and future problems of teacher shortage in Zimbabwe and elsewhere. Data for the present study were collected over a period of two years through personal experience, participatory methods, observations, document analysis, informal discussions and illuminative methods.



On the basis of the present findings, effective distance education programmes would require the adoption of the following key strategies:

- Winning government support for distance teacher education,
- Setting up a directorate for the coordination of distance teacher education,
- Adoption of the partnership model in the training of teachers.

Cordially,

Editors

Prof. Dr. Zeki KAYA, Gazi University, Ankara, TURKEY

Prof. Dr. Ugur DEMIRAY, Anadolu University, Eskisehir, TURKEY.

Foreword

Globalization is consolidated by the extraordinary invasion of education and learning by new technologies, especially the Internet. The development of communication and information technologies makes it possible for distance teaching institutions to strengthen their position in the educational landscape. But learning in the 21st century also requires new skills on how to learn and how to assess learning with the new tools. New technologies also pave the way for lifelong education for all and at the same time are challenging the traditional universities and schools.

This issue of the International Journal on *New Trends in Education and Their Implications* is an impressive collection of scholarly articles from many countries and cultures which show convincing interest in information technologies in education. The contributions range from assessment to communication problems. Communication skills and competence remain basic in the emerging information and knowledge society. The articles of this issue even examine the issues related to effective use of meta communication concept as nonverbal communication.

The philosophy of e-learning focuses on the individual learner although it recognizes that most learning is social. In the past training has organized itself much for the convenience and needs of instructors, institutions, and bureaucracies. Now e Learning is the convergence of learning and networks, the Internet. New university systems are being developed for new global needs and different scenarios for the school classrooms of the future are being developed.

One scenario for the future classroom is that there will not be radical changes in the next 10 years. The philosophy of knowledge transfer continues and schools remain teacher centric with testing at fixed periods. However, this scenario is challenged by two new perspectives.

The second scenario is that information technologies and virtual learning environments will bring big changes to schools and other educational institutions. The current economic and financial situation encourages administrators to look for more economic means for organizing effective education. This philosophy emphasizes getting the facts straight and virtual education. It is learner centric rather than teacher centric, and implies continuous testing and assessment. In essence, this approach might turn out to be too technocratic and undervalues human and civilization dimensions in education.

Therefore, the third scenario recognizes that the 21st century requires radically new skills but also communication competences. The philosophy is learning how to learn. New technologies are applied with real-life learning with virtual assistance but human and cultural values are emphasized. Testing may require personal judgement from outsiders.

The new literacies can be approached as functional literacy in the same way as traditional reading, writing and calculating. The new abilities are believed to have a strong correlation with the traditional ones but in fact seem to do so much less than expected. The evaluation tools are quite advanced in assessment of access and information literacy competence standards, for example. But the assessment of media and digital literacy still requires a lot of research work.

The use of ICT and digital skills in performing art, craft, and other fields require a team work with special skills. The trend of digitalization does not mean that everything traditional should be rejected. New communicative inventions have also destroyed something valuable, and special attention should be given to the diversity of approaches in the information technologies applications. A blended approach is often adopted. Most essential

in this new learning environment is the fact that the learner is constantly facing epistemic conflicts when a problem is presented that needs to be solved but lies outside the learner's current repertoire. Most of the problems of the information society will be of that kind. The learner needs to proceed with self-regulation with an active engagement, which is the learner's response to the conflict. The idea is to adjust and reconstruct thinking to deal with the learning problem at hand.

The cultural dimension in the information technologies applications also brings the dimension of feelings and the spirit of sharing and caring to the process. The social dimension requires inclusive policies. In an intercultural world, communication necessarily mediates different values and cultural behaviors. Great civilizations and cultures have very different patterns of communication and use different senses in a different way. In consequence, if a truly global information society is to be created, more attention should be given to the diversity of cultures and the co-existence of different civilizations and cultures

This journal brings excellent contributions from different countries and great civilizations. In general, the study of complexity has brought science closer than ever to art. Knowledge has gone through a cycle from nonspecialism to specialism and is now moving back to interdisciplinarity, even transdisciplinarity. Art deals with the sensual world (media as the extension of senses) and the holistic concept of human being.

Especially in the vocational field, knowledge is also contextual and needs to be created in application – learning by doing. This also reflects local and regional realities. The Western philosophy is characterized by analytical, scientific, objective, rational, and critical thinking while the Eastern approach is characterized by synthesis, literature and art with a subjective and emotional thinking. One cannot and should not dominate the other.

People of the work force face two overlapping challenges. The first is to acquire the skills necessary to enter an increasingly digital job market, and the second is to continually improve those skills, and learn new ones, as life-long learning. Many studies suggest that workers around the world may not be keeping pace. It is widely believed that schools are failing to sustain the pipeline of employees who are adequately prepared to exploit new knowledge and skills.

The challenge now in the 21st century is to bring together scientists, public authorities, businesses, academics, civil society organizations and other interested groups and stakeholders to understand challenges for sustainable education and cultural literacy in the global context; identify the potential of information technologies to advance and improve education; share knowledge and best practices about successful policies in global education; create venues of collaboration; and consolidate responsible communities for multiliteracies.

This issue contributes to these goals and raises several issues for further discussion.



Professor Tapio Varis brings unique expertise in e-learning solutions. He is the Chair of Professional Education, with an emphasis on global learning environments, at the Research Centre for Vocational Education, University of Tampere, Finland, and the UNESCO Chair in Global E-Learning. He is a Principal Research Associate at UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, and a member of the Governing Board of the UNESCO Institute for Information Technologies in Education, the European Commission Media Literacy Expert Group, and the Digital Literacy Expert Group. He is also the acting President of Global University System (GUS) and a Media Scholar at the Universities of Helsinki and Lapland as well as the University of Art and Design in Helsinki. He is media education expert of the Finnish Board of Film



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THE EFFECTS OF MNEMONIC KEY WORD METHOD ON SCIENCE LESSONS: ACCESS AND ATTITUDE OF STUDENTS

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ABSTRACT

The aim of this research is to define the affect of Keyword Mnemonics in 6th class Science Lesson on the students' achievements and their attitudes. Treatment started with the application of achievement and attitude pretests for the experiment and control groups. Afterwards, while keyword mnemonics were used for the experiment groups, traditional method was used for the control groups during the courses. At the end of the courses the achievement and attitude post test was applied to each group.

At the end of the research it is seen that the students who were trained by using the key word mnemonics had higher achievements than the ones trained by using the traditional method. A significant difference was not found between the control group and the experiment group in terms of attitude points.

Keywords: Science education, mnemonics, keyword method.

INTRODUCTION

Mnemonic strategies are tools that facilitate learning and remembering a lot of information difficult to remember. In order to make this education permanently memorable, use of strategies that consist of memory supportives in the learning process are suggested (Ormrod, 1990; Fulk 2000; Scruggs ve Mastropieri, 2000). Mastropieri and Scruggs (1998), have stated that techniques like concentration, keeping notes, increasing the significance level, using pictures, preventing mixing, increasing the participation, enabling students to think and comment on the subject, increasing the number of repetition can also be helpful to store the information but they do not particularly aim at students to remember new information that they often fail to remember and learn. In this respect mnemonic strategies can be useful in learning new and unusual information.

Mnemonic strategies first of all provide the placement of the material to be learned into a structure or organization of this material. Secondly, they help the students to develop connection between their former knowledge and the new information they get and the third theme is that they furnish criteria for information storage and retrieval of memory supplements in order to provide necessary clues for students to remember the information later on (Ormrod, 1990). Mnemonic strategies are divided into two parts as visual and verbal. Verbal memory supplements are about adjusting initials and creating rhymes but visual memory supplements are used with visual images like placement method, chaining method, word method of suspension and key word method (Senemoğlu, 1997).

Key word method is a mnemonic strategy that operates with using a visual material defining the meaning of the information to be learned and using a word connoting this information.

For example: “Perfumes of the stars are reaching to the ozone layer” can be a tool sentence when working on the plot “stratosphere contains a layer called the ozone layer”. Here the key word is “star” to remember the word stratosphere.

Açıkgöz (1984) states that key word method had been used in foreign vocabulary learning and it was observed that there was a hundred percent increase in remembering the foreign words. In another research of Hogben and Lawson (1998) it was confirmed that the key word method had positive results in short-term and long-term remembrance. Similarly Doğan (1995) validated the significant impacts of the key word method in his research of the utility ratio of this method in simultaneous translation of medicine education. Ellis (1998) used this method in teaching new terms, important names, places and events and determined that the method had positive effects for all students especially the students with learning disability.

Mnemonic strategies had been used in various branches and in teaching disparate information proving their efficacy in the result of many studies. In these studies you can see different usages of different mnemonic techniques (Carlson, Kincaid, Lance and Hodgson, 1976; Carlson, Buskist and Martin, 2000; Carney and Levin, 2000; Franke, Levin and Carney 1991; Dretzke and Levin, 1990; Olçum, 2000; Rummel, Levin and Woodward, 2003; Carney and Levin, 2003; Stephens and Dwyer, 1997; Carney, Levin and Stackhouse, 1997; Uberti, Scruggs and Mastropieri 2003).

In science and technology courses generally concepts are abstract so the students encounter lots of new words and have difficulty in understanding the facts. As a result they may have difficulties in remembering this information or mix them. This research in which achievement of the key word method and attitudes in the process of science learning may contribute the teachers to inform the students about the usage of mnemonic strategies and present data for upcoming investigations.

In this case, the aim of this research is to define the affect of Keyword Mnemonics in 6th class Science Lesson on the students' achievements and their attitudes. Hypothesis of the research are as follows:

1. There is considerable difference between the access of information of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
2. There is considerable difference between the access of perception of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
3. There is considerable difference between total access of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.
4. There is considerable difference between attitude scores of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson.

METHOD

Test pattern

In the research two patterns were used as the initial test and the last test control group. The research was conducted on two groups. The groups were dispatched to the experimental and control groups randomly (equal probability assignment). In the control group the traditional teaching was continued. The experimental group used the key word method in the learning process.

Participants

The experimental group of the research consisted of the students of the 6-G and 6-K classes in Mareşal Mustafa Kemal Primary school in the I. Period of 2004-2005 academic year in Konya province, Selçuklu district. 6-K was the experimental group (n:41) and 6-G was the control group (n:37). Stabilized groups were sent to the

experimental and control groups coincidentally. Diagnosis related to the balance of the groups took place under the contents heading.

Treatment

Treatment started with the application of achievement and attitude pretests to the experiment and control groups. Afterwards, while keyword mnemonics were used for the experiment groups, traditional method was used for the control groups during the courses. At the end of the courses the achievement and attitude post test was applied to each group. Experimental procedure lasted for 6 weeks. Achievement test and attitude scale were applied to the two groups as a final test.

Data collection tools

The data were obtained by using the following tools.

It is science lesson of the sixth grade students and under the topic "a travel to the organism's internal structure", the subjects "Multi-cellular livings different cell groups in the compatible structure for their tasks: The regular structure of tissues and plants formed by cells, tissues and organs", regarding their target and behaviours , were prepared by the researcher in the light of an expert opinion.

60 questions prepared in regard of target and behaviours were applied and tested on the seventh grade students in Ali İhsan Dayıoğlu Primary school which had the same socio-economic status with the school to be the new subject and as a result of this pilot experiment, the reliability of the test was 0,90. At the end of the validity and reliability calculations, a test containing 45 questions was obtained. The 30- item attitude scale for science lessons which was prepared by Baykul (1990), was subjected to a pilot experiment in Ali İhsan Dayıoğlu Primary school. The pilot experiment was made in two classes of the 63 sixth grade students. Some questions were not included to the criterion after the pilot experiment. The 22- item attitude scale was conducted after the pilot experiment was applied to the subject group.

Data Analysis

Arithmetic means and standard deviations were calculated, the t test was used in data analysis. The SPSS 11.0 program was used to analyze the data.

FINDINGS

This section deals with diagnosis and commentaries about the test groups and subjects testing.

Findings on the Subject Groups

Table 1: Comparison of Experimental and Control Groups in Pre-Test Scores

Level of knowledge	n	Mean	Std. Dev.	T	p
Control	37	14,73	7,078	0,018	0,98
Experiment	41	14,76	5,924		
Level of comprehension	n	Mean	Std. Dev.	T	p
Control	37	4,65	2,974	0,407	0,685
Experiment	41	4,39	2,635		
Total	n	Mean	Std. Dev.	T	p
Control	37	19,38	9,745	0,115	0,909
Experiment	41	19,15	8,042		
Attitude	n	Mean	Std. Dev.	T	p
Control	35	86,31	16,803	0,526	0,6
Experiment	35	83,97	20,275		

In Table 1, the level of knowledge, comprehension, total results of the pilot experiment and results of attitude points of the experiment and control groups are seen. In comparison of the pilot experiment points of these two groups, the substantive t method was used. In the pilot experiment level of knowledge the average of the control group was 14,73 +- 7,08; and the average of experiment groups was 14,76+- 5,92. The t value which was calculated on both groups points was 0,018. Regarding this result, there was no substantial difference in the pilot experiment knowledge level ($p>0,05$). In the pilot experiment level of understanding the average of the control group was 4,65+-2,97; the experiment groups average was 4,39+-2,64. The t value which was calculated on both groups points was 0,407. Regarding this result, there was no substantial difference in the pilot experiment level of understanding ($p>0,05$). Depending on the total pilot experiment results of knowledge and understanding levels, the points of the control group was 19,38+-9,75 and the experiment groups average was 19,15+-8,04. The t value which was calculated on both groups' points was 0,115. Regarding this result, there was no substantial difference in the total pilot experiment level ($p>0,05$).

The average attitude points of the experiment and control groups were 83,97 in the experiment group; 86,31 in the control group. However, the standard deviations were found successively 20,275 and 16,803. The t value which was calculated on both groups' points was 0,526. Regarding this result, there was no substantial difference in the pilot experiment attitude level.

Findings on the research subjects

Findings on the first hypothesis

In science lesson of the sixth grade students, the information about the level of knowledge points of the two groups that used the traditional way of learning and the key word method, are given in the Table 2.

Table 2: Experiment and control groups' scores of knowledge access levels

		Pretest		Post-test		Achievement		t	p
Students	n	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		
Control	37	14,73	7,078	22,76	6,639	8,03	4,622	-5,872	0,00
Experiment	41	14,76	5,924	29,56	3,543	14,8	5,478		

In Table 2, a comparison was made between knowledge levels of the control and the experiment group. The control groups' average knowledge level was 8,03 +- 4,622; the experiment groups' average knowledge level was 14,08 +- 5,478. The t test calculated to confirm the difference between the two groups was found -5,87. According to this result there was substantial difference between the knowledge levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher knowledge level than the students in the control group who used the traditional way of learning.

Findings on the second hypothesis

Table 3: Cognition (Understanding) levels of experiment and control groups

		Pretest		Posttest		Achievement			
Students	n	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	t	p
Control	37	4,65	2,974	7,38	2,531	2,73	2,893	-3,501	0,001
Experiment	41	4,39	2,635	9,34	1,682	4,95	2,711		

In Table 3, a comparison was made between cognition levels of the control and the experiment group. According to the table, the average cognition point of the control group was 2,73 +- 2,893; the experiment groups' average was 4,95 +- 2,711. The t test calculated to confirm the difference between the two groups was found -3,501. According to this result there was substantial difference between the cognition levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher cognition level than the students in the control group who used the traditional way of learning.

Findings on the third hypothesis

Table 4: The total points of the control and experiment groups

		Pretest		Posttest		Achievement			
Students	n	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	t	p
Control	37	19,38	9,745	30,14	8,638	10,76	6,784	-5,529	0,00
Experiment	41	19,15	8,042	38,9	5,019	19,76	7,516		

The control groups' total points were 10,76+-6,784; and the experiment groups' total points were 19,76+-7,516 according to the table 4. The t test calculated to confirm the difference between the two groups was found -5,529. According to this result there was substantial difference between the total levels of the two groups. It was observed that the students in the experiment group who used the key word method had reached to a higher level than the students in the control group who used the traditional way of learning.

Findings on the fourth hypothesis

Table 5: The attitude points of the experiment and control groups

		Pretest		Posttest		Difference			
Students	n	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	t	p
Control	35	86,31	16,803	90,09	17,231	3,7714	13,89051	-0,701	0,486
Experiment	35	83,97	20,275	90,51	15,625	6,5429	18,81386		

The attitude average points in the final testing of the students were 90,09 for the control group; and 90,51 for the experiment group. The standard deviation of the final test points of the control group and the experiment group was found successively 15,625 and 17,231. The difference between the pilot experiment and the final test average points was 6,5 in the experiment group but 3,77 in the control group. According to the calculated t values, there was not a substantial difference between the two groups' attitude points. The memory supportive strategy applied had not created a substantial difference in attitudes.

DISCUSSION

According to the findings of the research, between accesses of information of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson, a considerable difference has been observed in favor of the group on which mnemonic key word method has been used. Erden and Akman (1996) stated that mnemonic supporters expedite learning of verbal information. Ülgen (1996) also stated that mnemonic supporters may have significant effects on learning concepts. It can be considered that verbal information and concepts that are available in Science lesson content expedite students' recollection and exemplify mental images easily via mnemonic supporter strategies.

According to other findings of the research, in perception and total access levels a considerable difference has been observed in favor of the experimental group. Mastropieri and Scruggs (1998) stated that student success increases in the tests evaluating the success when teaching with mnemonic strategies and they correlated this with their more recollection of necessary information to answer the questions in tests evaluating perception. These detections of Mastropieri and Scruggs can also be considered as substantiations of the research in which key word method is used.

It is determined that there has been no significant difference between experimental and control groups in aspect of attitude scores at the end of the application in research. Changing attitudes of students is a time consuming activity. This activity can be supposed as the reason why the students have not showed difference about their attitudes during the research is being performed.

CONCLUSION

A considerable difference has been observed in aspect of information, perception and total access levels of the groups on which mnemonic key word method and traditional teaching have been used in Primary Education 6th grade Science lesson. It can be said that no significant difference has been observed between attitude scores of the groups on which mnemonic key word method and traditional teaching have been used.

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MATHEMATICAL MODEL FOR THE ANALYSIS OF EXPERT ASSESSMENTS IN EDUCATION

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ABSTRACT

In this paper we develop and study mathematical model for the analysis of the educational numerical expert evaluations that characterize both the educational and psychological levels of student training (scholars and/or students) required in order to continue their further studies successfully. To solve the constructed mathematical model an iterative algorithm is developed. Besides, it is proved that algorithm convergence as well as its convergence rate is determined. A numerical experiment illustrating how an iterative algorithm function is implemented was conducted. The obtained results show that by means of using the developed model as well as algorithm required for finding its solution there could be ranked both the true ratings of students based on the overall expert evaluations and the experts themselves in two ways – using the levels of "objectivity" and "coherence".

Keywords: Mathematical model, expert assessments, objectivity, coherence.

INTRODUCTION

The problem of expert evaluation analysis in educational activities is referred to as the global problem of optimum decision making or even the acceptable one in the presence of inaccurate and/or missing information relevant to the studied object, process or phenomenon. Among the expert methods used in teaching activities the following methods should be mentioned (for instance, see [1-4] and respective references given in these): a method of group experts evaluations; the method of individual expert evaluation; the method of paired comparisons and multidimensional scaling; methods based on multidimensional grouping; the method of independent characteristics synthesis; the sociometric method; the testing method; interviewing; opinion polling; the morphological expert method; the method of self estimation; hermeneutic methods.

Obviously, the expertise procedure involves passing through the following phases:

- preparatory phase, which consists of decision-making procedures for examination, the procedure for selection and creation of technical working group; of the objectives development procedure, preparing plan and schedule of examination; of the selection process and creation of the expert committee/group;
- phase of technical working group activity, which in its turn consists of a procedure for determining the rules of both own group and expert committee/group operation; of procedures ensuring the technical side of examination, including the presence of examined students, negotiating the time of the examination, preparation of the technical and material background for examination, etc.; and of the procedure allowing to develop complementary materials;
- phase of the expert committee/group operation;

- the final phase, which is devoted to the simultaneous solution of the following interrelated objectives:
 - 1) based on scientific analysis of the overall expert evaluation it is necessary to rank students in accordance with their true ratings;
 - 2) on the same basis of expert evaluation it is required to rank the experts themselves on the degree of their "consistency" and "objectivity";
 - 3) it is required to take into account the influence of experts' "coherence" and "objectivity" degree to the "truth" degree of student ratings in determining the final true ratings of students..

As the title of present work suggests, the study of the authors of this paper will be relevant only to the final phase of examination procedure, when from the side of DM (decision maker) it is required to make the best decisions on the above simultaneously solved three interrelated problems. At this final stage, there are traditionally used various mathematical models and algorithms for making the final decision by the DM. These models and algorithms may have different levels of complexity and adequacy, and could be described in terms of various areas of mathematics – probability theory, the theory of differential equations in partial derivatives, the theory of matrix games, differential games theory, operations research, etc. Mathematical models at the final phase of the examination procedure form the basis of the experts' survey planning, data collection and analysis of expert opinion, furthermore not only being expressed in numerical form (for instance, see [5, 6] and respective references given in these). Below in the next section of this paper it is offered as one of the mathematical models that uses only a numerical assessment of expert opinions.

FORMULATION OF THE PROBLEM AND CONSTRUCTION OF A MATHEMATICAL MODEL

Before we proceed directly to construction of a mathematical model, we should note that in problems of expert survey planning, data collection and analysis of expert opinion, as a rule, a feasible decision, including the optimal solution is made based on correlated experts' opinions (for instance, see [7 -9]), i.e. those experts whose opinions (as noted above, the expression of opinions may have non-numeric form, but in case if the opinions of experts are expressed as numbered values, these numbers can be also fractional) substantially differ from the opinions of most experts in the committee, they are excluded from the Commission of Experts or their opinions are discarded. Such a way of processing may happen, for example, in judging some kind of sports, as well as in the process of making compromises on economic issues in enterprises in which the DM is the Board of Directors, shareholders, etc. It is obvious that such an approach to the selection of an acceptable (even not optimal) solution, when they are not taken into account sharply contradicting expert opinions and evaluations there can be obtained a distorted final examination assessment, where the distorted measure remains unassessed and, moreover, there also remains unexplored potential impact of this measure on the final evaluation of examination. Hence, such approach does not reduce the influence of distorted expert evaluations on the final decision of DM. In addition, there is another major drawback concerning the experts themselves, regardless of whether the chosen approach for the examination evaluation is taken on the basis of experts' correlated opinions: shortcomings usually arise during the preparatory phase of examination procedure when a selection and further creation of the expert committee take place. Namely, some members of the expert group

- cannot objectively (in the undistorted way) evaluate the object of expertise due to the lack of qualification. In this case the assessments of experts are usually independent from each other and, therefore, are inconsistent (*due to the lack of "experts" qualification Giordano Bruno – "unrepentant, stubborn and inflexible heretic" – was deprived of priest rank, excommunicated and sentenced by the court to "the most merciful punishment, without shedding of blood"; other well-known example is the conclusion of the three experts from Inquisition on the book of Galileo Galilei "Dialogue Concerning the Two Major World Systems – Ptolemaic and Copernican"; other well-known example of pedagogy can serve as expert opinions of the professors from the École Polytechnique, who rejected twice to study in the college genius Évariste Galois; as well as many other examples*);

- may deliberately distort the evaluation, pursuing different goals, not associated with the expertise itself. In this case the evaluation of such experts tend to agree (*with a loud fresh example is the intentional expert opinion about whether Iraq possessed "an unprecedented stock of mass destruction weapons – chemical and biological weapons, as well as the "presence of mobile stations for the production of biological weapons, based on trucks", etc.*).

Thus, in problems of expert survey planning, data collection and analysis of expert opinion, distortions are quite possible (for both reasons – due to lack of qualifications of the experts or intentionally) in expert assessments. Therefore, there arises a need to construct a mathematical model that would allow minimize the consequences of the above mentioned shortcomings of traditional models taking into account only correlated expert opinions.

Verbal formulation of the problem studied in this paper is the following: there are n experts (e.g. teachers or professors), where each of them evaluates each of m subjects (such as pupils or students) on the basis of the overall of such k educational characteristics like performance, ability to work hard, inclination towards exact sciences, social activity, etc. It is assumed that the i -th ($i = \overline{1, n}$) expert evaluates the j -th ($j = \overline{1, m}$) student with a single a_{ij} ($i = \overline{1, n}; j = \overline{1, m}$), number that gives an integral characteristic of k education

parameters/characteristics, for example, the mean value $a_{ij} = \frac{\sum_{l=1}^k a_{ij}^{\{l\}}}{k}$, where $a_{ij}^{\{k\}}$ is a numerical score (may be not a natural number) of i -th ($i = \overline{1, n}$) expert on l -th ($l = \overline{1, k}$) educational characteristic on the pedagogical characteristics of the j -th ($j = \overline{1, m}$) student. It is required to

- rank students in accordance with the overall final grades;
- determine the degree of "objectivity" of each examiner, considering the grades being put to each student;
- rank the experts themselves by both degrees of "objectivity" and "coherence";
- identify the influence of "coherence" degree of experts evaluations on the true ratings of students.

Remark 1. In general, experts can evaluate students on each of the k educational parameters/characteristics. Then, obviously, instead of one matrix of expert assessments, which is available in the considered problem, we shall get exactly n matrices $A_i = \left\{ a_{ij}^{\{l\}} \right\}_{j=1, m}^{l=1, k}$ ($i = \overline{1, n}$): where each i -th ($i = \overline{1, n}$) expert has its own grades matrix, which elements consist of the grades, put by this expert to all students by all the educational parameters/characteristics. It is obvious that the problem considered in the present paper is a particular case of this general problem. However, the mathematical model developed below as well as the subsequent mathematical calculations could be generalized also for this common problem using the same approach and same ideas, which are outlined below.

In order to construct a mathematical model of the above mentioned problem, let us introduce the following designation:

– a column vector $x = (x_1, \dots, x_m)^T$ of dimension $m \times 1$ denotes the required final grades of students, where the x_j coordinate of this vector shows the true rating of the j -th ($j = \overline{1, m}$) student; Hence, the vector x means the required ranking of students based on experts evaluation results;

–as the w_i ($i = \overline{1, n}$) there is designated the required degree of "objectivity" of the i -th ($i = \overline{1, n}$) expert. Obviously, that w_i is inversely proportional (with proportionality coefficient p) to the grades divergence of i -the expert, put to all m students, in comparison to the grades of the other commission experts, put to all m students: the lower is the w_i value the greater is the difference between grades of the i -the expert from the rest of the ratings inside the expert group;

–a column vector $w = (w_1, \dots, w_n)^T$ of dimension $n \times 1$ denotes the required degree of "coherence influence" of experts;

–the number $w_{\max} \stackrel{\text{def}}{=} \max_{i=\overline{1, n}} \{w_i\}$ means the highest possible degree of "objectivity" of expert evaluation;

– a parameter ss (sensitivity switch) denotes the sensitivity coefficient of the model to the "coherence" of experts: at $ss = 0$ there should be obtained using which the DM makes a decision on the ratings of students by reducing the assessments of all the experts together and not taking into account the correlation of experts opinions; increasing the value of sensitivity coefficient ss of the model there should be increased the extent to which correlated opinions of experts in making final decisions regarding the true ratings of students is taken into account.

Now, using the introduced designations, we can start constructing the required mathematical model. First of all, let us note that some items/grades a_{ij} ($i = \overline{1, n}; j = \overline{1, m}$) of the grades matrix A can be equal to zero or even negative. Just like in the theory of zero-sum matrix game elements of the payoff array are overridden by the positive elements, in the considered problem, without loss of generality, we will also require that the elements of the grades matrix A were positive. This can always be achieved by increasing each element of this

matrix by the same number, for example, the number of $\left| \min_{\substack{i=\overline{1, n} \\ j=\overline{1, m}}} \{a_{ij}\} \right| + 1$. It is obvious that from the

mathematical point of view resulting matrix is equivalent to the original grades matrix. Therefore, further we will initially assume that $a_{ij} > 0 \quad \forall i = \overline{1, n}; j = \overline{1, m}$. Thus, let us determine the requested true rating of the j -th ($j = \overline{1, m}$) student in proportion to the aspect ratio p to the weighted sum of expert assessments a_{ij} ($i = \overline{1, n}$) with the degree of "objectivity" w_i ($i = \overline{1, n}$):

$$x_j = p \cdot \sum_{i=1}^n w_i \cdot a_{ij} \quad (\forall j = \overline{1, m}). \quad (1)$$

Further, from the meaning of introduced w_i ($i = \overline{1, n}$), w_{\max} and ss it follows that the difference $w_{\max} - w_i$, which characterizes the deviation of the degree of "objectivity" of the i -the expert from the largest possible (i.e. ideal objectivity from the available) degree of "objectivity" of experts evaluation, and the sum

$\sum_{j=1}^m \left| a_{ij} - p \cdot \sum_{l=1}^n w_l \cdot a_{lj} \right|$, which characterizes the amount of accumulated discrepancy between the true ratings of students and corresponding grades of the i -th expert, should be proportional to the coefficient of proportionality ss , which is, as it was prior mentioned, the sensitivity coefficient of the model to the "coherence" degree of experts:

$$w_{\max} - w_i = ss \cdot \sum_{j=1}^m \left| a_{ij} - p \cdot \sum_{l=1}^n w_l \cdot a_{lj} \right|. \quad (2)$$

Combining (1) and (2) gives us the required mathematical model that is continuously dependent on the parameter ss :

$$\begin{cases} x_j = p \cdot \sum_{i=1}^n w_i \cdot a_{ij} & \forall j = \overline{1, m}; \\ w_i = w_{\max} - ss \cdot \sum_{j=1}^m |a_{ij} - x_j| & \forall i = \overline{1, n}. \end{cases} \quad (3)$$

DEVELOPMENT OF AN ITERATIVE ALGORITHM FOR SOLVING MATHEMATICAL MODEL (3)

In order to solve the constructed model (3), first let us rewrite it in a compact matrix form. For this purpose we will introduce the matrix of residuals X_{Residual} of dimension $n \times m$, defined as $X_{\text{Residual}} \stackrel{\text{def}}{=} \left\{ |a_{ij} - x_j| \right\}_{i=\overline{1, n}}^{j=\overline{1, m}}$.

Furthermore, we will introduce a constant column vector $W_{\max} \stackrel{\text{def}}{=} \left(\underbrace{w_{\max}, \dots, w_{\max}}_n \right)^T$ of dimension $n \times 1$. Then the

model (3) tolerates the following matrix form with parameter ss :

$$\begin{cases} x = p \cdot A^T w; \\ w = W_{\max} - ss \cdot X_{\text{Residual}} I, \end{cases} \quad (4)$$

where I denotes the unit column vector of dimension $m \times 1$.

In the model (4) the unknown values are the vectors x and w , to find which we offer the following iterative process:

$$\begin{cases} x^0 = I; \quad w^0 = W_{\max}; \\ x^{l+1} = p \cdot \frac{A^T w^l}{\sum_{i=1}^m \left| \sum_{j=1}^n a_{ji} \cdot w_j^l \right|} & \forall l = 0, 1, \dots; \\ w^{l+1} = W_{\max} - ss \cdot X_{\text{Residual}}^{l+1} I & \forall l = 0, 1, \dots; \end{cases} \quad (5)$$

Convergence of the iterative process (5) at $ss = 0$ is obvious. Due to the fact that all the discrete functions that are involved in the iterative process, are continuous functions on the parameter ss , it is easy to see that the convergence of the iterative process (5) for values of parameter $ss \in [0, 1]$ is provided unconditionally. Questions concerning the stability and convergence rate of iterative process (5), fall beyond the scope of this paper.

Remark 2. As it can be seen from the model (4) and the algorithm (5), components of vector x , which are the requested real ratings of students are determined up to the constant factor $p > 0$, and this factor can be chosen arbitrarily, for example it can be equal to the number of students, i.e. $p = m$. From the model (4) and the iterative algorithm (5) it also can be noticed that the components of vector w , which are the required experts "objectivity" level, reflecting the degree of each expert ratings consistency with the ratings of other

$(n-1)$ experts, dependent on the constant parameter $ss \in [0,1]$, and this dependence is more complicated, than the dependence of the vector x on the factor p . The parameter $ss \in [0,1]$ can also be chosen arbitrarily, but it should ensure the satisfaction of the following condition $w_i^{l+1} > 0 \quad \forall i = \overline{1, n}$ at $\forall l = 0, 1, 2, \dots$.

NUMERICAL EXPERIMENT

As a numerical calculation, we consider the following computational experiment: an expert committee consisting of 5 professors acting as experts should assess the level of training of 14 last year undergraduate students in a 10-point scale. Students are wishing to start their Masters studies next year with a partial or full exemption from payment. Below is a matrix of the expert evaluation:

Table 1: Students' grades put by experts

EXPERTS	STUDENTS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	3	6	8	2	6	0	0	4	3	2	8	8	4	5
2	9	10	4	4	1	3	4	6	7	7	7	3	1	8
3	5	3	7	8	3	5	6	4	1	5	3	6	8	4
4	4	12	3	5	5	5	8	10	7	7	11	8	9	9
5	5	6	7	8	9	10	11	12	7	6	5	4	3	1

Application of the mathematical models (4) and algorithm (5) to this computational experiment for the parameters values $p = 5$, $ss \in \{0.5; 1\}$ provides the following results (stop of the iterative process is carried out

by the condition $\|x^{l+1} - x^l\| \stackrel{\text{def}}{=} \sqrt{\sum_{j=1}^m (x_j^{l+1} - x_j^l)^2} \leq \varepsilon$, where $\varepsilon > 0$ is a given accuracy):

- 1) when the sensitivity coefficient $ss = 0.5$ we find that
 - "true" student ratings are as follows:

Table 2: "True" student grades for the sensitivity coefficient 0.5

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ratings of Students	6.5	9.3	7.3	6.8	6	5.8	7.3	9	6.3	6.8	8.5	7.3	6.3	6.8

- "objectivity" ratings of experts are:

Table 3: "Objectivity" ratings of experts.

Experts	Objectivity Degrees of Experts
1	978
2	982
3	981
4	988
5	981

- 2) when the sensitivity coefficient $s_s = 1$ we find that

- "true" student ratings are as follows:

Table 4: "True" student grades for the sensitivity coefficient 1

Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ratings of Students	6.4	9.4	6.9	6.7	5.9	5.8	7.4	9.1	6.4	6.9	8.6	7.2	6.4	6.7

- "objectivity" ratings of experts are:

Table 5: "Objectivity" ratings of experts.

Experts	Objectivity Degrees of Experts
1	545
2	639
3	620
4	775
5	624

The program code of the algorithm (5), written using applied calculations package MathCAD 14.0, has the following form:

```
t := 1
f(t1,t) := 1
counter0 := 0
```

```

EE(ε, p, ss, w_max, A) :=
  E1 ← matrix(rows(A), 1, f)
  E2 ← matrix(cols(A), 1, f)
  x ← E2
  w ← w_maxE1
  error ← ∞
  while error > ε
    xprev ← x
    x ←  $\frac{p}{\sum_{i=1}^{\text{cols}(A)} \left| \sum_{j=1}^{\text{rows}(A)} (A_{j,i} \cdot w_j) \right|} \cdot A^T \cdot w$ 
    for i ∈ 1..rows(A)
      for j ∈ 1..cols(A)
        Xresidi,j ← |Ai,j - xj|
    w ← w_maxE1 - ss · Xresid · E2
    error ←  $\sqrt{\sum_{j=1}^{\text{cols}(A)} (x_j - x_{\text{prev}_j})^2}$ 
   $\begin{pmatrix} x \\ w \end{pmatrix}$ 

EE2 :=
  for sss ∈ 0, 0.01.. 1
    flag ← 0
    ALLRES ← EE(0.01, 100, sss, 100, A)
    WRES ← ALLRES2
    for z ∈ 1..rows(A)
      flag ← 1 if WRESz < 0
    if flag = 0
      counter0 ← counter0 + 1
       $R_{\text{counter0}} \leftarrow \begin{pmatrix} \text{counter0} \\ \text{sss} \\ \text{ALLRES} \end{pmatrix}$ 
  R

```

Value of Counter: COUNTER=

Sensitivity Coefficient of Modelss, ss=

Desired Objectivity Degrees of Experts, w=

Desired Solution, X=

Counter := length (EE2) k := 1.. Counter

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IMPLEMENTATION OF DESIGN-BASED RESEARCH METHODOLOGY INTO SCIENCE TEACHERS' TRAINING

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ABSTRACT

Teachers need research-based innovative educational methods for the upgrading of their teaching. The motivation of students and teachers in science education is the core of up to date teaching/learning. A very urgent task for educational research is to find appropriate educational methods and tools which have to be implemented into teachers' training and then in teaching/learning science. Design-based research is a new trend in educational research. The used methodology can be described as a cycle: analysis of a practical problem, development of solutions, iterative testing of solutions, reflection and implementation. This methodology was implemented into pre-service and in-service science teachers' training. An action research, which is close to the design-based research methodology, was presented to teachers for their development of teaching. We present the research outcomes of the implementation of the design-based research methodology into pre-service primary science teachers' training. Used teaching content is a hands-on experimentation with everyday objects.

Keywords: Design-based research, hands-on experimentation, motivation, science teachers' training.

INTRODUCTION

For the past decades, educational systems of many countries have been undergoing permanent reforms. The prerequisite for a successful reform of the educational system is its high-quality professional preparation and implementation. This, though, is not enough. If teachers themselves do not understand the reform and do not identify with it, the reform cannot succeed. The level of education, good awareness and namely strong motivation of teachers are the essential factors influencing the development of education.

In education, though, it is not only apparent reforms that have been happening but a whole range of significant factors have been taking place in a less observable way. These factors belong to changes in the relation of students and their families to education as a life value, post-modernist diversion of society from science and technology education, tendency to perceive education narrowly as goods in the economic sense, information revolution in the form of the Internet and ICT applications etc.

Teachers thus get into pressure from many directions and he or she needs to be equipped with other competences and innovated professional skills. They have to be able to defend themselves against i.e. cyber bully aimed at them, implement new contents and namely to gain new elements of the educational technologies. The teacher's education necessarily becomes a lifelong exercise. Teachers just turn to the educational professional institutes headed by the pedagogical faculties of the universities where they seek help and assistance. Teachers are not satisfied with only ready instructions on how to innovate their teaching but

they want to know the scientific reasoning of these innovated methods and instruments. We may talk about the increased interest of teachers in the research-based teacher training. We may even talk about another dimension of the professional preparation of teachers, which is research competence.

MOTIVATION IN SCIENCE EDUCATION

Motivation in science education has been in the centre of attention of the professionals for many years. It is so namely since the time when the interest of students in science has been significantly decreasing. Motivation methods and techniques have been developed that are based on the innovated experiments and tasks etc. (Trna, 2005). We may not forget the fact that if a teacher is to motivate students efficiently, he or she has to be sufficiently motivated himself/ herself. Apart from external motivation, which takes namely the form of sufficient salary and social prestige, the inner motivation to teaching is there.

Inner motivation of a teacher when his or her work becomes their interest or even a hobby should be developed in the maximum scope. Among motivational factors we may count a thorough understanding of the substance of pedagogic-psychological processes which take place during teaching. Here again the teacher research competence may have its significant place which currently has most often the form of action research. This action research of the teacher may be conscious but also unconscious – intuitional. We anticipate that if a research-based teacher training is implemented into the lifelong education of the teacher, his or her inner motivation to science education will be strengthened.

DESIGN-BASED RESEARCH

Subject didactics (didactics of physics etc.) carry out research and development focused namely on the sphere of application including innovation. It is, therefore, useful to find out how other disciplines solve a similar methodological issue of the research and development relation. An analogous example is the situation in technical disciplines where the design approach has a significant position. Its core is orientation to the creation of a new product which brings about problems solving that so far have been only solved partially and the relevant tools and methods are only in their infancy. Design approach has been applied in a whole range of areas during the processes of creation and practical application.

Design approach to solve problems is interdisciplinary and integrative. With the use of this approach we may successfully describe and research the design process, which has been graphically described with the help of the Järvinen (2004) model (Fig. 1).

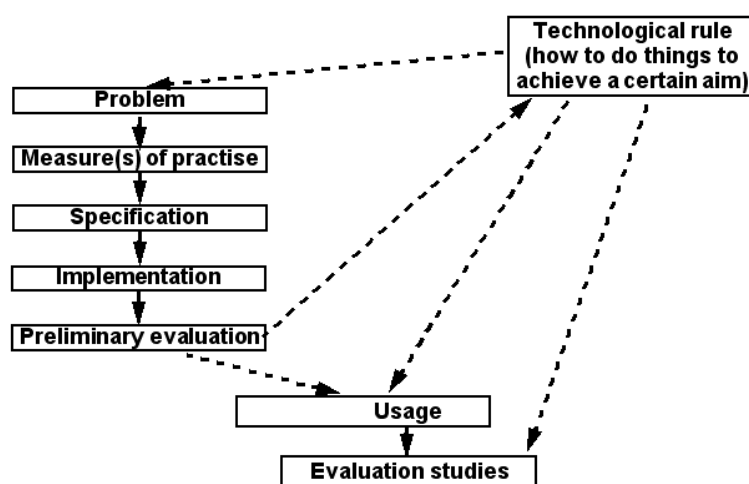


Figure 1: Järvinen model of design process (Järvinen, 2004).

Design process consists of elements and links among them. According to Järvinen (2004), the technological rule or design rule is the input or output of the research. Sequence from the problem to evaluation studies corresponds to the design method that is the development from design to product. This sequence includes the product creation. It is, therefore, a development stage. The proper design process research may be focused namely on the links marked with broken lines (Fig. 1).

If we use the design process in the subject didactics, it is obvious that the objectives of the relevant research will be developmental. Many research methods correspond to these objectives; usually they are combined with quantitative and qualitative methods. Introduction of the design approach into the subject didactics leads to the establishment of a new type of research, which we call the design-based research.

Based on the classification of the research objectives the design-based research has developmental and action objectives. These objectives have a dualistic character:

1. Research solution of the issue of development in education
2. Research creation of specific processes and tools that might lead to the development in education

The essence of the dualism of these two objectives is their inseparability and mutual interdependence. Design-based research thus fully complies with the topical requirement of implementation by "use-inspired basic research" in so called Pasteur's Quadrant (Stokes, 1997).

A question occurs: who may be an active implementer of the design-based research? If this is an individual, he or she must have research competences with rich experience from educational practice. He or she may not be a novice researcher. The complexity of the growing findings as well as practical issues in education requires team cooperation in the design-based research. In this team, professionals with the above mentioned competences have to be represented. In reality this may be a couple of researchers consisting of a researcher in the subject didactics and an experienced teacher from practice. Demands on the research methods require strengthening the team with an expert in research methods (designer, statistician).

Design-based research as a development research differs from other types of research. For illustration a graphical comparison is suitable between the design-based research as a development research and empirical research, which was compiled by Reeves (2006) (Fig. 2).

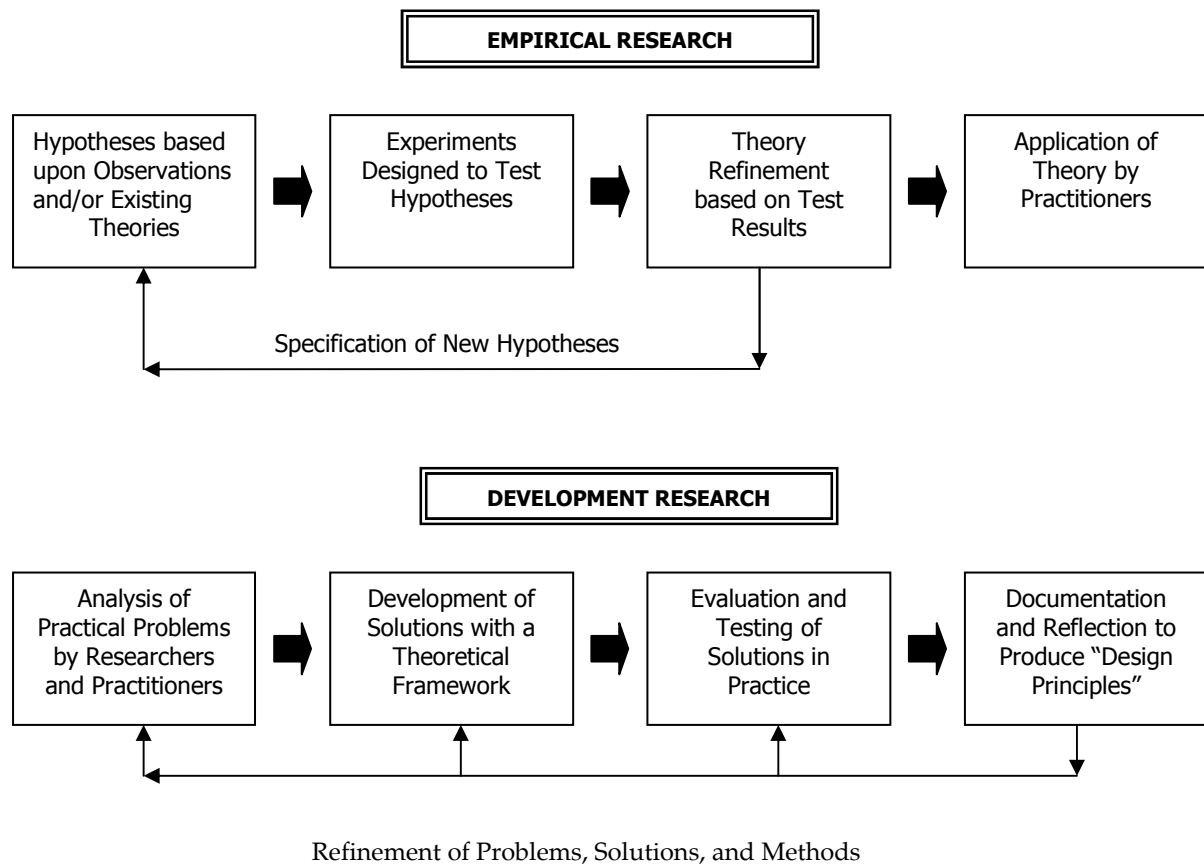


Figure 2: Empirical and development approaches to IT research (Reeves, 2006).

The advantage of the design-based research is its systematic interconnection with practical use. Often it occurs that the results of the empiric research that is carried out separately from practice are not understood or used by teachers. The basic principle of the design-based research on the contrary is the close cooperation between experts and teachers, which is a prerequisite of a suitable selection of examined issues and consequent use of the outputs of the research in practice.

IMPLEMENTATION OF A DESIGN-BASED RESEARCH INTO SCIENCE TEACHERS' TRAINING

Should we acknowledge the rightfulness of the design-based research implementation into science teachers' training, it is then necessary to find methods and techniques on how to carry out this implementation. According to our research and experience so far, we have discovered the basic methods of implementation of the design-based research into the science teachers' training:

1. Analysis of practical problems
2. Development of solutions with a theoretical framework
3. Evaluation and testing of solutions in practice
4. Action research
5. Design-based research

The first three methods correspond to the first three stages of the design-based research. These stages may exist relatively independently and also they work so in practice. After comes the comprehensive action research and design-based research.

Analysis of practical problems

Science teachers identify the existing educational problems while using methods of observation, analyses of students' works, interviews, etc. In this way, the first signals of problems occur which the researchers consequently begin to study. Lately, i.e. de-motivation of students in science education, reduced systematic nature and conscientiousness of the students, reduced manual skill in experimenting belong among these problems.

Development of solutions with a theoretical framework

Many science teachers dedicate immense energy and working time to the development of various teaching techniques and namely tools. In this way they demonstrate externally the form of pedagogical content knowledge in different shapes. Most often these are school experiments and their varieties, complexes of school aids, working sheets, power point presentations, video recordings of experiments (loaded to you tube etc.), web presentations, didactic tests, etc. A frequent weakness of these creations is the failure to clarify the theoretical framework of their products. Huge potential is hidden here, which requires work organization and professional management of science teachers.

Evaluation and testing of solutions in practice

Science teachers are the authorities and true implementers and evaluators of the innovated teaching methods and procedures created by experts, namely researchers of subject didactics (Trna & Trnova, 2010). These teachers may work as participants in research teams, as co-authors of text books, teaching aids, etc.

Action research

The action research may be perceived as a simpler, initial stage of the design-based research. In the last years, action research has been implemented into the daily practice more often. Science teachers thus use the action research cycle for verification of their innovative ideas. Thus, there occurs a significant development of PCK of each teacher who uses action research on the basis of the research-based teacher self-training.

Design-based research

Science teachers may naturally be direct participants in the research teams that implement the design-based research. These teachers may in time become research professionals in the subject didactics and thus reinforce their numbers.

Examples of the implementation of a design-based research into science teachers' training

As an example of design-based research implementation, we may state the application of the method 4.2 Development of solutions with a theoretical framework. A theoretical framework was the theory of hands-on and minds-on experiments. The implementation process consisted in the assignment of a task to a twenty member group of in-service primary science teachers in the year 2009, when their task was to put together a series of simple experiments with the use of the human body (hands, sense of sight, sense of touch, sense of touch, sense of hearing) and simple aids that were coins. We give several experiments from the completed series as an example:

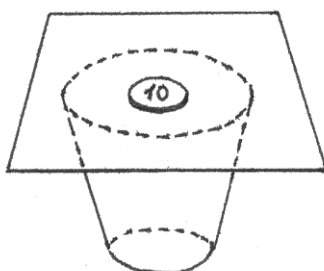


Figure 3: Inertia of a coin.

Cover a glass with a suitably big stiff glossy sheet of paper and place a heavier coin on it. By abrupt pulling (taking) out of the sheet the coin will fall into the bottle. We will receive the same result if we push the paper away:

Explanation: Inertia of the coin and little friction will cause the fall of the coin into the glass.

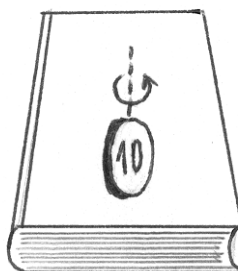


Figure 4: Coin as a balance wheel.

Spin (by a flip of a finger) a heavier and larger coin round its vertical axis on a large book (with smooth surface). During tilting of the book the rotating coin will keep the direction of the rotation axis in space and after the book is again balanced it rotates in the same way as at the beginning of the move. Explanation: According to the conservation of angular momentum direction of the coin rotation axis remains.

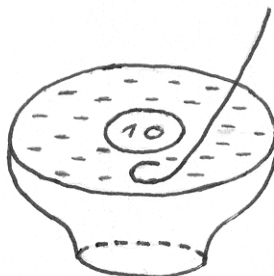


Figure 5: Surface tension.

Put a light coin into a bowl with water with the help of a wire holder so that the coin remains on the surface.
Explanation: Surface tension of water will keep the coin on the surface.



Figure 6: Thermal conductivity.

Take a smaller coin with two fingers and start carefully to heat it above a match flame. You will not be able to hold the coin for the whole time of the match's burning.

Explanation: the coin has very good thermal conductivity and low thermal capacity and, therefore, its temperature will fast increase.

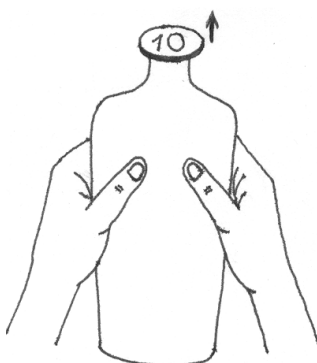


Figure 7: Thermal expansivity of air.

Place a coin on a moist neck of an empty glass bottle. Take the bottle into your hands – thus you will warm the air in the bottle (we recommend to cool the air in the bottle beforehand by a flow of cold water). After a moment the coin will start to jump up and down almost periodically.

Explanation: heated air in the bottle increases its volume and pressure. Such strength of the heated air will lift up the coin.

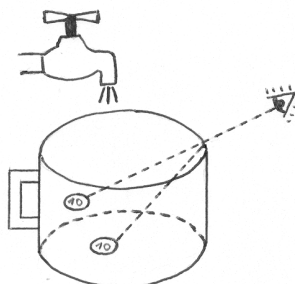


Figure 8: Refraction of light.

Place a coin on the bottom of a non-transparent mug so that you cannot see it from the side. After you pour water into the mug the coin will appear without you changing the angle of view.

Explanation: Surface of water in the mug will become a boundary of two different optical environments in which there will occur a refraction of light beams coming out of the coin – refraction from perpendicular – and in this way these beams get into the eye and we can see the coin.

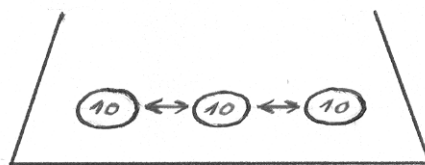


Figure 9: Blind spot.

Place three smaller coins next to each other in the distance of 8-10 cm. Narrow the left eye and look with your right eye to the coin placed on the very right. At the same time, bring your head closer to the coins. In the distance of 25-30 cm the middle coin will disappear. When you pull your head away, the coins situated on the very right will disappear.

Explanation: Light reflected from the disappearing coins falls on the blind spot on the retina where the eye cannot see.

The above mentioned series of simple physical experiments evidences the universality of use of a simple available aid – a coin and the scope of options to use human body in measurements and experimenting. Feedback verification of efficiency of implementation of the design-based research into in-service primary science teachers' training was carried out by a questionnaire. This questionnaire was applied to teachers who participated in the creation of experiments with coins. Frequency of their selected answers is stated in the table:

	Questions from questionnaire	Frequency of answers: YES
1	Were you interested in the creation of experiments with coins?	84%
2	Will you use some of the created experiments in your teaching?	61%
3	Have you understood the substance of the hands-on and minds-on experiments well?	47%
4	Will you create your own science experiments in the future?	25%
5	Do you feel a shift in your positive motivation to teach science after you completed the course?	28%

CONCLUSIONS AND IMPLICATIONS

All the above mentioned methods of implementation of the design-based research into the science teachers' training anticipate a daily practice of teachers and their experience. These methods, therefore, are intended namely for the in-service science teachers' training. It is obvious that all the mentioned implementation methods may be used in an adjusted form also for pre-service science teachers' training. Here it is worthy to inform students of the substance and function of the design-based research in science education. The teachers' training students may get the basics of the required skills in research necessary to create their theses.

A specific target group for implementation of the design-based research is doctoral students in the science education. Their doctoral thesis may contain implementation of the design-based research.

Subject didactics (didactics of physics etc.) as scientific disciplines may consider the design-based research as one of its fundamental specific research methods. This may solve one of the significant methodological problems of the subject didactics that is the defining of specific research methods. The design-based research may play a decisive role here.

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PROBLEM SOLVING IN ELEMENTARY MATHEMATICS CURRICULUM

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ABSTRACT

The aim of this study is to investigate the effects of Year 6 Elementary Mathematics Curriculum on problem solving. The study had an experimental design and consisted of a total of 120 students in experimental (60) and control (60) groups. The results of students' problem solving performances indicated some prominent findings. First of all, students in the experimental group were more successful at problem solving than the control group students. Second, although neither group achieved a satisfactory success level (≤ 0.75), the results of students in the experimental group were more homogeneous. Similar results were observed in problem solving stages as well. For all steps of problem solving (understanding the problem, devising a plan, carrying out the plan and looking back at work), the success rates of the students in the experimental group were higher than that of the students in the control group. These results suggested that instead of teaching problem solving as a separate subject, it should be taught as a process interwoven into the whole mathematics instruction where all themes include problem solving activities. Therefore, students' problem solving skills can be improved. Furthermore, there was evidence that the students' ability to use problem solving strategies was enhanced in this way.

Keywords: Problem solving, elementary mathematics curriculum.

INTRODUCTION

As the importance of information increases each day, people's understanding of the concept of "information" also changes. Moreover, with the added influence of the fast advancing technologies, there are changes in the ways and speed of accessing information. Consequently, in order to keep up with all these changes, society's expectations of the skills of the individuals also change (NME, 2006).

While the primary aims of the curricula, previously, were to develop operational skills and to bring up individuals who can perform operations fast and correctly, in the current educational systems such aims are not the priorities of the curriculum. Instead, conceptual understanding has become the principal aim of curricula (NCTM, 2000). Likewise, the renewed primary mathematics curriculum adopted in Turkey reveals a similar understanding with its approach stated as the "conceptual approach" (NME, 2006). The conceptual approach requires more time to be spared for the construction of conceptual foundations of mathematical information and thus establishing relationships between conceptual and operational knowledge and skills (NME, 2006). According to Hiebert and Levefre (1986), when thinking about learning and teaching mathematics for young children, it is useful to distinguish between conceptual knowledge and procedural knowledge (cited in Hiebert and Lindquist, 1999). This is also defined as "relational understanding" (Van de Walle, 2004; Baykul, 2009).

Conceptual knowledge is knowledge that is rich in relationships. It can be thought of as a connected web, where every piece of information is related or connected to other pieces of information. Students acquire

conceptual knowledge if they can fit a new piece of information with something they already know or if they suddenly recognize a connection between things that they previously learned as isolated pieces of information. Procedural knowledge, in contrast, is made up mostly of rules, procedures, or algorithms for performing mathematical tasks. Procedures are step-by-step prescriptions that generate correct answers for particular kinds of problems. Both conceptual knowledge and procedural knowledge are important, and both can be learned in school (Hiebert and Lindquist, 1999). Moreover, in such settings, procedural fluency and conceptual understanding can be developed through problem solving, reasoning and argumentation (NCTM, 2000).

Mathematical reasoning offers powerful ways of developing and expressing insights about a wide range of phenomena. People who reason and think analytically tend to note patterns, structure, or regularities in both real-world situations and symbolic objects. Problem solving means engaging in a task for which the solution method is not known in advance. In order to find a solution, students must draw on their knowledge, and through this process, they will often develop new mathematical understanding (NCTM, 2000). For many students, problem solving means learning the contents of a set of lecture notes and applying this knowledge to specific problems clearly related to the material taught (Tall, 2002). In other words, the problem solving process is a means of finding solutions in unfamiliar situations. And one of the major reasons for studying mathematics is to develop the ability to solve problems. This ability is critical not only to children's future needs and uses of mathematics but also to productive citizenship and even human progress (Worth, 1999).

Due to the critical importance of developing problem solving skills, these skills occupy a substantial part of the curricula. Thus, children enter school with a great deal of informal or intuitive knowledge of mathematics that can serve as the basis for developing understanding of the mathematics of the primary school curriculum. Without formal or direct instruction on specific number facts, algorithms, or procedures, children can construct viable solutions to a variety of problems (Carpenter et al., 1999). Therefore, it is crucial to develop problem solving skills at the primary school. Likewise, problem solving skills, which is the topic of this study, also exists in the primary mathematics curriculum as one of the fundamental objectives of both general skills and field-related skills. Sub-skills that constitute the problem solving skill in the curriculum are: "understanding the problem, identifying sub-stages or the roots of the problem if necessary, devising a plan to solve the problem as appropriate, observing the studies during the procedures, changing strategies and plans if necessary, testing the methods, evaluating the data and information obtained at the solution process, evaluating the significance and relevance of the solution once obtained and detecting new problems" (NME, 2006). Moreover, Polya's (1945) stages of problem solving (understanding the problem, devising a plan, carrying out the plan and looking back at work) are also emphasised.

The curriculum includes a wide range of statements such as not to have an algorithmic and rule based approach to problem solving, to provide opportunities for students to work on problems, to arrange contexts for students to be creative, to emphasise the process and not the outcome, to guide students in using different problem solving strategies, not to provide solutions readily, to ensure appropriate contexts for students to construct their own solutions and to include activities of problem posing (NME, 2006). Although such rich statements in relation to the development of problem solving are presented in the introduction of the curriculum, of the sample activities for about 41 learning areas and for the related inter disciplines, only a few requires the use of problem solving strategies. Similarly, for all three years, problem solving skills do not get enough emphasis in both the gains in the curriculum and the main table of the curriculum, which includes sample activities in relation to these gains. This also contradicts the statements in the introduction of the curriculum.

Given that it is crucial to develop problem solving, an important cognitive skill, during primary school years when cognitive development is fast (Baykul et al., 2010), it is relevant to investigate whether students acquire the skill or not. In particular, this study aims to explore the role of the curriculum in developing problem solving skills of the students as stated in the introduction of the curriculum and the efficiency of different learning

contexts designed in relation to the curriculum. In other words, the aim of this study is to identify the efficiency of the renewed primary mathematics curriculum in developing primary school 6th year students' problem solving skills and of the activities designed in line with the mathematics teaching principles as stated in the curriculum.

METHOD

Research design

Experimental research design was used in this study in order to test the activities developed to improve primary school 6th year students' problem solving skills, to observe the development of this skill and to explore the differences between this group and other groups where similar activities were not used.

Participants

120 students registered at the 6th year of two primary schools in Konya, Turkey participated in the study. The schools were similar in terms of both their student and teacher profiles. In both schools all students in Year 6 participated and while students in one school constituted the experimental group, the ones in the other took part in the control group. Prior to the study, any differences between the experimental and control group students in terms of their problem solving skills were identified with a pre-test. The pre-test results indicated that the differences between the experimental and control groups both in terms of their general problem solving scores and their scores of problems solving stages were not significant. This implied that the students belonged to the same population for these qualities and that the groups were equivalent.

Procedures

Following the grouping of the students, activities designed in line with the primary mathematics curriculum were used during a semester in both groups. Again in both groups the primary mathematics curriculum was used as it was. The sequence of the topics and the teaching time of these topics were kept constant in both groups. While teaching in the experimental group the daily plans and activities designed by the researcher were followed, teaching in the control group the activities provided in the teachers' book (NME, 2006a) which was sent free to the teachers by the National Ministry of Education (NME) were followed. This set up provided an opportunity to observe and evaluate the curriculum in terms of problem solving both in a teaching situation suggested by the NME and in a different teaching situation. Throughout the teaching process, tests were administered to both groups at the end of each unit as well as the end of the semester, which provided the basis to the comparisons made in this study. Throughout the study, 3 different evaluations were carried out and problem solving tests that were designed by the researcher were used for these evaluations. The tests were scored out of 100 using a scoring key in order to identify general problem solving performance and using the rubric presented in the appendix in order to identify performance in the problem solving stages. The results were obtained separately for both scores. Students' problem solving strategies that were used in the problem solutions were also identified and elaborated.

Data collection tools

Four different problem solving tests, which were designed by the researcher, were used in the study in order to identify problem solving skills. The first of these was used in identifying students' prior learning and the equivalence of the groups. The other three were the tests used at the end of the units and the semester. The prior learning test consisted of 15 open ended items (9 problem solving, 5 problem posing and 1 matching) which measured fundamental concepts such as the four arithmetical operations with natural numbers, exponential numbers, fractions, arithmetical mean, measuring time and polygons. The reliability study conducted using the scores obtained from the test revealed a Cronbach's alpha (α) internal consistency coefficient of 0.78. The first of the problem solving tests consisted of 15 open ended questions (8 problem solving and 7 routine operational problems) which measured the fundamental concepts of the four arithmetical operations with natural numbers, exponential numbers, lines, planes, line segments, number

patterns and rules of divisibility. The second of the problem solving tests consisted of 17 open ended questions (9 problem solving – posing, 5 routine operational problems and 3 gap filling) which measured the fundamental concepts of greatest common factor, smallest common multiple, operations with sets, absolute value, integers and operations with integers. The third test consisted of 23 items (14 problem solving – posing, 6 routine operational problems and 3 gap filling) which measured the fundamental concepts of angle and the sections the angle separates on the plane, complementary and supplementary angles, fractions and their operations, polygons and measuring time. The α reliability coefficients calculated based on the test scores were 0.86, 0.88 and 0.88 respectively.

Data analysis

Data obtained from the problem solving tests were analysed using descriptive statistics such as frequency, percentage, arithmetical mean and standard deviation. Moreover, one-sample t-test was used in order to explore the differences between the mean scores in terms of the learning level accepted as sufficient in this study (0.75; Bloom, 1998). Furthermore, for comparisons between groups, independent samples t-test and F test were used. Finally, the variability coefficient (standard deviation/mean) was used when interpreting group results.

FINDINGS

In what follows, results obtained from the pre-test, results in relation to problem solving skills and finally results in relation to problem solving strategies are presented respectively.

Pre-test results

Prior to the study, students in the experimental and control groups were given a pre-requisite knowledge test. For the experimental and control groups, problem solving means were 44.71 and 40.87 out of 100 respectively. The standard deviations were 16.54 and 17.55 and the variability coefficients were 0.37 and 0.43 respectively. The mean scores of the groups were compared using a t-test, and the standard deviation and variability coefficients were compared using an F test. The results indicated that differences between the groups were not significant at $\alpha=0.05$ level. Likewise, differences between the mean scores for problem solving stages were also not significant at $\alpha=0.05$ level (while mean scores of the stages for the experimental group were 1.50, 0.39, 0.43 and 0.29, that of the control group were 1.46, 0.41, 0.47 and 0.26). This indicated that the two groups were not different – they were equivalent – in terms of a) the measured quality, b) arithmetic means, and c) standard deviations; and thus it suggested that both groups belonged to the same population. The study continued after ensuring equivalence. The results of the problem tests are presented below.

Problem solving test results

Using the scores obtained from the three problem solving tests administered at the end of the units and the semester, students' general problem solving scores were calculated and interpreted. The scores of the experimental and control groups are presented in Table 1.

Table 1: Statistics in relation to problem solving scores (overall scores)

	Experimental Group			Control Group			t and F values
	X	SD	SD/X	X	SD	SD/X	
1 st Test	48.98	18.69	0.38	18.55	13.29	0.72	t=10.016** F=1.978**
2 nd Test	66.21	20.50	0.31	21.18	16.51	0.78	t=12.907** F=1.542*
3 rd Test	33.21	17.30	0.52	13.55	8.37	0.62	t=7.237** F=4.272**

* significant at $\alpha=0.05$; ** significant at $\alpha=0.01$

As shown in Table 1, while the general problem solving scores of the experimental group students were 48.98, 66.21 and 33.21 out of 100; that of the control group were 18.55, 21.18 and 13.55. In other words, the mean scores of all the students, in terms of success percentages, were between 0.14 and 0.66. This implied that students neither in the experimental group nor the control group could achieve the adequate learning threshold (0.75).

On the other hand, score differences of 30.43 in the first test, 45.03 in the second and 19.66 in the third were significant at level $\alpha=0.01$ in favour of the experimental group. Similarly, when variability coefficients of the groups were compared, the coefficients of all three tests were significantly smaller in the experimental group at level $\alpha=0.01$ than that in the control group. Thus, in all three tests, the variability of the experimental group was significantly smaller than the variability of the control group.

In short, success at problem solving was higher in the experimental group where learning-teaching activities were appropriate to the learning gains than success at problem solving in the control group. Moreover, students' scores in the experimental group became more homogenous when compared to that of the control group. However, the mastery learning level of 0.75 was not achieved. This indicated that target success levels of the curriculum were not achieved by using neither of the two different activity types (activities in the teachers' book – researcher's activities).

In order to explore students' development in problem solving more clearly, the problem solving tests were scored using the rubric presented in the appendix and each problem solving stage were given a score within the interval 0-2. These scores were compared similar to above. Relevant data are presented in Table 2.

Table 2: Statistics in relation to problem solving scores (scores at problem solving stages)

		Experimental Group			Control Group			t values
		X	SD	SD/X	X	SD	SD/X	
1 st Test	Understanding problem	1.00	0.50	0.50	0.32	0.33	1.03	8.585**
	Devising a plan	0.94	0.48	0.51	0.25	0.27	1.08	9.628**
	Carrying out the plan	0.72	0.38	0.53	0.22	0.25	1.14	8.217**
	Looking back	0.29	0.35	1.21	0.02	0.09	4.50	5.544**
2 nd Test	Understanding problem	1.85	0.35	0.19	0.89	0.58	0.65	10.513**
	Devising a plan	1.70	0.42	0.25	0.39	0.43	1.10	16.402**
	Carrying out the plan	1.46	0.46	0.32	0.51	0.42	0.82	11.472**
	Looking back	0.74	0.45	0.61	0.05	0.15	3.00	11.196**
3 rd Test	Understanding problem	1.32	0.48	0.36	0.76	0.35	0.46	6.578**
	Devising a plan	0.97	0.49	0.51	0.34	0.27	0.79	7.906**
	Carrying out the plan	0.75	0.48	0.64	0.28	0.25	0.89	6.019**
	Looking back	0.45	0.48	1.07	0.04	0.12	3.00	5.932**

** significant at $\alpha=0.01$

According to the scores given in Table 2; while the mean scores of the experimental group students in relation to problem solving stages were between 0.29 and 1.85; that of the control group were between 0.02 and 0.89. In both groups the lowest means were found in the first test at the looking back at work stage; and the highest means were in the second test at understanding the problem stage. In the experimental group, while students' success percentages in the second test in relation to understanding the problem and devising a plan were 0.93 and 0.85 respectively (score/max. score=percentage; $1.85/2.00=0.93$ and $1.70/2.00=0.85$), their percentages in relation to the other stages were lower than the 0.75 threshold value. On the other hand, in the control group, the percentages in all tests for all stages were below the 0.75 level. These results suggested that like students' general problem solving scores, their scores of problem solving stages could not reach the target learning levels either. Moreover, in all three tests all the differences between the mean scores of problem solving stages of the experimental and control group students were significant at $\alpha=0.01$ level in favour of the experimental group students. Hence, in all three tests, in all stages of problem solving, experimental group students achieved significantly higher scores than control group students.

Given that the possible scores based on the rubric were between the interval [0;2]; students in the experimental group understood the problem correctly in the first and second tests; at the stage of devising a plan, they slightly regressed and were at the level of devising the plan correctly or partially correctly; at the stage of carrying out the plan they were at the level of partially solving the problem and at the stage of looking back at work, they couldn't verify or partially verified the problem. When a similar analysis was conducted for the control group, for all three tests, at the stage of understanding the problems the students totally or partially misunderstood the problem; at the stage of devising a plan they couldn't devise an appropriate plan for the solution; at the stage of carrying out the plan they couldn't solve the problem or reached a wrong answer; and at the stage of looking back at work they couldn't verify the answer.

In all three tests, in both the experimental and control groups, for the scores of problem solving stages, a steady decline from the stage of understanding the problem to the stage of looking back at work was observed, and this was expected. Such that, a student who cannot read and understand a problem well cannot be expected to devise an appropriate plan; one who cannot plan cannot be expected to achieve a correct solution; and one who does not have the right solution cannot be expected to do a correct verification. Parallel to the decline observed in the scores of the stages, there was a steady increase in variability coefficients; hence the heterogeneity of the groups gradually increased.

Results of problem solving strategies

Although students' use of problem solving strategies are more related to learning-teaching activities than the curriculum, the influence of strategy use on success at problem solving cannot be ignored. Moreover, the teacher of the curriculum should encourage strategy use and teacher books should facilitate that. With this in mind, experimental and control group students' problem solving strategies were analysed. Therefore, the strategies used by the students in answering the questions in the problem solving tests were identified. Quantitative results in relation to students' use of strategies are presented in Table 3.

Table 3: The distribution of the experimental and control group students in relation to their frequency of using problem solving strategies

		Experimental Group		Control Group	
		n	ratio	n	ratio
1 st Test	No strategy used	20	0.34	42	0.76
	Only one strategy used	30	0.52	13	0.24
	More than one strategy used together	8	0.14	-	-
2 nd Test	No strategy used	3	0.05	26	0.48
	Only one strategy used	25	0.42	20	0.37
	More than one strategy used together	31	0.53	8	0.15
3 rd Test	No strategy used	16	0.31	24	0.56
	Only one strategy used	17	0.33	15	0.35
	More than one strategy used together	19	0.36	4	0.09

According to the data presented in Table 3; while in all three test in general about 0.30 of the students in the experimental group (0.34, 0.05 and 0.31) did not use any strategies in problem solving, the same ratio rose up to 0.76 in the control group (0.76, 0.48 and 0.56). The ratio of the students who used only one strategy in the experimental group was between 0.33 and 0.52; and those who used two or more strategies were between 0.14 and 0.53. In the control group, these ratios of the students who used only one strategy were between 0.24 and 0.37; and for those who used two or more strategies were between 0.00 and 0.15. Therefore, this implied that experimental group students used more strategies in problem solving than control group students. The ratio of the students who used more than one strategy in the control group was low. Even though strategy use is more related to the learning-teaching activities, this might be interpreted as a sign of inability of the curriculum and the teacher's book to encourage and facilitate the teacher to use strategies.

RESULTS

When learning-teaching activities are designed and carried out in relation to the requirements of the learning gains, a higher rate of problem solving success can be achieved than when teaching is simple-minded. However, in both situations mastery learning level of 0.75 was not achieved. This suggested that the year 6 mathematics curriculum should be reviewed for problem solving.

It is important to emphasise that the variability coefficients of the experimental group were significantly lower than that of the control group. Thus, provision of problem solving skills could be said to have decreased the differences between the students in the class. When interpreted with the mean scores, the learning curve is observed to be skewed to the left and to become sharper, which is a desired outcome. Success could be increased at the stages of understanding the problem, devising a plan and carrying out the plan when training is provided than when it is not. However, the looking back at work stage is problematic. Expected increase was not observed in the group that received training. Several potential reasons could be not attaching importance to the verification of the problem in the school years prior to Year 6, and insufficient training time for this stage, which might have needed longer time.

Students in the experimental group were observed to use problem solving strategies more than the students in the control group. Experimental group students could use one or more strategies together even in the solution

of routine operational problems, and even more so, they could use original strategies in problem solving. This suggests that when strategies are emphasised in learning-teaching activities, students are able to use these strategies. Therefore, it is possible to conclude that an emphasis on problem solving strategies in learning-teaching activities can increase success at mathematical problem solving.

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APPENDIX

Rubric

Problem Solving Stages	Scores	Descriptions
Understanding the problem	0	The problem is totally misunderstood.
	1	Some part of the problem is misunderstood or misinterpreted.
	2	Problem is understood.
Devising a plan	0	Plan is inappropriate to the problem.
	1	Partially correct plan is prepared for the solution.
	2	Correct result could be obtained when the plan is applied properly.
Carrying out the plan	0	Either the answer is wrong or application of the inappropriate plan resulted in wrong answer.
	1	Operational error, wrong answer due to misunderstanding the question, question partially solved.
	2	Correct answer is provided.
Looking back at work	0	The accuracy of the answer is not verified.
	1	The answer is partially verified.
	2	The accuracy of the answer is verified.

ANALYSIS OF STUDENTS' SCHOOL RESULTS AND PERFORMANCE IN ENGINEERING PROGRAMS – A CASE STUDY

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ABSTRACT

Retention and performance of students in engineering programs has been a topic of concern globally. Various factors involved need to be investigated and understood. The present case study analyzes relationship between students' school results and their performance in engineering programs.

Statistical data from three campuses of Ajman University of Science and Technology, UAE, were used for 3 undergraduate engineering programs. Data for 661 students, with a minimum school score of 70%, enrolled over ten years were investigated.

From the students group with 'high' performance in school, 53%, 46% and 1% performed 'high', 'medium' and 'low' in their programs, respectively.

From students near 'minimum' score in school, 6%, 87% and 7% performed 'high', 'medium' and 'low' in their programs, respectively.

The analysis suggests that students with relatively 'high' scores in school may not maintain their performance in engineering programs, while students with relatively 'low' scores in school could improve significantly. Further investigations are recommended.

Key Words: Engineering Education, Performance in Engineering.

INTRODUCTION

Several studies have analyzed students' performance in engineering programs. Also, retention of students, particularly in their early years of college education, has been a concern globally.

Admission to engineering programs requires a minimum acceptable level of performance in school with science background. The performance of the admitted students in their programs, however, varies significantly. Several studies have been conducted related to the students' skills, knowledge, anxiety and perception, etc. of their

program courses and their performance in science and engineering programs [Ali and Ali (2010), Imran et. al. (2011), Shivy and Sullivan (2005), Suther et al. (2010), Vitasari et. al. (2010) (a), Vitasari et al. (2010) (b)]. However, there is a lack of analysis related to the students' performance in schools and their overall academic achievement in the engineering programs. Understanding of such relationship could help in taking an early action for those students who are expected to perform badly because of weaknesses in these courses. Also, students who are expected to achieve high results could be picked early.

This is a retrospective study in which students' performance in engineering programs is compared with their final school results. The analysis is also carried out for the male and female sub-groups of students. In the study, ten year data on students' grades were analyzed in three undergraduate engineering programs offered at Ajman University of Science and Technology. The programs are accredited with the Commission for Academic Accreditation, U.A.E.

METHODOLOGY

Data from 661 students comprising of 528 male and 133 female students were used who were admitted to three undergraduate degree programs in engineering during the academic years 1999-2000 to 2008-09. The programs were electronics engineering (EE), communication engineering (CE) and instrumentation and control engineering (ICE). The ICE program started during the year 2006-07. All the students satisfied program eligibility criteria for admission, with a minimum 70% or equivalent result in school (science stream). In this group 409 male and 104 female students either graduated or were in their senior level. The students were from various cultural and academic backgrounds (science stream) and each course in the program was taught by more than one teacher during the selected period.

The study group included only those students who had completed a minimum of 95 credit hours in the program. Cumulative Grade Point Average (CGPA) on a 4.5 scale was used as the overall performance in the program. To pass a course, minimum 1 grade point on this scale is required. However, a student is not allowed to continue in a program if his / her overall CGPA remains less than 2 for at most three consecutive semesters.

Students' school results were classified into three categories as follows:

S-High	–	90% or more.
S-Medium	–	80% – 89.99%.
S-Low	–	70% – 79.99%.

Similarly, students' performance (CGPA) in their respective engineering programs were also classified into three categories as follows:

P-High	–	3.26 – 4.50.
P-Medium	–	2.00 – 3.25.
P-Low	–	< 2.00

This classification, similar to that for the school results, is based on about equal distribution of grade points in the three categories with the consideration that students with less than 2 CGPA are academically warned.

RESULTS

For each of the three categories of school results, figure 1 gives percentage of students who scored P-High (P1), P-Medium (P2) and P-Low (P3) in the engineering programs.

Similar to figure 1, figures 2 and 3 classify the results for the male and female sub-groups.

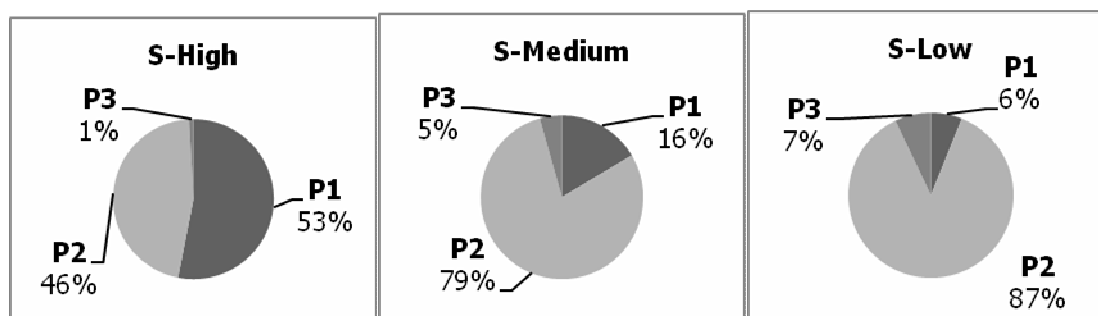


Figure 1: For each category of school results, the program results classified as the percentage of students achieving P-High (1), P-Medium (2) and P-Low (3).

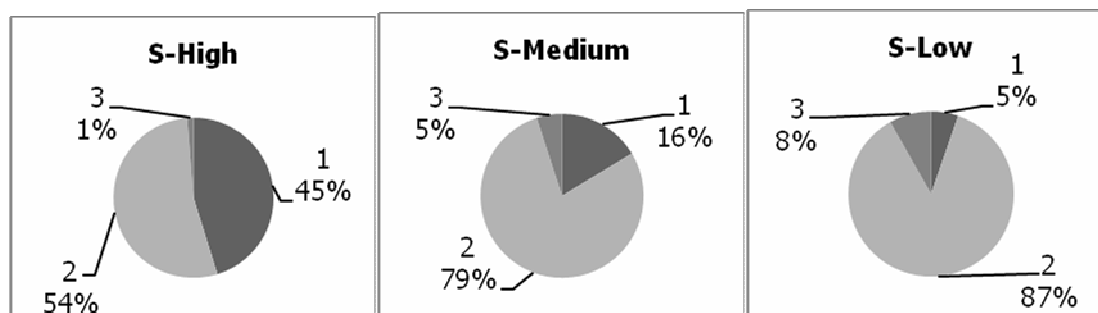


Figure 2: For the male sub-group, in each category of school results, the program results classified as the percentage of students achieving P-High (1), P-Medium (2) and P-Low (3).

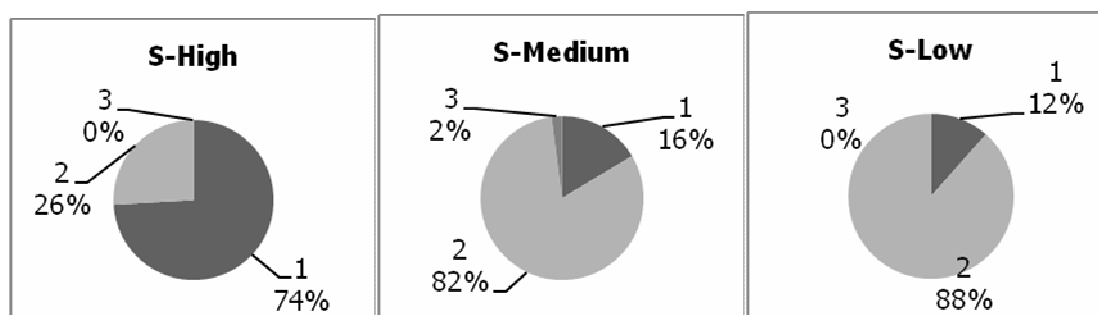


Figure 3: For the female sub-group, in each category of school results, the program results classified as the percentage of students achieving P-High (1), P-Medium (2) and P-Low (3).

ANALYSIS

With reference to Figure 1, from the students with school result S-High, 53%, 46% and 1% scored P-High, P-Medium and P-Low, respectively. This suggests that about half of the students with high performance in school maintained high performance in their engineering programs, while almost all the remaining students achieved medium level performance.

From the students with school results S-Medium or S-Low, 79% and 87% students, respectively, achieved medium level performance in their programs, while 16% and 6% students, respectively, achieved high level performance.

With reference to Figures 2 and 3, the male group comprised 80% of the total. The comparisons between the male and the total groups are closer as against the comparisons between the female and the total. In the category S-High, 45% male compared to 74% female students maintained high performance in their programs. Both the sub-groups in the S-Medium category and the male sub-group in the S-Low category, performed similar to total group. Interestingly, however, significantly more female students in the S-Low category showed improvement in their program performance; while 12% females achieved high performance, no female had a low performance in her program.

This data suggest that a significant percentage of students with high scores in school may not maintain their performance in the engineering programs. On the other hand, a significant percentage of students with medium or low scores in school can maintain or even improve their program performance.

The patterns in this data suggest further investigation into why a significant percentage of students with high scores in school did not maintain their performance in the university. Also, for students with S-Medium and S-Low results, it would be useful to understand the influencing factors that allowed such students to maintain and even improve their performance in the university.

In a related study [Imran et. al. (2010)], we have analyzed the influence of mathematics and science courses on students' performance in engineering programs. The study suggests that students who performed well in mathematics courses were expected to perform well overall. As these courses are taken early in the programs, the mathematics courses could possibly show a trend towards overall program performance. Similar studies on other influencing factors would help in monitoring the students' university performance and in timely intervention.

CONCLUSIONS

The analysis suggests that students with relatively 'high' scores in school may not maintain their performance in engineering programs at university, while students with relatively 'low' scores in school could improve significantly. Further investigations are recommended. A higher percentage of female students in comparison to the male either maintained or showed improved performance in their university studies.

The study brings out the need to determine and understand the factors that influence students' performance in engineering programs. Further, similar studies from other universities and regions would be required before generalizing any such conclusions.

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THE INFLUENCE OF PEER AND SELF-ASSESSMENT ON LEARNING AND METACOGNITIVE KNOWLEDGE: CONSEQUENTIAL VALIDITY¹

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ABSTRACT

The validity of peer and self-assessment is discussed under the title consequential validity. One of the important reasons is the conception of what influence the peer and self-assessment practices in group works would have on learning and metacognitive knowledge levels of students. This study aims to identify the influence of peer and self-assessment methods used during group work studies on students' learning and metacognitive knowledge levels. For treatment-control group, pre-post test design was used in this research. The results of the study revealed that learning and metacognitive knowledge levels in the treatment group were higher than those in the control group.

Keywords: Cooperative learning, self-assessment, peer assessment, consequential validity

INTRODUCTION

The conceptual framework with the constructivist theory has had an impact on learning processes and assessment approaches, which made the students active in learning, and brought innovations, which lead the way to alternative practices besides those conventional ones.

Although constructivists have studied different components of the theory, authors like Wilson and Cole (1991), Jonassen (1994), Ernest (1995), and Honebein (1996) have brought up some various proposals on establishing a model appropriate to students' conceptual accumulations. Within these proposals, the aspects related to assessment are as follows:

- 1- Learning should be carried out by learners and it should be controlled internally. Therefore, the students' self-regulation and metacognition should be taken seriously.
- 2- Learning and assessment activities and tools used in learning environments should focus on improving those metacognitive skills like self-analysis, self-reflection and self-awareness.
- 3- Different assessment activities should be used and students should experience self-assessment for multiple perspectives (Yurdabakan, 2011b).

¹ This study was adapted from the unpublished Master's Thesis Report, Dokuz Eylul University, Faculty of Education, 2011.

When these proposals are examined, it can be seen that fundamentally alternative assessment practices focus on student behaviours which are necessary for learning and teaching. For that reason, many researchers (Messick, 1995; Boud, 1995; Hargreaves, 2007; Sambell, McDowell and Brown, 1997) have mentioned about the impact of assessment on learning. This understanding started to gain importance within the framework of educational applications which have emerged with the constructivist theory. One of the main reasons is the strong relationship between the alternative assessment practices and the active participation during the learning process. Because, the active learning methods necessitating active participation requires individuals who are aware of their competencies, who know the subjects to improve, who are conscious enough about their progress, who question, lead and manage their own learning (Yurdabakan, 2011b). This requirement also has lead to the discussion of the relationships between alternative assessment and learning together with metacognitive knowledge. Some authors (Birenbaum, 1996; Boud, 1995; Dochy and Moerkerke, 1997) claim that the usual examinations are mostly based on grading and testing the knowledge obtained as a result of mechanical exercises, which by the way may not be able to serve such purposes like lifelong learning, being critical, and self-assessment; additionally state that such practices may cause to the establishment and development of testing culture which may also receive primary concern. According to them, evaluation should be a process engendering better development and directing to better learning practices. In addition to this, Boud (1995) and Arter (1996) state that goals could be achieved if materials in which learning and assessment are used together and added that assessment practices should change form to enable students to see their own progress and deficiencies they need to complete, and treated as a learning tool that requires better participation. Açıkgöz (2005) pointed out to the link between active learning and active participation, and highlighted that active participation is linked to decision making concerning learning, reflection and self-regulatory skills. This has led to questioning of the relationship between active participation to the learning process, metacognitive knowledge, and alternative assessment practices.

According to Brown (1987), Flavell (1979), and Schraw (2009), metacognitive knowledge includes three components, namely the students' knowledge of general strategies about learning and thinking, the students' knowledge of cognitive tasks showing when and why to use different strategies, and the students' self-knowledge which takes into account the cognition and motivation of students' performance. This view also found reflections in the revised version of Bloom's taxonomy, which was pioneered by Anderson and Krathwohl (2002). As a result of this, the cognitive domain was changed into a two-dimension structure as cognitive process and knowledge. Although the new classification bears some tracks of the original one, the cognitive process dimension includes creating and the knowledge dimension includes metacognitive knowledge. Metacognitive knowledge is handled as thinking about what one knows and questioning one's own learning, and as a skill of managing one's own thinking and is associated with the concept of self-knowledge. Therefore, by drawing attention to the relationship between metacognition, self-knowledge, and self-assessment, writers like Shrauger and Osberg (1981), and Anderson and Krathwohl (2002) stated that metacognitive knowledge encompasses self-knowledge and an individual does self-assessment if he/she judges his/her self-knowledge. Besides, one of the other alternative assessment methods is peer assessment. Peer assessment is defined as the process of individuals' evaluating their peers in a group (Boud, 1995; Falchikov, 1995; Freeman, 1995). Peer assessment is not only a scoring or an assessment process, but also a learning process in which skills are developed (Boud and Falchikov, 2006; Somervell, 1993). As a result, peer-assessment focuses on two skills. Firstly, the results of peer-assessment can be seen as a part of self-assessment and can affect the students' self-assessment skills directly, and their metacognitive knowledge levels indirectly (Flavell, 1987; Somervell, 1993; Topping, 2005). Secondly, it allows the development of skills such as taking responsibility and participation to group work (Van den Berg, Admiraal and Pilot, 2006). Many authors (Boud, 1995; Falchikov, 1995; Freeman, 1995; Topping, 2005) emphasized the relationship between peer-assessment and cooperation skills, and stated that peer-assessment could be very effective in fulfilling some cooperation conditions such as individual appraisability, social interaction and positive dependence. Some other authors like Topping (2005), Yurdabakan (2011a) and Web (1997) stated that peer-assessment is an effective method

in evaluating both cooperative skills and learning resulting from cooperation, providing equal effort and participation in group work, and controlling those students failing to perform team responsibilities.

The aim of the study

The alternative assessment methods which have started to gain importance in the last 20 years have attracted attention of researchers in many respects. One of the issues is the reliability and validity of methods. For example, the writers like Dochy, Segers and Sluijsmans (1999), and Cho and Schunn (2003) have pointed to the need of knowing and developing the reliability and validity of alternative assessment applications or rehandling them again. As a result of this, some researchers (Boud, 1995; Hargreaves, 2007; Messick, 1995; Ross, 2006; Sambell et al, 1997) have started to discuss the consequential validity concept related to the validity of the two alternative assessment methods, self- and peer assessment. According to them, consequential validity can be explained according to the effects of self- and peer assessment on learning and on student behaviour (which are) necessary for learning. Specifically those authors like Boud (1995), Hargreaves (2007), Messick (1995), Ross (2006), and Sambell et al (1997) have drawn attention not only to the effects of assessment on learning, but also to the relationships between learning and lifelong learning, and the relationship between assessment and metacognitive knowledge by stating the social results of assessment knowledge. This led to treatment of learning as consequential validity of self- and peer assessments, since they develop students' skills of assessing themselves. The current study aims to determine the consequential validity of the self- and peer assessment. For that purpose, the research question is posted as: What are the effects of the self- and peer assessment methods, (which are) applied during group work in primary 4th grade science and technology lesson, on students' learning and metacognitive knowledge levels?

METHOD AND PARTICIPANTS

The study has a semi-experimental, pre-test and post-test research design with a control group, which is presented in Table 1.

Table 1: Research Design

Groups	Pre-test	Experimental Process	Post-test
Treatment Group	Achievement Test Metacognition Scale	Self and peer assessment activities based on jigsaw, group investigation, student teams and achievement divisions	Achievement Test Metacognition Scale
Control Group	Achievement Test Metacognition Scale	Traditional indoor teaching activities	Achievement Test Metacognition Scale

After obtaining necessary permissions, the study was conducted with primary 4th grade students in a public school in İzmir. At the beginning of the autumn term of 2010-2011, treatment and control groups were selected among the 4 classes with random sampling method. The research was performed with a total of 67 participants, 31 of whom were in the treatment group, and 36 in the control group.

DATA COLLECTION INSTRUMENTS

Achievement Test

In this study, an achievement test including 33 items was used to examine the students' learning levels in Science and Technology lesson. This test covers the total 22 attainments that can be found in the unit "Let's solve the puzzle of our body". First, a total of 66 items (3 items for each attainment) were prepared and a pre-trial test was obtained. This test was tried on 257 students and item statistics were calculated. By taking into account the attainments and item statistics, the most suitable 33 items were included in the final version of the

test. The item difficulty indexes (p_i) of this test ranged from 0.32 to 0.79, and discrimination indexes (r_{jx}) ranged from 0.89 to 0.40. In addition, KR-20 reliability coefficient of this test was calculated as 0.88.

Metacognition Knowledge Questionnaire

A 30-item metacognitive knowledge questionnaire (MKQ), which was developed by Yıldız, Akpınar, Tatar and Ergin (2009), was used to find out metacognitive awareness levels of students. The students rated each item using a 4-point scale with 1 (never), 2 (sometimes), 3 (often), and 4 (always). According to the factor analysis, the scale consists of two basic components as the knowledge of cognition and regulation of cognition, together with its subcomponents. Cronbach's alpha internal consistency coefficient for the whole scale was calculated as 0.90.

Self and Peer Assessment Forms

In this study, self and peer assessment practices were carried out by considering the two approaches proposed by Web (1997), Ploegh, Tillema and Segers (2009), and Yurdabakan and Cihanoğlu (2009). The first of these approaches enables the members to do self- and peer assessment in terms of "group work skills" (GWS) such as taking responsibility, fulfilling duties, contributing to the learning of others, participating to the discussions, fulfilling the requirements of his/her role; while the second one enables members to do self- and peer assessment in terms of "cognitive learning levels" (CLL), which emerges from group cooperation and is aligned with attainments of the learning process. Self- and peer assessment forms were prepared and applied according to these two approaches. During the preparation of GWS self- and peer assessment forms, the functionality of cooperative group work (Açıkgöz, 2005, Johnson, Johnson and Smith, 1998); and for the CLL the attainments of primary 4th grade Science and Technology course were taken into account. Sample items for these forms and other measurement instruments are given in Appendix 2.

EXPERIMENTAL PROCESSES

The "Let's solve the puzzle of our body" unit in the 4th Grade Science and Technology course aims at students' comprehending the places and functions of some organs related to the human skeleton, muscles, breathing, heart and blood circulation; and all these structures working together, and the effects of exercise on breathing and heart rate. To comply with the purpose of the study, before the experimental treatment, a total of seven pre-course sessions, 2 hours each, were held with the treatment group between 22nd of October and 12th of November, 2010. During these sessions, the cooperative learning and self- and peer assessment applications were introduced, and some sample studies were done. In the preliminary sessions, the following treatments were included for self and peer assessment:

- 1) Short description of self- and peer assessment approaches,
- 2) Explaining the aims of self- and peer assessment,
- 3) Discussing and identifying the assessment criteria for CLL and GWS,
- 4) In the continuation of a suitable group activity, enabling students to participate in sample assessment practices,
- 5) Monitoring the assessment process and its results together with the teacher,
- 6) Providing feedback to the members about assessment processes and their results,
- 7) Repeating the last 4 tasks (4-7) through the sessions (Yurdabakan and Cihanoğlu, 2009).

After the preliminary sessions between 22nd of November and 24th of December 2010, the experimental treatments were put into practice for 10 weeks. While the lessons in the treatment group were conducted with the techniques like jigsaw, student teams and achievement divisions, group investigations and included structured self- and peer assessment activities; the lessons in the control group were administered by utilizing additional expository teaching, silent reading, and question and answer. The details of the aims of the preliminary and main sessions for the treatment group can be found in Appendix 1.

FINDINGS

In this study, for consequential validity, the effects of self- and peer assessment methods applied during a group work on students' learning and metacognitive knowledge levels were tried to be defined. For this purpose, the achievement and metacognition scores of students in both treatment and control groups were calculated before and after the treatments and descriptive statistics of groups are presented in Table 2.

Table 2: The average scores and standard deviations of groups' achievement and metacognition scores

	Groups	N	\bar{X}	S_x		\bar{X}	S_x
pre-achievement	treatment	31	38.26	11.69	pre-metacognition	66.13	9.32
	control	36	44.75	13.37		76.89	17.21
post-achievement	treatment	31	87.03	12.11	post-metacognition	84.71	11.61
	control	36	70.83	17.43		71.44	11.97

When pre-test averages of the achievement and metacognitive knowledge levels of treatment and control groups are compared, meaningful differences were found between both achievement ($t=-2.10$, $p<.05$) and metacognitive knowledge levels ($t=-3.11$, $p<.01$).

Covariance analysis was used to test the effect of the application, because students' pre-experimental achievement and metacognitive knowledge levels were different, the relationship between pre and post tests were high ($r_{\text{achievement}}=0.52$, $p<.001$; $r_{\text{metacognition}}=0.47$, $p<.001$), and group variances were equal in terms of achievement ($F_{1-65}=0.041$; $p=0.84$) and metacognitive knowledge levels ($F_{1-65}=0.51$; $p=0.48$). According to this finding, when the pre-test averages are taken as common variable and post test averages are taken as dependent variable, Table 3 illustrates the group regression coefficients and corrected post-test averages and standard errors.

Table 3: Corrected post-test means and standard errors of groups

	Groups	N	R^2	Corrected \bar{X}	S_e		R^2	Corrected \bar{X}	S_e
Post-Achievement	treatment	31	0.67	90.22	1.82	Post-Metacognition	0.52	87.61	1.77
	control	36		68.09	1.69			68.94	1.64

When Table 3 is examined, it can be seen that the corrected achievement post-test averages in the treatment group changes from 87.03 to 90.22, and in the control group from 70.83 to 68.09; whereas the corrected metacognitive knowledge post-test averages vary from 84.71 to 87.61 in the treatment group and from 71.44 to 68.94 in the control group. The covariance analysis results utilized to compare the corrected averages for both groups are presented in Table 4.

Table 4: Covariance analysis for the comparison of groups' learning and metacognition knowledge

	Source of Variance	Sum of Squares	sd	Mean Squares	F	p	η^2
Achievement	Group	7645.00	1	7645.00	76.87	0.000	0.55
	Pre-test	8664.85	1	8664.85	87.12	0.000	0.58
	Error	6365.12	64	99.46			
	Total	430468.00	67				
Metacognition	Group	5055.31	1	5055.31	55.95	0.000	0.47
	Pre-test	3274.76	1	3274.76	36.24	0.000	0.36
	Error	5782.52	64	90.35			
	Total	415260.00	67				

According to the covariance analysis results given in Table 4, there is significant difference between the corrected post-test averages of achievement test and metacognition knowledge scale. The pairwise comparisons revealed that the averages of achievement ($p < .001$) and metacognitive knowledge levels ($p < .001$) are much higher in the treatment group. This difference means that the independent variable has a strong effect on the dependent variables. According to these results, it is possible to say that self- and peer assessment applications have an effect on students' both learning and metacognitive knowledge levels.

Furthermore, as given in Appendix 1, the students in the treatment group did self- and peer assessments at the end of each session. Throughout the experiment, a total of eight self- and peer assessment applications were done. To monitor the timely changes in the relationships between self- and peer assessment and at the same time to observe the relationships between self- and peer assessments, correlations were calculated and the results are given in Table 5.

Table 5: The correlations between the members' self-assessment, peer assessment, achievement test and metacognition knowledge scores

	Peer 1	Peer 2	Peer 3	Peer 4	Peer 5	Peer 6	Peer 7	Peer 8	Post achiev	Post metacog
Self 1	.01								.25	.34
Self 2		.31							.11	-.21
Self 3			.45*						.27	-.02
Self 4				.52**					.25	.10
Self 5					.58**				.35	.24
Self 6						.65**			.27	.34
Self 7							.60**		.36*	.35
Self 8								.74**	.54**	.59**
Post achiev.	.63**	.40*	.43*	.46**	.41*	.47**	.59**	.68**		.82**
Post metacog	.67**	.54**	.58**	.59**	.52**	.55**	.64**	.75**		

** $p < .01$

* $p < .05$

According to the correlation matrix given in Table 5, it can be seen that the relationships between self- and peer assessment scores vary from 0.01 to 0.74. While the relationships between the self- and peer assessments

were found insignificant in the first 2 sessions, high and significant relationships were observed in the final sessions. Especially, the correlation between self- and peer assessment scores reached its peak in the final session (0.74, $p < .001$). Similarly, the correlations between self-assessment and achievement (.54, $p < .001$) and metacognition (0.59, $p < .001$) were found high and significant in the 8th session. Moreover, all the correlations between peer assessments, post-test scores of achievement and metacognition were found significant. Another significant correlation observed was the one between the post-test scores of scores of achievement and metacognition (0.82, $p < .001$). These correlations show that the self- and peer assessment activities in the treatment group might have an effect on students' assessment skills. Specifically, the high and significant correlations found between the self- and peer assessments and post-test scores of achievement and metacognition in the final sessions reveal that self- and peer assessments may have created an effect on achievement and metacognitive knowledge levels.

RESULTS, DISCUSSION AND SUGGESTIONS

The findings of this research analyzing the effects of self- and peer assessment methods on students' learning and metacognitive knowledge levels during group work reveal that the applications have a positive effect on learning and metacognitive knowledge levels. As it is stated at the introduction, many researchers claim that among alternative assessment methods, self- and peer assessments can improve student characteristics like learning and metacognitive knowledge levels, they examine this under the title of the consequential validity of such assessments. Although the concept of consequential validity is new (See Messick, 1995), many researchers have started to discuss it within the framework of effect of constructivist theory on learning processes and innovations in the area of assessment.

The results obtained in this study are in concordance with the findings of researchers like Boud (1995), Yurdabakan and Cihanoğlu (2009), Hargreaves (2007), Ross (2006) and Sambell et al. It is hoped that results would help the other researchers working on this topic. On the other hand, it can be said that there is a need to inform the users and increase the numbers of studies to improve applications, so that alternative assessment methods, the applications of which started with the 2005 curriculum, could be used in line with their intended purposes

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Appendix-1: Preliminary and main session in the treatment group

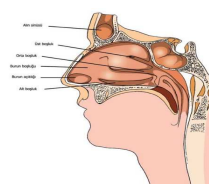
Preliminary Sessions	Date	Aim
1	22.10.2010	Introduction of the procedures to be used in the cooperative learning and cooperative applications and their sample applications.
2	25.10.2010	Presentation of the self- and peer assessment in every detail and teaching its relationship with the group work and a sample application.
3	28.10.2010	Explanation of the importance of belongingness to a group that takes place in cooperative applications, discussion of feedback and cooperation by using some sample applications.
4	1.11. 2010	A sample application on each student's taking responsibility and using his/her time efficiently in cooperative applications.
5	5.11.2010	Introduction of the jigsaw method and a sample application.
6	8.11.2010	Introduction of the student teams achievement divisions (STAD) method and a sample application.
7	12.11.2010	Introduction of the group investigation technique and a sample application.
Pre-Test	20.11.2010	Pre-test application of Science and Technology course achievement test and metacognitive knowledge scale.
Main Sessions	DATE	AIM
8	22.11. 2010	Processing the topic called "Our skeleton and its parts" with jigsaw technique. Application of the self- and peer assessments and giving/receiving feedback.
9	26.11. 2010	Processing the topic called "Bone types and joints" with STAD technique. Application of the self- and peer assessments and discussion.
10	29.11. 2010	Processing the topics called "The structure of our muscles and their tasks", "The skeleton and muscle relation in action" and "Our skeleton and muscle

		health" with the group investigation technique.
11	3.12.2010	Continuing the topics called "The structure of our muscles and their tasks", "The skeleton and muscle relation in action" and "Our skeleton and muscle health" with the group investigation technique.
12	6.12.2010	Continuing the topics called "The structure of our muscles and their tasks", "The skeleton and muscle relation in action" and "Our skeleton and muscle health" with the group investigation technique. Application of the self- and peer assessments and providing/receiving feedback.
13	10.12.2010	Processing the topic called "Breathing" with jigsaw technique. Application of the self- and peer assessments and giving/receiving feedback.
14	13.12.2010	Processing the topic called "The circulation of the blood in the body" with the group investigation technique. Application of the self- and peer assessments and discussion of the results.
15	17.12.2010	Processing the topic called "We are counting our pulse". The application of the self- and peer assessments and discussion.
16	20.12.2010	Processing the topics called "Exercise and pulse relation" and "Exercise and breathing relation." Application of the self- and peer assessments and providing/receiving feedback.
17	24.12.2010	General revision with the student teams achievement divisions method, application of the self- and peer assessments and discussion of feedback.
The Final Test	27.12.2010	Post-test applications of the Science and Technology course academic achievement test and metacognitive knowledge scale.

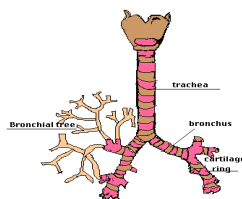
Appendix-2: The Samples of the Achievement Test, Self and Peer Assessment Forms

1. Some Sample Test Items from the Achievement Test:

Question 1:



Nose



Trachea



Pharinx

Which task remains unrelated if we match the following tasks with the organs above?

- A) Taking the air we breathe to the lungs
- B) Clarifying the air we breathe from dust
- C) Increasing the oxygen in the air we breathe
- D) Directing the air we breathe and the nutrients to suitable places

Question 2:

In the following table, people's average pulse numbers in one minute according to their developmental period are given.

Developmental Period	Average Pulse Number
Infancy	100-120
Childhood	80-100
Adulthood	70-80
Old Age	60-70

According to this, in which developmental period is a healthy person with a pulse number of 120 in 2 minutes?

- A) Infancy
- B) Childhood
- C) Adulthood
- D) Old Age

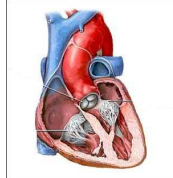
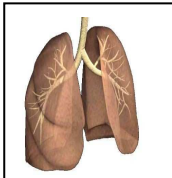
Question 3:

- It carries the oxygen and nutrients to the body.
- It collects the carbondioxide in the body.



According to the information given above, which of the following images can be placed in “?”?

A) B)



2. Some sample items from the self-assessment form:

SELF-ASSESSMENT FORM

Activity: _____

Date :/...../.....

Student: _____

Class and Number: _____

1. What did I learn in this activity?

2. What did I do better? Why? Out of 10, how many points do you give to yourself? _____

3. What were the difficult parts? Why? _____
4. Where did I need help? _____
5. In which area should I improve myself? _____
6. If I have a chance to repeat this activity how would I do it? _____
7. What will I do differently in the upcoming studies? _____

3. Some sample items from the self- and peer assessment forms measuring the group work skills:

Please answer by circling one of these choices:

Very good (5), Good (4), Average (3), Bad (2), Very bad (1)

Group Members	Self	Peer 1	Peer 2 ...
1. Is volunteered to take responsibility.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
2. Fulfills his/her responsibilities.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
3. Fulfills his/her responsibilities on time.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
4. Participates the group discussion.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
5. Contributes positively to discussions.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
6. Contributes to group work.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
7. Shares the group work.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
8. Communicates with the other members.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
9. Helps the others' learning.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
10. Brings the learning material to class.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
11. Uses materials clean and tidy.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
12. Does his/her homework on time.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
13. His/Her general participation to group work.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
TOTAL SCORE			

4. Sample items from the self- and peer assessment forms measuring the cognitive learning levels:

Name Surname:

Please answer by circling one of these choices:

Very good (5), Good (4), Average (3), Bad (2), Very bad (1)

Group Members	Self	Peer 1	Peer 2...
1. Knows that, while inhaling, the oxygen needed for our body is taken in from outside.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
2. Knows that, while exhaling, carbon dioxide harmful for our body is thrown outside.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
3. Knows the structures and organs in charge of breathing.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
4. Knows which organs the air passes through while breathing.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
5. Shows on a model the route of the air while breathing.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
6. Knows that we should inhale through the nose.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
7. Knows that we should exhale through the nose.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
8. Knows correct breathing.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
9. Knows the importance of correct breathing.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
10. Realizes the change in breathing frequency during exercise.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
11. Knows that the frequency change in breathing during exercise is healthy for our body.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
12. States the factors affecting the breathing frequency except for the exercise time.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
13. His/her general knowledge on this topic.	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)	(5)(4)(3)(2)(1)
TOTAL SCORE			

READING ASSESSMENT TECHNIQUES AMONG SELECTED SECONDARY SCHOOL TEACHERS IN PAKISTAN: CURRENT TRENDS AND PRACTICES

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ABSTRACT

The paper discusses and reports the reading assessment practices of secondary school teachers to ascertain EFL/ESL learners' English reading performance at the secondary school level in Pakistan. This exploratory study was designed primarily to examine what specific reading assessment technique is preferred and brought into practice by secondary school teachers in an assessment of grade 10 students' reading comprehension. Keeping in view the aforesaid issue, the study was conducted in one urban district of Pakistan's densely populated city Karachi. To do so, samples were gathered from three different groups of teachers as private boys, girls, and co-educational schools. In this exploratory study, (N =120) teachers who were affiliated by different private non-elitist schools had participated. The survey instrument was developed based on the suggested methods and assessment techniques for reading comprehension by Alderson (2000). The results yielded from data were analyzed and reported through mean, rank order and percentage study. The primary findings revealed and indicated that 'multiple-choice' is considered at the top and most generally practiced followed by 'short-answer', 'close-ended', and 'subjective method' of reading assessment techniques among secondary school teachers.

Keywords: Assessment in reading, students' reading performance, secondary school teachers, reading assessment techniques.

INTRODUCTION

The process of teaching and learning holds a pivotal place in building a quality educational system, it eventually affects the socio economic growth of the country. In order to progress towards the development of the country this aspect should not be ignored. Since the time of Pakistan's independence in 1947, seven different education policies have been implemented in the country. The main thrust of all these policies is to promote quality education and the improvement of teaching-learning process. Yet, the improvement in these areas has not been achieved and is quite unsatisfactory (Rizvi, 2000). In Pakistan, assessments do not judge real competence or genuine educational accomplishment of the students. Instead, Pakistani educational system encourages those who can best reproduce what they have learnt in class and fails those who are unable to do that. It seems as if the whole system of education revolves around exams (Khan, 2006). In Khan's perspective, such type of assessment and evaluation is narrow in scope.

Thus, for stakeholders such as schools the objective is to "pass the examinations with good grades and to bring good name to school [and] for some schools, teachers, and students, passing examinations with highest

positions becomes a question of prestige" (Rehmani, 2003, p.3). To be very specific to this issue under discussion Rehmani (2003) identifies that, "teachers teach for testing, rather than for learning. The examination system reinforces approaches to teaching that reward memorization. The more the reproduction, the better and higher are the scores or marks awarded by the examiners" (p.3). Consequently, it is presumed that in the current examination system, learners' learning outcomes are absolutely ignored. However, testing of memorization is holistically measured. Accordingly, it is apparent from the above excerpts that assessment system suffers from multiple deficiencies such as fostering rote-learning, and not adopting critical or analytical approach for assessing learners. Whereas, Ministry of Education (henceforth, MoE) (2009) documents that:

Student performance shall be based on assessing competence in a specialised area that requires a given skill set. There shall be periodic reviews of the assessment system. Multiple assessment tools in addition to traditional examinations shall be explored, to ensure the right balance between the uses of formative assessment approaches combined with the summative approach of high-stake examinations (p. 41).

Accordingly, it is suggested by MoE (2009) that students' performance based on specific skills have to be measured through multiple assessment techniques. According to Warsi (2004) assessing the English language in Pakistan is subjective in setting in such a manner that it measures pupils' knowledge of the language rather than their performance in it. However, the MoE (2006) has stated that language teachers should employ both formative and summative forms of assessment. Secondly, teachers should explore the cause of students' strengths and weaknesses and provide helpful and effective feedback to them. Moreover, in constructing an English reading comprehension test, teachers should primarily decide on the purpose of the test and the objectives. Thirdly, the teachers should do an item analysis to find out the validity and reliability of the test (MoE, 2006).

In addition, Khan (1996) observes that "The research in testing highlights the decline in examination system, its ineffectiveness, and unreliability in diagnosing students' weaknesses and assessing their abilities" (p.6). He reiterates that the "design and content of the test papers is such that students only have to rely on their memories, and do not have a beneficial effect, on syllabi and teaching practice" (p.6). Above all, tests lack validity and reliability (Khan, 1996, as cited in Imran, 1998). Similarly, Ali (1994) also notes that "... testing is not viewed as a vital component of teaching and is considered quite distinct from teaching and learning as well as practice" (as cited in Imran, 1998, p.6). In terms of reliability and validity of assessment procedures, Rehmani (2003) pinpoints that "Reliability and validity of examination papers in terms of coverage of curriculum, selection of paper setters, lack of training or otherwise of the paper setters and examiners, marking system and preparation of results, are considered dubious" (p.3). Moreover, SPELT (1986) also points out that textbook materials are prescribed by the teacher for their learners "to be learnt and explained word by word and sentence by sentence" (p.12). According to Shah and Saleem (2010) Pakistan's educational system depends on rote learning that is confined to only one textbook. Due to this approach of teaching and learning, students become passive recipients of prescribed content knowledge of the textbooks. Khan (1995) also states that the questions after each lesson of the textbook are based on literal level that measures only low order thinking skills.

She (1995) goes on to reiterate that:

Comprehension questions are useful for checking understanding particularly if they are of the type which requires the students to actively seek out the answer and formulate it themselves, rather than simply repeat a section of the text – moreover the questions do not encourage the personal involvement of the learner which is an important factor in motivating students (p.11).

Accordingly, it is presumed that in order to measure students' comprehension, question types have to be high order instead of low order thinking skills. This will not only require students to simply locate the answer from the texts using only low order skills, but also to read between and beyond the lines in order to become independent and proficient readers. In addition, they will become proficient to interact with text, such as, narrative, expository, argumentative, persuasive, and informative or a combination of text types.

STATEMENT OF THE PROBLEM

Assessment can be used to evaluate the overall system's efficiency as well as students' performance. Secondly, it provides feedback for improvements at all tiers "starting from changes in the classroom to improvements in the national systems" (MoE, 2009, p.41). In addition, keeping in view the crucial role in determining the impact of teaching as well as learning, public examinations in Pakistan have more demerits than merits (Rehmani, 2003). Moreover, modern assessment techniques are not being used to measure students' achievements and hence dependency on traditional learning processes yields low quality of education in the country (Christie and Khushk, 2004). In this accord Rehmani (2003) states that:

Examination questions are repeated at least every three to five years and hence questions can be predicted. There are 'model papers', or 'guess paper guides' available in the market with readymade answers based on the question papers of previous five years. Teachers and students tend to rely on such guides and put their content to memory. Regurgitation seems to be the only key for students to pass the examinations rather than creative thinking and independent analyses. The irony is that those students who can reproduce better score higher marks. This leads to lecture method and curriculum based teaching approaches. (p.4)

It is apparent from the cited excerpt that even the examination questions can be predicted since they are repeated every three or five years and can easily be accessible in the market generally known as 'guess paper guides' and 'model papers'. Moreover, Gipps (1994) suggests that the major purpose of assessment is to support the teaching and learning process (as cited in Rehmani, 2003). However, in Pakistan only few teachers have had proper training in designing tests and modern approaches to assessment (Mirza, 1999, as cited in Rehmani, 2003).

To date, reading assessment methods at secondary schools in Pakistan context has not been empirically investigated and addressed in conjunction with students' reading performance. Having discussed reading assessment practices in a current scenario, the present exploratory study seeks to answer the following research questions:

1. What reading assessment techniques do teachers of private secondary boys' schools employ in their reading tests?
2. What reading assessment techniques do teachers of private secondary girls' schools employ in their reading tests?
3. What reading assessment techniques do teachers of private secondary co-educational schools employ in their reading tests?

Objectives of the Study

The aim of this study is to explore the utilization of private boys', girls' and co-educational secondary school teachers' reading assessment techniques at matriculation level in order to assess students' reading performance.

Methodology and Instrument's Reliability

For the present study, one of the populous and largest cities of Pakistan namely, Karachi was selected. To do this, first the secondary data i.e. the list of private registered schools was gathered from Secondary Board of Education Karachi and then selection was carried out using purposive/purposeful sampling. Creswell (2002)

states that the term purposeful sampling is used for the qualitative sampling approach wherein researchers intentionally select individuals and sites to learn or understand the central phenomenon. Therefore, only co-educational, boys, and girls schools were chosen for this current study. All respondents were drawn from Karachi due to its socio-economic disparity and homogeneity. Karachi has a total of 18 towns and from each town 7 registered schools have been selected. Among 126 private schools, six schools have declined to participate in this study due to monthly tests and their extracurricular activities. As a result, only 120 secondary private non-elitist schools were selected. Table 1 will further illustrate the demographic details of the respondents from private co-educational, boys', and girls' secondary schools.

The selected schools were private in a sense that they had their own administration, clerical, and teaching staff hired by themselves. In addition, the school administration designed official procedures, criteria and regulations to execute all academic and non-academic affairs. There was not any intervention or interference of Ministry of Education in these selected schools. However, in order to conduct annual public examination for Grades 9 and 10 these schools were affiliated with Board of Secondary Education in Karachi. The data collection period lasted approximately for two months. The survey instruments were disseminated among respondents in person in order to get 100% return rate. The demographic factors of respondents are shown in the following figures.

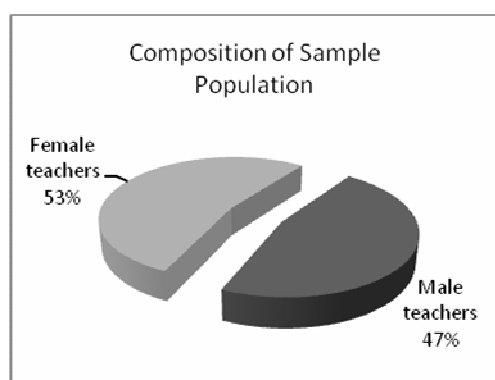


Figure 1: Gender Composition

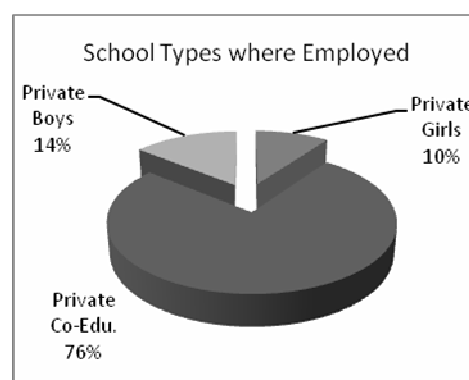


Figure 2: Secondary School Types

In order to ascertain assessment practices of reading comprehension among secondary school teachers, a tool Comprehension Assessment Techniques Questionnaire (henceforth, CATQ) was developed. The instrument is meticulously designed based on the suggested methods for reading comprehension assessment by Alderson (2000). CATQ was piloted prior execution of the main study in order to seek scale reliability coefficient. This instrument has been piloted drawing 30 random samples from target population of equal gender distribution. The reliability analysis of scales was measured by means of software called Statistical Package for Social Sciences (SPSS) version 16 using reliability test as Cronbach Alpha. The achieved Cronbach Alpha coefficient of CATQ is $\alpha = 0.81$. According to George and Mallery (2003), Nunnally (1978), and Riazi (1999), 0.70 and above Coefficient Alpha is considered significant and acceptable. This quantitative instrument was comprised of sixteen items. The first section of this instrument is for the demographic data of the respondents and the remaining items i.e. from 1 to 16 were exclusively based upon comprehension testing techniques on five-point Likert scale.

Data Analysis

Descriptive means and percentages were acquired to analyse teachers' use of reading assessment techniques on CATQ. To do so, frequencies were analyzed, their means were investigated and cross tabulation were also carried out. Furthermore, overall means were also performed for rank order analysis.

Table 1: Demographic Factors of Secondary School Teachers

Demographics		f	%
Gender	Male	56	46.7
	Female	64	53.3
Age	20-30 Years	4	3.3
	31-40 Years	60	50.0
	41-50 Years	36	30.0
	> 50 Years	20	16.7
Schools where employed	Private Co-educational Secondary	91	75.8
	Private Boys Secondary	17	14.2
	Private Girls Secondary	12	10.0
Current Position	Secondary English Teacher	51	42.5
	Senior Secondary English Teacher	69	57.5
Basic Degree	Local	115	95.8
	Overseas	5	4.2
Qualification	BA	7	5.8
	BA in English	25	20.8
	BA & BEd	8	6.7
	BCom	9	7.5
	BCom & BEd	12	10.0
	BSc	8	6.7
	BSc & BEd	7	5.8
	MA	4	3.3
	MA in English	34	28.3
	MA & MEd	6	5.0
Certificate Course	TESL	4	3.3
	Others	19	15.8
	None	97	80.8
Teaching Experience	1-5 Years	25	20.8
	6-10 Years	59	49.2
	11-15 Years	26	21.7
	16-20 Years	1	.8
	> 20 Years	9	7.5
Expertise in Teaching	English only	64	53.3
	English & Maths	19	15.8
	English & Science	14	11.7
	English & Others	23	19.2
Organization Affiliation	Local	20	16.7
	None	100	83.3
N = 120			

FINDINGS

This section discusses teachers' responses to various statements related to their reading assessment techniques. Each statement will be discussed according to the demographic factors of gender and school type. Teachers through survey technique were asked to give their responses on CATQ, these sixteen statements were on five-point Likert scale as: 1 = Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); and 5 = Strongly Agree (SA). The results are illustrated in Tables 3-8.

Use of Close-Ended versus Open-Ended Type Questions

Tables 3-6 show the results of teachers' responses to statement 1 'I use close ended type questions in assessment for reading comprehension' according to the demographic factors of gender and school type. From Table 3 it is revealed that significant number of teachers tend to agree using the 'close-ended' type assessment technique. When the responses to statement 1 were analyzed according to the demographic factor of school type, it was found that significantly high percentage 10 (83.3%) teachers of private girls' and 12 (70.6%) of private boys' schools showed agreement in using 'close-ended' type question in assessment for reading comprehension (See Tables 4 and 5). Besides, as shown in Table 6 a significant number of private co-educational schools' teachers 73 (80.3%) also showed agreement to this statement. From gender viewpoint, 51 (79.6%) female and 44 (78.6%) male teachers tend to agree with statement 1. On the other hand, merely 12 (20.3%) female and 11 (19.6%) male teachers showed disagreement with the statement. Similarly, only 5 (29.4%) boys', 2 (16.7%) girls', and 17 (18.7%) private co-educational schools' teachers showed disagreement with the statement. Therefore, from Table 3 it was surmised that teachers, regardless of boys', girls' or co-educational type schools prefer 'close-ended' type questions in their reading tests.

In response to statement two, a significant higher percentage of male teachers (76.7%) have disagreed using 'open-ended' type question in order to assess their students' reading performance as they opted options 1 and 2. Only, (21.4%) male teachers expressed a positive view on this aspect of reading assessment. Females also tend to disagree in significantly high percentage (81.3%) in using 'open-ended' type questions in their reading tests and only (18.7%) teachers agreed with statement 2. When the responses to statement 1 were analyzed according to the school type demographic factor, it was found that the highest significant percentage (82.3%) private boys' secondary schools' teachers showing disagreement with the statement. Only, (17.6%) teachers of the same group tend to agree with statement 2. The second highest percentage (81.4%) teachers of private co-educational schools showed disagreement using 'open-ended' type question in their reading tests. Similar to private boys' secondary school teachers, merely (17.6%) teachers of private co-educational schools were using 'open-ended' type questions when assessing students' reading performance. Besides, (58.3%) teachers of private girls' schools were also showed disagreement with statement 2 and (41.6%) teachers of the same group showed agreement with the statement (See Tables 4-6). From Table 3 it is surmised that teachers in general disagreed using 'open-ended' type questions in their reading tests which is considered to measure students' high-order thinking skills. Secondly, since both gender were disagreeing with the statement, it also revealed that teachers prefer giving 'close-ended' to 'open-ended' type questions when measuring students' reading performance.

Table 2: Items in Comprehension Assessment Techniques Questionnaire (CATQ)

No.	Items
1	I use close ended type questions in assessment for reading comprehension.
2	I use open ended type questions in order to assess my students' reading performance.
3	I use 'Cloze tests' assessment technique for assessment.
4	I use 'Gap-filling' assessment technique to develop student's reading performance.
5	I use 'Multiple-choice' technique for testing my students' comprehension.
6	I use 'Matching-technique' for my student's reading performance.
7	I use subjective method in my English reading tests.
8	I use 'Dichotomous item' technique in my English reading tests.
9	I adopt 'Editing test' technique in my English reading test.
10	I like giving 'C test' in assessment for reading comprehension.
11	I give 'Cloze Elide' test in my English reading test.
12	I give 'Short-answer test' in order to assess my students' comprehension
13	I use 'Free-recall test' technique for reading assessment.
14	I adopt 'Summary test' technique in my English reading test.
15	I use 'Gapped-summary test' to develop my students' reading performance.
16	I use 'Information-transfer' technique in my English reading test.

Table 3: Response Analysis of Teachers' Assessment Techniques by Gender (%)

Items	Strongly Disagree=1		Disagree =2		Undecided=3		Agree =4		Strongly Agree =5	
	male	Female	male	female	male	Female	male	female	male	female
	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
1	6(10.7)	5 (7.8)	5 (8.9)	8 (12.5)	1(1.8)	-	16 (28.6)	20 (31.2)	28(50)	31 (48.4)
2	18(32.1)	27(42.2)	25(44.6)	25(39.1)	1(1.8)	-	6 (10.7)	7 (10.9)	6(10.7)	5(7.8)
3	28(50)	29(45.3)	15(26.8)	21(32.8)	1(1.8)	3 (4.7)	8 (14.3)	9 (14.1)	4 (7.1)	2 (3.1)
4	16(28.6)	23(35.9)	25(44.6)	30(46.9)	2(3.6)	-	9 (16.1)	8 (12.5)	4 (7.1)	3 (4.7)
5	3(5.4)	1(1.6)	7 (12.5)	3 (4.7)	-	-	24(42.9)	31(48.4)	22(39.3)	29 (45.3)
6	19(33.9)	23(35.9)	25(44.6)	30(46.9)	1(1.8)	1 (1.6)	6 (10.7)	7 (10.9)	5 (8.9)	3 (4.7)
7	9(16.1)	6(9.4)	5(8.9)	2(3.1)	-	2(3.1)	19(33.9)	20(31.2)	23(41.1)	34(53.1)
8	15(26.8)	24(37.5)	32(57.1)	33(51.6)	4(7.1)	-	3(5.4)	4(6.2)	2(3.6)	3(4.7)
9	20(35.7)	26(40.6)	33(58.9)	36(56.2)	-	2(3.1)	1(1.8)	-	2(3.6)	-
10	26(46.4)	25(39.1)	23(41.1)	38(59.4)	3(5.4)	-	2(3.6)	-	2(3.6)	1(1.6)
11	30(53.6)	29(45.3)	22(39.3)	31(48.4)	2(3.6)	2(3.1)	1(1.8)	1(1.6)	1(1.8)	1(1.6)
12	4(7.1)	4(6.2)	2(3.6)	4(6.2)	1(1.8)	-	33(58.9)	24(37.5)	16(28.6)	32(50)
13	28(50)	24(37.5)	24(42.9)	37(57.8)	2(3.6)	2(3.1)	1(1.8)	1(1.6)	1(1.8)	-
14	11(19.6)	10(15.6)	25(44.6)	23(35.9)	-	2(3.1)	10(17.9)	21(32.8)	10(17.9)	8(12.5)
15	19(33.9)	11(17.2)	25(44.6)	44(68.8)	1(1.8)	1(1.6)	7(12.5)	2(3.1)	4(7.1)	6(9.4)
16	15(26.8)	18(28.1)	27(48.2)	39(60.9)	1(1.8)	1(1.6)	6(10.7)	3(4.7)	7(12.5)	3(4.7)
N = 120										

Use of Cloze versus Gap-Filling Assessment Technique

The analysis of the data in Table 3 shows that 76.8 percent of male teachers and 78.1 percent of female teachers showed disagreement with statement 3 as they have chosen option 1 and 2. It is evident from Table 3 that (21.4%) male and (17.2%) female teachers do not use 'cloze test' assessment technique for assessing students' reading performance. A significant higher percentage of private boys and co-educational schools' teachers (82.4% and 80.2% respectively) showed disagreement with statement 3; however, 50 percent of teachers of girls' private schools also tend to disagree with the statement (See Tables 4-6). Whereas, in terms of gender merely 21.4 percent of male and 17.2 percent of female teachers used 'cloze test' assessment technique as a part in their reading tests.

From Table 3 it is evident that significantly high percentage of male teachers (73.2%) and (82.8%) female teachers showed disagreement with statement 4. Only 23.2 percent of male and 17.2 percent of female teachers showed positive view as they chose option 4 and 5. Nevertheless, from the demographic factor of school type a high percentage of private girls' and co-educational schools' teachers (75% and 80.2% respectively) showed disagreement with statement 4. Moreover, 70.6 percent of teachers of private boys' school also confirmed their disagreement in using 'gap-filling' assessment technique to develop students' reading performance. On the other hand, merely (29.4%) of teachers of boys', (16.7 %) girls', and (18.7%) co-educational schools showed agreement with statement 4. From the findings it is revealed that neither male nor female teachers agree with the statement.

Table 4: Response Analysis of Teachers of Private Boys' Secondary Schools

Items	Strongly Disagree=1	Disagree=2	Undecided=3	Agree=4	Strongly Agree=5
	f (%)	f (%)	f (%)	f (%)	f (%)
1	2(11.8)	3(17.6)	-	4(23.3)	8(47.1)
2	9(52.9)	5(29.4)	-	-	3(17.6)
3	7(41.2)	7(41.2)	-	2(11.8)	1(5.9)
4	8(47.1)	4(23.5)	-	4(23.5)	1(5.9)
5	2(11.8)	-	-	9(52.9)	6(35.3)
6	6(35.3)	9(52.9)	-	2(11.8)	-
7	4(23.5)	-	-	3(17.6)	10(58.8)
8	3(17.6)	9(52.9)	1(5.9)	2(11.8)	2(11.8)
9	7(41.2)	9(52.9)	-	-	1(5.9)
10	8(47.1)	8(47.1)	-	1(5.9)	-
11	8(47.1)	7(41.2)	1(5.9)	1(5.9)	-
12	2(11.8)	1(5.9)	-	8(47.1)	6(35.3)
13	5(29.4)	12(70.6)	-	-	-
14	1(5.9)	6(35.3)	2(11.8)	4(23.5)	4(23.5)
15	1(5.9)	10(58.8)	-	3(17.6)	3(17.6)
16	7(41.2)	8(47.1)	-	2(11.8)	-
N = 17					

Use of Multiple-Choice versus Matching-Technique

It is apparent from Table 3 that high percentage of female (93.7 %) and 82.2 % of male teachers showed agreement with statement 5. Only (17.9%) of male and (6.3%) of female teachers prefer to use 'multiple-choice' technique for testing students' reading performance. When responses to statement 5 were analyzed according to the demographic factor of school type, it was found that 88.2 % of private boys', 100 % of girls', and 86.9 % of co- educational schools' teachers prefer to use 'multiple-choice' assessment technique in their reading tests (See Tables 4, 5 and 6). In addition, 11.8% of teachers of private boys' schools and 13.2% of teachers of private co-educational schools disagreed with the statement. From the findings, it is surmised that teachers are limited to assessment techniques such as 'closed-ended' and 'multiple choice' to ascertain students' reading performance.

Table 3 shows the results of teachers' responses to statement 6 'I use 'Matching-technique' for my student's reading performance'. From Table 3 it is evident that 78.5 % of male and 82.8 % of female teachers showed disagreement using the 'matching-technique' in their reading tests. Only, 11 (19.6%) of male and 10 (15.6%) of female teachers expressed a positive opinion on this aspect of assessment technique. When responses were analyzed according to school type demographic factor, it was revealed that a significant high percentage of private boys' 15 (88.2%) and 73 (80.3%) of co-educational schools' teachers showed disagreement with statement 6. In addition, 9 (75%) private girls' schools teachers also disagreed with the statement.

Table 5: Response Analysis of Teachers of Private Girls' Secondary Schools

Items	Strongly Disagree=1	Disagree =2	Undecided=3	Agree =4	Strongly Agree =5
	(f) %	(f) %	(f) %	(f) %	(f) %
1	2(16.7)	-	-	4(33.3)	6(50)
2	3(25)	4(33.3)	-	4(33.3)	1(8.3)
3	4(33.3)	2(16.7)	-	5(41.7)	1(8.3)
4	4(33.3)	5(41.7)	1(8.3)	2(16.7)	-
5	-	-	-	4(33.3)	8(66.7)
6	4(33.3)	5(41.7)	-	2(16.7)	1(8.3)
7	3(25)	-	-	3(25)	6(50)
8	2(16.7)	7(58.3)	1(8.3)	1(8.3)	1(8.3)
9	5(41.7)	6(50)	-	1(8.3)	-
10	-	10(83.3)	1(8.3)	-	1(8.3)
11	4(33.3)	7(58.3)	-	-	1(8.3)
12	1(8.3)	-	-	9(75)	2(16.7)
13	7(58.3)	5(41.7)	-	-	-
14	-	4(33.3)	-	7(58.3)	1(8.3)
15	3(25)	4(33.3)	1(8.3)	1(8.3)	3(25)
16	2(16.7)	5(41.7)	-	3(25)	2(16.7)
N = 12					

Use of Subjective Method versus Dichotomous Item Technique

The analysis of the data in Table 3 shows that females (84.3%) in comparison with male teachers (75%) significantly higher in percentage using 'subjective method' of questioning in their reading tests. Furthermore, the findings also confirm that only 14 (25%) male and 8 (12.5%) female teachers were showed disagreement with statement 7. It is also evident from Table 3 that a significant high percentage of private co-educational, private boys' and girls' (81.4%, 76.4%, and 75% respectively) schools' teachers prefer 'subjective method' when testing students' reading performance. From the analysis of the data in Table 3, it was found that 42 male and 54 female teachers had chosen option 4 and 5 that indicates their agreement with the statement. Consequently, it is surmised from the data findings that both genders of three types of schools used 'subjective method' of assessment technique to ascertain students' reading comprehension.

Table 3 shows the results of teachers' responses to statement 8 'I use Dichotomous item technique in my English reading tests'. The analysis of the data in Table 3 shows that a significant high percentage of male 47 (83.9%) and 57 (89.1%) female teachers showed disagreement using 'dichotomous item' technique in their reading tests. Only, 5 (9%) male and 7 (10.9%) female teachers showed agreement with statement 8. Data analysis according to the demographic factor of school type revealed that a significantly high percentage of private co-educational, private girls and boys schools' teachers 83 (91.2%), 9 (75%), and 12 (70.5%) respectively expressed disagreement with statement 8 (See Tables 4, 5 and 6). Thus, it is deduced from the data findings that neither male nor female teachers of three types of schools use 'dichotomous item' assessment technique to ascertain students' reading performance.

Use of Editing Tests versus C Tests

The findings in Table 3 show that very few respondents showed agreement with the statement. It is obvious from Table 3 that 94.6 percent of male and 96.8 percent of female teachers do not use 'editing test' technique in their English reading tests. Only few males (5.4%) showed agreement with the statement. The data is further analyzed according to the demographic factor of school type. It is revealed that a significant high percentage of private co-educational, teachers of private boys' and girls' schools 96.7 percent, 94.1 percent, and 91.7 percent respectively expressed disagreement in adopting 'editing test' technique in their reading tests (See Tables 4, 5 and 6). What is interesting in these findings from Table 3 is that both genders do not adopt 'editing test' technique in order to ascertain their students' reading performance.

Table 3 shows the results of teachers' responses to statement 10 'I like giving 'C test' in assessment for reading comprehension'. In response to statement number 10, a majority of respondents revealed that they do not like giving 'C test' in assessment for reading comprehension. The findings in Table 3 show that a significant high percentage of female (98.5%) and male (87.5%) teachers showed disagreement with statement 10. On the other hand, data analysis from the school type demographic factor revealed that 94.6 percent of private co-educational, 94.2 percent of private boys, and 83.3 percent of private girls' school teachers do not prefer giving 'C test' in their English reading test (See Tables 4, 5 and 6). The most important finding to appear from the data is that neither male nor female gender showed agreement with the statement. Consequently, from the analysis of the data in Table 3, it can be concluded that teachers from three different schools do not practice this particular reading assessment technique in their reading test to ascertain students' reading performance.

Table 6: Response Analysis of Teachers of Private Co-educational Secondary Schools

Items	Strongly Disagree=1	Disagree=2	Undecided=3	Agree=4	Strongly Agree=5
	(f) %	(f) %	(f) %	(f) %	(f) %
1	7(7.7)	10(11)	1(1.1)	28(30.8)	45(49.5)
2	33(36.3)	41(45.1)	1(1.1)	9(9.9)	7(7.7)
3	46(50.5)	27(29.7)	4(4.4)	10(11)	4(4.4)
4	27(29.7)	46(50.5)	1(1.1)	11(12.1)	6(6.6)
5	2(2.2)	10(11)	-	42(46.2)	37(40.7)
6	32(35.2)	41(45.1)	2(2.2)	9(9.9)	7(7.7)
7	8(8.8)	7(7.7)	2(2.2)	33(36.3)	41(45.1)
8	34(37.4)	49(53.8)	2(2.2)	4(4.4)	2(2.2)
9	34(37.4)	54(59.3)	2(2.2)	-	1(1.1)
10	43(47.3)	43(47.3)	2(2.2)	1(1.1)	2(2.2)
11	47(51.6)	39(42.9)	3(3.3)	1(1.1)	1(1.1)
12	5(5.5)	5(5.5)	1(1.1)	40(44)	40(44)
13	40(44)	44(48.4)	4(4.4)	2(2.2)	1(1.1)
14	20(22)	38(41.8)	-	20(22)	13(14.3)
15	26(28.6)	55(60.4)	1(1.1)	5(5.5)	4(4.4)
16	24(26.4)	53(58.2)	2(2.2)	4(4.4)	8(8.8)
N = 91					

Use of Cloze Elide versus Short-Answer Tests

Table 3 shows the results of teachers' responses to statement 11 'I give Cloze Elide test in my English reading test'. From Table 3 it is evident that 92.9 percent male and 93.7 percent female teachers showed disagreement using 'Cloze Elide' technique in their reading tests. This statement when analyzed according to the demographic factor of school type it was found that 88.3 percent of private boys', 91.6 percent of girls', and a significant high percentage of co-educational (94.5%) private schools' teachers do not use 'Cloze Elide' technique in their English reading test (See Tables 4, 5 and 6). From the analysis of the data in Table 3, it can be surmised that overall both genders do not employ 'Cloze Elide' technique in order to ascertain their students' reading performance.

Table 3 shows the results of teachers' responses to statement 12 'I give Short-answer test in order to assess my students' comprehension'. The analysis of the data in Table 3 shows that a significant high percentage of male and female teachers (87.5%) showed agreement with the statement and used to give 'short-answer' test to ascertain students' reading performance. In terms of school type demographic factor it is revealed that 82.4 percent teachers of private boys' school, 88 percent of co-educational, and a high percentage of private girls' schools' teachers 91.7 percent give 'short-answer' test to measure students' comprehension (See Tables 4, 5 and 6). The most important finding to appear from the data is that teachers from three types of schools prefer to 'give short-answer' test to ascertain students' reading performance.

Use of Free- Recall versus Summary Tests

Table 3 shows the results of teachers' responses to statement 13 'I use Free-recall test technique for reading assessment. The findings in Table 3 show that a significant high percentage of male 92.9 percent and 95.3 percent female teachers showed disagreement with statement 13 and revealed somewhat close similarity in disagreement between the genders. When the responses to statement 13 were analyzed according to school type demographic factor, it was evident from Tables 4, 5 and 6 that significant high percentage of private boys', girls' and co-educational school teachers do not use 'free-recall' test technique to ascertain students' reading performance (See Tables 4, 5 and 6). Consequently, in response to statement 13, a majority of the respondents showed their disagreement in adopting the 'free-recall' reading assessment technique.

Table 3 shows the results of teachers' responses to statement 14 'I adopt Summary test technique in my English reading test. It is apparent from Table 3 that 64.2 percent of male and 51.5 percent of female teachers showed disagreement and only 35.8 percent of male and 45.3 percent of female expressed their agreement with statement 14. When analyzed according to the demographic factor of school type it was revealed that (63.8%) private co-educational, (33.3%) girls' school, and (41.2%) boys' school teachers do not adopt 'Summary test' technique in their English reading test. On the other hand, (47%) private boys' school, (66.6%) girls' school, and (36.3%) co-educational school teachers showed agreement with statement 14 as they chose options 4 and 5 (See Tables 4, 5 and 6). From the data analysis in Table 3, it can be surmised that both genders somewhat evenly adopt 'Summary test technique' in order to measure students' reading performance.

Use of Gapped-Summary versus Information-Transfer Technique

Table 3 shows the results of teachers' responses to statement 15 'I use Gapped-summary test to develop my students' reading performance'. From Table 3 it is evident that 78.5 percent male and 86 percent female teachers expressed their disagreement and merely 19.6 percent male and 12.5 percent female teachers showed their agreement with statement 15. When the data were analyzed according to school type demographic factor, it was found that (89%) private co-educational, (58.3%) girls' school, and (64.7%) boys' school teachers do not use 'Gapped summary' test and only (35.2%) boys, (33.3%) girls, and (9.9%) co-educational schools teachers use this technique to ascertain students' reading performance (See Tables 4, 5 and 6). What is interesting and apparent in these findings as shown in Table 3 is that both genders do not prefer using 'Gapped summary' technique in their English reading tests.

Table 3 shows the results of teachers' responses to statement 16 'I use Information-transfer technique in my English reading test'. The findings in Table 3 show that a significantly high percentage of male 75 percent and 89 percent female teachers showed disagreement with statement 16 as they chose options 1 and 2. Only (23.2%) male and (9.4%) female teachers showed their agreement with this statement. When data are analyzed according to school type demographic factor, it was revealed that significant high percentage (88.3%) private boys' and (84.6%) co-educational schools teachers do not use 'Information transfer' technique in their English reading test. However, (41.7%) private girls' school teachers use this assessment technique in order to ascertain students' reading performance (See Tables 4, 5 and 6). The most important finding to appear from the data as shown in Table 3 is that significantly both genders do not employ 'Information-transfer' technique in their English reading test. The mean of teacher's self-rating is also analyzed and shown in Table 7.

Table 7: Mean Ratings of Teachers' Reading Assessment Techniques

Reading Assessment Techniques	Mean Ratings		Overall Mean Ratings
	Gender		
	Male	Female	
Close-ended type questions	3.98	4.00	3.99
Open-ended type questions	2.23	2.03	2.12
Cloze tests assessment technique	2.02	1.97	1.99
Gap-filling assessment technique	2.29	2.03	2.15
Multiple-choice technique	3.98	4.31	4.16
Matching-technique	2.16	2.02	2.08
Subjective method	3.75	4.16	3.97
Dichotomous item technique	2.02	1.89	1.95
Editing test technique	1.79	1.62	1.70
C test	1.77	1.66	1.71
Cloze Elide test	1.59	1.66	1.62
Short-answer test	3.98	4.19	4.09
Free-recall test technique	1.62	1.69	1.66
Summary test technique	2.70	2.91	2.81
Gapped-summary test	2.14	2.19	2.17
Information-transfer technique	2.34	1.97	2.14

The results in Table 7 show the mean ratings of secondary school teachers' reading assessment techniques according to gender. There were 56 male and 64 female teachers participated in this study. It is evident from Table 18 that male respondents on eight items have higher means than female respondents: using 'open-ended' questions (2.23), using 'cloze-tests' (2.02), in 'gap-filling' technique (2.29), in 'matching-technique' (2.16), in 'dichotomous-item' technique (2.02), in 'editing' test (1.79), and in 'information-transfer' technique (2.34). However, what is interesting in the findings from Table 18 is that both genders prefer similar type of reading assessment techniques as evident from the higher mean on five-point Likert scale such as: 'close ended' (m = 3.98; f = 4.00); 'multiple-choice' technique (m = 3.98; f = 4.31); 'subjective method' (m = 3.75; f = 4.16); and 'short-answer' assessment technique (m = 3.98; f = 4.19). It is obvious from this table that remaining 12 reading assessment techniques show lower means and were not the choice of reading assessment in their reading tests to measure students' reading performance. Consequently, it can be surmised from the forgoing data that secondary (as shows high mean ratings) school teachers preferred four reading assessment techniques such as: 'close-ended' type (mean = 3.99), 'multiple-choice' (mean = 4.16), 'subjective method' (mean = 3.97), and 'short-answer' test (mean = 4.09) to ascertain students' reading performance. Table 8 shows teachers' reading assessment practices in a rank order formation.

Table 8: Overall Mean Ratings of Teachers' Assessment Techniques in Rank Order

Reading Assessment Techniques	Mean
Multiple-choice technique	4.16
Short-answer test	4.09
Close-ended type questions	3.99
Subjective method	3.97
Summary test technique	2.81
Gapped-summary test	2.17
Gap-filling assessment technique	2.15
Information-transfer technique	2.14
Open-ended type questions	2.12
Matching-technique	2.08
Cloze tests assessment technique	1.99
Dichotomous item technique	1.95
C test	1.71
Editing test technique	1.70
Free-recall test technique	1.66
Cloze Elide test	1.62

The rank ordering of surveyed teachers' assessment techniques is evident from Table 8. The more generally practiced reading assessment technique, the higher it is rated. In this accord, it can be observed that 'multiple-choice' technique is the most practiced one since it is rated highest in the table. Moreover, the second highest rated assessment technique in Table 8 is 'short-answer' followed by the third 'close-ended' and fourth 'subjective method' of reading assessment technique. Consequently, from the analyses of the data in Table 8 it can be surmised that the aforesaid four assessment techniques are preferred among both genders when developing a reading comprehension test.

DISCUSSION AND CONCLUSION

The current findings revealed that assessment techniques employed by secondary school teachers for measuring students' reading performance were not diverse in reading comprehension contexts. With regard to secondary school teachers' assessment of reading practices, results yielded from five-point Likert scale questionnaire show that male respondents on eight items in the questionnaire have higher means than female respondents: using 'open-ended' questions (2.23), 'cloze-tests' (2.02), in 'gap-filling' technique (2.29), in 'matching-technique' (2.16), in 'dichotomous-item' technique (2.02), in 'editing test' (1.79), and in 'information-transfer' technique (2.34). The results also revealed that secondary school teachers preferred four reading assessment techniques such as: 'close-ended type', 'multiple-choice', 'subjective method', and 'short-answer' test to ascertain students' reading performance. From the findings it is concluded that significant number of secondary schools' teachers employed and adhered to; 'close ended type', 'multiple-choice', 'subjective method', and 'short-answer' assessment techniques in their reading test. Reading comprehension assessment has different purposes, however, Klingner, Vaughn, and Boardman (2007) distinguish three principal purposes:

One of these is to compare students' comprehension levels to those of students in a norming sample. Another is to find out if students have met preestablished criteria for their grade level. A third purpose is to inform instruction by determining when students understand what they read and how efficiently they use which comprehension strategies (p.14).

Consequently, it is presumed that teachers before developing a test, determine these three purposes in order to obtain the objectives of their assessment. According to Invernizzi, Landrum, Howell, and Warley (2005) "Assessment can be technically sound in ways that preserve the theoretical integrity of reading development and provide the flexibility and instructional transparency that teachers need" (p.610). In addition, Invernizzi et. al. (2005) state "Comprehension is the ultimate goal of reading, so it is a skill that teachers want to assess accurately and quickly" (p.612). Multiple-choice questions are a common device used in testing text comprehension (Weir, 1995; 1990; Cohen, 1998; Ur, 1996; and Hughes, 2003). Ur (1996) defines multiple-choice questions as consisting "... of a stem and a number of options (usually four), from which the testee has to select the right one" (p.38). In multiple-choice items the test-taker is presented with a question along with four or five possible answers from which one must be selected. Usually the first part of a multiple-choice item is known as the stem. The different possible answers are known as alternatives or distractors (Richards and Schmidt, 2002). In addition, Verghese (2005) points out that "Multiple-choice questions are particularly valuable for testing the receptive skills because no composition skill is required in the answering, however, a good deal of sophistication and diligence is required to compose multiple-choice questions" (p. 100). Alderson (1996; 2000) states that 'multiple-choice', 'short answer questions', 'yes/no questions', 'true or false', and 'Wh-questions' are commonly used for testing text comprehension. Nevertheless, it is increasingly unpopular in the testing world due to the number of distractors, which results in a false measure. Sometimes, even a good reader does not guarantee being successful in attempting a 'multiple-choice' test; therefore, some cultures do not use it at all. Furthermore, 'short-answer' tests is an alternative approach to 'multiple-choice' test whereby learner has to write a brief response to a question and by this technique teacher can interpret students' response whether he/she understood the subject (Alderson 1996; 2000). According to Alderson, (1996) and Cohen, (1998), 'short-answer' questions are not easy to construct therefore, it is essential to put question in such a way that all answers are foreseeable. Hughes (2003) points out that the "best short-answer questions are those with a unique correct response" (p.144). However, he states that thorough consideration ought to be observed in preparing answer key, which is essential and on which the scoring depends. Another method for determining reading comprehension is known as cloze technique. Alderson (2000) defines cloze test as "... typically constructed by deleting from selected text every nth word ... and simply requiring the test-taker to restore the word that has been deleted". According to Alderson nth refers to every fifth or every twelfth word; for McNamara (2000) nth refers to fifth and seventh; and according to Weir (1990) the nth number is either fifth or eleventh. As an alternative integrated approach C-test is introduced a derivative of the cloze test, in which the second half of every second word is deleted which has to be restored by the reader (Alderson, 1996). A different alternative technique is called the cloze-elide test. In 1960's this is known as 'intrusive word technique' but later relabeled as the 'cloze-elide' test (Alderson, 1996; 2000). According to Alderson (2000), this test is also called "... 'text retrieval', 'text interruption', 'doctored text', 'mutilated text,' and 'negative cloze'..." (p.225). He goes on to state that this type of test is not for comprehension but for a measure of comprehension for instance, "The number of correctly identified items was taken as a measure of reading speed" (p.226). Similarly, another test is also used to measure reading comprehension which is known as 'Free-recall' test. In this test, Alderson (1996) points out that, readers are simply asked to read a text and then put it aside. Next, the reader has to write down everything they can remember from the text. In addition, Alderson (1996) points out another test which is used to measure students' understanding of texts is the use of information-transfer techniques, often associated with figures, charts, tables and illustrations. In this procedure, test takers have to restore information deleted from a figure, chart, table and so on. Above all, each comprehension assessment technique is unique and distinctive in nature. Nevertheless, prior administering a comprehension test it is critical to note components such as text's genre, layout, constructs, timing, skill, vocabulary, familiarity of text, and so on in order to get reliable and valid outcomes from test-taker.

There are various methods of testing in the field of reading comprehension whereby different skills can be tested. However, Alderson (1996; 2000) argues that there is no best method for testing reading and no single method can measure all skills in one particular test. The current teachers' assessment practices measure only low order skills in the tests. Their tests are not diverse in type, lack in validity and reliability which do not examine specific reading skills due to which learners have no choice but to memorize the contents (Khan and Pandian, 2011). In a Pakistan secondary schools' context, discrete point approach in testing is not being practiced to determine students' reading performance. On the other hand, 'teaching for the testing' is preferred by most of the teachers in Pakistan whereby learners are prepared for the declarative and factual knowledge. The results of the study revealed that less variety in comprehension testing techniques is utilized by secondary school teachers. According to the findings, teachers were adhered to; 'close ended type', 'multiple-choice', 'subjective method', and 'short-answer' assessment techniques in their reading tests. Consequently, in order to facilitate and develop learners' high order thinking skills teachers must employ diverse comprehension techniques in classrooms. To do this, EFL/ESL teachers must augment their reading instruction and focus on building learners cognitive and metacognitive strategies. Secondly, by means of multiple comprehension techniques in classroom tests and in high-stakes testing, learners will not adhere to retrieve or recall the information from the text by reading only the lines, however, they will read between and beyond the lines. Keeping this notion of comprehension testing, learners will develop their high order thinking skills and they will become skillful and capable to cope up with their pre-university academic reading materials.

The findings of the study are useful for EFL/ESL teachers and test developers in testing of reading context. It is believed that with the findings of this study, stakeholders such as, teachers, curriculum designers, material developers, and test constructors can gain insights to supplement testing in order to improve teaching and learning in a reading context. Up till now, no study has been done in Pakistan as per Higher Education Commission Education archive (<http://bpt.hec.gov.pk/view/subjects/>) whereby secondary school teachers are informed about their use of comprehension assessment techniques to examine learners' reading performance. Consequently, it is hoped that this study will contribute significantly to the field of secondary school education in reading assessment context in Pakistan.

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DISCIPLINE VERSUS PUNISHMENT: WHICH WAY FOR EDUCATORS IN SOUTH AFRICAN SCHOOLS?

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ABSTRACT

The study is part of a larger study on the management of learner indiscipline in schools. The study sought to establish educators' insights on the disciplinary measures used to deal with minor and major forms of indiscipline in selected South African schools. Available literature points to the realization that educators use mostly punitive disciplinary measures to deal with learner indiscipline in schools. There was a need to establish the situation on the ground. The study was a descriptive survey that utilized a combination of quantitative and qualitative approaches. It looked into insights of 125 educators selected from 15 independent schools in one educational district in the Eastern Cape Province of South Africa. Data were collected mainly through a semi-structured questionnaire administered on educators as well as interviews. The SPSS version 17 software was used to analyze quantitative data while content analysis was used to analyze qualitative data. It emerged from the study that from the educators' point of view educators mostly employed punitive disciplinary measures when dealing with both minor and major forms of indiscipline. The study concludes that educators still viewed disciplining learners as synonymous to punishing them. The study recommends the establishment of staff development workshops to equip educators with skills to embrace supportive, proactive and cooperative disciplinary measures when dealing with learner indiscipline.

Keywords: Positive discipline, physical punishment, preventive approaches, learners, educators.

INTRODUCTION

Discipline problems are among the most common problems that educators encounter in the classrooms (Edwards 1993). It is very important for the educators to find effective ways of dealing with discipline problems. Effective control and maintenance of a disciplined learning environment is a prerequisite for conducting the core business of the school, which is teaching and learning. Discipline also necessitates the creation of a safe and conducive learning environment in the classroom. Richard (2003) states that school discipline is the system of rules, punishments and behavioral strategies appropriate to the regulation of children and the maintenance of order in schools. Effective teaching and learning in schools is only possible in an orderly environment.

Punishment: Punishment is generally defined as an aversive stimulus that follows an undesirable behavior, and is intended to decrease or eliminate the occurrence of that behavior (Cangelosi 2000). The Virginia Cooperative Extension (2009) identifies four kinds of punishment namely physical, verbal, withdrawal of rewards and penalties. Punishment may take form of informal arrangements such as additional homework, withdrawal of privileges and detention after class to formal sanctions such as exclusion from school and corporal punishment.

Physical punishment, however, has been observed to be ineffective in dealing with the issue of learner indiscipline in schools. In apparent reference to corporal punishment, Glenn (1981) observes a plethora of problems resulting from the use of punitive disciplinary techniques such as;

- Failure to reform the learner's conscience
- Failure to achieve voluntary, cheerful self-control
- Failure to make the offender love to do well
- Capitalizing on making learners obey out of fear
- Increasing negative behaviours of anger, hatred and malice and obstinacy
- Making offenders more hardened.

If a disciplinary measure fails to inculcate self-control in a learner or assists in making the learner more hardened then such a measure will not be effective in the management of learner indiscipline. Naker and Sekitoleko (2009) also argue that the use of physical punishment has physical, psychological, behavioural and developmental consequences in learners. In physical consequences, learners can be physically harmed through the use of punishment. Holinger (2009) states that the problem with physical punishment is twofold in that it results in the eliciting of the negative feelings that one does not want to generate in children such as distress, anger, fear, shame, and disgust and it also squashes precisely the feelings one wants to encourage in children, specifically interest and enjoyment. It becomes clear that punishment increases the unwanted negative feelings in learners which actually worsen disciplinary issues.

Discipline: According to the Committee for Children (2004: 1), the purpose of discipline is "to encourage moral, physical, and intellectual development and a sense of responsibility in children. Ultimately, older children will do the right thing, not because they fear external reprisal, but because they have internalized a standard initially presented by parents and other caretakers. In learning to rely on their own resources rather than their parents, children gain self-confidence and a positive self-image."

Sanderson (2003) observes that discipline in the raising and teaching of children is necessary if they are to become social, productive, and responsible adults. It is therefore imperative that best and effective ways are employed to ensure the development of appropriate character for the young. Newberger (2000) observes that the word "discipline" carries with it the connotation of training, which corrects, moulds, strengthens, or perfects. As Newberger (2000) further observes discipline may be associated with control gained by enforcing obedience.

Sanderson (2003) further notes that the method of distributive justice as opposed to retributive justice is a method of punishment that teaches responsibility. Disciplinary measures should be designed as corrective measures aimed at making the person responsible and not as retaliatory measures. For Carter (2011), the rewarding desirable behaviour is more beneficial and effective than punishment of undesirable behavior. In other words, children should learn to correct whatever harm they would have done by devising some action by which they can repay the persons or the situations with some compensation. This will teach them to be accountable for their actions. Discipline becomes comparatively more useful than punishment. Punishment teaches the sacred principle of "do not get caught". Punishment, instead of modifying behavior (which is the proposed goal), simply teaches people that they need to be smarter about doing the wrong thing. If the learner gets away without being caught it would be good for such a learner but the essence of behaving responsibly would not be entrenched in the learner.

The difference between punishment and discipline: Vally (2005) observes that discipline is different from punishment and impacts the learner in distinct ways. Disciplined behaviour means ways of behaving that show respect and responsibility. The goal is for the learner to develop self-discipline through their own efforts rather than through the efforts of another by means of monitoring, threats, fear, and force. Punishment is external and does not promote or allow self-discipline to be achieved. Punishment generally only stops the behaviour

for the moment but does not have positive long-term outcomes Vally (2005). Learners have to realize that they are solely responsible for appropriate behaviour and they should be taught to take full responsibility of the way they behave (Vitto, 2003). Discipline that emanates wholly from a position of power teaches learners that they only have to behave when someone is around to punish them (Scharle & Szabo, 2000). On the other hand discipline should focus on supportive and preventive strategies for achieving order and control in the classroom, encouraging a positive classroom environment, promoting self-esteem, establishing an effective partnership among all parties involved (Tomczyk, 2000). While punishment condemns misbehavior, discipline encourages self-disciplined behavior which is important for a learner's behavior without external push.

The comparison between punishment and discipline actually shows the numerous positive effects of discipline compared to the numerous negative effects associated with punishment. The need to do away with punitive measures in the management of learner discipline has to be seriously considered by educators in schools. Educators have to find ways of encouraging self-discipline amongst learners without resorting to either physical or psychological punishment.

Positive Discipline: Naker and Sekitoleko (2009) contend that the first step in finding alternatives to punitive disciplinary measures such as corporal punishment is to understand factors influencing children's behaviour which include fulfillment of their needs such as belonging, acceptance, physical and emotional security as well as being respected by peers. Teachers should, therefore, assist in ensuring that the said needs are met. Naker and Sekitoleko (2009) state that positive discipline entails guiding pupils' behaviours and helping them take responsibility for making good decisions and why those decisions are in their best interest. Children learn and ultimately develop self-discipline without fear, coercion of external forces.

Positive Discipline states that discipline should entail use of non-punitive methods and should be for teaching valuable social and life skills in a manner that is respectful and encouraging for both children and adults. Adults could include teachers and parents. Positive Discipline is also premised on the observation that children who feel a sense of connection to their community, family, and school are less likely to misbehave. Therefore, children must learn social and life skills in order to be contributing members of their community. Positive discipline is based on the understanding that discipline must be taught and that discipline teaches. Nelsen, Lott and Glenn's (2000) criteria for positive discipline state that discipline teaches and;

- Helps children feel a sense of connection.
- Is mutually respectful and encouraging.
- Has been effective long – term.
- Teaches important social and life skills .
- Invites children to discover how capable they are.

The issue of positive discipline, therefore, entails prevention of indiscipline and thrives on the use of proactive, empowering and cooperative approaches to the management of learner indiscipline.

Disciplinary measures in South African Schools: Long before the attainment of independence in South Africa in 1994, the maintenance of discipline in South African schools relied heavily on the use of corporal punishment and discipline was taken as synonymous to punishment (Porteus, Vally & Ruth, 2001). The use of corporal punishment and other harsh physical forms of punishment has been outlawed in South Africa (Republic of South Africa, 1996a, 1996b, 1996c). Naz et al (2011:130) observe that in most countries in the world corporal punishment has been outlawed 'because of the affront to the child's dignity'. Alternatives to corporal punishment are used against the realization that children have rights that should not be violated through harsh and outrageously punitive disciplinary measures (Hart & Cohen, 2001). It is actually a criminal activity for educators in South African schools to use corporal punishment as they are liable to prosecution.

The use of disciplinary measures in South African schools is well documented, at different levels in the Department of Education (2000: 25) document. Educators are given disciplinary actions to consider depending on the magnitude of the disciplinary case committed by a learner. For example, for minor cases of indiscipline such as learners failing to be in class on time, playing truant; failing to finish homework; failing to obey instruction; being dishonest with minor consequences there is a suggestion on the use of verbal warning, community service, demerits, among other measures. For major offences such as inflicting minor injury on another person; gambling; being severely disruptive in class; forging documents or signatures with minor consequences; exhibiting racist, sexist or other discriminatory tendencies; possessing or distributing pornographic, racist material; possessing dangerous weapons; theft; vandalism; cheating during exams at schools are advised to consider written warning of the possibility of suspension from school; referral to a counsellor or social worker; community service, once permission is granted by Provincial Education Department. However, for more severe cases such as threatening another person with a dangerous weapon; causing intentional limited injury to another person; verbally threatening the safety of another; engaging in sexual abuse; such as grabbing; engaging in sexual activity; selling drugs; possessing or using alcohol or drugs or being drunk or under the influence of narcotics; disrupting the entire school e.g. organizing boycotts; forging documents or signatures with serious consequences schools are advised to refer the learner to an outside agency for counseling; applying to the Provincial Education Department for limited suspension from school activities. For criminal cases such as inflicting major physical injury on another person (assault); intentionally using a dangerous weapons; sexual harassment; sexual abuse, rape; robbery; major theft; breaking and entering locked premises; and murder schools are advised to apply to the Provincial Education Department for expulsion or transfer of the learner from the school. Allow for criminal or civil prosecution which may follow, given that misconduct is of a criminal nature. On major cases of discipline, schools always work together with concerned parents and School Governing Bodies in decision-making.

There are reported cases, however, that despite the outlawing of corporal punishment and the existence of the document on alternatives to corporal punishment there is still prevalent use of corporal punishment in South African Schools (Morrel, 2001; Makapela, 2006; Sokopo, 2010). This shows that despite the legislation in existence that makes it an offence to use corporal punishment, teachers still have the audacity to use corporal punishment. A study by Maphosa and Shumba (2010) revealed that teachers had challenges in maintaining discipline in schools in the absence of corporal punishment.

Research Context

Learner indiscipline in South African schools is on the increase (Masitsa, 2008; Aziza, 2006; de Wet (2007). Educators have to deal with this challenge of growing indiscipline in schools. Disciplinary measures used have to comply with constitutional requirements of upholding the rights of the child (Republic of South Africa, 1996a). Disciplinary measures used to deal with different forms of learner indiscipline encountered in schools everyday are based on different theoretical assumptions underpinning such measures.

METHOD

The study was a descriptive survey of selected educators in schools in one educational district. The study employed both qualitative and quantitative methodologies. Qualitative data was sought to complement the quantitative data (De Vos, 2005).

Sample Selection: Ten educators drawn from each of the fifteen schools participated in the study. Stratified random sampling was employed to select educators from different type of schools namely the junior secondary and high schools.

Tools: A semi-structured questionnaire was used to collect quantitative and qualitative data whilst phenomenological interviews were used to collect qualitative data. The questionnaire was used to collect

mainly the quantitative data required for the study. A semi-structured questionnaire was designed and some qualitative data was also collected through the questionnaire as respondents were allowed to comment on issues in some instances. Interviews were utilized to complement data collected from questionnaires.

Procedures: The researcher administered the questionnaire with the assistance of contact persons who had been identified in the participating schools. A total of 130 educator questionnaires were returned out of the 150 administered, marking an 86.7% return rate. Measures to recover outstanding questionnaires proved fruitless. Of the 130 returned educator questionnaires five were partially completed and could not be analyzed, which left the researcher with 125 valid questionnaires for analysis. Permission to conduct interviews for research purposes was sought from principals well in advance and necessary appointment were made in such a way that research activities did not interfere with teaching and learning in the school. The research participants completed an informed consent form after the purpose of the study was explained to them. A semi-structured interview guide was used to pose questions to selected educators. Interview question items were designed in such a way that they gave room for further probing and prompting. All interview proceedings were planned to be audio taped and later transcribed but participants felt uncomfortable with the use of the tape recorder and the strenuous note-taking method was employed.

Data Analysis: Quantitative data were analyzed statistically with the aid of the SPSS version 17 software whereas qualitative data reporting took the form of narratives and thick description.

RESULTS

Biographic Details

The study made use of 123 participants of which 60 (48%) were male and 65 (52%) were female. Of the total number of participants, the majority 83 (66%) were above 31 years of age while 86 (69%) had above 5 years of teaching experience. The majority of the participants were professionally qualified teachers whereas 10 (8%) of them had non-teaching qualifications. There was also a fair representation of junior secondary school and high school teachers.

Disciplinary measures used for minor forms of indiscipline

Table 1: Educators' responses and statistical significance regarding disciplinary measures used for minor indiscipline (N=125)

Disciplinary measures for Minor offenses	Responses				Significance		
	YES	%	NO	%	χ^2	df	P
Verbal reprimands	116	92.8	9	7.2	91.592	1	0.000*
Talking to learners	108	86.4	17	13.6	66.248	1	0.000*
Demotion from leadership positions	96	76.8	29	23.2	35.912	1	0.000*
Manual tasks	87	69.6	38	30.4	19.208	1	0.000*
Kneeling on the floor	86	68.8	39	31.2	17.672	1	0.000*
Sending learners out of class	78	62.4	47	37.6	7.688	1	0.006*

Denial of privileges	75	60.0	50	40.0	5.000	1	0.025*
Menial tasks	74	59.2	51	40.8	4.232	1	0.040
Corporal punishment	67	53.6	58	46.4	.648	1	0.421
Verbal insults	63	50.4	62	49.6	.008	1	0.929
Ignoring	59	47.2	66	52.8	.392	1	0.531
Not marking learners' work	54	43.2	71	56.8	2.312	1	0.128

*df =1, $p < 0.05$. Statistically significant difference between participants who said 'yes' and those who said 'no' because p is less than 0.05

The questionnaire also sought the educator respondents' views on disciplinary measures used to deal with minor forms of indiscipline in classrooms. As Table 1 above shows, there were statistically significant differences between participants who confirmed and those who denied the use of the following disciplinary measures in dealing with minor forms of indiscipline such as verbal reprimands, talking to learners, demotion of learners from leadership positions, manual labour, making learner kneel on the floor, sending learners out of the classroom and the denial of privileges. This suggests that these were measures seemingly in use according to educator respondents.

There were no significant differences between respondents who confirmed and those who denied the use of menial tasks, corporal punishment, verbal insults, ignoring and not marking learners' work as disciplinary measures used to deal with minor forms of indiscipline. This suggests that, from the point of view of educator respondents, these were not commonly used.

In interviews carried out with educators most of the already cited disciplinary measures were further raised. The following are some of the excerpts from the interviewees;

Interviewee A:

Because we are not allowed to beat, I simply ask those learners who misbehave when I am teaching to kneel on the floor for the whole lesson.

Interviewee B:

Some of the learners are so disruptive of teaching that I normally ask such learners to leave the classes. However, the Principal does not want learners to be sent out of classes.

Interviewee C:

In cases where learners do not submit given work for marking on time, I just don't mark the work. This will teach them to submit work on time in future.

Interviewee D:

I normally threaten misbehaving learners with unspecified action. At times it helps but most of the time it doesn't because they know that I use empty threats and will not follow-up my threats with serious action.

Interviewee E:

Some of the noisemakers are punished by being made to sweep the floors after school.

Further probing showed that the educators looked for ways which made learners feel they had been punished.

The next table summarizes frequencies on educators' responses on disciplinary measures used for major forms of indiscipline.

Disciplinary measures used for major forms of indiscipline

Table 2: Educators' responses and statistical significance regarding disciplinary measures used for major indiscipline (N=125)

Disciplinary measures for Major offenses	Responses				Significance		
	YES	%	NO	%	χ^2	df	p
Guidance and Counseling	107	85.6	18	14.4	63.368	1	0.000*
Talking to learners	103	82.4	22	17.6	52.488	1	0.000*
Suspension	95	76.0	30	24.0	33.800	1	0.000*
Detention	93	74.4	32	25.6	29.768	1	0.000*
Demotion	88	70.4	37	29.6	20.808	1	0.000*
Manual Labour	79	63.2	46	36.8	8.712	1	0.003*
Use of anger management techniques	70	56.0	55	44.0	1.800	1	0.180
Use of stress management techniques	69	55.2	56	44.8	1.352	1	0.245
Expulsion	65	52.0	60	48.0	.200	1	0.655
Referral to psychologist	62	49.6	63	50.4	.008	1	0.929
Community Service	59	47.2	66	52.8	.392	1	0.531
Transferring	56	44.8	69	55.2	1.352	1	0.245

*df =1, $p < 0.05$. Statistically significant difference between participants who said 'yes' and those who said 'no' because p is less than 0.05

Table 2 shows that there were statistically significant differences between educators who confirmed the use of guidance and counselling, talking to learners, suspension, detention, demotion and manual labour and those who did not confirm the use of these disciplinary measures in dealing with major forms of indiscipline. The existence of such significant differences shows that the cited disciplinary measures seemed to be in common use in schools participating in this study.

There are no statistically significant differences between respondents who confirmed the use of anger management techniques, stress management techniques, expulsion, referral to psychologists, community service and transferring. This suggests that, from the point of view of educator respondents in this study, such measures were not commonly in use.

In interviews held with educators, some interviewees lamented the lack of strong deterrent measures to deal with serious forms of indiscipline. The following are some of the excerpts from the interviewees;

Interviewee O

It is really unfortunate that we are supposed to administer discipline in schools when our hands are tied. Pieces of legislation in place make it very difficult to discipline learners, it is very difficult to suspend, let alone expel a learner. The processes and procedures are too many and often with serious repercussions for us as educators.

Interviewee P

Learners who engage in gross violation of the school code may be suspended for a short period of time and they come back to join others and they continue misbehaving.

Interviewee Q

The Deputy Principal always offer counseling to some offenders of great cases in the school. The situation would be better if we had a resident trained psychologist in the school to offer professional counseling services.

Interviewee R

The Principal advises parents of learners who are habitual offenders to transfer from the school.

Interviewee S

If a learner misbehaves while holding a leadership position in the school, such a learner is automatically demoted from that position. This serves as a lesson to others in similar positions to behave appropriately.

Such views only helped the researcher to gain further insight into how helpless some educators felt when it came to the issue of having in place the necessary disciplinary measures.

DISCUSSION

This study sought to establish the different kinds of disciplinary measures used to deal with both minor and major forms of learner indiscipline. It emerged from the study that the following disciplinary measures were mostly used in dealing with minor forms of indiscipline; verbal reprimands, talking to learners, demotion of learners from leadership positions, manual labour, making learner kneel on the floor, sending learners out of the classroom and the denial of privileges. Such disciplinary measures are mostly punitive in nature. The findings are consistent with findings in earlier studies by Van Wyk (2001) that most educators in South Africa had limited knowledge of disciplinary strategies. The finding further confirm the findings in a study by Maphosa and Shumba (2010) which found that after the banning of corporal punishment in South African schools, educators had serious challenges in coming up with and using alternative disciplinary measures. Use of punitive disciplinary approaches contradicts calls by the Committee for Children (2004) for disciplinary measures that encourage moral and mental development, as well as a sense of responsibility in children.

The study also found that the disciplinary measures commonly used to deal with minor forms of indiscipline were mostly retributive in nature. Such a finding confirms an assertion by Zaibert (2006) of the existence of disciplinary measures that are meant to 'fix' perpetrators of indiscipline. Sending children out of class or

demoting them from leadership positions as disciplinary measures really confirm the thinking behind disciplining that one deserves to be punished as 'pay back' to the offence committed. Sadly, such approaches do not help the offender to understand their disciplinary problems and assist with ways to behave in better ways in future. Sanderson (2003) advocates for disciplinary measures that are corrective and not retaliatory.

It further emerged from the study that disciplinary measures used to deal with minor forms of indiscipline were mostly reactive. This finding is consistent with assertions by Liaupsin, Jolivet and Scott (2005:48) that for a long time schools have dealt with challenging student behaviours using disciplinary measures that are 'reactive, exclusionary and ineffective'. Turnbull et. al (2002) actually argue that use of punitive and reactive disciplinary measures is linked to the increase and intensity of the behaviours meant to be controlled. The use of disciplinary measures that only deal with disciplinary cases after they have occurred have been observed to be often too little and too late (Charles, 2007).

The study also found out that suspension, detention, demotion, and manual labour were found to be the most common disciplinary measures used in dealing with major forms of indiscipline in schools. Such a finding further corroborates assertions by Vally (2005) of the need to distinguish between discipline and punishment in schools. When a learner is detained after school or suspended from school for a disciplinary offence one wonders the motive behind this when considering the need to be more proactive and supportive to offenders. Scarlet (2008) advocates for disciplinary measures that focus on the prevention of indiscipline.

The use of suspension of learners from school as a disciplinary measure also confirms findings in a study by Aziza (2001) which also found that there were rising cases of students suspended from schools in one of the provinces in South Africa. Some of the disciplinary measures also infringed on the rights of the child as pronounced in the South African Constitution. Detention and manual labour, for example, are in contravention of sections of the Constitution which spell out that children should not be treated in inhumane or degrading ways (Republic of South Africa 1996a). Nieuwenhuis, Beckmann and Prinsloo (2007) warn teachers of their crucial role of ensuring discipline in schools in an environment that is very sensitive to the protection of children's rights.

The study also found that corporal punishment was still in use in schools despite the fact that it was unlawful to use it. Such a finding is consistent with findings by Makapela (2006) that corporal punishment was still in use in South African schools. Such a finding further strengthens the observations by Maphosa and Shumba (2010) and Vally (2005) that educators still lacked the capacity to instill discipline to learners without punishing them.

CONCLUSIONS

The present study that sought to ascertain the disciplinary measures used to deal with minor and major forms of indiscipline concluded that educators still viewed disciplining learners as synonymous to punishing them. Disciplinary measures used for both minor and major forms of indiscipline were largely punitive in nature and used with the intention to 'fix' learners for offences committed. Disciplinary measures used were also found to be reactive rather than proactive. Educators waited until before cases of indiscipline were committed before they could take action. Some outlawed disciplinary measures such as corporal punishment were still found to be still in use in schools. Some of the disciplinary measures used in schools were observed to be infringing on the rights of children.

Recommendations

In the light of the findings of the study the following recommendations are made;

1. Short courses or staff development workshops on discipline should be offered to educators with emphasis on creating awareness on the use alternative disciplinary measures.

2. It should always be highlighted to teachers by creating disciplinary guidelines in schools that clarify the differences between discipline and punishment.
3. Teachers should always be reminded of the dangers of physical punishment in general and corporal punishment in particular so that they avoid the use of physical punishment in schools.
4. Learners should be empowered to report cases of abuse in the form of physical punishment by teachers and avenues to report such abuses should be made clear to learners.

Limitations and implications for future studies

The present study focused on one type of school, the independent schools in one educational district and as such results may not be generalized to all schools in South Africa. Future studies may be carried out at national level and involve different types of schools so as to obtain more generalizable results.

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THE INVESTIGATION OF PARENTS' ATTITUDE TOWARD INCLUSIVE EDUCATION FOR SLOW LEARNERS

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ABSTRACT

The purpose of this research was to investigate the effective factors on attitude of parents that have slow learning children in regular schools toward educational integration. 204 available parents in Arak were used (all of parents that have slow learning child). In this correlational research, questionnaire of assessing attitude was prepared by researchers. Researchers used the statistical parameters such as regression analysis for analyzing data. Results showed that the attitude of the parents was positive toward educational integration. The relation between parents' attitude and their age, the number of children's friends, and their academic grade was significant. Parents were dissatisfied with poor facilities in classrooms and school size. They approve teachers' supportive and sympatric relation with their children. So regression analysis showed that relation of other variables with parents' attitude was not significant. The other results are presented in the article.

Keyword: Slow learning students, integration, parents' attitude, inclusive education.

INTRODUCTION

One of the main discussions in Education and rehabilitation of exceptional children in recent years is to integrate these students in normal schools and follow normalization principle. Inclusive education is opposed to the concept and practice of special education. It demands that schools should change in order to be able to meet the learning needs of all children in a given community. It seeks to improve the learning outcomes of students in academic achievements, social skills and personal development (Ainscow, 1995). Normalization principle believes that disables persons must benefit from same rights and opportunities as normal persons. Integration programs, comprehensive education, and setting up inclusive schools are the applications of integration principle (Behpajuh, 1992; Williams, 1988). In school year 93-94, execution of measurement plan for children ready to go to primary school, which one of its results was distinguishing and replacing slow students for education and rehabilitation, resulted in extra classes for these students beside normal classes in normal schools. These classes were held for two years in some cities of Iran. This integration was followed in school year 95-96 and was stopped after five years because of some problems like increment of costs, space problems, transportation of students, and negative emotional effects, and finally in 2000-2001, Ministry of Education decided to follow merging slow students and in normal classes beside normal students (Tat & Housepian, 2000).

Children with borderline intellectual functioning ("slow learners") have an intelligence quotient (IQ) in the range of 71 to 84 (APA, 1994). An overall poor performance in all school subjects, difficulty in reading / writing / mathematics, poor memory, and hyperactivity/ inattentiveness in the classroom are the usual problems noticed by classroom teachers in slow learners (Karande, Kanchan & Kulkarni, 2008).

Educational experts believe that these slow learning students are better to educate in normal schools because they have little difference from normal students by mental growth.

Meanwhile, families of slow students believe that in separate system their children have opportunity to attain skills and knowledge proportional to their level. On the other hand, they desire their children interact with normal students and learn conformity with social life (Nelson, 1988). Also, participation in normal schools can help modification of view of normal students and help them to remove negative views toward disabled children (Vang, 2008). There are many factors that affect success of integration of disabled students in normal schools. Parents of normal students often resist against integration plans, especially when these plans have not been compiled well and children suffer severe disability. In other words, integration is affected by attitudes (Behpajuh, 1988). From those factors that are effective in integration of slow students is socio-economic situation of families. Hall et al. also found that one of the success conditions of exceptional students is that their parents have higher education and desire their children have higher education and help their children and make good relations with them.

In a study by Minayi and Vismeh (2001) in Tehran, they found that low-hearing integrated students in normal schools suffer from special problems like undesired quality of teacher services, view of other parents, low educational level of teacher, non-consent teacher of his job, low experienced teacher, and lack of rehabilitation services. Another study on 230 parents of disabled students showed that parents aside from their children studied in normal schools, they had positive beliefs about integration because it improved participation of their children in group situations (Miller et al, 1992). One of the basic integration elements is related to teachers and parents of slow students. They should be prepared to encounter a slow student in their class. On the other hand, positive views of teachers can affect views of parents. Paul & Young (1975) designed an on-the-job program to guide teachers, and this helped somehow removing misunderstandings and superstitions about these students (narrated from Jenkinson, 1997). In a study by Bruilet (2000) in Vietnam, there are deficiencies in inclusive programs for low-hearing students like non-desire and non-participation of parents in training and lack of time for presenting special training like sign language and behavioral problems. Many factors affect view of parents of slow students toward integration, such as type of facilities, type of communication with normal classmates, and type of educational planning. In a study, Kakabrayi (2005) by examination of attitude of parents of low-hearing or deaf students concluded that parents of low-hearing students have a positive view about integration and factors like correct planning and justification of parents of low-hearing students affect this view. Results of studies of BalBoni (2001) showed that those parents with a good economical situation have a more positive view toward integrated educational plans. Presence of slow learner students in regular classes is a subject that has been noticed by education experts all the world and researchers of different countries also studies about this. For example, Opdal (2001) studied views of normal teachers in inclusive education and concluded that 60 percent of teachers agreed on this method. Meanwhile, many of them suggested that architectural style of public schools should be changed in respect to needs of exceptional children.

Education of slow students in integrated situations is affected by many factors that can be discussed by either number or type. Integration is a complex process in which success of disabled students depends on special corporal and psychological situations, recognition of effective factors, and planning for integrated education. In a space that there is not an integral research about mainstreaming slow students and successful factors of these plans, this research seeks to answer this basic question that "what factor or factors do affect attitude of parents of slow students toward integration?" In other words, this study seeks to find answers of the following questions:

- From the views of parents, what problems do the schools encounter to execute integration plan?
- What are the attitudes of parents of slow students toward integrated education?
- What are factors related to attitude of parents toward inclusive education?

RESEARCH METHOD

In this research, there are two types of subjects:

1. All slow students of Arak, Iran in school year 2007-2008 in normal primary schools.
2. Parents of these students, which there are 204 slow students in normal schools of Arak (133 boys and 71 girls).

Samples were also selected by counting. To measure attitude of parents of slow students toward integration, a researcher-built measuring scale was used. To construct these tools, 30 expressions from five-score Likert scale were used. Initial form of this scale including 30 expressions, was executed in a pilot study on 70 parents (35 fathers and 35 mothers). The gathered data were analyzed based on classic error model, and 15 expressions that were not from features of a desired psychometric were removed. Internal consistency coefficient of final form of this scale was estimated by Alpha formula of Chronbach of 0.84. Salvia & Yezeldike (1991) suggest that minimum reliability coefficient for a test is 0.60. Therefore, this scale is enough and their marks can be ensured.

This is an application study, because this is done in order to obtain practical results. Since this plan identifies and determines factor or factors that are related to view without any mental inference, this is a traversal-analytical plan. Analytical traverses are specially arranged to discover and examine relations between certain variables (Openheim, 1968).

FINDINGS OF RESEARCH

Findings are offered in two descriptive and inferential sections. In the first section, results of demographic features of sample and data descriptions are included. In the second section, inferential data are offered to answer research questions.

Most important results of this research are included in following tables. Frequency of socio- economic situation for slow learners' families will be presented in table number 1.

Table 1: Frequency of socio- economic situation for slow learner's families

Socio- economic situation	frequency	Frequency percent
high	14	7
average	44	21
low	146	72
total	204	100

As table 1 shows, 72% of families have low SES. Frequency of Amount of literacy for slow learners' families will be presented in table number 2.

Table 2: Frequency of Amount of literacy for slow learners' families

Amount of literacy	Up to 5 grade	diploma	B.S.	B.A.	total
father	178	15	3	8	204
Frequency percent	90.6	.075	.015	.04	100
mother	188	11	2	3	204
Frequency percent	92.9	.055	.01	.015	100

As table 2 shows, more than 90% of families have low literacy level.

Table 3: Frequency of attitude levels of parents toward inclusive education for slow learners

Attitude	frequency	Frequency percent
negative	17	8.3
positive	164	80.4
unknown	23	11.3
total	204	100

As can be seen in table 3, 80.4% of parents have positive perspectives toward inclusive education for slow learners. In contrast, 8.3% of them have negative attitudes.

It is essential to mention that for determining positive and negative attitudes, researchers used a cutting point. Number 45 is considered as cutting point because the questionnaire for assessing parents' attitude had 15 multiple choice questions. If we want to give 1 till 5 to each option, so we will have maximum 75 and minimum 15 with average 45. Therefore, parents who attained 44 or below, were considered as having negative attitudes. In contrast, those parents who attained 45 or above, were considered as having positive point.

Table 4: Frequency of parents' opinions toward relationship between teacher and students

opinion	frequency	Frequency percent
agreement	120	60
Without opinion	60	29
disagreement	24	11
total	204	100

As can be seen in table 4, 60% of parents have positive perspectives toward relationship between teacher and students. In contrast, 11% of them have negative perspectives.

Table 5: Frequency of parents' opinion toward class population and class facilities for their children

opinion	frequency	Frequency percent
satisfied	64	31
Without opinion	48	23
unsatisfied	91	46
total	204	100

As can be seen in table 5, 46% of families are not satisfied with school facilities. In contrast, 31% of them are satisfied.

Table 6: Result of one way ANOVA for parents' attitude

Source of changes	Sum of squares	df	Mean	F	Sig.
Within group	52975.02	3	17658.34	71.32	.001
Between group	4951.21	200	247.57		
total	102489.2	203			

As can be seen in table 6, F ratio is significant. On the other hand, changes of parents' attitude are predictable based on antipant variables.

Table 7: Result of regression for parents' attitude

Model	coefficients	t	Sig.
Constant		10.63	.001
Age of parents	.41	7.65	.001
Academic level of parents	.34	6.27	.001
Number of friends (of slow learners)	.18	3.44	.001

As can be seen in table 7, all coefficients are significant. On the other hand, changes of parents' attitude are predictable based on antipant variables such as age of parents, academic level of parents and number of slow learning friends. So there are significant relations between them.

CONCLUSION

This study investigates factors that affect attitude of parents of slow students in respect to educational integration. Questions that were studied in this research were:

- From the views of parents, what problems do the schools encounter to execute integration plan?
- What are the attitudes of parents of slow students toward integrated education?
- What are factors related to attitudes of parents toward inclusive schools?

About the first question, 45% of parents were not consent about facilities of schools and placement of students in a class. But 31% were consent. Also, according to descriptive results of this study, lack individualized instruction and extra classrooms for borderline students can be pointed as one of the problems and limitations of inclusive schools. One of the effective factors in non-consent of parents is communication of slow students with their normal classmates. As Eva (2003) also reported, non-acceptance of slow students by their normal classmates is not because of their weak of performance but it is because they disarrange the classroom and they are children that suffer from communicational and behavioral features. This was also suggested in another research differently. Abbasalizadeh Qarahshiran (2001) reported that slow learning students have lower social compliance than normal students. About the second question, the results showed that 80.4 percent of parents of slow students have positive views toward integration plans and only 8.3 percent of them have negative views. In a research by Kakabarayi (2005), it is mentioned that some parents of mainstreamed low-hearing students have negative views toward integration plans. In respect to the third question, regarding the data we can say that variables of parents' ages, parents' academic level, and number of children's friends have a significant relation with parents' views. Namely, the more the age, educational level, and number of children's friends, the more the positive views. This result expresses that increment of social compliance and interpersonal relation of students are very important for parents. Another point is effect of level and type of awareness of parents and its relation with their views toward inclusive education. In a research, Naor & Milgram (1980) concluded that whatever we increase information about exceptional children, we will improve public views about them. In another research, Minayi et al. (2002) showed that the more the economical level of a family, the more positive the parents' views of low-hearing students toward integration. Kakabarayi (2005) in a study showed that level of education and age of parents have direct relation with their views toward their children. One of the factors that affect integration of slow students is socio-economic situation of families. This finding complies with the results of Hall et al. These researchers found that one of the conditions of success of exceptional students and slow learning students is higher educational level of their parents and their desire to enable higher education of their children (Hassanzadeh & Khodaverdian, 1998). Other results of this study should be noticed. The reason of concentration of slow learning students in first and second grades of primary school is that either the current instructions can compensate their growth delay and guide them to educate in higher levels, or a group of these students cannot attend normal schools so they finally get into exceptional schools. Naeij showed that 17% of borderline intelligence students use individualized instructions in their home

and 76% of them are disadvantaged in terms of such instructions. This finding can be interpreted besides the finding about socio-economic situation of families of integrated students.

Finally, we can say that slow students can be educated and must be educated in inclusive schools. However, this requires exact planning, usage of more facilities, and support of parents, teachers and classmates. Since integration, in perception of some researchers (e.g. Wong, 2008), is affected by views of involved persons, enough notice is necessary for teachers and parents (of exceptional and normal) students. Anyway, in Iran, educational integration has gradually opened its place in education system of exceptional students, and parents of this group has accepted this well. However, this does not mean there is no problem in implementation of this method. Authorities should proceed to remove problems of this method precisely. Inclusion is better educational option for slow learning students but this educational setting needs to have some facilities and preparation.

We hope that till the time such ideal educational facilities are made available, pediatricians, psychologists, and counselors will be able to counsel the parents of slow learners of the benefits of inclusive system of education. Such timely counseling will prevent slow learners from experiencing grade retention and becoming school drop-outs. We hope standard tools will be used to examine parents' views for integrated education in next studies, because in this study, researchers were forced to examine parents' views upon raw marks for lack of standard questionnaires. This places the findings subject to validity damages. Of course, this method is not unexampled in study of integration. For example, Kakabarayi (2005), Minayi, Vismeh, & Hassanzadeh (2005), and Vismeh (2005) used this method. Future researchers can examine views of other groups affecting integration (e.g. teachers, normal students, parents of normal students, etc) by doing more psychometric activities on these tools.

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ROLE AND FUNCTION OF META COMMUNICATION CONCEPT AS NONVERBAL COMMUNICATION IN TEACHING EFL

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ABSTRACT

This paper examines and focuses on some issues and questions related to effective use of meta communication concept as nonverbal communication in teaching English as a foreign language by giving some language tips on how to teach meta-communicative items in the foreign language class. "Meta Communication" is the process between message designers when they are talking about the learning process, as distinguished from their articulation of the "substantive" learning, itself. Like verbal communication, nonverbal communication exists in a context, and that context determines to a large extent the meanings of any nonverbal behaviors. The same nonverbal behavior may have a totally different meaning when it occurs in another context. It is also important to mention culture in teaching meta-communication as the nonverbal behaviors are generally culture specific. Thus, there can be misunderstandings in communication. It is essential to remember that the meta-communication which accompanies any message is very powerful. The receiver will use these clues to help them to interpret what you mean, but more importantly they will often take the meaning from the meta-communication rather than from the words themselves, particularly when what you are saying conflicts with what you are doing. Hence, understanding or interpreting nonverbal messages accurately is especially important for second/foreign language (L2) learners whose comprehension skill is more limited. Thus, this paper aims to demonstrate authentic uses of meta-communication by showing some visual and written materials to be used in class to increase students' awareness of the target language.

Key Words: Meta communication, nonverbal communication, teaching English as a Foreign Language, critical thinking.

INTRODUCTION

Communication not only lies at the heart of the teaching process, but it also emerges as the most basic requirement of a liveliness and existence. In fact, "living is to communicate" in a sense. The humankind, since his/her species began to live as a social being, has used communication for maintaining his/her liveliness, for sharing what they have produced, for transferring some of his/her values, settled opinions, knowledge to the coming generations. Its history begins with the history of humankind. We live in a kind of message web at every moment in our everyday lives except for the sleep, ringing of the alarm clock, the sound of the azan coming from loudspeaker, shouting of the salespersons in the street, billboards, while greeting each other, in schools, on the street, while turning the heads, maintaining attitudes and so on. It would be a great mistake to describe communication as being static; it should rather be defined as a process. The transferring of knowledge, emotion, opinion, attitude or beliefs with behaviors, from one person to another (between the source and the

receiver), by using some channels that aims at change, occurs as a process rather than having a static and fixed form and quality.

In other words, communication is a process of transferring information from one entity to another. Communication processes are sign-mediated interactions between at least two agents, which share a repertoire of signs, and semiotic rules. Communication is commonly defined as "the imparting or interchange of thoughts, opinions, or information by speech, writing, or signs". Although there is such a thing as one-way communication, communication can be perceived better as a two-way process in which there is an exchange and progression of thoughts, feelings or ideas (energy) towards a mutually accepted goal or direction - information- (Schwartz and et. al., 2008, p. 129). Since the process indicates dynamism all the time from moment to moment with the framework of its own rules and communication structures as a process, it entirely has a dynamic structure by the cause of its existence. Therefore, what must be understood from the suggestion? It should be understood that, communication is circular process for the better quality of communication.

FORMS OF COMMUNICATION: NONVERBAL COMMUNICATION VERSUS VERBAL COMMUNICATION

Communication is a process whereby information is enclosed in a package and is channeled and imparted by a sender to a receiver via some medium. The receiver then decodes the message and gives to the sender as a feedback. All forms of communication require a sender, a message, and a receiver. Communication requires that all parties have a space of communicative commonality. There are auditory means, such as speech, song, and tone of voice, and there are nonverbal means, such as body language, sign language, paralanguage, touch, eye contact, as well as writing.

Communication is thus a process by which meaning is assigned and conveyed in an attempt to create a shared understanding. This process requires a vast repertoire of skills in intrapersonal and interpersonal processing, listening, observing, speaking, questioning, analyzing, and evaluating. It is through communication that collaboration and cooperation occurs (<http://www.k12.wa.us/CurriculumInstruct/Communications/default.aspx>).

Over time, technology has progressed and has created new forms and ideas about communication. These technological advances revolutionized the processes of communication. Researchers determine that communication was transformed in three revolutionary stages that are:

1. The 1st Information Communication Revolution, in which the first written communication began, with pictographs.
2. The 2nd Information Communication Revolution, in which writing began to appear on paper, papyrus, clay, wax, etc. Common alphabets were introduced, allowing the uniformity of language across large distances.
3. The 3rd Information Communication Revolution, in which information can be transferred via controlled waves and electronic signals.

The complicated nature of communication results from its relatedness to human nature. Essentially, communication skills are particularly important when communicating or contacting with people who are very sensitive to verbal and nonverbal nuances due to their emotional distress. Communication always develops in a given situation or context. If the subject, the speaker talks about and the situation he/she is in is not known precisely or the context in which a message is transferred is not understood, the meanings may not be clearly conceived and may be analyzed wrongly. It is possible to categorize communication depending upon various criteria such as the number of participants, materials and medium that is used. Communication can be categorized structurally into two according to the codes used in it:

- Verbal Communication which contains oral-audial and written items and
- Nonverbal Communication

Verbal Communication

The basis of communication is the interaction between people. Verbal communication is the most well known way for people to communicate face-to-face. Some of the key components of verbal communication are sound, words, speaking, and language (http://www.cobweb2.louisville.edu/faculty/regbruce/bruce//mgmtwebs/commun_f98/Verbal.htm).

While the term "verbal communication" seems almost self-explanatory, it is indeed far more complex in its appearance. By definition, verbal communication includes not only oral discussions, but also written messages and mediated communications. The most apparent type of verbal communication is oral, and a number of examples of oral communication are readily available. Speeches, presentations and announcements are all forms of verbal communication, as well as casual conversations between friends.

In addition to standard verbal communication, most communication models also include verbal feedback from the receiver, which may be in the form of questions or comments, but also in shorter forms such as "Yes" or even a nondescript "Uh-huh."

While specific examples of oral verbal communication are virtually unlimited, any conversation involving at least a receiver and a sender that are using spoken words can be considered an example of verbal communication. While it may seem counterintuitive, written communication is deemed as a form of verbal communication, under most commonly accepted definitions of the term. For this reason, a plethora of seemingly nonverbal communication forms can be used as examples of verbal communication, including written letters, memos, newsletters, newspapers, journals and even personal notes. Textbooks, novels and other literature also serve as examples of verbal communication, because they use words as the medium through which a message is conveyed. Even though the field of mediated communication is a separate branch of communication study, it contains examples of both verbal and nonverbal communications. Most World Wide Web content consists of either typed text or videos, both of which rely heavily on verbal communication to convey their messages.

Likewise, webcasts and other online interactive media use verbal communication, as do emails, telnet sessions and newsgroup postings. Mediated communication does not stop with the Internet, of course; television broadcasts use a combination of verbal and nonverbal communication, and radio broadcasts rely on verbal communication (Evans, 2010).

Crucial components of verbal communication include language, sound, words and speaking. The emphasis in verbal communication is the act of speaking. Words alone are not enough to put across the gravity of the message or the real meaning. The uttering part makes verbal communication a distinct type. Basically intent or purpose of verbal communication is to provide the necessary information and direction.

When a person employs verbal communication, he delivers information. Speaking about something means clarifying or stating how things are. Thus, there is the direction part. Through verbal communication, it's possible to direct perception into certain thoughts and meaning and people have the ability to manipulate things using words (http://www.ehow.com/about_6763748_difference-between-verbal-nonverbal-communication.htm).

Nonverbal Communication

A person may use his/her body language effectively in everyday life intentionally or unintentionally and mostly unconsciously. Beyond that, a person can not control his/her body as he/she controls the words. Our body gives much more spontaneous reactions against events or situations. It is possible to hide our actual feelings and thoughts behind the words; however it is most of the time not possible to conceal our body language. A good listener perceives not only the words of the person with whom he/she communicates, but also the things

he/she has performed by his/her face, hand, arm and body. Because, communication is possible by using nonverbal messages such as facial expressions, hand and arm movements, posture of the body, tone of the voice. In fact in such forms of communication, only a little part of the message interaction is made up of verbal messages.

At this point, the question of how to define nonverbal communication should be touched upon. It is possible to make various definitions with different perspectives. It is possible to come across some approaches that define a communicational form beyond verbal, and enacts not by words or voice, but any other thing such as body language, facial expression, way of dressing and environmental factors while communicating. This form of communication consists of the codes which occur naturally such as intonation, facial expressions, mimics, gestures, body movements, colours, accessories. In other words, it consists of the communication codes made up of nonverbal signs, involves also the voices other than words. A given situation or context, is a dynamic process in which, nonverbal behaviors are performed individually or as a group together with verbal behaviours during the exchange, interpretation or analysis of meanings.

Nonverbal behaviours, experiences and communication occurs all day long on TV, in cinema, radio, newspapers, magazines, during speeches that take place in front of a community, private meetings, classrooms, in short in every field and at every moment of life and they are effective. They are enacted to identify definite behaviours or codes of nonverbal communication and help people to improve their communication skills.

There are five major characteristics of nonverbal communication: it is present in most interpersonal communication; it often conveys more information than verbal communication; it is usually believed to be more effective than verbal communication; it is a primary means of communicating emotions and finally, it is meta communication.

Nonverbal communication engages in most of our senses, therefore we experience many different forms. Nonverbal communication involves **facial** -displays, identity, attraction, emotion-, **eye behaviors** -eye contact and pupil size-, **movement and gestures** -emblems, illustrators, affect display, regulators, adaptors-, **touch behaviors** -affection, care giving, power and control, aggression, ritual-, **vocal behaviors** -pitch, inflection, volume, rate, filler words, accent, silence, etc., **the use of smell** -memories and sexual attraction-, **the use of space** -four distances-intimate, personal, social, and public-, **physical appearance**-attractiveness=positive qualities-, **the use of time** -send messages of value and power **the use of artifacts** -selection and **placement of objects, use of light**, as well as **use of color**.

Nonverbal communication intends to put more meaning into verbal communication. In some cases, the use of words or manipulation is not enough to emphasize the emotions or thoughts behind the message. The use of other objects, facial expressions and hand gestures provides a different kind of clarity. Nonverbal communication provides clues and hints to the real meaning behind the words used (http://www.ehow.com/about_6763748_difference-between-verbal-nonverbal-communication.htm).

Nonverbal vs. Verbal Communication

It is widely debated which form of communication is more persuasive and the underlying reasons by scholars. It seems that verbal communication is seen as a more persuasive form in general and that nonverbal communication exists just to supplement verbal communication. But also, some are wondering whether if these two forms are equally effective on their own ways. Verbal communication is about the content, and can be persuasive depending on how it articulates, proof, logic and emotional appeal. Whether or not verbal communication is persuasive depends largely on the bias and receptiveness of the listener. Non verbal communication is separate from content, and communicates vocally through pitch, tone, cadence and motion, like posture, physical appearance, gesture, and facial expression.

Unlike verbal communication, perceptions based on non verbal communication tend to be qualitative and descriptive, like honesty, confidence, intelligence, authority, and credibility. However, it is not possible to persuade anyone for anything without verbal communication, because there must always be a message. Despite all these, we may still argue that in the presence of a truly unbiased and receptive listener, nonverbal communication can be the main tipping point to decide, whether the person across knows what he is talking about or not. Precisely because nonverbal messages are more primitive, uncontrollable, believable, continuous, unstructured, they are more efficiently and widely understandable.

Similarities between verbal and nonverbal messages are symbolic, individually produced and subject to interpretation. While both verbal and nonverbal communication serves as reflections of people's thoughts, ideas and emotions, they vary in the extent of use. For instance, nonverbal communication is imprecise and explains certain things, but maybe not in its entire complexity. Verbal communication can explain complex ideas because the use of words and speaking are the main forms of communication that people use to get any message across. Regardless of how complex the idea is, people can always explain it verbally. Further, nonverbal communication is only possible within a certain distance.

Unless there is some form of video conversation, nonverbal communication cannot be applied over great distance. Verbal communication does not exactly need visuals to be able to convey thoughts. Therefore, verbal communication can transmit factual information whereas, nonverbal cannot (http://www.ehow.com/about_6763748_difference-between-verbal-nonverbal-communication.htm).

In what comes next, we will develop 'meta communication' as a concept to convey the ways in which these two forms of communication may indeed envelop on each other in multiplicity of ways in order to think further on the ways in which this meta communicative strategies could be useful in the teaching process.

META COMMUNICATION AS A CONCEPT

The prefix can have various meanings but as used in communication, philosophy and psychology its meaning is best recognized as *about*. Thus, *meta communication* refers to communication about communication; *meta-language* is language about language; *meta-message* is a message about a message. In the same way, you can use language (i.e., meta-language) to talk about language (i.e., object language). And you can talk about your messages with meta-messages.

For example, when you send someone an e-mail with a seemingly sarcastic comment and then put a smiley at the end, the smiley communicates about your communication; it says something like "this message is not to be taken literally; I'm trying to be humorous." The smiley is a meta-message; it's a message about a message. When you say, in preface to some comment, "I'm not sure about this but...." you're communicating a message about a message; you're commenting on the message and asking that it be understood with the qualification that you may be wrong. When you conclude a comment with "I'm only kidding" you're meta-communicating; you're communicating about the communication.

"Every communication has a content and relationship aspect to such an extent that the latter classifies the former and is therefore a meta-communication." Each person responds to the *content* of communication in the *context* of the relationship between the communicators. The word meta communication is used in many different ways, but Watzlawick uses it to refer to the exchange of information about how to interpret other information (http://www.im.ovgu.de/im_media/downloads/lehre/ws1011/I_deckers/Watzlawick+5+Axioms.pdf).

Just as the interpretation of the words "What an idiot you are" could be influenced by the following words "Just kidding", it could also be influenced by the relationship between the communicators. In the example given, the

word "idiot" might be accepted quite happily from a close friend, but convey an entirely different meaning in other circumstances (Coates, 2009).

De Vito (2000) suggests that for a message to have meaning, both elements, verbal and nonverbal, need to be present. He defines nonverbal communication as communicating without words: "You communicate nonverbally when you gesture, smile or frown, widen your eyes, move your chair closer to someone, wear jewellery, touch someone, raise your vocal volume, or even when you say nothing" (DeVito, 2000, p. 130). According to DeVito, meta communication is "communication that refers to other communications" (2001, p.136). In other words, meta communication is talking about 'talk' or 'communication'.

For example, if two married people sit-down to talk about an argument they just had, they are meta communicating because they are talking about the communication that happened in the argument. Meta communication can be communication about both verbal and nonverbal communication. If a girlfriend is talking to her boyfriend and she complains that her boyfriend does not seem to be listening to her and judging from his lack of eye contact (nonverbal communication), then the girlfriend is meta-communicating because she is talking about her boyfriend's nonverbal communication.

'Meta communication' is therefore something that occurs 'in addition to the communication' and we must always be aware of its existence. It is essential to remember that the meta communication which accompanies any message is very powerful. The receiver will use these clues to help them to interpret what you mean, but more importantly they will often take the meaning from the meta communication rather than from the verbal words themselves, particularly when what one is saying conflicts with what he/she is doing. If, for example, you are angry but trying to hide your anger, you must be aware of your body posture, the way you use your eyes, gestures and facial expressions, and the tone of your voice, which may well give you away. Similarly, in writing, the 'tone of your voice' may show, show your attitude/character. In addition meta communication is to create meanings by solving relationships of body language (Demiray, 2009).

KNOWLEDGE BUILDING PROCESS WHILE LEARNING AND TEACHING

To understand knowledge building process it is essential to distinguish learning -"the process through which the cultural capital of a society is made available to successive generations" from knowledge building- "the deliberate effort to increase the cultural capital". This, in turn, requires distinguishing knowledge building from a broad range of activities that share its constructivist underpinnings, but not its focus on the creation of new knowledge. These include collaborative learning, guided discovery, project-based learning, and communities of learners, communities of practice, and anchored instruction, distance learning as well as learning a foreign language. Knowledge building teaches students how to develop a repertoire of skills that allow them to become experts in the art of learning, a skill that, once developed, can be used across their academic and working lives. In a knowledge-building environment, structured assignments can assist learning for students, rather than teachers, are invested with the individual and collective responsibility to identify holes in their knowledge, develop plans to close them, and assess progress in attaining their goals.

Learning needs, discovered through structured assignments, which determine the activities students perform in order to master a specific subject. Knowledge building may bridge the chasm between the classroom and the corporation, because it allows students to develop the skills involved in learning, thinking critically and working co-operatively with others (<http://www.ccl-cca.ca/CCL/Reports/LessonsInLearning/>). The same principles apply to learning a foreign language as well.

DYNAMICS OF KNOWLEDGE BUILDING PROCESS AND ITS RELATIONSHIP WITH META COMMUNICATION

The dynamics of knowledge building process has social aspects such as the creation of public knowledge. In contrast to knowledge situated within the individual mind (the traditional concern of education) and knowledge situated in the practice of groups (the concern of situated cognition and communities of practice), public knowledge has an out-in-the-world character. Public knowledge can itself become an object of inquiry and the basis for further knowledge building. Thus there is the possibility of a knowledge building dynamic that drives the continual creation and advancement of new knowledge. What makes knowledge building a realistic approach to education is the discovery that children as early as grade one can engage in it. Thus there is a clear developmental link running from childhood education on into advanced education and adult knowledge work, in which the same process is carried out at increasingly high levels (<http://ikit.org/kb.html>).

Like all your communication, your meta communication may be used both effectively and ineffectively. Generally, it's helpful to analyze your talking patterns and the ways in which you and your partner or management and workers, say, relate to each other. This is good; this is the effective use of meta communication and can often lead to significant improvements in your own relationships. But, when you substitute talking about your communication for talking about a problem, you're likely to create more problems than you had originally.

The conversation (and soon-to-be argument) is now between the parents and their view of each other. When this type of talk becomes the sole or main topic of conversation, you're into what is called a *meta communication spiral*, with your talk focusing more and more on the ways you talk and less and less on the problem of the child. So, the lessons to be learned from meta communication are two fold: Use meta communication to improve your interpersonal and relationship communication -to preface important messages or to analyze and ultimately improve relationship communication- for example, and avoid meta communication when it substitutes for addressing an immediate problem (<http://tcbdevito.blogspot.com>).

As it is mentioned above the most important phase in building knowledge-is using meta communicational element. We can discuss many examples as meta communicational elements in education materials which are produced for traditional or distance education environments, domestically and universally. But we should discuss the exact universal examples here rather than domestic ones. For example let's look at the traffic education course. Some symbols talk us universally.



For example "**DO NOT HORN**", means not disturb here, please be careful, there is some sensitive thing around here like school, hospital etc. The meanings of these symbols and their function for our life with correct running of the traffic system talk us from various aspects of possibilities as described by the teachers. Also this would mean to discuss with learners for receiving their critics and thoughts during this traffic education period. Learning of other signs and rules of traffic education are similar on using meta communication process and its function. Since, we have to learn and teach these certain

rules and values via signs and symbols by the same meaning. These meanings do not change in different societies or in between different regions of the same society. In this context maybe life sciences have more advantages than the social ones like history, philosophy, geography or literature. In social sciences terms and concepts appear more abstract and we have to think more in abstract terms. However the terms of life sciences like chemistry, physics or math have more definite signs, symbols and icons for their contents. So that we can use meta communicational elements more often and also functionally while producing educational materials in instruction for these fields.

Other examples are useful to clarify understanding of meta communication concept and its function in life long learning process with our daily life. For example, some signs dealt with disabled person which are conveniently understand each others in same the meaning of parking for disabled person, toilet for disabled person, meal for disabled person, path for disabled person, reserve for disabled person, line for disabled person which we can meet anywhere. The word 'disabled' is unnecessary. We understand meaning of these symbols very briefly and then behave how it is necessary in social perspective.



Let's have look deeper to examples from the math course world. Usually 2×2 is 4 or $2+2=4$ in every corner of the world or to take area of square into consideration can be formulating square of on side length in everywhere (Reynard, 2009).

Another example deals with etiquettes. Etiquettes are practicing in good manners or to know how to behave in given situation and to know how to interact with the people or others. Proper etiquette helps you make a great first impression and stand out in a competitive with others. From point of communication science, etiquettes have meta communicational function in communication process. In this process etiquettes are verbally have a meaning dealt with what you say and how you say it and nonverbally Etiquette has a handshake, posture, eye contact, facial expressions meaning, In other words etiquette is defined as the forms, manners, and ceremonies established by convention as acceptable or required in social relations, in a profession or in official life.

Textbooks make claims about how meta communication betters relationships in various ways; however, research is not cited to uphold such claims. Therefore, since studies in the past have not examined the possible link between meta communication and relationship satisfaction within romantic relationships, a relationship between the two concepts must be addressed and tested (Alexander, 1972). Although online learning offers a more direct mode of communication between the learner and the instructor than in many in-class situations, many students and educators feel that a deeper interaction is needed to feel part of a group dynamic online. However, does this actually help the student learn, feel part of the class, and control the attrition rate? What value does a photograph add to online learning (Hand, 2000)?

The knowledge builder must have the knowledge and experience of various forms of activities such as reviewing Experience, attitude Questions, finding Things Out, finding and using Information, role Play, preparing Written Information and problem solving and planning action: (Rashid, 1998).

Indeed same principles may apply to teaching English as a foreign language, therefore this process could be enhanced by use of meta communicative techniques. In order to develop this argument, first we need to consider the structure and system of 'language' as a social phenomena briefly and show the ways in which 'English' language came to be a commonly learned and spoken language in our global world.

ROLE AND FUNCTION OF META COMMUNICATION CONCEPT FOR TEACHING ENGLISH

Language may refer either to the specifically human capacity for acquiring and using complex systems of communication, or to a specific instance of such a system of complex communication (<http://en.wikipedia.org/wiki/Language>). People have always been interested in learning a language by using linguistic or extra linguistic means of communication. Learning a language involves:

- Paralinguistic and extra linguistic means of communication (i.e. the function of gestures, mime, prosody, etc.).
- Linguistic means of communication (including knowledge about items belonging to the levels of phonology/graphology, morphology, syntax, lexis).
- Pragmatic and discourse knowledge (e.g. knowledge how to express speech acts by linguistic and paralinguistic means, knowledge about the structure of different discourse types, knowledge about co-occurrence restrictions on speech acts (possible adjacency pairs).
- Socio-interactional knowledge, refers to the knowledge on general social rules for interaction in a given society or situation (Faerch & Kasper, 1986).

By metacommunicating we imply the learners' activity in analysing, monitoring and evaluating those knowledge systems implicit within the various text-types confronting him during learning. Such metacommunication occurs within the communicative performance of the classroom as a sociolinguistic activity in its own right. Through this ongoing communication and metacommunication, learners not only become participants in the procedures and activities, they may also become critically sensitised to the potential and richness of the unified system of knowledge, affects and abilities upon which their communication depends (Breen & Candlin, 1980). Metacommunicative function indicates how the referential meaning of a message is to be interpreted and it relates to the speaker's subjective intentions or the hearer's subjective interpretation thereof when using the code. Nonverbal communication which involves conveying messages to an audience through body movements, head nods, hand-arm gestures, facial expressions, eye gaze, posture, and interpersonal distance can be given as an example of meta communication (Kellerman, 1992). Goldin-Meadow (1999) suggested that "gesture serves as both a tool for communication for listeners, and a tool for thinking for speakers". For speakers, gestures facilitate retrieval of words from memory and reduce cognitive burden. For listeners, they can facilitate comprehension of a spoken message (e.g., Cassell, McNeill, & McCullough, 1999) and convey thoughts not present in speech. Although nonverbal communication gives clues to what speakers are thinking about or enhances what they are saying, cultural differences may interfere with understanding a message (e.g., Pennycook, 1985). Facial expressions in Korean culture are different from those in Western cultures in terms of subtlety.

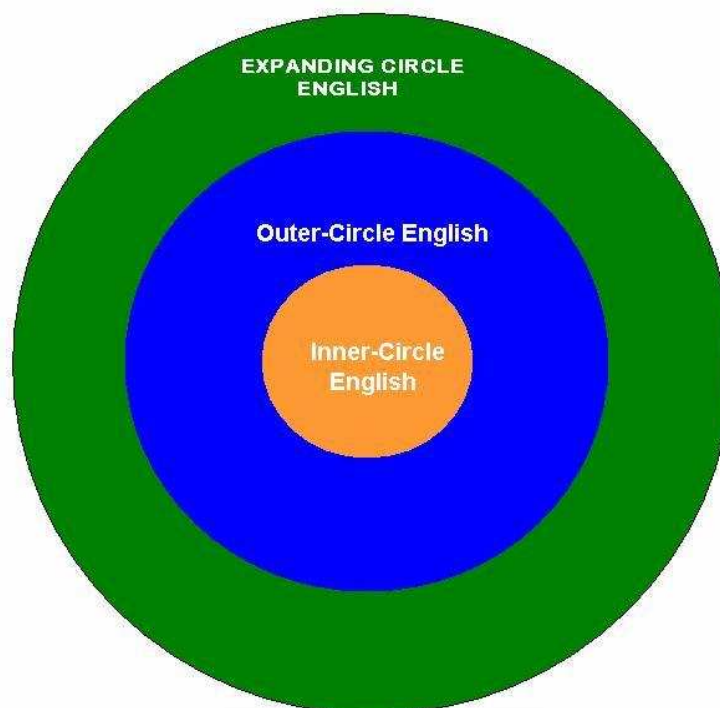
Perceptiveness in interpreting others' facial expressions and emotions is an important element of nonverbal communication (Yum, 1987). In Japan, gestures and facial expressions sometimes serve social functions such as showing politeness, respect, and formality. Bowing or looking slightly downward shows respect for the interlocutor (Kagawa, 2001). Engaging eye contact is often considered rude in Asia culture.

Various studies with native speakers have shown that the presence of gestures with a verbal message brings a positive outcome to both speakers and listeners. Morrel-Samuels and Krauss (1992) found that a gesture functions as a facilitator to what a speaker intends to say. In narration, gestures are synchronized with speech and are conveyed right before or simultaneously with a lexical item. They facilitate negotiation of meaning and help speakers to recall lexical items faster (Hadar, Wenkert-Olenik, Krauss, & Soroket, 1998). Gestures are

particularly effective for listeners when the intelligibility of the speech is reduced, as in noisy conditions. Other studies focusing on gesture use by L2 learners have found that those learning English as an L2 in a naturalistic setting have the benefit of greater exposure to nonverbal communication features such as gestures and tend to acquire more native-like nonverbal behaviors in contrast to learners of English as a foreign language (EFL; McCafferty & Ahmed, 2000). Learners also use more gestures when producing L2 English than their L1s (e.g., Gullberg, 1998).

Learners with higher proficiency, perhaps in conjunction with more L2 exposure and interaction experience (McCafferty & Ahmed, 2000), might have a greater ability to use gestures as one of their communication strategies. Nonverbal cues may play an important role in interactions that promote interlanguage (interlangua) development for L2 learners by facilitating negotiation and comprehension as well as output (Sueyoshi, A. & D. M. Hardison, 2005).

English, as the most commonly spoken language across the world, has become an international language in the course of time. Kachru (1985) classifies the spread of English in three circles. The first one is inner circle which illustrate the conventional essence of English. The United States, the United Kingdom, Canada, and Australia are inner circle countries. The other category is the outer circle which refers to the countries where English is taught as a second language because of the official status given to English. People living in these countries such as Nigeria, Hong Kong, Pakistan, Singapore and India have to learn English because they will need it in a state office anyhow. In other words, people have a chance to use English every time and everywhere in these countries. The last category is called expanding circle which involves the areas where English language is not used for official purposes, but rather as an international language and taught in institutions of education. Learners' interaction in English is limited to school environments and they do not have many chances to communicate in English in their daily lives. Some of these countries can be lined up as Turkey, Greece, France, Germany and Japan.



Kachru's "Circles" Theory

A new term has come into existence by the spread of English worldwide. English as a Lingua Franca (ELF) can be described as an international medium of communication which has no native speakers and no proper culture of its own to speak of (Alptekin, 2011). Alptekin says that ELF is everyone's property and lacks idioms, puns, connotations, slang, humour, and culture-specific pragmatic dimensions. As the forms and conventions of ELF transforms and transpositions in speech acts and cultural contexts and interact and influence one another, each variety itself becomes multicultural in the process and gradually fosters a multicultural identity among its speakers (Brutt-Griffler, 2002). Jenkins (2004) claims that learners need to learn not only variety of English, but about Englishes; their similarities and differences; issues involved in intelligibility; the strong links between language and identity rather than conforming to a native standard such as British English.

Today it is possible to mention about Chinese English, Japanese English, Thai English which have different syntactic, lexical and meta communicative characteristics. As Smith (1983) states no one needs to become more like the Americans, the British, the Australians, the Canadians or any other English speaker in order to lay claim on the language.

No matter what kind of English that aimed at teaching, we cannot escape the need to decide on the variety or varieties which students are exposed to and have to learn.

The choice seems to be between adopting one (perhaps native speaker) variety, or, raising students' awareness and 'plucentricity', so that they can adjust their speech 'in order to be intelligible to interlocutors from a wide range of L1 backgrounds, most of whom are not inner circle native speakers' (Harmer, 2007). Harmer further claims that for beginner students, whether from the inner circle or from anywhere else, presenting the language in its variety will be an appropriate pedagogical model. As the students become more advanced, the variety's richness – including metaphors and idioms- should also be offered in order to make them absorb better, unless they are not too culture-specific. Jenkins states that (2004) our students should be made more and more aware of different Englishes as they become more advanced.

The more students are exposed to the varieties of meta communicative elements, the better they can understand and be aware of varieties of English language. Meta communicative abilities may serve students as an effective method to allow the students to systematically examine texts in a critical manner. Here it is inevitable to mention about critical thinking. From a practical perspective, Haskins (2006:2) states that critical thinking is "a process by which we use our knowledge and intelligence to effectively arrive at the most reasonable and justifiable positions on issues, and which endeavors to identify and overcome the numerous hindrances to rational thinking." A critical thinker, according to Birjandi & Bagherkazemi (2010:137), is someone who among other characteristics:

- has a strong inclination to notice the prominence of good thinking;
- describes problems and concentrates on related topics and issues;
- differentiates between logical and illogical inferences;
- postpones judgments and decisions in the absence adequate proof;
- comprehends the difference between logical reasoning and rationalizing;
- knows that one's comprehension is restricted and that there are degrees of belief;
- distinguishes between facts, views and suppositions;
- watches out for authoritarian effects and specious assertions;
- predicts the results of alternative actions.

It should be stated that critical thinkers are also good at understanding meta communicative concepts and use them in communicating in the target language. Good language learners make guesses about the language, use reasoning and they are good at making inferences.

CONCLUSION AND IMPLICATIONS

As is emphasized in the text, meta-communication is a very important, powerful and functional concept during knowledge building for preparation of the course materials in education field. In this meaning, concept is becoming a more carefully designing course for language learners. Good language learners are the ones who can understand and use meta communicative elements in communicating in English. The more students are exposed to meta communicative elements, the better they can understand the dynamics of good communication skills.

The implications of such a method that makes use of critical thinking and meta communication will accompany teachers who inform their students that other nations are also using English as an official language. Some other supportive techniques and strategies may be developed as well. For instance, teachers may bring some videos to the class on which Indians, Africans and other people from different nationalities using English either as a foreign or second language. In this way, students will better understand the internationality and multiplicity of the ways in which English language is performed through different agents across cultures. Most of the students and teachers think that the USA and the UK impose their culture via their language. Teachers may bring reading texts related to the other cultures just to show that English can be used as a tool to learn something that is not related to the USA and the UK culture. Teachers may bring extra reading texts apart from the ones in their course book materials to familiarize students with other cultures and make them competent interculturally (Tomak 2011). By doing so, students will also improve their intercultural competence by acquiring information about other cultures as well.

Teachers can create a holistic environment (by not focusing exclusively on language forms), they can interact naturally with the meaning students want to create. In this experimental curriculum native speakers may be invited to enroll in the class or assist in the lessons.

Teachers may create blogs or carry out online activities as well in order to support and develop students' critical thinking capacities. English textbooks and materials should be written which reflect other cultures and identities so the students can engage in relating the texts books into their own cultural terms and expressing their identity rather than mimicking the others. By gaining awareness of meta communicative aspects of target language, students may communicate with other speakers of English whether they use English as ESL, EFL or ELF.

In conclusion, curriculum developers and material designers may discuss their educational course materials for re-building (at any level such as printed, audio, visual, electronic and verbal) from point of function of meta communication and knowledge building theory perspectives according to recent developments and learners' needs. Lesson materials and course books may be prepared to include instances of meta communication in order to raise students' awareness. Students may be exposed to natural language use by ESL, EFL and ELF learners. They may be helped to be critical thinkers by applying language learning strategies.

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JOB SATISFACTION OF TECHNOLOGY AND DESIGN EDUCATION TEACHERS IN TURKEY (ANKARA CASE)

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ABSTRACT

This paper studies whether job satisfaction levels of technology and design teachers will have an influence on both the organizational success and societal development. The basic aims of the study are to identify the job satisfaction levels of technology and design teachers in primary schools in Ankara and to suggest ways to improve job satisfaction. The study is a descriptive research. Job satisfaction measurement tool was administered to eighty one technology and design teachers. Technology and design teachers are found to have least job satisfaction score in regard to their profession. Attempts to improve job satisfaction may focus on the dimension of job itself. "Regarded as important and being respected" may contribute to satisfaction.

Keywords: Job Satisfaction, Technology and Design Education, Technology and Design.

INTRODUCTION

Regardless of their types, organizations are composed of people in any structure to achieve a common goal. However, the achievement of this common goal, specifically producing desirable goods or services, is dependent on effective and productive work of the members. Job satisfaction plays crucial role in members' effective and productive work. For instance, Byars and Rue (2000: 12) support the idea of minimizing employee turnover and unemployment benefit cost by practicing sound human relations and creating a work atmosphere that promotes job satisfaction.

Locke describes job satisfaction as positive affect of employees towards their job or job situations (Gupta and Sharma, 2009: 17). Job satisfaction is affected by individual and organizational factors. Individual factors include personal characteristics, expectations from job and job setting. Such expectations of workers firstly relate to their personality. People look for jobs based on their educational background, social status and

relationships, and also perform their jobs depending on such factors. The major individual factors influencing job satisfaction are age, gender, years of work experience, intelligence, educational level, sociocultural qualities, personality, level of occupation, and occupational differences (Erdoğan, 1999: 234).

Organizational factors which affect job satisfaction are the quality of job, its content, its social and economical benefits (specifically wage, promotional opportunity, proper reward system), and working conditions (Erdoğan, 1999: 242; Balci, 1985:13-18). These factors may be arranged by employers to increase job satisfaction of workers. Erdoğan (1999:242) also argues that being a part of successful group, interpersonal relationships and job security have all positive effects on job satisfaction. Similarly, Fraser (1987: 29) emphasizes Ling's claim on six types of goal that must be achieved before job satisfaction can be attained. These, he claims, are money, prestige and status, security, approval, a sense of belonging, and creativeness.

Spector (1997: 3) indicates the common job satisfaction factors as; appreciation, communication, coworkers, fringe benefits, job conditions, nature of the work itself, organization itself, organization's policies and procedures, pay, personal growth, promotion opportunities, recognition, security, supervision. Aamodt (2007: 342) argues that the harmony of employee with the job and organization is highly important if the employee's value, interest, personality, lifestyle and skills match with the organization, coworkers and supervisor then job satisfaction is a conclusion. Besides, needs/ supplies fit is also important. Needs/ supplies fit is the extent to which the rewards, salary and benefits received by employees are perceived to be consistent with their efforts and performance (Aamodt, 2007: 342).

Lower levels of job satisfaction in organizations that adopt the importance of human factor, indicate that these organizations have problems in functioning. On the other hand, higher levels of job satisfaction signal that the organization is managed properly (Özer, Bayrak, Kaya, 1995: 2). According to some ideas, job satisfaction is a direct "cause" of specific work behaviours, while others see it as a "consequence" (Hall, 2003: 285).

Several studies deal with the concept of job satisfaction and the problem of lack of job satisfaction. Research findings suggest that there are differences between dissatisfied workers in developed countries and those in underdeveloped countries in terms of the reasons of the lack of job satisfaction. For instance, the factor of wage is not a source for job satisfaction for developed country workers, whereas it is still crucial for workers in underdeveloped countries, including Turkey and is one of the foremost factors that cause lack of job satisfaction (İncir, 1990:2). Gupta and Sharma (2009: 24) in their study suggest that creation of opportunities to interact and to enhance mutual interests in improvement of working conditions, so that employees feel comfortable and can work conveniently which, in turn, will improve their job satisfaction level.

Today, teachers are expected to deal with various societal problems and to prepare individuals for a technologically changing society. However, they try to realize these expectations working under inappropriate conditions and they are not given opportunities to improve themselves as well as their wages are lower compared to many other countries (Akçamete, Kaner ve Sucuoğlu, 2001: 1). Technology and design education teachers also regard their wage as very low. They also state that their wage is not enough to meet basic needs (Tor, Aytaç, Seyhan, 2002:4).

Negative conditions decrease both teachers' professional attempts and job satisfaction. Continuous negative conditions cause many of the teachers not to go to work regularly and eventually lead to leave the job altogether (Akçamete, Kaner ve Sucuoğlu, 2001: 2).

Significance of the Study

Technology and design education teachers who significantly contribute to train technologically able individuals are employees realizing many aims of the schools. The findings of a research dealing with the job satisfaction levels of these teachers can contribute to the development of the schools they work in. Furthermore, this study was conducted when technology and design course was introduced into the curriculum and a new instructional program was developed. Therefore, the findings of the study may guide the arrangements to meet the needs of the teachers.

Aim

The basic aims of the study are to identify the job satisfaction levels of technology and design education teachers working in primary schools of Ankara city center and to suggest ways to improve their job satisfaction. In parallel to these aims, the study tries to answer the following questions:

1. What are the mean scores of technology and design education teachers in such factors as management and interpersonal relationships, school setting job, and total job satisfaction?
2. Are these mean scores related to gender, age, educational level and experience of teachers?
3. Which factors are given significance by teachers in job satisfaction?

METHOD

The study is a descriptive research using scanning model. The data were collected through a measurement tool to determine the job satisfaction levels of the participants.

The data collection tool is made up of three sections. The first section, including four items, addresses personal information. The second one, which contains fifty- seven items, deals with job satisfaction. The last part requests the respondents to order the factors affecting job satisfaction. Items in the second section are responded through a five-scale; including "completely agree", "quite agree", "somewhat agree", "quite disagree", and "completely disagree". Factor analysis showed that final version of the second section should include twenty-nine items. It was found that the tool has three dimensions: relationships between administrators and colleagues, school setting, and job. Measure of sampling adequacy of job satisfaction tool was found as 0.77 and determined as adequate. The rate of the first dimension to account for variance is 0.36. These rates are 0.17 and 0.64 for the second and third dimensions, respectively. The reliability of the tool was found to be 0.95.

The data obtained were analysed by means of SPSS 10.0 package program. Personal information of the sample is given in terms of frequency and percentages. The data on the job satisfaction are interpreted based on three dimensions stated above and on total mean scores obtained from each three dimension. T-tests and variance analysis were employed to determine the potential effects of gender, age, educational level and professional experience of teachers on their mean scores.

The scale was administered to eighty-one technology and design education teachers working in 35 different primary schools in Ankara. Personal information of the sample is given in Table 1.

Table 1: Data on Personal Information of the Sample

Variable			N	%
Gender	Female		55	67.9
	Male		26	32.1
	Total		81	100
Age	22-27		37	45,7
	28-33		34	42.0
	34-39		10	12.3
	Total		81	100
Educational Level	Two-Year Education	University	13	16.0
	Four-Year Education	University	45	55.6
	Graduate Study		23	28.4
	Total		81	100
Professional Experience	1-10 years		65	80.2
	11 years or more		16	19.8
	Total		81	100

Table 1 shows that the two-thirds of the sample is women (67.9 %) and one-third is men (32.1%). In terms of age, the sample is classified into three age groups: 22-27 age group (45.7 %); 28-33 age group (42 %) and 34-39 age group (12.3 %). In regard to the educational background, the graduates of higher education form the largest group (55.6 %). Nearly one-third of the sample has graduate education (28.4 %). 16% of the sample has two-year university education. Professional experience of the sample is as follows: 1-10 years of experience (80.2%), and two years or more (19.8%).

FINDINGS AND DISCUSSION

This section provides data on job satisfaction levels of the sample and related discussion of the data.

1. Job Satisfaction Levels of Technology and Design Education Teachers

Teacher's mean scores on three dimensions (relationships between administrators and colleagues; school setting; job) and total mean scores are determined. Table 2 provides mean score on each dimension and total mean score on job satisfaction as well as standard deviations for scores.

On the dimension of relationships, the satisfaction level of the sample was measured in regard to relationships with administrators and with other teachers in the school. This dimension includes the following points: distribution of additional course fee, equity, moving condition because of work, proper treatment in terms of skills, fulfillment of teachers' requests by administrators, cooperation and trust among teachers, friendship in school, administrators' attitude towards teachers, teachers' views and suggestions, administrators' kindly behavior, support by administrators, meeting educational needs, social gatherings, social interaction with other teachers.

Table 2: Mean Scores on Job Satisfaction Dimensions of The Sample (Job Satisfaction Level)

Dimension	Aritmetical Mean	Standard Deviation
Relationship between Administrators and colleagues	57.69	18.66
School Setting	29.54	6.94
Job	14.00	3.78
Total	102.95	25.89

As seen in Table 2, mean score on the first dimension is 57.69 which refers to "quite agree" response. The higher score for this dimension is 80, and the lowest score is 16. As it can be seen from Figure 1, job satisfaction of the teachers for human relations dimension is "quite agree".

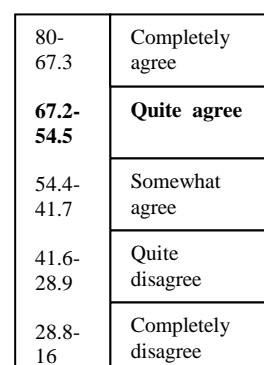


Figure 1: Administrator and human relations

It is also found that more than half (66.7%) of the sample report that they are treated based on their skills. Also more than half of them (58%) state that administrators realize their desires. However, 42 % of the sample report that there are no social gatherings in school and that they do not have any social contact with other teachers. On the other hand, more than one-thirds of the participants (33.4%) think that their work is not evaluated fairly. Finally near one-thirds of them (29.7%) think that allocation of course fee is not fair.

Therefore, such concerns negatively affect their satisfaction in regard to relationships with administrators and other teachers in the school.

The dimension of school setting questions the teacher's working conditions: importance given to their profession, working conditions, promotion opportunities, health care security, environment of the school, individual development opportunities.

As seen in Table 2, teachers' mean score for the dimension of school setting is 29.54. It refers to the response of "quite agree".

40-33.7	Completely agree
33.6-27.3	Quite agree
27.2-20.9	Somewhat agree
20.8-14.5	Quite disagree
14.4-8	Completely disagree

Figure 2: School Setting

In regard to school setting, 48,1% of the sample state that they could not get promotion although they fulfill all their tasks. They also report that personnel is given importance in the school (69.1%). Majority of the sample think that the environment of the school is positive (71.6%). The dimension of job satisfaction deals with increase in economical status, retirement opportunities, social facilitates, necessary knowledge for the job.

As seen in Table 2, the mean score of the participants in regard to the dimension of job is 14.00. The highest possible score for this dimension is 25, the lowest score is 5 in this dimension. Therefore, the mean score of the participants refers to "somewhat agree" option in this dimension (Figure 3).

25-21.1	Completely agree
21-17.1	Quite agree
17-13.1	Somewhat agree
13-9.1	Quite disagree
9-5	Completely disagree

Figure 3: Job

The mean scores of the subjects are lower for the third dimension, job satisfaction. The mean scores on this dimension equal to the response of "somewhat agree". There are some reasons for this. Particularly the sample has negative views on their economical status and insufficient social offerings (75.3 % and 71.6 %, respectively). Moreover, over half of the teachers (59.2%) state that they are not pleased about retirement opportunities. These reasons about work dimension must be considered.

As seen in figure 4, total mean job satisfaction score for the sample is 102,95 which refers to the response of "quite agree". The maximum score for job satisfaction measurement tool is 145, the lowest score is 29. As seen in Figure 4, total job satisfaction of the teachers is found to be "quite agree".

145-121.1	Completely agree
121.7-98.7	Quite agree
98.6-75..5	Somewhat agree
75.4-52.3	Quite disagree
52.2-29	Completely disagree

Figure 4: Total Job Satisfaction

2. Job Satisfaction Based on Teachers' Personal Characteristics

This section deals with the effects of teachers' personal characteristics on their job satisfaction. In order to present such effects, each dimension of job satisfaction and all dimensions are analysed based on the personal characteristics of the teachers.

Effects of Gender on Teachers' Job Satisfaction

Table 3: Mean Scores and T Test Results on The Effects of Gender on Job Satisfaction

Dimension	Gender	N	\bar{X}	S	Sd	T	P	Significance
Relationships with administrators and with other teachers	Female	55	62.76	14.92	79	3.40	0.00*	<0.01
	Male	26	46.96	21.38				
School setting	Female	55	30.70	5.76	79	1.97	0.06	>0.05
	Male	26	27.07	8.54				
Job	Female	55	14.98	3.79	79	4.06	0.00*	<0.01
	Male	26	11.92	2.81				
Total	Female	55	110.36	22.93	79	4.10	0.00*	<0.01
	Male	26	87.26	25.15				

As seen in Table 3, the gender of the subjects leads to differences in mean scores of the dimensions of job satisfaction and in total mean scores. Female subjects have higher mean scores on the dimensions, and their mean total score is higher. T-test is conducted to determine if the difference of total scores for each dimension and in total are significant. Only in mean scores for the dimension of school setting, there is no statistically significant difference between male and female teachers.

Both in the dimensions of interpersonal relationships and job, and in total mean scores, there are statistically significant differences among mean scores. Female teachers have higher mean scores on the dimensions of relationships with administrators and with other teachers, and on the dimension of job. Furthermore, on the total mean score of job satisfaction they have higher scores in contrast to male teachers.

Effects of Age on Teachers' Job Satisfaction

Table 4 provides the variance analysis results of t-tests concerning the effects of age on the job satisfaction.

Table 4: Mean Scores and Variance Results on the Effects of Age on Job Satisfaction

Dimension	Age Group	N	\bar{X}	S	F	P	Significance	Difference
Relationship with administrators and with other teachers	22-27	37	50.78	21.96	5.15	0.00*	P<0.01	Between 28-33 age group and 22-27 age group
	28-33	34	63.53	11.65				
	34-39	10	63.40	17.55				
School setting	22-27	37	28.30	7.89	1.55	0.22	P>0.05	—
	28-33	34	31.18	5.45				
	34-39	10	28.80	7.35				
Job	22-27	37	13.05	2.79	4.05	0.02*	P<0.05	Between 28-33 age group and 22-27 age group
	28-33	34	15.35	4.25				
	34-39	10	12.90	4.20				
Total	22-27	37	93.62	27.90	5.08	0.00*	P<0.01	Between 28-33 age group and 22-27 age group
	28-33	34	112.09	19.80				
	34-39	10	106.40	26.89				

Table 4 indicates that three age groups have different mean scores for three dimensions and different total mean scores. In all three dimensions and in total job satisfaction, 28-33 age group has higher mean score. It is found that mean scores for the dimensions of interpersonal relationships and job, and also total mean score are statistically significant only between 28-33 age group and 22-27 age group. The mean scores of the school setting dimension are not statistically significant as a result of age distinctions. Therefore, it can be argued that job satisfaction increases between 28 and 33 ages and remain at the same level later. However, job satisfaction levels of the younger subjects (22-27 age group) are relatively lower.

Effects of Educational Level on Job Satisfaction

Table 5 shows the mean scores and the results of variance analysis concerning the effects of educational levels of teachers on their job satisfaction.

Table 5: Mean Scores and Results of Variance Analysis Concerning the Effects of Educational Level on Job Satisfaction

Dimension	Educational Level	N	\bar{X}	S	F	P	Significance	Difference
Relationship with administrators and with other teachers	Two Year University Education	13	65.69	6.33	3.72	0.03*	P<0.05	Two Year University Education - Graduate Studies
	Four Year University Education	45	59.44	16.09				
	Graduate Studies	23	49.74	24.84				
School setting	2Year University Education	13	31.23	1.96	0.47	0.63	P>0.05	—
	Four Year University Education	45	29.33	6.16				
	Graduate Studies	23	29.00	9.75				
Job	Two Year University Education	13	12.92	3.68	1.17	0.32	P>0.05	—
	Four Year University Education	45	13.87	3.66				
	Graduate Studies	23	14.87	4.03				
Total	Two Year University Education	13	111.00	8.26	1.62	0.21	P>0.05	—
	Four Year University Education	45	104.33	24.17				
	Graduate Studies	23	95.70	33.70				

As seen in Table 5, the mean scores of teachers with two-year higher education are higher in two dimensions (relationships with administrators and with other teachers, and job) and in total job satisfaction in contrast to the other educational level groups. However, the mean scores of all groups are very close to one another.

Findings in Table 5 show that only in the first dimension, the educational level of the sample leads to a statistically significant difference in mean scores. Specifically, the mean scores of teachers with two-year higher education are higher than those of teachers with graduate education. In another words, as education level rises, job satisfaction level decreases in this dimension.

Effects of Experience on Job Satisfaction

Table 6 presents the mean scores and results of t-test in regard to the effects of experience on teachers' job satisfaction levels.

As indicated in Table 6, the mean scores of the technology and design education teachers' on three dimensions are very close to one another regardless of their experience level.

T-test for unrelated groups was conducted to see whether or not there is statistically significant difference between the mean scores of the teachers with 1- 10 years experience and those with 11 years or more experience on the dimensions of relationships with administrators and with other teachers, school setting and job as well as total job satisfaction.

The results of t-test show that the professional experience of the teachers does not influence the mean scores in any dimension. Also, it is seen that there are no significant differences between total job satisfaction mean scores. Thus, the total mean scores are not affected by their professional experience either.

Table 6: Mean Scores and Results of T-Test concerning The Effects of Experience on Job Satisfaction

Dimension	Experience	N	\bar{X}	S	Sd	T	P	Significance
Relationship with administrators and with other teachers	1-10 years	65	58.31	18.98	79	0.60	0.55	>0.05
	11years and more	16	55.19	17.68				
School setting	1-10 years	65	29.85	6.95	79	0.79	0.43	>0.05
	11years and more	16	28.31	7.00				
Job	1-10 years	65	13.92	3.70	79	0.37	0.71	>0.05
	11years and more	16	14.31	4.21				
Total	1-10 years	65	103.74	25.56	79	0.55	0.58	>0.05
	11years and more	16	99.75	27.86				

3. Teachers' Evaluation of Factors Influencing Job Satisfaction

The third section of data collection tool asked the subjects to evaluate the job satisfaction- related factors (one point to the most important factor and nine points to least important factor). Therefore, the factors influential on job satisfaction were identified based on their scoring.

Table 7 presents the job satisfaction influencing factors ranking from the most important to the least important based on the scoring of the participants.

Table 7: The Order of Factors Influencing Job Satisfaction

Order	Factor	Score
1	Regarded as being important, being respected	256
2	Working conditions	321
3	Wage / Rewards	343
4	Motivation	380
5	Communication	403
6	Opportunities to improve yourself	416
7	Secure job	441
8	Social activities	526
9	Institution	543

As seen in Table 7, “regarded as being important/ be respected” is concerned as the most important factor that contributes to job satisfaction. It is followed by “working conditions” and “wage/ rewards”. However, the factor of “institution” is not seen as a significant factor for job satisfaction. “Social activities” and “secure job” are not given so much importance as well.

The findings clearly indicate that technology and design education teachers desire to be respected and regarded as being important. Wage and rewards also affects job satisfaction.

CONCLUSION AND RECOMMENDATIONS

The section includes the conclusions of the study and the suggestions to improve job satisfaction.

Conclusion

- Job satisfaction of technology and design education teachers is organized into three dimensions: relationships with administrators and with other teachers; school setting and job. The job satisfaction levels of the teachers on two dimensions (relationships with administrators and with other teachers, and school setting) and total job satisfaction is found to be at the level of “quite agree”. It is at the level of “somewhat agree” in job dimension.
- The reasons for lower levels of job satisfaction on the third dimension seem to be related to the economical facts, social facility opportunities and retirement.
- It is found that such variables as gender, age, educational level, experience do not affect all dimensions of satisfaction but they are influential in some aspects of job satisfaction.
- Gender appears to lead to differences in relationships with administrators and with other teachers and in job dimension as well as in total job satisfaction. Specifically, female teachers have higher levels of job satisfaction in contrast to male teachers.
- Similarly, age seems to have effects on relationships with administrators and with other teachers and in job dimension as well as in total job satisfaction. More specifically, the teachers in the 28-33 age group have higher levels of job satisfaction than those in the 22-27 age group. It may be a result of the fact that younger teachers have some different professional expectations.
- The educational level of the subjects leads to differences only in interpersonal relationships dimension of job satisfaction. In other words, teachers with two-year higher education have higher levels of job satisfaction in contrast to those with graduate education.
- The experience of the subjects, on the other hand, does not affect their mean scores on three dimensions as well as on total job satisfaction.
- In regard to importance of job satisfaction related factors, the following order of the related factors is found: (1) “regarded as being important/ be respected”, (2) “Working conditions”, (3) “wage/rewards”, (4) “motivation”, (5) “communication”, (6) “opportunities to personal improvement”, (7) “secure job”, (8) “social activities”, (9) “institution”. This order may indicate which factors should be focused to improve job satisfaction.

Recommendations

- Attempts should be made to improve job satisfaction levels of technology and design education teachers. Such attempts should address income, retirement and improvement of social facilities issues.
- Findings on the effects of age, gender, education level on job satisfaction should be taken into consideration. Therefore, attempts should be made to improve the job satisfaction of male and younger (especially 22-27 age group) technology and design education teachers.
- Improvement of the teachers’ significance, being respected, working conditions and income/ rewards may positively contribute to their job satisfaction.

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A STUDY OF LEARNING-THINKING STYLE OF SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT

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ABSTRACT

The styles depend upon cerebral dominance of an individual in retaining and processing different modes of information in his own style of learning and thinking. This study attempted to find out the relationship and significance of difference between academic achievement and learning-thinking style of secondary school students. The study was delimited to class Xth students only. The purpose of present study was to see whether there is a relationship between academic achievement and learning-thinking style of secondary school students or not. Normative Survey method was applied for conduction of the study. The population for the research includes students of secondary class of different areas. Mean and Pearson's Product Moment Correlation ('r') are the statistical technique which helped in the analysis and interpretation of the result. The collected data was analysed and interpreted on the basis of hypothesis. It has been found that learning-thinking style and academic achievement of secondary school students are positively and significantly related to each other. Students having high academic achievement are better for teaching. It can be said that academic achievement is a factor which influence the learning-thinking style of secondary school students. It can also be concluded that male and female secondary school students are not different in respect to their academic achievement whereas they are different in respect to their learning-thinking style.

Key Words: Learning style, thinking style, secondary school, academic achievement.

INTRODUCTION

"Styles depend upon cerebral dominance of an individual in retaining & processing different modes of information in his own style of learning and thinking ". Style indicates the hemisphericity function of the brain and students learning strategy and information processing are based on the preferences of the brain area . (Venkataraman 1990). Styles are propensities rather than abilities . They are the ways of directing the intellect which an individual finds comfortable . The style of learning thinking are as important as levels of ability and we ignore to identify the thinking styles at their earlier and appropriate stage. It is foremost important for the teachers to focus their attention on students favourite thinking styles before imparting the subject matter . If they fail to do so, the consequences may be serious , because the teachers may tend to confuse styles of students mind. Since the method of teaching adopted by teachers often reflects their personal thinking style ,the students who have the same thinking style of the teachers are only benefited and rewarded. Since any subject can be taught in any way that is compatible with any style, students will seek learning activities that are compatible with their own preferred styles, Both teachers and students tend to exploit their preferred styles .Which may or may not match.

Therefore, it is important for the teachers to know the students preferred styles, so that the teachers can capitalize the opportunities for students learning. Styles like abilities are not formed by birth . They are partly developed due to environmental condition and by way of nurturing children by their parents and teachers. Some individuals may have one preferred style at one stage and another preferred styles at another stage.

Styles are not fixed, but changeable . we need to recognize the preferred styles of students and ourselves .The efforts to understand learning and thinking styles and to learn to use them flexibly requires the identification of an individual's preferred style of learning and thinking . Research tools are readily available to identify the individuals preferred style of learning and teachers must eventually come forward to understand and identify the styles of learning and thinking in students. this direct approach with the help of research tool will help to understand and assess the styles of students for developing intelligence and creativity in the fields of their preferred styles in acadmic areas. Thus the 'Tool' is very important to assess the preferred styles of students learning and thinking.

Three different styles are learning styles, cognitive styles and thinking styles . These styles although different but have one thing in common; they are individuals' , preferred way of processing information and using abilities that they have. Styles are not abilities . Difference in the way of thinking of individuals makes the way to formation of theories of thinking styles . Thinking style is our preferred way of thinking and managing our activities. A learning style is how you receive information most efficiently (and naturally).

	VISUALVI	KINESTHETIC
AUDITORY Auditory learners receive information best by listening; they tend to learn best through lectures & audio-based instruction.	VISUAL Visual learners tend to learn better when a variety of visual aids, such as blackboards, overhead projectors and films are used during instruction. They often use imagery to learn complex subjects.	KINESTHETIC Kinesthetic learners (also known as "Tactile Learners") prefer to learn by doing. They usually learn best when they are allowed to use their hands and sense of touch to learn new information and apply new skills.

A thinking style is how you process information most efficiently (and naturally).

LINEAR (Left Brain-Dominant)	Linear thinkers prefer a very structured approach to learning. If a learning process involves progression (Step A, Step B, Step C, etc.) linear thinkers will feel more comfortable starting Step B <u>only</u> after Step A has been completed. Mathematics and accounting are considered linear subjects since they involve a process-oriented presentation of information.
GLOBAL (Right Brain-Dominant)	Global thinkers (or "strategic thinkers") are more comfortable with new information if they can put it into context with the big picture. They also tend to be impatient with linear subjects and linear-oriented instruction - they prefer access to all the information (early on) so they can relate it to their overall goals.

Of course, it would be nearly impossible for a person to possess only one learning style, or be strictly a linear or a global thinker, and still be able to function adequately in our complex world. Most of us tend to incorporate a variety of styles to complete a task. For example, when determining how much to tip a waiter or waitress, you must use linear skills (to calculate the percentage for the tip), and global skills (to judge the quality of service and amount of money needed for additional purchases that day).

Review of Related Literature

It is important to put a glance on some related studies.

Elena L. Grigorenko, Robert J. Sternberg (1997) "Styles of Thinking, Abilities and Academic Performance"

The cognition- and the personality-centred approaches typically imply that styles are either-or constructs (a person could be either field-independent, or field-dependent, but not both). In these approaches, styles are consistent across various tasks and situations, and can be modified very little, if at all, by training during the life span. Cognitive and personality styles are most often viewed as structures, where the focus is placed on stability over time as such, styles are "givens" in a training or educational setting (Riding & Cheema, 1991). Cognition- and personality-centred theories also usually have built-in evaluating attitudes assuming that certain styles. **F Cano-Garcia, EH Hughes (2000) conducted a study on "Learning and Thinking Styles: an analysis of their interrelationship and influence on academic achievement"** and found that students' academic achievement was related to students' thinking styles. Students that prefer to work individually (Internal), that do not enjoy creating, formulating, and planning for problem solution (Legislative in a negative sense) and those that have adherence to existing rules and procedures (Executive) were those which obtained higher academic achievement.

Robert J. Sternberg, Li-Fang Zhang (2001) "Perspectives on Thinking, Learning and Cognitive Styles"

Traditionally, many psychologists and educators have believed that people's successes and failures are attributable mainly to individual differences in abilities. For the past few decades, however, investigators have been studying the roles of thinking, learning, and cognitive styles in performance with both academic and nonacademic settings. Although these three kinds of styles may be viewed as overlapping historically, they have been conceptualized in different ways. **Li-Fang Zhang (2002) "Thinking Styles: their relationships with modes of thinking and academic performance"** This study aimed at investigating the nature of thinking styles as described in the theory of mental self-government. Two-hundred-and-twelve US university students responded to the Thinking Styles Inventory and the Styles of Learning and Thinking. Results from convergent statistical analysis procedures indicated that thinking styles and modes of thinking share certain common variance in the data. It was evident that the more creativity-generating and more complex thinking styles are significantly related to a holistic mode of thinking, and that the more norm-conforming and more simplistic thinking styles are significantly related to an analytic mode of thinking. These findings are discussed in terms of practical implications for educators.

Mark Mason¹ (2007) "Critical Thinking and Learning" This paper introduces some of the debates in the field of critical thinking by highlighting differences among thinkers such as Siegel, Ennis, Paul, McPeck, and Martin, and poses some questions that arise from these debates. Does rationality transcend particular cultures, or are there different kinds of thinking, different styles of reasoning? What is the relationship between critical thinking and learning? In what ways does the moral domain overlap with these largely epistemic and pedagogical issues? The paper concludes by showing how Peters, Evers, Chan and Yan, Ryan and Louie, **Springer Netherlands (2009) "Process-oriented instruction in learning and thinking strategies"** The learning effects were higher than the effects of an preliminary version of the program implemented with students from an open university. These results support the importance of the process-oriented instructional model. The linking of a thorough diagnosis of personal learning styles to individually tailored instructional measures, turned out to be a powerful way to activate students to reflect on their learning and to develop their mental models of learning.

OBJECTIVES

Objectives of the study are given below:

- To study the relationship between academic achievement and learning-thinking style of secondary school students.

- To study the relationship between academic achievement and learning-thinking style of male secondary school students.
- To study the relationship between academic achievement and learning-thinking style of female secondary school students.
- To find out the significance of difference between academic achievement of male and female secondary school students.
- To find out the significance of difference between learning-thinking style of male and female secondary school students.

HYPOTHESES

1. There is no significant relationship between academic achievement and learning thinking style of secondary school students.
2. There is no significant relationship between academic achievement and learning thinking style of male secondary school students.
3. There is no significant relationship between academic achievement and learning thinking style of female secondary school students.
4. There is no significant relationship between academic achievement of male and female secondary school students.
There is no significant relationship between learning thinking style of male and female secondary school students.

DESIGN OF THE STUDY

For the present study normative survey method was applied to find out the academic achievement and learning-thinking style of secondary school students. The sample of the study is consisted of 140 students- 70 boys and 70 girls of 10th class.

POPULATION

Table 1: Sample of selected schools

S.No	Name of the schools	Total students in the schools in 10 class	Students included in the sample
1	P.D.M B'Garh	120	46
2	G.S.K.V B'Garh	200	46
3	Bal Bharti B'Garh	100	48

Tools

Investigators made achievement test and D.Venkataraman's Style of Learning and Thinking were used for collecting data. Pearson's Product Moment Correlation is used for analyzing and interpreting the data.

ANALYSIS AND INTERPRETATIONS

- **To study the relationship between academic achievement and learning-thinking style of secondary school students.**

The hypothesis framed to achieve the above stated objective is that there exists no significant correlation between academic achievement and learning-thinking style of secondary school students.

Table 2: Correlation between Academic Achievement (X) and Learning-Thinking Style (Y) of Secondary School Students.

Variable	(X)	(Y)	Level of Significance
(X)	1.00	0.692	Positively Significant
(Y)	0.692	1.00	

It is observed from the table II that the computed value of co-efficient of correlation between academic achievement and learning-thinking style of secondary school students is 0.69 which is positive in nature that indicates a positive correlation. Hence, the null hypothesis of no significant correlation between academic achievement and learning-thinking style of secondary school students is rejected. Now, it can be interpreted that academic achievement and learning-thinking style are correlated with each other.

- **To study the correlation between academic achievement and learning-thinking style of male secondary school students.**

In pursuance of the objective stated above the co-efficient of correlation is computed by using Pearson's product moment correlation. The correlation between academic achievement and learning-thinking style of male secondary school students is presented vide table 2.

Table 3: Correlation between Academic Achievement (X) and Learning-Thinking Style of Male students (Y1)

Variable	(X)	(Y1)	Level of Significance
(X)	1.00	0.734	Positively Significant
(Y1)	0.734	1.00	

It is observed from the table III that the computed value of co-efficient of correlation between academic achievement and learning-thinking style is 0.734 which is positive in nature that indicates a positive correlation. Hence, the null hypothesis of no significant correlation between academic achievement and learning-thinking style of male students is rejected. Now, it can be interpreted that academic achievement and learning-thinking style of male students are correlated with each other.

- **To study the correlation between academic achievement and learning-thinking style of female secondary school students.**

In pursuance of the objective stated above the co-efficient of correlation is computed by using Pearson's product moment correlation. The correlation between academic achievement and learning-thinking style of female secondary school students is presented vide table 3.

Table 4: Correlation between Academic Achievement (X) and Learning-thinking style of Female Learning-Thinking Style (Y2)

Variable	(X)	(Y2)	Level of Significance
(X)	1.00	0.816	Positively Significant
(Y2)	0.816	1.00	

It is observed from the table IV that the computed value of co-efficient of correlation between academic achievement and learning-thinking style is 0.816 which is positive in nature that indicates a positive correlation. Hence, the null hypothesis of no significant correlation between academic achievement and learning-thinking

style of female secondary school students is rejected. Now, it can be interpreted that academic achievement and learning-thinking style of female secondary school students are highly correlated with each other.

- Significance of difference between the Academic achievement of male and female secondary school students.**

In order to test the hypothesis formulated is that there exists no significant difference between the academic achievement of male and female secondary school students, critical ration is adopted. A comparative analysis of mean scores of academic achievement of male and female secondary school students is also done which is given vide table 4.

Table 5: Significance of difference between Academic achievement of Male and Female Secondary school students

Groups	Mean	S.D.	N	Critical Value (C.V)	Level of Significance
Male	1.55	0.55	70	4.08	0.01
Female	2.61	1.66			

Table Value at 0.05 level: 1.96
at 0.01 level: 2.58

The above table shows that calculated critical ration is more than the table value at 0.01 level of significance. It means that there exists a significant difference between academic achievement of male and female secondary school students. Hence the earlier formulated null hypothesis is rejected.

- Significance of difference between the Learning-thinking style of male and female secondary school students.**

In order to test the hypothesis formulated is that there exists no significant difference between the learning-thinking style of male and female secondary school students, critical ration is calculated. A comparative analysis of mean scores of learning-thinking style of male and female secondary school students is also done which is given vide table 5.

Table 6: Significance of difference between Learning-thinking style of Male and Female Secondary school students

Groups	Mean	S.D.	N	Critical Value (C.V)	Level of Significance
Male	14.86	2.62	70	3.83	Significant at 0.01 level of significance
Female	13.48	2.03			

Table Value at 0.05 level: 1.96
at 0.01 level: 2.58

The above table shows that calculated critical ration is higher than the table value at 0.01 level of significance. It means that there exists significant difference between learning-thinking style of male and female secondary school students. Hence the earlier formulated null hypothesis is rejected. It can be concluded that gender is a factor which influences learning-thinking style of secondary school students

FINDINGS

- It has been found out that there exists significant relationship between academic achievement and learning-thinking style of secondary school students.
- It has been found out that there exists significant relationship between academic achievement and learning-thinking style of male secondary school students.
- It has been found out that there exists significant relationship between academic achievement and learning-thinking style of female secondary school students.
- It has been found out that there exists significant difference in the academic achievement of male and female secondary school students.
- It has been found out that there exists significant difference in the learning-thinking style of male and female secondary school students.

CONCLUSION

In accordance with the analysis done and interpretations made it can be concluded that learning-thinking style and academic achievement of secondary school students are positively and significantly related to each other. Students having high academic achievement are better for teaching. It can be said that academic achievement is a factor which influence the learning-thinking style of secondary school students. It can also be concluded that male and female secondary school students are not different in respect to their academic achievement whereas they are different in respect to their learning-thinking style.

EDUCATIONAL IMPLICATIONS

No research can be said to be complete in itself especially in behavioral science. The present study has adequately dealt with academic achievement and learning-thinking style. The findings of the study are likely to be of importance to educational secondary school students, teacher educators and policy makers who are concerned with the sphere of education. One of the implications of the present conclusion for teacher educators and policy makers is that their curricula, syllabi, text book, method of teaching etc. all should be modeled in such a fashion that they can utilize their energies in the right direction. It is therefore most important for student teacher to develop the academic achievement to become a perfect teacher.

Achievement is the level of learning and attainment in a particular area of the subject in terms of knowledge, understanding, skills and applications. The main focus of educative process is to improve the performance or learning of the students. The learning outcomes of the students are measured with the help of their achievement or performance. Performance assessment is the process of measuring the terminal behaviors of the students at the end of instruction. It is the job of the teacher to measure whether the students have acquired the component concepts, as on achievement, before proceeding with the instruction which arranges these concepts in proper relationship for the learning of the principles. The achievement is the end product of the instruction usually verbal performance.

BIODATA AND CONTACT ADDRESSES OF AUTHORS



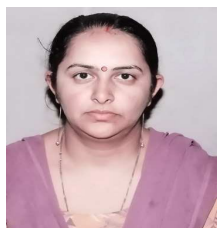
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TEACHER DEVELOPMENT THROUGH OPEN AND DISTANCE LEARNING: THE CASE FOR ZIMBABWE

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ABSTRACT

The last article is from ZIMBABWE . It is entitled as “TEACHER DEVELOPMENT THROUGH OPEN AND DISTANCE LEARNING: THE CASE FOR ZIMBABWE” and written by Caleb KANGAI and Richard BUKALIYA from Zimbabwe Open University, Marondera. This article that is a case study of distance teacher education at the Zimbabwe Open University, is part of an ongoing longitudinal study the two researchers are undertaking at the Zimbabwe Open University (ZOU) concerning issues of quality and effectiveness in open and distance learning (ODL). The article argues that distance teacher education has the potential to solve the current and future problems of teacher shortage in Zimbabwe and elsewhere. Data for the present study were collected over a period of two years through personal experience, participatory methods, observations, document analysis, informal discussions and illuminative methods. On the basis of the present findings, effective distance education programmes would require the adoption of the following key strategies:

- Winning government support for distance teacher education,
- Setting up a directorate for the coordination of distance teacher education,
- Adoption of the partnership model in the training of teachers.

Key Words: Teacher development, Open and Distance Learning.

INTRODUCTION

In general, Africa is struggling to give effect to the Education for All (EFA) mandate and to achieve the educational Millennium Development Goals (MDGs) (UNESCO, 2005). Research studies into teacher education in Africa have indicated that acute shortages of teachers exist and rural communities are the most challenged in recruiting and retaining qualified teachers (Moon, 2006). In some countries, the shortage of teachers is now formally acknowledged as a national crisis. Many countries in Africa are facing a number of challenges in teacher development that include:

- Inadequate or poor continuous (in-service) teacher development and teacher training facilities;
- Shortage of trained and qualified teachers;
- Lack of opportunities for continuous professional development;
- Shortage of reference and training materials for teachers;
- Underdevelopment and under-utilization of Information Communication Technologies (ICTs) to benefit teacher training and development and
- Depletion of teachers due to HIV/AIDS and the decline in the number of people entering the teaching profession.

The demand for teachers has seen many countries in Sub-Sahara Africa adopt innovations that call for a paradigm shift in the traditional models of teacher education. One of the innovations, aimed at improving the quantity and quality of teachers, is to use open and distance learning in teacher development. It is generally accepted that distance education can increase the quantity of trained teachers. However, there are fears that distance education would increase the quantity of teachers at the expense of teacher quality (Chakwera and Saiti, 2005; Chakwera and Saiti, 2005). Local research studies into distance teacher education are still very scanty. Thus in 2005, UNESCO commissioned a number of case studies because of demands of Member States for guidance on implementing programmes of distance education for teachers. The studies were intended to document experience on which to base the guidelines for teacher education at a distance. These case studies have been a source of very vital information. In the present study the two researchers reviewed twenty of the case studies on distance teacher education in order to make a well informed and meaningful contribution to the quantity/quality debate in distance teacher education. More specifically, we wanted to find out how open and distance learning were being used in teacher education, how effectively they were working, and what methods they were using. In asking how effectively it was working, we wanted to examine its record in attacking the major problems confronting teacher education. This article is part of a longitudinal study the two researchers are undertaking at the Zimbabwe Open University (ZOU) concerning issues of quality and effectiveness in open and distance learning (ODL). The article argues that distance teacher education has the potential to solve the current and future problems of teacher shortage in Zimbabwe and elsewhere. It is our conviction that if open and distance learning for teachers is effective, and working on a big enough scale, in other countries, then it is the key to solving many of our educational problems including teacher shortage.

BACKGROUND OF THE STUDY

In Zimbabwe, distance teacher education was first introduced in the training of primary school teachers in 1983 in order for the country to meet the critical shortage of primary school teachers brought about by the expansion of the education system (Zvobgo, 1986; Gatawa, 1986). At independence in 1980, Zimbabwe faced political, economic, and social challenges that normally accompany attempts to build a new nation. One of the challenges was experienced in introducing reforms in the education sector. The government undertook massive and unprecedented expansion of education at the primary level. In 1980, Zimbabwe had 2,401 primary schools with an enrolment of 819,586 pupils. By 1989, the country had 4,504 primary schools with an enrolment of 2,274,178 pupils (Zvobgo, 1986). Between 1980 and 1988, as table 1 shows, the number of both trained and untrained teachers at the primary level increased dramatically.

Table 1: Teacher Numbers at the Primary Level, 1980-88

Year	No. of Trained Teachers	No. of Untrained Teachers	Total
1980	20,422	8,031	28,455
1981	22,654	15,119	37,773
1982	23,699	21,768	45,465
1983	25,954	26,548	52,502
1984	30,424	24,000	54,424
1985	31,496	26,610	56,675
1986	31,496	26,752	58,248
1987	26,133	30,987	57,120
1988	29,589	28,173	57,762

Source: Ministry of Education – Annual Reports (1980 - 1988).

The expansion of primary education meant that more trained teachers were needed. The demand for teachers outstripped the supply from the country's conventional colleges. For example in 1983, Zimbabwe needed 26,548 primary school teachers but teachers colleges could only supply 1,244 teachers (see tables 1 & 2).

Table 2: Output of Teachers from Conventional Colleges (1980-83)

Year	Conventional College Output
1980	680
1981	666
1982	642
1983	1,244

Source: Ministry of Education data.

It was increasingly clear that conventional teachers colleges were unable to meet the growing demand for trained teachers. The shortage of teachers was exacerbated by the fact that teachers colleges were experiencing a decline in student enrolments.

The Zimbabwean government with financial and material assistance from United Nations International Children's Education Fund (UNICEF) introduced a distance teacher education programme, the Zimbabwe Integrated Teacher Education Course (ZINTEC) for the training of primary school teachers. Programme evaluations by Chivore (1986) and (1989) indicated that a total of 17,455 teachers, trained through ZINTEC, helped to alleviate the demand for trained teachers. The programme was hailed as a huge success and ZINTEC teachers were considered highly qualified and even better than conventional teachers in terms of practical skills and experience gained through a lengthy teaching practice. Speaking on the sidelines of the Regional Open and Distance Learning awareness workshop for media practitioners in Johannesburg in South Africa on 11 February 2011, Professor Richard Siaciwena said the ZINTEC programme was the best on the continent and continued to inspire improvements in education standards. The quantitative and qualitative demand for teachers in Zimbabwe and the success of the ZINTEC programme became very strong reasons in support of the introduction of distance teacher education at the University of Zimbabwe in 1993 (Gatawa, 1986). Distance education started when the department of education set up the Centre for Distance Education (CDE) which initially offered one programme - the Bachelor of Education degree aimed at equipping school heads with skills in educational administration, planning and policy studies (BEDEAPPS). The CDE later transformed into the University College of Distance Education which subsequently transformed into the Zimbabwe Open University (ZOU) through an Act of Parliament Chapter 12: on 1 March 1999.

Since 1999, the ZOU has established itself as the second largest open and distance Learning institution in Africa, second only to the University of South Africa (UNISA). The ZOU now boasts of four Faculties and offers more than 60 diploma and degree programmes. The growth of distance education at the ZOU has seen the Department of Education introducing more teacher education programmes. During the time of the present study, in 2010, the department of education was offering 12 teacher education programmes:

- Diploma in Education for Primary school teachers
- Diploma in Education Secondary school teachers
- Bachelor of Education Degree Early Childhood Development
- Bachelor of Education for Secondary School Teachers
- Bachelor of Education Curriculum Studies
- Bachelor of Education (Technical)
- Bachelor of Education (Youth Development)
- Post Graduate Diploma in Education
- Bachelor of Education in Educational Management

- Master of Education in Educational Management
- Master of Philosophy in Education
- Doctor of Philosophy in Education

Although there is wide recognition that teacher education need to be integrated, in ways that operationalize lifelong learning for teachers, the resources allocated to it are usually inadequate and the opportunities are very few. Can open and distance learning respond to these challenges? Robinson (2003) notes that ongoing evaluation and impact analysis of distance teacher education programmes is generally weak and that these weaknesses are exacerbated by the complexities of distance education delivery: "Most reports are largely descriptive, only sometimes including detailed statistics and often lacking well-evidenced findings on outcomes" (Robinson 2003:196-7).

The present study attempts to offer some answers, in describing a range of uses of open and distance learning for both initial and continuing teacher education.

STATEMENT OF THE PROBLEM

Teacher education has become a topical issue in most developing countries. Many teachers are untrained or under-qualified or teaching subjects in which they are not qualified or trained. The demand for teachers in Africa is rising due to Universal Primary Education (UPE) and Education for All (EFA) targets, increasing enrolments, the migration of teachers to neighbouring countries, and the loss of many teachers because of HIV and AIDS. In the rural remote areas of the country, untrained or under-qualified teachers make up a substantial proportion of teachers. The question to be addressed in this article is: Can distance education quantitatively and qualitatively meet the demand for teachers?

In order to address this question, the present study was guided by five sub questions.

- Why is distance education used for teacher development?
- What is the role of distance education in the context of teacher education?
- Can distance education meet the quantitative and qualitative demand for teachers?
- What are the challenges and opportunities in training teachers through distance education?
- What is needed for effective teacher education through distance education looking to the future?

Importance of the study

The present study was undertaken in an attempt to address the issues of quantity and quality in distance teacher education. Findings of the present study contributes vital information to the theory and practice of teacher education at a distance and helps to inform both educational policy makers and distance teacher educators on the potential of distance education in the improvement of the quantity and quality of teachers. This study also aims at generating research interest into distance education in general, and distance teacher education in particular.

LITERATURE REVIEW

The Concept Open and Distance Learning

Saide and Saide (2003) have defined distance education as an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Open learning, in turn, is an organized educational activity, based on the use of teaching materials, in which constraints on study are minimized in terms either of access, or of time and place, pace, method of study, or any combination of these. In the context of teacher education, we have found it useful to understand distance education not as a mode of delivery with one identity, but rather as a collection of methods for the provision of structured learning in situations where students are unable primarily to attend fixed classes at a centralized

venue and in the physical presence of a teacher. In the present study we consider the term “open and distance learning” as an umbrella term to cover educational approaches (print media, telephone, computers and television) used to reach teachers in their schools, provide learning resources for them, or enable them to qualify without attending college in person. The flexibility inherent in open and distance learning, and the fact that it can be combined with a full or near full-time job, makes it particularly appropriate for the often widely distributed force of teachers and school managers.

Theoretical Framework

Teacher education has been an issue of major debate and controversy over the past decade (Booth, Furlong and Wilkin, 1990). In Zimbabwe, the training of teachers through the distance education mode is generating much interest and heated debate. Much of the discussion centers round the roles of the training institution and the school in providing a coherent, relevant and effective course with political support from key stakeholders. There are fears that training teachers through distance education would affect teacher quality (Dellana, Collins, and West, 2000). Although, several comparative studies carried out in Zimbabwe and elsewhere have demonstrated that there is no significant difference in quality between distance education and conventional education programmes (Chivore, 1989; Verduin and Clark, 1991; Phipps and Merisotis, 1999; DeSantis, 2002; Russell, 2000), distance education in Zimbabwe is yet to win the battle for recognition as an alternative form of education particularly in teacher education. The major issue of concern is how distance teacher education can effectively deal with the theory/practice paradigm.

Models of Teacher Education

Basically, the theory/practice debate has been dominated by three teacher education models. The first model is the apprenticeship model or school based model. In this model, the training of teachers should be school based with the experienced classroom teacher playing the major role. All that is needed is for a trainee teacher to spend time with an experienced teacher in school to pick up “tips on teaching”. This idea of apprenticeship has been attacked by some educationists. The training is carried out in individual schools and lacks uniformity. Each school has its own professional standards. The model emphasizes the acquisition of practical teaching skills at the expense of theory. Wragg (1984) argues that this approach de-professionalizes both teaching and teacher training because the model lacks training in theory of education.

The second model is the college based model which argues that much of the training must take place in the training institution with the school facilitating teaching practice for a shorter period (Booth, Furlong and Wilkin, 1990). In Zimbabwe this has been the traditional method used by conventional teachers colleges. The training programme is three years. Trainee teachers spend the first year in college studying the theory of education and professional foundations, the second year on teaching practice in the schools and the third year back in college to write the research project and examinations. The major limitation of the model is that it puts more emphasis on theory of education at the expense of practice and takes too long to produce qualified teachers especially in the face of a national crisis of teacher shortage.

The third model is the equal partnership model involving the training institution, the school and the government, with the training institution teaching theory, the school facilitating teaching practice and the government providing funding. The training programme is normally four years. Students spend the first and third years in college studying theory of education and professional foundations. The second and fourth years are spent on teaching practice in schools.

These three perspectives (school based model, college based model and equal partnership model) have characterized the development of teacher education in Zimbabwe. However, the demand for qualified teachers brought about by the expansion of the education system at independence (1980) and failure by conventional colleges to meet this demand, has forced Zimbabwe to search for new models in the training of teachers. The trend in training teachers is now shifting away from the traditional conventional mode to a more flexible

approach through open and distance learning. However, distance teacher education programmes at the Zimbabwe Open University are experiencing a number of challenges that threaten their very existence. The present study, therefore, examined challenges and opportunities faced by ZOU in the training of teachers through distance education.

RESEARCH DESIGN AND METHODOLOGY

The present study was a case study of distance teacher education at the Zimbabwe Open University. Data for the present study were collected in two stages.

Stage 1: Inspired by the motivation to understand the challenges and opportunities inherent in the distance teacher education programmes offered by the ZOU, the two researchers/lecturers working in the department of education and based at the Zimbabwe Open University Mashonaland East Regional Centre, collected data and information for the present study over a period of two years through personal experience, participatory methods, observations, document analysis, informal discussions and illuminative methods.

Stage 2: The two researchers reviewed twenty case studies on distance teacher education programmes in operation in Africa and elsewhere randomly selected from the internet and through reading books and journal articles. Analysis of these case studies focused on the five sub-questions that guided the study. The presentation and discussion of research findings that follows, is guided by these research questions and refer to some of the cases we analyzed.

DISCUSSION OF FINDINGS

The first question the study sought to address was, “why is distance education used for teacher development?”

In the present study we identified and analyzed a number of innovative programmes (case studies) that are in operation in Africa and elsewhere from which we can derive inspiration (see Appendix 1).

The analysis of case studies we undertook revealed a number of reasons why different countries introduced distance education methods in the training of teachers. (See table 3 below).

Table 3: Reasons for Introducing Distance Teacher Education N=20

Reason	No	%
1. To meet the demand for teachers	18	90%
2. In service training of teachers	12	60%
3. Pre-service training of teachers	5	25%
4. Up grading teachers' skills	10	50%
5. Low training costs	2	10%
6. Increased access to higher education and attainment of equity	6	30%
7. More teaching practice	8	40%

In many developing countries (90%) distance teacher education was introduced so as to solve the problem of teacher shortage. Traditionally, teachers were trained in teachers colleges using the conventional college-based model. However, conventional methods can no longer meet the present and future demands for teachers. Factors responsible for the shortage of teachers include the following;

- In Africa for example, the attaining of political independence saw many countries adopt educational reforms that democratized each country's education system. This resulted in an unprecedented increase in school enrolment. Therefore, a faster and cheaper method had to be found to train teachers on the job.
- The HIV/AIDS pandemic is also taking its toll and reducing the number of trained teachers.
- The poor salaries and conditions of service have also made the teaching profession less attractive to prospective teachers. Hence there is a marked decline in the number of people training as teachers.

One strategy many countries have adopted is to train more teachers. To this end distance education has been found to be the most appropriate and desirable approach. A number of reasons have been put forward in support of distance teacher training. Distance education is cheaper than conventional education. No facilities such as classrooms or hostels are required to house students like as is the case in conventional colleges. In distance education, the average cost of educating a student actually decreases as the enrolment increases. In a country experiencing a critical shortage of trained teachers like Zimbabwe, distance education is the way to go as teachers are trained on the job and do not have to leave their work or take study leave. Distance education also addresses the theory/practice question more effectively in that learnt skills, methods and techniques are applied in the classroom immediately rather than wait for the future when students are on teaching practice. As students are trained on the job, they get to master the practical skills of the organization and management of the different school activities. New developments in information communication technology also make distance education more attractive and convenient as people can now study in the comfort of their homes and at their work places.

In Malawi distance teacher education was introduced at Domasi Teachers College in order to increase access to higher education and to reduce gender disparity (Chakwera and Saiti, 2005).

In Nigeria the National Certificate in Education (NCE) programme offered through distance education by the National Teachers Institute, provides an alternative but equivalent route to initial teaching qualifications for working primary school teachers in a country very short of qualified teachers and where conventional college output cannot meet demand (Aderinoye and Ojokheta, 2004).

The second question to be addressed by the present study was, "What is the role played by distance education in the context of teacher education?"

Research has shown that distance teacher education can play a crucial role in two different but sometimes overlapping areas of teacher education: initial professional education, and continuing professional development.

There are a number of countries that have used distance education in initial teacher education - the China Television Teachers College, the National Teachers' Institute in Nigeria, the PGCE programme of the UK Open University are good examples. In these countries distance education programmes are used to provide initial training (pre-service or in-service) for different levels of student teachers, for those with secondary-level entry qualifications in China and Nigeria to graduate entry in the United Kingdom. In pre-service programmes student teachers are trained before they are engaged as teachers in the schools, whilst in-service programmes are meant for teachers already employed as untrained teachers in the schools. Both teachers study for the initial teaching qualification.

In Zimbabwe distance education was used in the initial training of teachers through the ZINTEC programme. The Zimbabwe Open University offers initial teacher training through the Early Childhood Development (ECD) Degree programme for pre – school teachers, the Diploma in Education for Primary teachers and Diploma in Education for Secondary teachers.

Distance education can also be used for teachers' continuing professional development. This training is characterized by a diversification of provision, in terms of types of programmes, duration, management, technology and audience, and is an area in which distance education can also play a significant role. One good example of continuing professional development through distance education is provided by the Burkina Faso case. In Burkina Faso over a quarter of the country's head teachers (whose professional development is increasingly seen as a key element in school effectiveness) developed new knowledge and skills through distance education within four years. This served at least three functions: it furthered their careers, built capacity in the head teacher cohort and provided professional development.

At the Zimbabwe Open University, continuing professional development of teachers is provided through the Bachelor of Education in Educational Management (BED-Management), Master of Education in Educational Management (MED-Management) and Doctor of Philosophy in Education (DPhil Education). The BED-Management, MED- Management and DPhil programmes are in-service teacher programmes aimed at capacity building by equipping officers in the educational administrative positions with relevant administrative, planning and policy skills.

The third question the study dealt with was “Can distance education meet the quantitative and qualitative demand for teachers?”

Quantitative output of distance teacher education programmes

Distance education programs seem to be the best tool to bring down teacher shortage. For example, the distance teacher education programme implemented at Domasi Teachers College in Malawi was able to increase its annual intake from 180 to nearly 914 because the distance education program was recruiting at least 734 student teachers in the two years of its operation. The output of Domasi College alone was more than what all colleges were producing together through their regular programs (Chakwera and Saiti, 2005). In Burkina Faso a programme meant for the development of head teachers trained seventy head teachers in the first year, 920 heads in the second year and 1275 in the third year (Jean-Francois, 2004). In China, China television teachers college between 1987 and 1999, assisted 717,300 unqualified primary teachers to gain teacher certificates and 552,000 unqualified secondary school teachers gained a teaching diploma. Another programme to develop primary school teacher knowledge and skills in child guidance in India, churned out a total of 6,546 teachers between 1993 and 2001.

Data available for Zimbabwe indicate that of the original 7,353 candidates admitted into the ZINTEC programme, 5,887 (80.0%) passed. Of these, 236 (3.2%) obtained distinctions. The average failure rate was 1.5%. according to Gatawa (1986), the pass rates for the ZINTEC programmes were so impressive that they compared favourably with those of the conventional system (See Table 4).

Table 4: Candidates admitted and those who completed the course between 1981 and 1988 under the ZINTEC Programme

College	Admitted	Passed		Distinction		Fail	
	N	N	%	N	%	N	%
Morgan	2559	2014	78.8	66	2.5	41	1.6
Marymount	1815	2413	78.1	73	4.0	20	1.1
Gwanda	1461	1224	86.0	33	2.2	24	1.6
Andrew Louw	1518	1236	86.6	64	4.2	29	1.9
Total	7353	5887	80.0	236	3.2	114	1.5
College		Referred		Deferred		Dropouts	
		N	%	N	%	N	%
Morgan		277	10.8	221	8.6	6	.2
Marymount		183	10.1	191	10.5	8	.4
Gwanda		173	11.8	36	2.4	4	.2
Andrew Louw		139	9.1	109	7.2	5	.3
Total		772	10.5	557	7.6	23	.3

According to Gatawa (1986:21), the dropout rate for the ZINTEC programme was given at .3% and this was statistically insignificant. In fact, the programme was so attractive that its numbers were continuously augmented by “drop-ins” from the conventional system (Gatawa, 1986:21). What Gatawa termed “drop-ins” were student teachers who left conventional colleges to join the ZINTEC programme.

The ZINTEC programme was structured in such a way that teachers had to spend more time on teaching practice in the schools. This was a deliberate move to alleviate the shortage of teachers in the schools.

At the ZOU between 1997 and 2002 a total of 6,222 school heads graduated with a Bachelor of Education in Educational Management and a total of 325 students graduated with a Master of Education degree in educational management between 2001 and 2002 (ZOU graduation Handbook from 1997 – 2002).

Quality, Effectiveness and Outcomes of Distance Teacher Education at the ZOU

An issue that has continued to attract attention of open and distance learning (ODL) educators, scholars and researchers is how ODL institutions, whatever their structure, context or circumstances, can assess their own quality (Myrdal, 1994). Kangai, Bukaliya, Musika and Mapuranga (2011), note that some critical questions that continue to fuel the “distance education” quality debate are; what makes distance education an experience that would be described as one of quality? How can distance education improve the quality of the ODL it offers? How can an institution providing ODL assess its own quality effectively? Agreeably, all institutions providing ODL will have some existing systems and procedures for assessing the quality of what they do. But not all have addressed the assessment of quality within their organizations in a systematic way as much as they need to (Mertens, 2005). Challenges facing ODL institutions are that procedures for assessing quality can be ad hoc, piecemeal, unsystematic, too reliant on individual discretion, and standards of practice can be unnecessarily inconsistent and variable.

According to a study by Chakwera and Saiti (2005) the distance teacher education provided at Domasi Teachers College compared favourably in terms of quality with the conventional programme.

In Nigeria quality assurance in distance education is undertaken by the National Commission for Colleges of Education (NCCE). This body visits centres, appraises the quality and quantity of tutors and sets the grading and

assessment system. Teaching practice and examination scripts are externally moderated. The learning materials are acknowledged to have a value wider than the distance education programme alone and have been used in other West African countries (Sierra Leone, Gambia and Ghana).

The ZOU is one of the few ODL institutions that have established a department responsible for quality assurance of its programmes. Quality assurance measures include the use of team approach in the production of learning materials, external assessment of courses and modules, and the external moderation of question papers and examination scripts. To keep the study materials up-to-date, the modules are revised every five years and reviewed by external assessors. Turnaround of assignments takes two weeks to give students' feedback within a specified time. Quality assurance for teaching practice is provided by the students teaching practice files, in which students record their activities and lesson plans and the assessment of teaching practice according to a common set of criteria plus a report by the supervising teacher to ZOU. ZOU teacher programmes, like those from conventional institutions, enroll students with 5 'O' levels including English and Mathematics. The programmes and materials are developed with the input of external assessors who are also involved in assessing students' work and performance. The materials are of high quality and widely used outside the programme by schools and other training providers.

According to a top Zambian academic, Professor Richard Siaciwena (2011), teacher education at the Zimbabwe Open University was among the best in Africa. Siaciwena, a proponent of distance education, argues that ODL as a learning route provides better benefits to learners than conventional systems. Amongst such benefits is increased quality, immediate knowledge application and enhanced graduate competence.

The fourth question was: "What are the advantages and challenges faced in training teachers through distance education?"

Advantages of Distance Teacher Education

There are some noticeable advantages for distance teacher education programmes which should be highlighted or registered in a country experiencing a perennial teacher shortage such as Zimbabwe.

Teachers pursue their studies without withdrawing their services, as it tends to be the case when serving teachers are admitted in a conventional face-to-face program. Teachers on training have an immediate opportunity to apply the knowledge and skills that they learn because they are in contact with students on a daily basis. This has an immediate impact on the quality of teaching and learning that goes on in the classroom. The increase in enrollment does not need a corresponding increase in teaching personnel. Distance education has made a big stride in ensuring women's participation in teacher training at a higher level. The home study provision has enabled pre- natal and ante- natal mothers to pursue their studies without disruptions while students in similar conditions in the regular program tend to be withdrawn on health grounds. There is no doubt that distance education offers an opportunity to remove the gender disparities that have characterized a number of education systems. For most women, ODL helps overcome social constraints that limit their ability to travel to pursue higher education (Allsop, 2008). Distance education is a sure way of increasing access to higher education in a country where the greater part of its limited resources are spent for the benefit of the majority in basic education. Distance teacher education provides for flexibility in the progress of student teachers because it is not tied to the fixed calendar of an academic year. For example, if the student teacher, for some reason, has not been able to complete courses, they may be allowed to take extra courses in addition to those uncompleted as they move to the next segment of the program. Morrison and Pitfield (2006) argue for some flexibility in course entry and exit points, for self-study modules with negotiated deadlines, flexible start dates, the possibility of extended time, recognition of prior learning and exploration of the implications for tutors' teaching beliefs and workload factors. If for some reasons, the student teachers withdraw from active studies, they can pick it up from where they stopped whenever they want to resume the studies. In the conventional program, the current practice is that such students would normally be made to repeat the whole

year because there are no provisions for students to join the program at any other time rather than the beginning of an academic year.

Challenges

Despite its advantages and the potential to increase the quantity of trained teachers, distance teacher education continues to face a number of challenges. Distance teacher education programmes continue to be marginalized. Some of the serious challenges confronting these programmes at the Zimbabwe Open University include low enrollments, low retention rate and low completion rate. It is generally accepted that the programmes have been less successful than expected. The present study established some of the most serious and most frequently mentioned problems affecting distance teacher education. These problems include delays in module distribution, shortage of reference materials, management of teaching practice and stakeholders' perceptions.

Learning Materials

One of the fundamental principles of distance education is the provision of opportunity for students to study according to their own learning pace or speed (Keegan, 1990). For this reason, a distance education system presupposes that every student receives all the course materials at the beginning of the program so that she/he can design his/her own study timetable in the light of the overall schedule of the program. However, some ODL systems fail to provide students with all the learning materials. In a distance education system where print medium is employed as the sole means of content delivery, students should receive the learning materials long before the dates fixed for tutorial programs. The intention here is to give students a reasonably sufficient amount of time to study the materials independently, work on the assignment questions and areas of difficulty before the actual date of the tutorial session. Consequently, the fundamental opportunities which a distance education system provides for each student to study the course materials independently and in accordance with his/her own learning pace and also to receive tutorial support pertinent to his /her own learning problems have been disregarded in the present system of ODL education (Willis, 1993; Keegan, 1990). Although the Zimbabwe Open University has managed to provide modules for all its teacher education programmes, challenges are sometimes experienced in the distribution of modules to students.

Library Services

It has been the primary challenge of distance education programs to provide current, relevant information for the distant students (McGreal 1995). Dillon, Gunawardena, and Parker (1992) discovered in an evaluation of learner support that: "Library resources are very important to distance students as the majority of them (57.3 percent) indicated that success in the course required access to library materials." As teacher education embraces distance education, libraries find themselves playing a pivotal but ever changing role of providing relevant information to a population that may never set foot into the library building. The challenges facing distance teacher education at the ZOU include the following:

- Inadequate library resources. The library has inadequate referencing materials such as text books and journals.
- The text books are too old and outdated (Kangai and Mapolisa, 2008)
- The library uses manual records since it lacks modern technology such as computers
- The library has no internet connectivity and students have no access to e-resources (Kangai and Bukalia, 2010).

According to Dillon, Gunawardena, and Parker (1992), the most serious challenge facing libraries in developing countries is that whilst the demand for the introduction of new technologies is on the increase, libraries lack the capacity to keep pace with the demand for new technology. Poor library resources and over reliance on modules will impact the quality of distance education programmes negatively.

Teaching Practice

One of the main attractions to teacher education at a distance is that the mode has the potential to effectively train teachers without taking them out of the classroom. Despite this great advantage in teacher education at a distance, there are problems, one of the main ones being the assessment of teaching and classroom performance in schools. Several studies in distance teacher education reveal that the organization of teaching practice for teacher trainees presents both logistical and educational difficulties (Makau, 1993; Oliveira & Orivel, 1993; Prescott & Robinson, 1993). Finding the means to assess teacher trainees on teaching practice eludes most distance education institutions. Logistical problems arise out of a need to supervise in-service teachers' work in the schools that are at a considerable distance from each other and from teacher educators (Perraton, 1993). Educational difficulties arise from the old problem of integrating theory and practice (Duschl and Waxman, 1991).

These organizational difficulties, have led some distance education institutions to abandon the supervision of teaching practice and have adopted various alternatives in attempts to meet its supervision needs. For example, in Nepal, peer-teaching sessions were arranged to introduce a practical element to teacher education (Holmes, Karmacharya & Mayo, 1993). In Brazil microteaching was incorporated into face-to-face sessions with student teachers (Oliveira & Orivel, 1993). The British Open University (OU), while not supervising teaching practice, has tried to link theory and practice through inviting teachers to report on their classroom experiences of ideas and practical activities covered in the course (Perraton, 1993).

Although teacher education at the Zimbabwe Open University is rated among the best in Africa (Siaciwen, 2011), there are some challenges experienced in the organization and management of teaching practice that need to be addressed. These challenges include:

- Lack of capacity to supervise student teachers
- Lack of political support of the government,
- Lack of collaboration between the University and the schools.

Perceptions of Stakeholders

Out of the various problems facing distance education today, a very important one is how it is perceived by the individuals involved in it. Despite the splendid role and increased popularity of open and distance learning, the quality of teacher education via distance education has been called to question (Dede, 1996; Harrison 2001 as cited in Peat and Helland, 2002). Different people perceive the advantages of ODL differently and their perceptions have influenced attitudes towards the acceptance and use of ODL in the system in our country and elsewhere. The tutors and other stakeholders' perceptions have an enormous effect on the successful implementation of distance teacher education programmes. People are having wrong perceptions about ODL because its benefits have not been documented. Most of the issues have been anecdotal yet focus should be on quality enhancement. Documentation will help counter these wrong perceptions.

The fifth question was: "What is needed for effective teacher education through distance education looking to the future?"

The twenty case studies examined in the present study provide us with a significant body of data to further our understanding about the use of distance teacher education for both initial and continuing training. Although the case studies are limited in their scope, they make it possible to draw some recommendations about the appropriate uses of open and distance learning in the training of teachers. On the basis of the present findings, effective distance education programmes would require the adoption of the following key strategies:

- Winning government support for distance teacher education,
- Setting up a directorate for the coordination of distance teacher education,
- Adoption of the partnership model in the training of teachers

Role of the State in distance teacher education

Just like any other teacher education programme, distance teacher education must be supported by government. Education in Zimbabwe enjoys a worldwide reputation for its high quality. This is achieved through a national system of regulation and quality assurance. The Ministry of Education, Sport and Culture is responsible for legislation pertaining to education. In this section we discuss the role of the state in distance teacher education in Zimbabwe. In Zimbabwe the government trains, hires and pays teachers. The key power held by the state over education is that of allocating the rights to supply credentials. To give degrees, an educational institution must be licensed by a body authorized by the state. This power of the state also applies to private educational bodies, and thus provides a strong unifying force on educational institutions. The case studies examined in the present study show that in most countries, distance education for teachers receives funds from all four of the most usual sources of funds for education; from government budgets, from student fees, from the private and NGO sector and from funding agencies. Several programmes receive funding from a combination of sources, for example, the distance teacher programmes in both China and Nigeria are funded partly by government and partly by student fees. All teacher education programmes at UNISA are state funded through grants. In Nigeria the National Teachers Institute is funded directly by the Federal Ministry of Education. A distance education programme for the professional development of head teachers in Burkina Faso is funded within the framework of a bilateral aid agreement between the government of Burkina Faso and France. The UK Open University received a grant of about US\$3.5 million to develop an ICT based initial teacher education programme through distance education. In Zimbabwe the ZINTEC programme was funded by the government of Zimbabwe with the material support from UNESCO (Chivore, 1989). At the ZOU, in-service teacher programmes eg. the Bachelor of education and Master of Education (Educational management) are fully supported by government. However there are challenges in the recognition of initial teacher training programmes such as the Diploma in Education for primary school teachers.

Our discussion in this article is based on the premise that the government has a social contract to provide education to all its citizens, just as it is its obligation to provide security to all its citizens. Similarly, education is the responsibility of the government for the social security of its citizens. Distance teacher education, therefore, needs government support.

Organization and Management of Distance Teacher Education Programmes

Distance teacher education programmes need to be well organized and managed. There is a need to set up a teacher education directorate responsible for coordinating distance teacher education. The directorate should be responsible amongst other things for:

- Integrating and rationalizing teacher education systems with the aim of providing standardized, accredited training for pre-service and in-service training.
- Implementing flexible open and distance learning methods, designing new roles and responsibilities for existing providers and transferring training and support tasks to the level of district, zone and school.
- Conducting feasibility studies, audits and baseline studies to determine what institutions and expertise already exist and could be pulled into a delivery and support system.
- Developing the delivery and support network that links all those involved with one another.
- Provision of student support as the key element for success.
- Enlisting commitment from all stakeholders.
- Quality assurance and quality control of all national teacher programmes.
- Student teacher administration such as deploying students into schools, paying their allowances and looking after their welfare.

Adoption of the Partnership Model in the Training of Teachers

Distance teacher education is best implemented using school based training in the context of partnership. The partnership model involves the third model that is the equal partnership model involving the training

institution, the school and the government, with the training institution teaching theory, the school facilitating teaching practice and the government providing funding.

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Appendix 1: Case Studies on Distance Teacher Education

ARTICLE	AUTHOR : JOURNAL AND YEAR
1.Training Teachers Through The Distance Mode: The Experience Of Domasi College of Education in Malawi	Elias Chakwera & Francis Saiti (2005) http://www.col.org/pcf2/papers/chakwera.pdf
2.Managing the Field Experience in Distance Delivered Distance Education Programmes	MARY SIMPSON Massey University New Zealand (2006) http://www.col.org/pcf2/papers%5Csimpson.pdf
3.Field Experience in Distance Delivered Initial Teacher Education Programmes	MARY SIMPSON Massey University New Zealand Journal of Technology and Teacher Education 2006
4.Distance Education for Technology Teachers: Case Studies of Botswana, Seychelles and Mauritius.	Williams P. J.Journal of technology Studies
5.Assessing Student Teachers Performance in Practicum	Haigh M. And Tuck B. http://www.aare.edu.au/99pap/tuc99118.htm
6.Teacher Education through Distance education – Rising to the Challenge	Saide J. G. And Saide T.M. http://www.nou.edu.ng/noun/acde2008/acde_en/speakers.pdf
7.Pre- service Education at a Distance: The Case of Zimbabwe	Chivore B.R.S. (1992) Distance Education in Anglophone Africa: Experience with Secondary Education and Teacher Training
8.Flexible Models for Primary Teacher Training in Africa	Mattson E. http://www.dfid.uk/pubs/files/field-based-models-teacher-training-63.pdf
9.Teacher Education Through Distance Learning: Technology, Curriculum, Cost, Evaluation, Summary of Case Studies.	Perraton H., Robinson B. and Creed C. The International Research Foundation for Open Learning UNESCO
10.Brazil: <i>Television –Plus: Journalism in the Service of Teacher Development.</i>	Oliveira Joao Batista The International Research Foundation for Open Learning UNESCO
11.Burkina Faso: <i>Professional Development of Head Teachers in Burkina Faso</i>	Terret Jean- Francois The International Research Foundation for Open Learning UNESCO

12.China: Reaching Teachers Through Television	Zhang Wei Yuan and Jian Niu The International Research Foundation for Open Learning UNESCO
13.Chile: Teachers Learning to Use Information Technology	Cerda Cristian, Leon Miriam, and Ropoll Miguel The International Research Foundation for Open Learning UNESCO
14.India: Developing Primary Teachers Knowledge and Skills in Child Guidance	Mehrotra Ram Narain The International Research Foundation for Open Learning UNESCO
15.Mongolia: Reorienting Primary Teachers to New Teaching Approaches	Robinson Bernaddette. The International Research Foundation for Open Learning UNESCO
16.Nigeria: An Alternative Route to Primary Teacher Qualification	Ederinoye Rashid The International Research Foundation for Open Learning UNESCO
17.South Africa: Interactive Radio For Supporting Teachers of English as a Second Language, OLSET	Potter Charles The International Research Foundation for Open Learning UNESCO
18.South Africa: New Route to Teacher Education Degrees	Potter Charles The International Research Foundation for Open Learning UNESCO
19.United Kingdom: Using ICT to Support School Based initial Teacher education	Walker Rob The International Research Foundation for Open Learning UNESCO
20.In-service Primary Teacher Training Through Distance Education in Madhya Pradesh	Sahoo P.K. and Khan M. Indian Journal of Open Learning (1998) Vol 7 (2) ISSN 0971- 2690.