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OBJECTIVES

The main objectives of the Journal are:
- To initiate, conduct, and support research in all fields of knowledge;
- To assemble all who are interested in these fields for an exchange of ideas and experiences;
- To disseminate research findings;
- To provide a database for members and researchers.

Academic procrastination among college Students with Learning Disabilities: The role of Positive and Negative Self-Oriented Perfectionism in Terms of Gender, Specialty and Grade

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Abstract

The purpose of this study was three folds: to explore whether there were relationship between academic procrastination and positive and negative self-oriented perfectionism of college students with learning disabilities, the extent to which positive and negative self-oriented perfectionism of college students with learning disabilities predicts academic procrastination, and whether level of academic procrastination tendency among college students with learning disabilities differs according to demographic variables. The research is based on a convenience sample of 80 undergraduate students from a variety of departments at Zagazig Faculty of Education, Egypt. Findings indicated that there was a positive correlation between academic procrastination and Positive Self–Oriented Perfectionism, while no significant correlation was determined between academic procrastination and Negative Self –Oriented Perfectionism. According to the multiple linear regression analysis results, Positive Self–Oriented Perfectionism, and Negative Self–Oriented Perfectionism account for 22% of academic procrastination. Positive Self–Oriented Perfectionism made a positive contribution to the model, Negative Self–Oriented Perfectionism made no significant contribution, which indicated that The only significant predictor was Positive Self–Oriented Perfectionism. The independent t-test showed that undergraduates' academic procrastination scores did not differ significantly according to gender. One-way ANOVA showed that undergraduates' academic procrastination scores did not differ significantly according to grade. The independent t-test showed that undergraduates' academic procrastination scores did not differ significantly according to Specialty.

Keywords. Academic procrastination, college students, positive and negative self- oriented perfectionism, gender, specialty , grade

Introduction

Procrastination has typically been defined as a trait or behavioral disposition to postpone or delay performing a task or making decisions (Milgram et al., 1998; Haycock et al., 1998; Kachgal et al., 2001). Additionally, procrastination has been seen as an impediment to academic success because it decreases the quality and quantity of learning while increasing the severity of stress and negative outcomes in students' lives (Howell & Watson, 2007). The literature has examined procrastination because it involves affective, cognitive, and behavioral mechanisms (Chu & Choi., 2005).

It is argued that identity style, self-consciousness, and perfectionism are underlying traits of procrastination. Procrastination may also be linked to depression, anxiety, and self-esteem. In addition, perfectionism has also shown a significant relationship with depression and anxiety (Stober & Joormann, 2001).

Some students procrastinate until anxiety and worry reaches its highest level, then they feel motivated to do their work. Students' beliefs about their procrastination are related to their motivational beliefs (Wolters, 2003). Students will be more likely to procrastinate if they believe they are not able to complete certain tasks and the tasks they believe they have the ability to complete will be done without procrastination. Chu & Choi (2005) state that there are two forms of procrastinators: a) passive procrastinators and b) active procrastinators. Passive procrastinators are the ones who will fail to complete the task in time, whereas active

procrastinators will postpone their task until the last minute, those are the ones who "work better under pressure."

Procrastination and Perfectionism

Perfectionism has been defined as multidimensional (Frost, Marten, Lahart, & Rosenblate, 1990). The Frost Multidimensional Perfectionism Scale includes six factors: 1) concern over mistakes, 2) personal standards, 3) parental expectations, 4) parental criticism, 5) doubts about actions, and 6) organization (Frost et al., 1990). Perfectionists tend to be highly concerned about their mistakes, have high personal standards, and tend to be extremely organized. In addition, they are susceptible to parental criticism and expectations (Stober et al., 2001). According to Miquelon, Vallerand, Grouzet, & Cardinal (2005), perfectionism is also divided into self-oriented perfectionism (SOP), other-oriented perfectionism (OOP), and socially prescribed perfectionism (SPP). SOP is the intrapersonal aspect of perfectionism and OCP and SPP are interpersonal. Research has found that SPP has consequences on students' psychological adjustment such as lower self-esteem, depression, anxiety, avoidant coping, fear of negative evaluation and so forth (Miquelon et al., 2005).

A plenty of research has shown that procrastination is negatively correlated with self-oriented perfectionism (Klibert, Langhinrichsen-Rohling, & Saito, 2005; Saddler & Buley, 1999; Seo, 2008). SOP is the tendency for a person to hold high standards for his or her own performance (Hewitt & Flett, 1991; Klibert et al., 2005), and research argues that such a perfectionist does not delay his or her work. By managing his or her time well, a self-oriented perfectionist avoids compromising the quality of his or her results.

Onwuegbuzie (2000) explored the relationship between procrastination and perfectionism in a graduate student population. The participants involved in the study were 135 graduate students from a graduate-level research methods class at a university in the southeast United States. Of the participants, 92.6% were female and the age range of students was 21 to 51 with a mean age of 26. Students were given the Procrastination Assessment scale-Students (PASS) and the Multidimensional Perfectionism Scale (MPS) and asked to fill out the surveys. The PASS questionnaire was made up of six lists of academic tasks, which included writing a term paper, studying for exams, maintaining progress on weekly reading assignments, following through on administrative jobs, being present at meetings, and following through on scholastic tasks.

Participants were instructed to complete three rating scales for each of the six tasks identifying the rate at which they procrastinated on the given task. A rating of 1 referred to "Never procrastinate," while 5 referred to "Always procrastinate." The participants were also asked for their opinions related to seeing procrastination as a problem (1 refers to "Not at all a problem" and 5 refers to "Always a problem") as well as desire to decrease procrastination (1 refers to "Do not want to decrease" and 5 refers to "Definitely want to decrease"). Frequencies were added up to show the overall measure of academic procrastination, with total scores that ranged from 12 to 60. High scores indicated self- reported procrastination on academic tasks. The second part of the PASS instructed students to reflect on the last instance in which they procrastinated on writing a term paper or dissertation, and to indicate how much, if at all, each of 26 reasons corresponded with why they engaged in procrastination. A rating of 1 referred to "Not at all reflects why I procrastinated" while 5 referred to "Definitely reflects why I procrastinated." Students mostly responded that fear of failure and reluctance to start a task were reasons for procrastination. The MPS was made up of 45 questions in a 7 point, Likert- type design, which measured three aspects of perfectionism including self

oriented, other-oriented, and socially prescribed. A high score on any section indicated perfectionist tendencies.

Onwuegbuzie (2000) found that 41% of the graduate students who participated in this study stated that they "nearly always" or "always" procrastinated on writing an academic paper, while 39.3% procrastinated on learning material for exams, and 60 % procrastinated on weekly reading for class. The study also indicated that graduate students were 3.5 times more likely to procrastinate on weekly reading assignments than undergraduate students. Some limitations of the study were the lack of demographic statistics relating to ethnicity, school size, and socioeconomic status of students. The majority of participants were female (92.6%) which may have affected reliability of the study.

Researchers have divided perfectionism into positive and negative constructs (Terry-Short, Owens, Slade, & Dewey, 1995). Positive perfectionism is similar to an individual's need for achievement; it is defined as the motivation to achieve a goal in order to obtain a favorable result. Negative perfectionism is the motivation to reach a goal to avoid negative consequences (Burka & Yuen, 2008, Flett & Hewitt, 2006; Haase & Prapavessis, 2004; Lotar & Kamenov, 2006). Neither positive nor negative perfectionism has been looked at in relation to procrastination, though it has been shown that negative perfectionism is correlated with self-handicapping (Lotar & Kamenov, 2006), the act of intentionally lessening the quality of one's work. Since procrastination is sometimes considered to be a means of self-handicapping (Burka & Yuen, 2008), it is possible that negative perfectionism and procrastination may be positively correlated. Additionally, similar to those who fear failure, negative perfectionists might postpone tasks to say they would have done better had they applied themselves earlier. Thus it may be theorized that negative perfectionists procrastinate in order to avoid the risk of trying and disappointing themselves.

Thus the purpose of the recent study was to explore the role of positive and negative self-oriented perfectionism can play in predicting Academic procrastination among college students in Egypt. The present study seeks to give answer to the following questions

1.Is there a significant relationship between academic procrastination and positive and negative self-oriented perfectionism of college students with learning disabilities? 2.To what extent does positive and negative self-oriented perfectionism of college students with learning disabilities predict academic procrastination?

3. Does level of academic procrastination tendency among college students with learning disabilities differ according to demographic variables?

Method

Participants

The research is based on a convenience sample of 80 undergraduate students (50% males,50%females) from a variety of departments at Zagazig Faculty of Education , Egypt. The mean age was 19.1 years (SD= 9.5). the participants were classified as having some kind of LD. The criteria for the diagnosis of LD are determined by a measure of learning disabilities "learning disabilities screening test (Mourad Ali, 2009) , which include indicators of cognitive abilities and achievement abilities. In addition, they all have a normal range or above IQ, but they failed their exams in two subjects or more. The participants were asked to

complete the questionnaires during class time in several large courses .The students were notified that participation in the research was voluntary and anonymous.

Psychometric Measures

Academic Procrastination Scale (APS; Justin, 2011). The APS was developed by means of a pilot study and the SONA participant pool at the University of Texas at Arlington. Item analysis, ensuring that items were highly correlated with total test scores, was used as one criterion for item selection. The APS consists of 25 items and has exhibited a high reliability, $\alpha = .95$. Using item discrimination indicators for item retention, however, may have auto-inflated reliability to some extent. Nevertheless, reliability was extremely high. The APS was validated using 86 undergraduates consisting of diverse academic majors and years of college completion. Items were scored using a 5-point Likert-type scale where 1 indicates disagree with the item and 5 indicates agree with the item. For example, a participant who agrees to the question "I put off projects until the last minute" would be indicative of an individual who procrastinates to a greater extent. Items were reverse scored for all scales when applicable, and a total across items was created.

The Positive and Negative Perfectionism Scale (PANPS; Terry-Short et al., 1995) The PANPS is a 40 item self-report measure designed to measure positive and negative perfectionism. It was developed with a sample of 281 participants, including individuals with eating disorders, depression, athletes and controls. The PANPS items were derived from a range of scales including eating disorder scales (EDI; Garner et al., 1983; SCANS; Slade & Dewey, 1986), the BPS (Burns, 1980), the MPS-H (Hewitt & Flett, 1991) and the Neurotic Perfectionism Questionnaire (NPQ; Mitzman, Slade, & De wey, 1994). The scale has been found to have a consistent factor solution comprised of two factors; 70 positive and negative perfectionism (Haase et al.,1999, 2002; Terry-Short et al., 1995).The PANPS has also been found to have good internal consistency, ranging from .83 - .88 (Haase et al., 1999, 2002).

The questionnaire is answered on a five point scale ranging from strongly disagree to strongly agree. There are 20 items on the positive perfectionism subscale and 20 items on the negative perfectionism subscale. The scores can range from 20-100 on both the negative perfectionism and positive perfectionism subscales, and the total perfectionism score can range from 40 -200. Higher scores indicate a higher degree of perfectionism. An example of a positive perfectionism item is; "I like the challenge of setting very high standards for myself" and an example of a negative perfectionism item is; "When I achieve my goals I feel dissatisfied".

Procedures

Scales were administered to students in groups, in a class environment. Before administration of the scales, students were given the requisite information about the aim of the research and how the measurement scales should be answered. Firstly, the relations between students' academic procrastination and perfectionism were investigated. Then, it was investigated whether academic procrastination differed significantly according to the independent variables in the personal information form. Data were analyzed using SPSS 15.00. Pearson's product moments correlation coefficient, multiple linear regression analysis, the independent t test and one-way ANOVA were used for data analysis. Significance was set at a minimum of 0.05, while other significance levels (0.01 and 0.001) are also shown.

Results

As shown in Table 1, there was a positive correlation (r = 0.54, p < 0.00) between academic procrastination and Positive Self –Oriented Perfectionism, while no significant correlation was determined between academic procrastination and Negative Self –Oriented Perfectionism.

Table 1. *Correlation between academic procrastination, positive and negative self-oriented perfectionism.*

Variables	**Academic Procrastination**	**Positive Self– Oriented Perfectionism**	**Negative Self – Oriented Perfectionism**
Academic Procrastination	1.00	.....	…..
Positive Self –Oriented Perfectionism	.54 **	1.00	
Negative Self –Oriented Perfectionism	.12	.17	1.00

Note: ** $p < .01$, $N = 80$

Table 2. *Multiple linear regression analysis results for the prediction of academic procrastination.*

Variables	**B**	**β**	**T**	**P**	**R**	**R2**	**ΔR2**	**F**
Fixed	52.00	-	18.341	0.000				
Positive Self –Oriented Perfectionism	0.647	0.632	20.563	0.000	0.632	0.29	0.29	82.12
Negative Self –Oriented Perfectionism	0. 131	0.139	1.625	0.285				

According to the multiple linear regression analysis results, Positive Self–Oriented Perfectionism, and Negative Self –Oriented Perfectionism account for 22% of academic procrastination variance (F= 82.12, p < 0.05) (Table 2). Positive Self–Oriented Perfectionism made a positive contribution to the model (β = 0.647, p < 0.05),Negative Self –Oriented Perfectionism made no significant contribution, which indicated that The only significant predictor was Positive Self–Oriented Perfectionism (p<.0.05).

Table 3. *Academic procrastination variations on the basis of gender.*

Group	**N**	**Mean**	**SD**	**T**	**Sig**
Female	40	74. 675	8.237	0.529	-
Male	40	72.325	7.986		

The independent t-test showed that undergraduates' academic procrastination scores did not differ significantly according to gender (t = -0.529, p > 0.05). (Table 3).

Table 4**.** *Academic procrastination variations according to grade*

	Sum of squares	**df**	**Mean Square**	**F**	**Sig**
Between Groups	443. 438	3	147.813	.400	.735
Within Groups	28081.450	76	369.493		
Total	28524.888	79			

One-way ANOVA showed that undergraduates' academic procrastination scores did not differ significantly according to grade ($F = .400$, $p > 0.05$). (Table 4).

Table 5. *Academic procrastination variations according to specialty*

Group	N	Mean	SD	T	Sig
Arts	40	77.125	9.332	.429	-
Science	40	75.575	8.967		

The independent t-test showed that undergraduates' academic procrastination scores did not differ significantly according to Specialty ($t = .429$, $p > 0.05$). (Table 5).

Discussion

This study examined the relationships between academic procrastination and Positive Self –Oriented Perfectionism and Negative Self –Oriented Perfectionism in college students with learning disabilities as an attempt to broaden and contribute to the small amount of evidence in this area. The findings of this study indicated that there was a positive correlation between academic procrastination and Positive Self –Oriented Perfectionism, while no significant correlation was determined between academic procrastination and Negative Self –Oriented Perfectionism.

This finding is similar to the other studies which reported that there was a positive correlation between academic procrastination and Positive Self –Oriented Perfectionism, while no significant correlation was determined between academic procrastination and Negative Self –Oriented Perfectionism (Klibert et al., 2005; Saddler & Buley, 1999; Seo, 2008; Trezza , 2011). The present study divided Self –Oriented Perfectionism into positive and negative Self –Oriented Perfectionism, and found that only positive Self –Oriented Perfectionism was correlated with procrastination.

Although another study (Sud and Prahba, 2003) found that negative Self –Oriented Perfectionism was correlated with maladaptive traits such as test anxiety and worry, as well as lower GPA, the present study found that this variable was not related to procrastination, and it supported the findings of Trezza's study (2011) .

Another variable that may account for the relationship between academic procrastination and Positive Self –Oriented Perfectionism is self-efficacy. Research has suggested that the negative relationship displayed between positive Self –Oriented Perfectionism and procrastination may be a result of self-efficacy as a mediator variable (Seo, 2008). This particular 2008 study showed that in a population of female Korean college students, students with higher levels of Self –Oriented Perfectionism tended to have higher levels of self-efficacy. Chu and Choi (2005) found that active procrastinators who choose to procrastinate and view it as a positive learning strategy tend to have higher levels of self efficacy than passive procrastinators who view procrastination in a negative way.

It also targeted a difference in levels of academic procrastination tendency among college students with learning disabilities according to demographic variables; namely gender , grade and specialty . Results indicated that there were no differences in levels of academic procrastination tendency according these variables .

The result of this study also showed that procrastination tendency does not differ according to gender. This finding goes on the same line with some researchers who found that there were no difference between men and women in procrastination tendency Beswick et al., 1988; Effert and Ferrari, 1989 ; Ferrari, 1992; Milgram et al., 1993; McKean, 1994; Ferrari and Emmons 1995; Johnson and Bloom, 1995; Haycock et al., 1998; Hess et al., 2000; Ferrari, 2000; Kachgal et al., 2001; Watson 2001; Onwuegbuzie, 2004; Alexander and Onwuegbuzie, 2007; Erkan , 2011).

The result of this study indicated that academic procrastination tendency of college students with learning disabilities does not differ significantly according to their grade. This may be because they lack motivation to learn as they are learning disabled students. This finding does not support that of Erkan (2011) which indicated that there were academic procrastination tendency of undergraduates attending school of physical education and sports differs significantly according to their grade .This may be because his sample were not academically failure students , and due culture differentiation .

The result of this study indicated that academic procrastination tendency of college students with learning disabilities does not differ significantly according to their specialty .Again this may be because they were learning disabled students ,and this type of students lacks motivation to learn , specially that students graduate from the universities and stays for a long lime without work .

The study accounted for 0.29% of the variance in academic procrastination scores. Results of the multiple regressions indicated that positive Self –Oriented Perfectionism was a significant predictor of procrastination; that is, students motivated by the desire to meet a self-determined standard of performance were less likely to delay their academic tasks than students without this motivation. This goes on line with the finding of Trezza (2011).

Limitations and Further Study

One limitation of the current study stems from the fact that academic procrastination was assessed via a self-report instrument, rather than on actual behavior, because it is possible that students may give socially desirable responses. Although self-report measures provide a simple, time efficient approach to measuring aspects of human thought and behavior, the limitation of these measures must be considered in this study. Self-report bias describes when people answer questions about themselves in a manner that is socially desirable, and they often respond in a way they want to see themselves rather than the truth. However, according to Rothblum et al. (1986, p. 388), 'self-reported procrastination has been validated against delay in taking self-paced quizzes (Solomon & Rothblum, 1984), delay in submitting course assignments (Rothblum, Beswick & Mann, 1984), delay in participation in psychology experiments (Solomon & Rothblum, 1984), and lower course grades (Rothblum et al., 1984)'. Nonetheless, future studies in this area should consider using behavioral measures of academic procrastination in addition to self-report instruments.

A second limitation of the current study stems from the fact that the scope of the study is limited to the data collected from college students with learning students . Hence, further research with larger and more demographically diverse populations with random selection would strengthen the findings of the study.

These limitations notwithstanding, this study extends previous research and contributes to the existing literature base on the role of positive and negative self-oriented perfectionism on academic procrastination of college students with learning disabilities. There are limited published research studies in this topic area using Egyptian samples and the

present study fills this specific gap, providing some insight into understanding the role of positive and negative self-oriented perfectionism on academic procrastination of college students with learning disabilities.

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International Journal of psycho-educational sciences

Preventing Early Reading Disabilities in Preschool Children at-Risk for Reading Failure: A Phonological Awareness-Based Program

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Abstract
This study describes an action research project designed to prevent early reading skills of children at- risk for future reading disabilities. A total of 47 children diagnosed as having poor pre-reading skills by teacher's nominations were invited to participate. The sample was randomly divided into two groups; experimental (n= 24, 16 boys, 8 girls) and control (n= 23, 18 boys and 5 girls). ANCOVA and Repeated Measures Analyses were employed for data analysis. Findings from this study indicated the effectiveness of the program employed in improving the pre -reading skills in the target children. On the basis of the findings, the study supports the idea of PA as a powerful predictor of early reading achievement
Keywords. Phonological awareness, pre- reading skills, reading disabilities, preschool children.

Introduction

Understanding the instructional needs of students with specific reading disabilities is still a major concern of educators and researchers .One of the most productive areas of research concerns the relationship between reading disabilities and phonological abilities (Balchman et al., 1994; Bender, 2001; Catts, 1991; Catts et al ,2001; Mourad Ali, 2007 Scanlon & Vellutino, 1987; Share & Stanovich, 1995; Stanovich, 1985, 1986; Wagner, 1986). Researchers in the field of learning disabilities, in the quest to identify precursors to reading disability, and its causes, have reached consensus that phonological processing plays a critical role in the development of reading.

Phonological processing refers to various linguistic operations that make use of information about the sound (i.e., phonological) structure of language. It is a set of mental activities or skills that are required in reading or learning to read. Phonological processing involves accessing, storing or manipulating phonological information (Mourad Ali, 2007).

Phonological processing involves a certain kind of knowledge about words- that they are made up of individual speech elements, which can be divided into segments of sounds smaller than a syllable. It is one aspect of the spoken language system which is important to early reading. Phonological processing is an insight about oral language, in terms of understanding that words are composed of sequences of small sounds called phonemes. In other words, phonological processing is a linguistic awareness that enables the individual to make use of information about speech and sound structure of the language (Mourad Ali , 2007) .

So, present research study seeks to explore the effectiveness of a phonological awareness – based program in preventing early reading disabilities in preschool children . It addresses the following questions :

1- Are there differences in post – test scores mean between control and experimental groups on pre –reading skills test ?

2- If the programme is effective, is this effect still evident a month later?

Literature review

Phonological Awareness

Definition of Phonological Awareness

Phonological awareness can be defined as the ability to define and manipulate the sound structure of oral language(Layton & Deeny,2002). Phonological awareness acquisition

involves the learning of two things. First, it involves learning that words can be divided into segments of sound smaller than a syllable. Second, it involves learning about individual phonemes themselves (Torgesen, 2000). The awareness of phonological structure of a word helps children to draw connections between the spoken form of a word and its written representation (Gillon, 2004).

Level of Phonological Awareness

Phonological awareness is a general ability that has multiple dimensions varying in difficulty(Smith, Simmons &Kameenui,1998).Gillon(2004)describes phonological awareness in terms of three different levels. They are onset-rime awareness, syllable awareness and phoneme awareness.

Onset-rime Awareness

Adams (1990) describes the rime as the obligatory part of the syllable consisting of its vowel and any consonant sounds that come after it, whereas onset consists of any consonant sounds that precede the vowel. Children are considered to have awareness of onset-rime if they can analyze syllables into onset and rime units in an oddity tasks (Treiman, 1992).

Syllable Awareness

Adams (1990) defines syllable awareness as the ability to detect the smallest unit of speech that can be produced in isolation. Some linguists suggest that children develop syllable awareness before the development of other phonological skills such as on-set rime and phonemic awareness (Adam, 1990; Tingley, Dore, Parsons, Campbell & Bird 2004; Treiman,1992).

Phonemic Awareness

Gillon (2004) defines phoneme as the smallest unit of sound that influences the meaning of a word. Adams (1990) states that the awareness of phonemes includes the abilities to segment, rearrange, and substitute them one for the other. Many researchers claim that awareness of phonemes is critical for learning an alphabetic writing system (Sawyer & Fox 1991; Treiman, 1992; Adams, 1990; Cook & Bassetti 2005).In addition, Torgesen (2000) suggests that although phonemic decoding skills should never be considered the end goal of reading, research now shows that, for most children, these skills are a critical step along the way toward effective reading skills.Share & Stanovich (1995) point out that phoneme awareness performance is a strong predictor of long-term reading and spelling success and can predict literacy performance more accurately than variables such as intelligence, vocabulary knowledge, and socioeconomic status.

Phonological Awareness Training

According to Oktay & Aktan (2002),phonological ability is not accompanied by an innate ability, which allows children to manipulate phonological elements intentionally. In addition, Cassady and Smith (2004) suggest that children should be trained to blend body-codas first, then to progress to more phonologically difficult blending tasks such as onset-rimes and phonemes. Study by Cheung et al. (2001) also suggests the important role of phonological training in reading acquisition. They point out that bilingual children develop phonological awareness earlier, but in the end, monolingual children reach the same level once they receive phonological skill training in reading development.

However, Durguno lu (2002) argues that children can gain insight into phonological skills if they have had exposure in their L1.

Assessment of Phonological Awareness

Treiman (1992) states that onset/rime tasks are easier than other kinds of phonological awareness tasks. On the other hand, onset clusters cause substantial difficulty in the phoneme deletion task. Moreover, the analysis of syllables into phonemes is also difficult. Daly et al. (2005) arrange phonological awareness skills according to their level of difficulty. Skill with rhyming or identifying similar word beginnings or endings is much easier than the skill that requires greater, or more explicit, manipulation of sounds such as segmenting, blending and deleting sounds. Torgesen (2000) suggests three different tasks for assessing phonological awareness. They are sound comparison tasks, phoneme segmentation tasks and phoneme blending tasks. Sound comparison measures are easier and are sensitive to emergent levels of phonological awareness, whereas segmentation and blending measures are sensitive to differences among children during later stages of development involving refinements in explicit levels of awareness. Measures of sensitivity to rhyme are less predictive of reading disabilities than those measures that ask children to attend to individual phonemes.

Relationship between Phonological Awareness and Reading Acquisition

Reading requires two different skills: children need to know how to identify printed words and how to comprehend written material (Torgesen, 2000). Torgesen summarizes the importance of phonological awareness in acquiring accurate word reading skills. First, phonological awareness helps children understand the alphabetic principle. Second, it helps children realize the regular ways that letters represent sounds in words. Lastly, it makes it possible to generate possibilities for words in context that are only partially sounded out. Moreover, as Koda (2005) states, poor readers uniformly are handicapped in a wide variety of phonological tasks. Furthermore, Metsala & Ehri (1998) state that comprehension is a meaning-construction process, which involves integral interaction between text and reader. Extracting phonological information from individual words constitutes one of the first and most important steps in this endeavor. Also phonological skills have a direct, and seemingly causal relationship with reading ability knowledge of letter patterns and their linkages to sounds facilitates rapid automatic word recognition; such knowledge evolves gradually through cumulative print-processing experience; and limited word-recognition skills tend to induce over reliance in context (p.254).

The failure of children to develop early reading skills that contribute to academic and social success has turned out to be a national concern. Poor reading skills result in lower overall academic achievement.

The phonological awareness plays a crucial role in reading and literacy. As the key component that makes the difference between good readers and poor readers, it is often referred to as a predictor to subsequent reading achievement. Although training in phonological awareness skills facilitates positive gains in phonemic awareness, decoding, and spelling, it requires activities characterized as explicit, comprehensive, intensive and supportive.

Method

Participants

Children participants selected from five kindergartens . forty- seven children were invited to participate. Each child participant met the following established criteria to be included in the study: (a)) a diagnosis of poor pre-reading skills by teacher's nominations), (b) an IQ score on the Children Intelligence Test (Seri , 1988) between 90 and 113 (c) a poor pre- reading skills test score(Mourad Ali, In Press) , and (d) absence of any other disabling condition. The sample was randomly divided into two groups; experimental (n= 24; 17 boys and 7 girls) and control (n= 23; 18 boys, 5 girls).

The two groups were matched on age , IQ ,and writing performance. Table 1. shows means, standard deviations ,t- value , and significance level for experimental and control groups on age (by month), IQ , and pre- reading skills test scores (pre-test)

Table 1. *pre-test Means, standard deviations , t- value , and significance level for experimental and control groups on age (by month) , IQ, and pre- reading skills test scores.*

Variable	Group	N	M	SD	T	Sig.
Age	Experimental	24	64.1	2.96	-.189	-
	Control	23	63.26	3.01		
IQ	Experimental	24	109.34	4.45	-.221	-
	Control	23	110.89	4.24		
pre- reading skills	Experimental	24	6.82	2.65	-.539	-
	Control	23	6.54	2.32		

Table 1 shows that al t- values did not reach significance level. This indicated that the two groups did not differ in age , IQ , and pre-reading skills (pre-test) .

Setting

The study took place in two kindergartens in Baltim town, Egypt, namely Basil School Kindergarten, and Ryad El Ganna. Both of them include 380 children.

Measure

Pre-reading skills scale for children (Mourad Ali , 2008)

The scale consists of six sub- sales as follows :

Letter Identification (4 items) . This test *requires* children to identify the letter from agroup in each card that the instructor points to *(e.g . what is this letter ; S ….etc)*

Rhyming word Recognition (4 items). This test requires children to identify the two words that rhyme from three word *(e.g. cat- dog- sat)*

Blending Body-Coda (4 items). This task assesses the ability to form a word when it has been segmented into the body and coda. Body is the part of the word starting from the beginning and carrying through the vowel, while coda is the part of the word that comes after the vowel *(e.g. sho/p)*

Phoneme substitution(4 items). This subtest requires children to replace the first phoneme sound of a given word with a new sound*(e.g. jeep to /k/)*

Sound comparing (4 items). This subtest requires children to identify the to words that sound the same*(eg. Man – sun – can)*

*Sound – blending (4 items)*This task requires children to synthesizes or blend each sound in the word *(e.g. /k/ /i/ /t/ /e/)*

Test reliability

The first issue of reliability was ensuring that The scale total score was a reasonable assessment of one broad construct of pre- reading skills despite the use of six subtests. To test this, Cronbach's alpha statistics was first employed. The result demonstrated the scale produced patterns of responses that were highly consistent, $\alpha = 0.90$.

Test validity

Ten professors of psychology were given the scale to rate the items. Agreement proportions were ranging from 90% to 100% .

Test scoring

The score on each item ranging from 0 to 1 score , and the total score on the scale ranging from 0 to 24 scores.

Procedure

Participants were selected, then pretest data were collected using the pre- reading skills test. The classroom PA training program was conducted by the author with the experimental class in one large group for 5 weeks with 20 minute sessions conducted three times a week. A variety of fun, play-based phonological activities were used with the class that incorporated the spectrum of PA skills (e.g., rhyming, sound/syllable matching, sound/syllable isolation, sound/syllable blending, sound/syllable addition or substitution, and sound/syllable segmentation).

The children participated by singing, listening, answering questions, and following directions. The following is a list of the PA activities addressed during training:

1. Sound Matching/Sound Identification
2. Rhyming Activities
3. Sound Addition or Substitution Activities
4. Sound/Syllable Blending Activities
5. Sound/Syllable Segmentation Activities.

The second author started with the earlier developing PA skills, such as matching and rhyming, and moved throughout the continuum of PA skills. These activities were rotated from easiest to hardest throughout the 5 week training period. At the end of the study, the posttest data were collected again using the same measure to determine the effectiveness of the PA training.

Experimental Design

An experimental Pretest-Posttest Control-Group design was used in this study. In this mixed design, two groups are formed by assigning half of the participants to the experimental group and half to the control group. Both groups were pretested and posttested in the same manner and at the same time in the study. The bivalent independent variable was the PA training and it assumed two values: presence versus absence of PA training. The dependent variables were the gains in scores on pre- reading skills test.

Results

Table 2 shows data on ANCOVA analysis for the differences in post-test mean scores between experimental and control groups in pre- reading skills test scores. The table shows that the (F) value was (285.166) and it was significant value at the level (0.01).

Table 2. *ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Pre	5.814	1	5.814		
Group	1123.316	1	1123.316	285.166	0.01
Error	173.323	44	3.939		
Total	1297.277	46			

Table 3 shows "t test" results for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores . The table shows that (t) vale was (16.75). This value is significant at the level (0.01) in the favor of experimental group. The table also shows that there are differences in post- test mean scores between experimental and control groups in pre- reading skills test scores in the favor of experimental group.

Table 3. *t test results for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores*

Group	N	Mean	Std. deviation	t	Sig.
Experimental	24	16.583	2.44	16.75	0.01
Control	23	6.826	1.37		

Table 4 shows data on repeated measures analysis for pre- reading skills test. The table shows that there are statistical differences between measures (pre- post- sequential) at the level (0.01).

Table 4. *Repeated measures analysis for pre- reading skills test.*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Between groups	1351.970	1	1351.970	643.039	0.01
Error 1	94.611	45	2.102		
Between Measures	955.545	2	477.772	136.724	0.01
Measures x Groups	647.176	2	323.588	92.601	0.01
Error 2	314.498	90	3.494		

Table 5 shows data on Scheffe test for multi-comparisons in pre- reading skills test. The table shows that there are statistical differences between pre and post measures in favor of post test, and between pre and sequential measures in favor of sequential test, but no statistical differences between post and sequential test.

Table 5. *Scheffe test for multi-comparisons in pre- reading skills test*

Measure	Pre M= 6.82	Post M= 16.58	Sequential M= 6.48
Pre	--	--	--
Post	10.41*	--	--
Sequential	966*	0.75	--

Discussion

The main objective of the present study was to explore whether there were differences in post – test scores mean between control and experimental groups on pre – reading skills. The study also examined If the program was effective, if this effect was still evident a month later.

The results of this study as revealed in tables 3 and 5 show that the phonological awareness program was effective in improving the pre- reading skills of children in experimental group, compared to the control group whose subjects did not receive such an intervention .

The present study comes to try to resolve the conflict. Many researchers are still trying to answer the "chicken and egg" question of which came first. Is PA a prerequisite for learning to read or does PA develop as a consequence of being exposed to reading instruction (Yopp, 1992)? A great majority of research conducted supports the idea of PA as a powerful predictor of early reading achievement.

This study supported other research findings in the literature about teaching children at-risk for reading disabilities and future academic failure (Vellutino & Scanlon, 1987; Wagner, et al., 1997). These children could benefit from a supplemental curriculum using appropriate sequence to train their phonological awareness, which is said to be a reliable predictor of future reading development. The effects of phonological awareness instruction have been addressed in previous research; however, this study contributed to the literature in several significant ways. First, it extended the participants to children as young as preschool and had implications that phonological awareness was teachable to younger children. Second, the results of this study indicated that children being considered at-risk for reading abilities and had not received any formal reading instruction are capable of improving their pre-literacy skills in preparation for their future reading. Finally, it is significant for educators to work to prevent reading failure in young children. This study demonstrated that phonological awareness skills can be effectively instructed to preschool children better positioning them for reading success.

Worth mentioning is that students in the experimental group retained the learnt information for a long time even after the period of the program finished, and this indicates the training effect.

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The Use of Addition/Subtraction Operation: Problem Equation Relationship Sample

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Abstract

This research was conducted to determine which method of operation is more commonly preferred (linear / lateral) in the process of students' learning addition and subtraction operation skills. A sample was created from the primary education 2nd grade students at various levels of success at mathematics lessons. The students' skills at performing these operations were examined using a success test consisting of 20 questions, along with semi-structured interviews with fifteen students. Results of this research show that students use the linear method for performing addition/subtraction operations. Their answers to the questions in the interview indicate that they prefer the lateral method when solving semi-abstract problems and those associated with the numerical axis. Students vacillate in determining the priority of each operation when solving the problem

Keywords: Addition/subtraction operations, lateral operations, linear operations, verbal problem solving.

Introduction

The need for effective mathematics skills, and their use in daily life, has increased. Mathematics facilitates one's life. It enables the individuals to analyze and explain their experiences and opinions, the behaviors of creative thinking and reasoning, patience, generating and using information and determination towards the events (Ministry of National Education (MEB), 2006). In addition, it helps the importance of mathematics education thanks to the need for mathematics in all fields of life.

There is a common belief that the mathematics lesson is the most difficult for students. In terms of learning the skills, as well as using them successfully, is learning mathematics different from other subjects? And is using a different learning method necessary in order for students to succeed at mathematics?

Mathematics has a different structure (abstract) compared to other subjects. It may not always be possible to bind all the information learned in the lesson or to express the information in a semi-abstract way. According to Bloom (1983), the presence of earlier learnings facilitates further learnings; however, the lack of prior learnings makes further learnings difficult. A mathematics lesson is a good example of this axiom, because there are prerequisites for learning (cited in Kelecioğlu, 1993). When students are unable to master certain mathematics subjects or one of the sub-parts of a subject, they most likely will encounter difficulties in establishing horizontal–vertical associations in the succeeding parts of the related subject or between the subjects or other lessons (Kelecioğlu, 1993; Swadener & Soedjadi, 1988).

Accelerating the development of analyzation skills, developing problem-solving skills and providing individuals with an advanced level of ability to reason are the aims of mathematics education (MEB, 2006; NCTM, 1989; NCTM, 2000). Developing problem-solving skills is a crucial factor in achieving these objectives. (Mestre,1991). In problem solving, Polya's analysis is commonly used: "1: understanding the problem; 2: determining the solution strategy and writing the mathematical sentence (equation) related to the problem; 3: solving the equation (or applying the strategy); 4: evaluation" (Altun, 2008). If a student is able to use these four steps when solving a problem on any subject (if he is able to express), it can be said that he has learned the related subject.

The problem-solving behaviours of primary school students were examined (Altun, 1995; Erden, 1986; İskenderoğlu, Altun and Olkun, 2004; Yazgan and Bintaş, 2005). Erden (1986) stated that 2nd grade students are successful at expressing a problem if they can use their own words in writing the operations and the rules for solving the problem. There are also studies that examine the skills of primary school student skills in performing addition operations, and in which linear addition is discussed (Carpenter et al., 1999; Riley et al., 1983).

In literature, it is interesting that there are few studies on the expression of verbal problems as a mathematical sentence (equation) or writing a mathematical sentence in the form of an verbal sentence (problem).There are also studies asserting that students have difficulty in transforming verbally expressed problems into into the form of an equation (Dede, 2004; Lodholz, 1990; Mayer, 1982). Based on these studies, it can be said that students cannot transpose a problem which is expressed verbally, into the form of an equation. Being able to convey a verbal expression (problem) as an equation or a verbal expression (problem) which is appropriate for the mathematical expression is quite difficult for students of all age groups.

Being able to create a verbal problem and express it as a mathematical sentence - are included in the curriculum from the 1st grade of primary education. Unless students learn how to express verbal problems as equations, these skills are extremely difficult to develop as their education progresses (Kieran, 1992; Silver, 2000; Pawley, Ayres, Cooper & Sweller, 2000). For this reason, students' skill levels (for creating verbal problems) should be tested from the 1st grade of primary education and onwards.

According to Rosnick (1981), the difficulties encountered by students during this process are due to the fact that the sub-parts of a subject are not understood completely. This is not a well-known point and often insufficient effort is made to compensate. This skill deficiency in students can be associated with the sub-learning parts of writing a mathematical sentence. The sub-parts of writing a mathematical sentence include performing operations using lateral, linear or various other methods (such as counting, analyzing, etc.). Especially while providing students with basic operation skills, verbal problems should be used first and the expression of a problem and the operation performed should be consistent. For example; "I had 3 balls. My brother gave me 2 more. How many balls do I have now?" While solving this problem the symbol "+" should be expressed as "gave"; and the symbol "=" should be expressed as "now". It is not effective to rush the process of expressing the names of the symbols because students do not know how to read and write (Albayrak, 2000). The present study was carried out mainly in three subtitles.

1. In the process of providing students with the operation (addition/subtraction) skills: establishing a relationship between the concept and the operation,
2. Expression of verbal problems mathematically,
3. Performing the operations while solving problems in different ways.

The present research can also be associated with the addition/subtraction operation, one of the sub-parts of writing a mathematical sentence, which is the second phase of Polya's problem-solving strategy.

Method

Data Collection

A case study was carried out within the present study, using primary school 2nd grade students. Students were chosen randomly from the 2nd grade classes of the two primary

schools. The group consisted of 15 students from each school (in total 30) with above-average skill level in mathematics lessons; 20 students (in total 40) of average skill level; and 15 students (in total 30) of below-average skill level. 5 students (average skill level) was excluded from the study for behavioral issues. In total, 95 students participated in the study. The students were given a test consisting of 20 questions, divided equally between lateral addition, linear addition, linear subtraction, lateral subtraction and verbal problems. Addition operation questions included the following:

Question 1: the addition of two one-digit numbers
Question 2: the addition of one two-digit number and two one-digit numbers
Question 3: the addition of two two-digit numbers and one one-digit number
Question 4: the addition of three two-digit numbers

Subtraction operation questions included the following:
Question 1: the difference between two one-digit numbers
Question 2: subtracting a one-digit number from a one-digit number
Questions 3 and 4: subtracting a two-digit number from another two-digit number.

The verbal problems used are of combined and piece- piece total according to the classification made by Carpenter and his colleagues (1999). All four problems question the unknown total and the unknown result. A semi-structured interview was also made in line with the students' answers.

There were two questions included in the interview to assess their problem solving skills. One of these questions tested the skills used in performing an operation using semi-abstract; and the other tested problem-solving skills using the numerical. In addition, the addition/subtraction operation, and the difficulties encountered while solving the verbal problems related to these operations, were discussed in the interview. In the interview, students were asked which operation method took first priority in the lessons (lateral or linear). Some of the interviews with the students are outlined in the findings section. Students' real names are not used in this study; they were assigned pseudonyms by the researcher.

The interview questions were prepared according to the answers of the students in the success test. Our aim in the interview was to determine where students have difficulty and which operations take top priority in lessons. Experts, course books and related literature were consulted in preparing the interview questions and success test. Experts consisted of three academicians who work in the department of primary school mathematics education and two classroom teachers who work within the body of the Ministry of National Education. While applying the success test to the students, the students were not guided, ie. "correct, wrong, you should revise the solution, are you sure that the answer is this..." To conduct a proper measurement the questions of the success test were not written as a whole, but were previously written as a single problem in such a way to be sufficient for the students. After one question was answered completely, the next question was given to students. In this way, all twenty questions were given to the students. The length of time to solve each problem was measured with a chronometer. The length of time to solve verbal problems was not measured.

Data Analysis

In the present study, 1 (one) point was given for the correct answers; 0 (zero) point was given for incorrect answers or unanswered questions. The Kuder-Richardson Formula 20 (KR-20) was used to measure the reliability of this study (Atılgan, Kan and Doğan, 2009;

Tekin, 1993). The questions in the success test in this study were given to 60 students before the actual application. The KR-20 internal consistency coefficient was found to be 0.76.

Results and Interpretation

The number of seconds to perform the lateral and linear addition/ subtraction operations for the students within the scope of the present study is given in Table 1.

Table 1: *Students: length of time to perform operations*

Question orders	Linear addition/ subtraction questions solve times (average /in seconds)	Lateral addition/subtraction questions solve times (average/in seconds)
1.	5	7
2.	10	13
3.	11	15
4.	11	16

According to the results in Table 1, students spend more time solving lateral addition/subtraction operation questions compared to the time spent solving linear addition/subtraction questions. These results are the same for lateral and linear subtraction operations. The results indicate that students use linear operations more often. The data in Table 2 indicates that students perform linear operations most successfully; their performance decreases when using lateral operations and solving verbal problems. These results can be considered as an indicator that the students use linear operations more commonly in lessons. Success levels may decrease in problem solving because sufficient time is not allocated for teaching concepts (when to perform which operation).

Table 2: *Correct answers: statistics*

Students	Linear addition/ subtraction		Lateral addition/subtraction		Verbal problems	
	f	%	f	%	f	%
Above-average class level	30	100%	25	83%	20	66%
Average class level	30	86%	20	66%	15	43%
Below-average class level	20	66%	15	45%	5	17%

The answers of one student from each student group are given below. The objective is to provide information about the interviews with students. An interview with student Ahmet, of above-average class level, follows:

Researcher: *Ahmet, when I analyzed your solutions, I understood that you perform linear (addition – subtraction) operations in a shorter time. Which method do you use more in your class, linear (addition/ subtraction) operations or lateral (addition /subtraction) operations?*

Ahmet: *We perform linear (addition/ subtraction) operations most. This is because it is easier to perform operations in this way.*

Researcher*: Well Ahmet, which question that we asked you was the most difficult one for you?*

Ahmet: *None of them was difficult, I solved all of them.*

Ahmet's answers in the interview are consistent with his answers in the success test. Ahmet answered all the questions correctly. However, he spent a little more time on the lateral (addition/ subtraction) operations and on the verbal problems. The answers given by other above-average class level students were similar to those of Ahmet.

The answers of the average class-level students can be summarized as follows. Some of the students (five students) in this group worked on the lateral (addition/ subtraction) operations, by rewriting them in a linear form. Our teacher gives us linear (addition/ subtraction) operation more frequently in lessons. We are rarely given (addition/ subtraction) operations. As we do not do them as frequently, it takes more time to solve them. Therefore we found it easier to perform operations in a linear way. Students stated that they found it difficult to solve the verbal problems. An interview with Student Pinar, who rewrote her questions in this way, follows:

Researcher: *…Well Pınar, which question that we asked you was the most difficult one for you?*

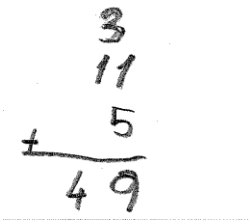
Pınar*: lateral (addition/ subtraction) operations.*

Researcher*:…You performed the (addition/ subtraction) operations that we asked you to perform laterally by writing them in a linear way. Why did you do this?*

Pınar*: Because it is easier, that's why I did in that way.*

Twenty students did not pay attention to the phase concept when writing the numbers in a linear way in solving the verbal problems. The operation used by one of these students is as follows:

Example: Alican is reading a story book. In the first day, he reads 11 pages of this book, in the second day he reads 5 pages and in the third day he reads 13 pages. How many pages in total did Alican read in this book?



Results of the study showed that the students of below-average class level are deficient in the skills used to perform the lateral addition/ subtraction operations and solve verbal problems. Fifteen of the below-average students were unable to even perform linear addition operations. They could not write the result in the lateral addition operations. The findings related to subtraction operation are the same. Again, these three students made a mistake carrying the decimal value to the next digit in the linear addition operation.

Moreover, it was understood that some of the students in this group wanted to answer the questions related to lateral addition operations by writing them in a linear way. Some students added the units digit of the first number to the two-digit of the second number when performing the addition of one two-digit number and one one-digit number operation. This situation is seen in the example above.

This may indicate an inadequate amount of instruction time. Students who did make an effort to answer the verbal problems used only a part of the numbers used in the problem

while performing the operations. A small proportion of the students used a multiplication operation while they should have used an addition operation. The interview with Student Adem, of below-average class level, follows:

Researcher: *Adem, you solved the problems related to lateral addition operation by writing them in a linear way. Why did you do this?*

Adem*: It is easier to do so...*

Researcher: *Well Adem, which method do you use more in your class, linear (addition/ subtraction) operations or lateral (addition/subtraction) operations?*

Adem*: linear*

Researcher*: which questions were you unable to solve, of the questions that I gave you?*

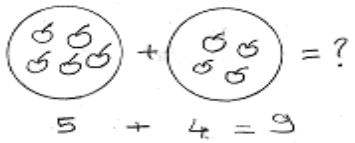
Adem: *well, these (he is showing the verbal problems)*

From the answers given by the students to the interview questions, it was found that, in class, they use linear addition/ subtraction operations most often..

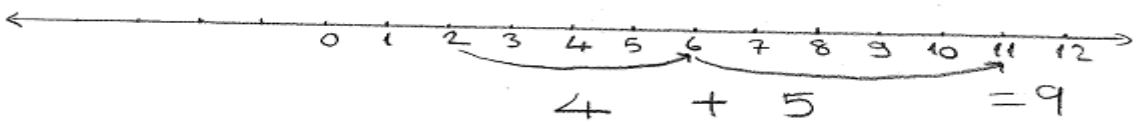
The results indicate that the majority of the students' skill-sets are inadequate for solving the verbal problems. Approximately 60% of the students are lacking adequate lateral (addition/ subtraction) operation skills. These students' answers are consistent with the answers that they gave to the questions in the success test and in the interview. All the students solved the verbal problems performing linear addition operations.

The majority of the students used the lateral addition operation to solve two of the questions asked in the interview (not included in the success test). These questions, and the students' answers, are as follows:

What is the result of the addition operation which is shown in the figure below?

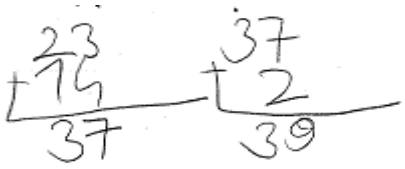


Question is; "Perform the addition operation given in the numerical axis below".

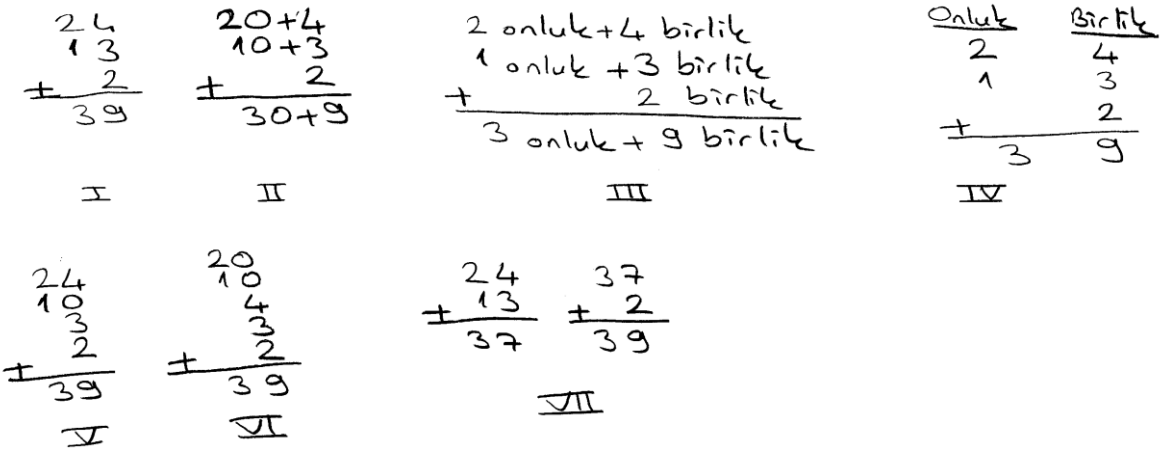


Results of analyzing the solutions of the verbal problems show that the students did not try a different method of solving them. Only two students performed an addition operation with three numbers by dividing them into 2 groups. Below is an example:

Example: Ali, his mother and his father go to pick tea and they weigh the teas that they picked at the end of the day. Ali's father picked 23 kg tea, his mother picked 14 kg tea and Ali picked 2 kg tea. In total, how many kilos of tea did they collect at the end of the day?



There may be a few different solutions of the above question: (these are examples authors' suggestions)



When students are taught only one method of problem-solving that is what they will use. When they are taught more than one method, the scope and quality of their insights is increased and broadened.

Evaluating students along these lines, it was seen that only ten (1st and 7th) of the solution types listed above were used. Only ten of the students used the 7th solution method. Why the majority of the students used the 1st solution method can be explained: they do not know other solution methods.

Using a variety of problem-solving strategies to perform operations can contribute greatly to the development of students' skill sets (Albayrak, 2000, pp. 111-114). In addition, the mistakes made by the students (writing the numbers in a linear way) can be eliminated using the 2nd, 3rd and the 4th solution ways above.

The results of the student interviews agree with those of the success test: "linear (addition/ subtraction) operations are the ones most commonly used in the classroom environment".

Discussion

It is appropriate to begin with problems when teaching basic operations to the students. According to the results of the study, it is impossible to say that this approach is adopted. The difference between the accomplishments of the students in performing operations and those in problem solving is great. That the students vacillate when choosing which operation to apply to which problem confirms this.

Teaching only one way of solving a problem ensures that students will use that method, but at the cost of using other, perhaps more effective methods.. That the operations which were asked to be performed laterally were performed in a linear way by the students confirms this idea.

It is frequently necessary to use concretization, semi-abstract or numerical axis when solving problems using the basic operations. In such problem solving, it can be said that lateral and linear operation methods are used at the same rate. However, it is indicated that lateral operations use decreased when the students started performing operations with two-digit numbers and they do not use this operation method after a while.

The use of linear and lateral operations in solving verbal problems should be given equal time at the same rate from the first grade of primary education. The students should be encouraged to perform lateral operations by using expressions like "linear operations cover a lot of ground, from now on let us use the lateral method". This is because lateral operations may be preferable to writing mathematical sentences in the following grades.

Some of the students performed the operation in the success test incorrectly. Performing the operations correctly is undoubtedly important. An effective way to facilitate this is to associate the operations with counting. Associating the basic operations with counting (counting forward one-by- one starting from one number as many as the other number, addition; counting backward one by one starting from one number as many as the other number, subtraction; multiplying the same numbers instead of adding; dividing a number instead of subtracting the same number from it again and again) can be easily performed (Albayrak, 2000). The performance of operations will be made attractive and easy thanks to associating counting with operations.

Given the relationship between counting and mental development, it is known that the students who cannot count can learn how to count in time. Therefore, it would seem that this skill can be taught later. However, the inability to solve problems turns into fear if these deficiencies in problem-solving are not addressed immediately. It is difficult for students to overcome this fear.

While a significant number of students are successful at performing operations, they fail in problem solving. One reason why the majority of the students failed in problem-solving is because they do not know which operation to use. Which operation to be used first in solving a problem or, in other words, the order of the operations is understood from the analysis of the problem (Albayrak, İpek, Işık, 2006). While discussing the methods of solving a problem, expressions like "Did it increase?", "Did it decrease?", "As it increased, it is addition; as it decreased, it is subtraction..." should not be used. While providing the students with this kind of skill, the concept of the operation in the sample problems should be emphasized. This is because the students who are able to perceive the order of the operations to be performed can also solve the problems. In order for students to understand which operation to perform first, it will be useful to solve two or three sample problems. Using these applications on different problems may eliminate the issue. Hence, it is useful to follow the order of concept and operation when solving a problem. In addition, time should be allocated for different counting methods, which can be followed in performing operations (counting in tens, performing operations on the same types after analyzing, etc.). Therefore, knowing how to solve a problem in more than just one way is of great importance for performing operations and thinking, as well.

Lateral operations and mathematical symbols are necessary for writing a mathematical sentence (equation) which may correspond to oral problems. Using the problems which include the addition and subtraction operations in which there is a variable or unknown is an appropriate approach when beginning to learn how to write mathematical sentences. Moreover, the expression "$5 + \blacksquare = 8$" should be used in addition to the subtraction operation for a problem like "I had 5 balls. How many balls does my brother need to give me so that I

have 8 balls?" Therefore, abstract thinking and being able to express thoughts using symbols become more meaningful.

Conclusion and Suggestions

The students in the sample group took longer to perform lateral (addition/ subtraction) operations than linear (addition/ subtraction) operations. Respondents made more mistakes in lateral operations because they are not as accustomed to using them. Being unable to solve the problem while answering the oral problems arose from the deficiencies based on the concept. Students who were able to determine which operation should be used were able to solve the problem without any mistakes. The students who used lateral operations are included in this group.

There is a parallel between the findings of the present study and the findings of the similar previous studies on this subject (Altun, 1995; Carpenter et al., 1999; Erden 1986; Riley et al., 1983). In the present study, the use of addition/ subtraction skills of the students in the process of problem solving was examined. A new study may be conducted that also includes multiplication/division operations.

Sentence writing is a skill required for mathematical thinking and expressing what you think mathematically. Performing operations and expressing these operations as symbols are a universal expression of thoughts. The association between the concept and the operation should be established from the first year of primary education. The subject should be expanded to include teaching other ways to perform the operation. Lateral and linear operations should be substituted. Teachers should gradually work up to symbol use. Teaching students to express a verbal problem as an equation and to create a verbal problem that corresponds to the expression given as equation should be included in the curriculum.

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Prior Knowledge in Chemistry Instruction: Some Insights from Students' Learning of ACIDS/BASES

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Abstract
The main purpose of teaching is to enhance learning by students. However, research has shown that teaching often has limited success in guiding students from their pre-instructional conceptual frameworks to new understandings. Therefore in order to improve or enhance learning, teachers would need to be clearer about the sort of understanding, knowledge and skills they want to develop with their students. This is only possible if teachers are aware of the ways in which students grapple with their own learning processes. That is, teachers need to understand students' prior knowledge and how it is used in knowledge construction during learning. This chapter raises three issues about prior knowledge: firstly it demonstrates the importance of prior knowledge on learning; secondly, it illuminates on the effects of the quality of prior knowledge on learning outcomes and lastly, it reports on the implications for the teaching of concepts in chemistry. To effectively assess the three issues about prior knowledge, an in-depth qualitative analysis of students' concepts and their use was conducted on three constructs of prior knowledge. The findings clearly demonstrate that if we are to improve students' learning in general and particularly in chemistry, far more attention should be paid on assessing the quality of the factors that influence the outcome(s) of their learning the most. Therefore, it is important to have a better understanding of students' prior knowledge before embarking upon teaching of new material.
Keywords*: Prior knowledge, chemistry instruction, ACIDS/BASES*

Introduction

Studies have been conducted on processes and relationships between and/or among the components of the teaching system in the fields of psychology and education. Components of the teaching system would in this chapter refer to *what* is taught, *how* it is taught, *who* is taught, *how* it is assessed and learned. In some of the studies (Ausubel, 1968; Biggs, 2003; Dochy, 1992; Resnick, 1989) the components of the teaching system were integrated while in others the foci were more specific to either. Completely separating the components of the teaching system is difficult because of their integrated nature. The goal of research on the teaching system has generally been to understand how humans learn and how better they can learn. However, recent studies on the teaching system have gone beyond just understanding learning. The content of what is learned and how it is learned has since become the target for research in many research studies. The focus on content has been influenced to some extent by differences in the nature of the content of subject matter.

The nature of subject matter has been found to affect the outcomes of learning in one way or the other. For example, studies in chemistry education (Gabel, 1999; Taber, 2002; Sirhan, 2007; Ware, 2001) have established that many students find chemistry to be among the subjects they find difficult to comprehend.

The concept of 'difficulty' can mean many things to many people and/or students considering the different backgrounds people bring into the learning situation. It is therefore necessary to explain the concept of 'difficulty' in the context of this chapter. Difficulty of subject matter in learning chemistry would therefore mean the inability by a student to construct understanding and/or generate meaning of concepts for meaningful learning. As this difficulty is not the same for all students it must therefore be due to a variety of factors. These factors affect learning differently for different subject matters and/or students. A host of factors have been identified as sources of difficulty in the learning chemistry. Sources of difficulties include the abstract nature of concepts (Johnstone, 1991b); language and communication (Gabel, 1999); and curriculum demands (De Vos, van Berkel & Verdonk,

1994). Johnstone attributes the abstract nature of concepts to the three levels (macro, sub-micro and symbolic) at which matter may be conceptualised as the main source of difficulty. Gabel cites the different meanings that English expressions (e.g. the use of reduction in electrochemistry have the opposite meaning as when used in English) have when used in chemistry. De Vos et al. posit that teachers do not follow appropriate strategies to promote conceptual understanding. These researchers attribute this to societal demands on the curriculum.

It is clear that the difficulty of learning in general and of learning chemistry in particular comes from a variety of factors. However what appears as common sources of difficulty in chemistry to many students are the nature and the manner in which it is usually taught. That is, the two factors are inherent in all teaching and learning (Gabel, 1999). The argument in this chapter is that among possible solutions to addressing the many factors contributing to the difficulty of learning is the understanding by both teachers and instructional designers of what the student already knows. What the student already knows is their prior knowledge of the subject matter of the topic to be taught. Students come into a learning situation with preconceived ideas of the learning matter. In fact, in his famous statement Ausubel (1968) argues that we need to ascertain what students know if we are to address their learning difficulties. That is, it is only through students' extant knowledge that appropriate diagnostic instruments and methods that teachers may understand what students already know or their prior knowledge.

The purpose in this chapter is therefore to demonstrate a framework that may be used to maximise the understanding of the quality or characteristics of students' prerequisite or prior knowledge in the learning situation. However, there are many characteristics of prior knowledge that may be assessed (Dochy & Alexander, 1995). In this chapter only two characteristics (structure and completeness) of students' prior knowledge will be assessed to determine the quality of students' prior knowledge within the three constructs (declarative, procedural and conditional) of their prior knowledge.

Chemistry Concepts: A view from the prior knowledge lens

It is generally accepted that to succeed in teaching one needs to understand the environment within which teaching and learning takes place. Teaching and learning environment includes the subject to be taught, available resources and the learner. That is, the teacher's plan should be based on the curriculum outcomes for the subject, the nature of the subject and the learner's knowledge. In fact, Magnusson, Krajcik and Borko (1999) find teaching to be "a highly complex cognitive activity" in which the teacher "must apply knowledge from multiple domains" if his or her teaching plan is to be successful (p.95). There are many factors contributing to the complexity of teaching. Common to these is the teacher's difficulty to establish what goes on in students' minds. In addition, different subjects require different teaching approaches and this is due to the nature of these subjects. Thus, the nature of the subject content adds to the complexity of effective teaching and/or meaningful learning of a particular subject.

In their independent studies, Gabel (1999), De Jong (2000) and Johnstone (1991b) reported that both teachers and students find chemistry a *difficult* subject to teach and learn respectively. The perceptions of teachers and students will obviously be different considering the fact that they emanate from opposite sides of the teaching-learning system. That is, the difficulty may be from different topics or different types and forms of subject matter. For example, Gabel (1999) attributes the difficulty of chemistry to the abstract nature of its concepts and the fact that they are inexplicably taught without the use of analogies or models.

Furthermore these abstract chemistry concepts are central to further learning or understanding in chemistry and other sciences thus making students' advancement in these subjects difficult, or in some instances impossible (Taber, 2002; Sirhan, 2007). De Jong (2000) cites complaints students and teachers make about why they find chemistry teaching and learning difficult. For example students find chemical formulas difficult to comprehend. On the other hand teachers complain about making chemistry understandable to learners because repeated explanations and demonstrations tend to be ineffective.

According to Brown, Le May jr, Bursten and Murphy (2009) chemistry is the study of matter and the changes it undergoes. Therefore, in an attempt to illuminate more on the nature of chemistry as the source of teaching and learning difficulties, Johnstone (1991b) describes the nature of matter or its inherent features, qualities or characteristics. It is therefore important that we describe the nature of chemistry in order to understand how it may affect teaching and learning. Since chemistry is the study of matter, its properties and the changes matter undergoes, the nature of chemistry would therefore be embedded in its composition. Johnstone (1982) uses a triangle (**Figure 1**) to describe the three levels at which the teaching and learning of chemistry subject matter could be conceptualised.

With this representation, Johnstone (1982) demonstrates what Evans, Yaron and Leinhardt (2008) regard as the 'explanatory power' of chemistry. According to Evans et al. (2008) the explanatory power of chemistry is drawn from the sub-microscopic level but students generally observe and make measurements at macroscopic level. Therefore the different levels at which chemistry teaching and learning take place complicate both the learning and teaching processes (Johnstone, 2000). The *macroscopic* level describes what can be seen, touched and smelt; the *sub-microscopic* level, describes atoms, molecules, ions and structures of chemical compounds; and the *symbolic* or *representational* level, describes the symbols and equations (Johnstone, 2000).

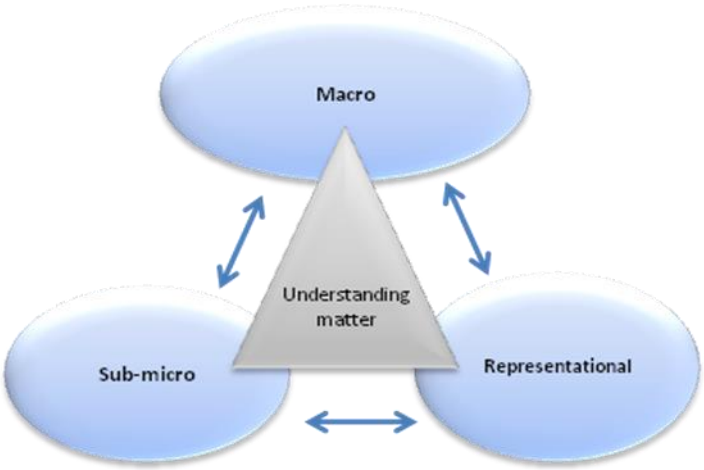

Figure 1: Levels of Conceptual Understanding of Matter in Chemistry (Johnstone, 2000)

The three levels are commonly seen as constituting the nature of chemistry. For example, the concept of *a proton* can be understood individually and interactively among the three conceptual levels. As a typical example of understanding a *proton* as a concept, it is represented as H^+ ion (*symbolic representation* and a *sub-micro* particle). At *macro* level, an aqueous acidic solution (according to the Brønsted theory of acids) is a solution that contains an excess of H^+ ions. What we need to ask in teaching is whether students are aware of these levels at which they are taught and/or learn chemistry. In fact, Harrison and Treagust (2002),

argue that understanding the particulate nature of matter is fundamental for both the students and their teachers in the teaching and/or learning of many topics in chemistry as it involves the particle theory. The two authors regard the particle theory as the basis of explanations of many topics (e.g. atomic structure, chemical equilibrium, and chemical reactions) in chemistry.

Clearly the nature of chemistry can play a fundamental part in understanding the problems associated with both the teaching and learning processes of chemistry. However, as earlier indicated in this discussion, teaching and learning are complex processes not only with regards to the activities involved between the teacher and the student. They are complex because of the different conceptions that teachers have about them. In fact, Norton, Richardson, Hartley, Newstead and Mayes (2005) argue that different approaches to teaching are a reflection of different underlying conceptions which change and are enhanced by acquisition of more sophisticated conceptions. The teachers' conception of teaching is therefore a typical example of the potential sources of problems in teaching and learning. There is therefore the need to reduce the complexity of teaching and learning either for the teacher or the student. The suggestion in this chapter is to focus on aspects of teaching and learning that we all can agree on. These aspects are the student, the knowledge they possess and the processes they undergo to acquire knowledge during teaching and learning.

Prior knowledge and Learning

One of the elusive quests by researchers has been the understanding of the processes of knowledge acquisition when individuals are engaged in learning (Bransford, Brown & Cocking, 2000). Understanding learning or its processes just like understanding teaching is complicated by the many perspectives in which it is generally understood. There are many ways in which learning is understood. For example, behaviourists (e.g. Pavlov, Watson, Thorndike, etc) assume learners to be passive recipients of knowledge from the teacher or responding to environmental stimuli. Furthermore (Santrock, 2001), behaviourists regard learning as involving a "relatively permanent change in behaviour that occurs through experience" (p.228). On the other hand cognitivists (e.g. Gagne, Wager, Bruner, etc) regard the human mind as an important and necessary 'tool' to understanding learning. That is, learning or knowledge acquisition is regarded as the outcome of symbolic mental constructions. Ormrod (2001) describes learning as a complex and multifaceted process that is based on behavioural change and mental associations. In effect the cognitivists' theory of learning expands on the behaviourists' theory by introducing the mental aspect. Cognitivists focus on mental processes underlying the individual's behavior.

The two theories are limited in their description of learning as they tend to isolate it from the learner's social and/or cultural environment backgrounds. Students come from different teaching and learning backgrounds. In South Africa for example these students come from disadvantaged science teaching backgrounds that have obviously influenced their learning in one way or the other. In fact, Vygotsky (as quoted in Carter, Westbrook & Thompkins, 1999) regards social contexts as paramount to the mediation of conceptual learning. In his argument through the *zone of proximal development* about the importance of social contexts, Vygotsky (as quoted in Moll, 1993) asserts that "maturing or developing mental functions must be fostered and assessed through collaborative, not independent or isolated activities". That is, individuals must be situated within specific social systems of interactions to enhance their learning or development (p.3).

Although it was clear from the behaviourist point of view what the student's role was (passive) in learning, this was not apparent in the cognitivists'. However, Wilson (1993)

clarifies this with another dimension of learning namely; that the learning object has to engage in some kind of activity for learning to occur. That is, learning and knowledge are integral and inherent to everyday human activities as learning is a process of 'knowing'. Kolb (1984) further adds that learning is "the process whereby knowledge is created through transformation of experience" (p.21). To summarise Wilson's (1993) and Kolb's (1984) definitions and complement Santrock (2001) and Ormrod's (2001) definitions of learning and for a better understanding of students' learning, De Corte(2000) describes learning as "a constructive, cumulative, self-regulated, goal-oriented, situated, collaborative, and individually different process of knowledge building and meaning construction" (p.254).

In De Corte's (2000) definition of learning, four significant learning perspectives are emphasised. In addition to the perspectives already alluded to, two others, the differential and situative perspectives are apparent. The differential perspective (Pellegrino, Chudowsky & Glaser, 2001) emphasises the nature of individual differences in their knowledge and potential for learning whereas the situative perspective views learning in terms of practical activity and context (i.e. a person's learning is influenced by active engagement with others using tools and their language).The fact that learning involves transformation of one's experience (Kolb, 1984) supports the differential perspective in that individuals enter the learning situation with different knowledge bases and/or experiences, hence they have differing potential to learn. Bodner's (1986) contention that teaching does not necessarily result in learning concurs with situative perspective's emphasis on the important contribution made by practical engagement by the student and the role played by context in one's ability to learn. In the learning of chemistry concepts for example, the student learns as an individual or in collaboration with others through engaging in practical work activities. Although there has been many conflicting views as to whether practical work enhances learning (Hofstein & Lunetta, 1982); practical activities do have a high potential to mediate learning (Carter, Westbrook & Thompkins, 1999). In this chapter practical work is regarded as an integral part of scientific teaching and learning to support the notion that practical engagement promotes the active participation of students in their own learning as described in de Corte's (2000) description of learning.

It is apparent from the learning theories and/or views discussed that teaching and learning are indeed complex processes. There are many factors that influence the outcomes of both processes. However to avoid complicating the understanding of the relationship between students learning and their knowledge this discussion will be limited only to students learning of chemistry concepts and/or its conception on the acid-base topic. Therefore, the focus will be on how students learn or construct knowledge from their prior knowledge because the only outcome of teaching in all its forms and under any conditions is always knowledge. Woolfolk (1998) views knowledge as both the outcome of learning and as more than the end product of previous learning but also as guiding new knowledge. Greeno, Collins and Resnick (1996) describe this knowledge (prior knowledge) or its quality as important in determining the potential and extent of students' future learning. According to Dochy (1992) knowledge or prior knowledge can facilitate and/or impede learning. This therefore makes prior knowledge important in any teaching and learning system. For the purposes of this discussion this would be the knowledge that students bring and use in the learning situation.

How and what do students use knowledge for? There are as many views on what teaching is as there are on how knowledge acquisition occurs depending on various theories of learning. For example, constructivists view learning as a process of knowledge construction that involves motivation within a particular social context (Fosnot, 1996). Lennon (1997) posits that the constructed knowledge reflects the knowledge constructor's

situation “at a certain historical moment in a given material and cultural context” (p. 37). Furthermore, De Corte (2000) in defining learning made reference to learning as a constructive process in which an individual actively builds knowledge and constructs meaning of his/her knowledge. However, in construction, one needs ‘material’ for the construction process. According to Resnick, (1989) current knowledge is learning the material the learning subject uses to construct knowledge. In fact, Glaser (1984) regards reasoning and learning as knowledge driven and that those with rich knowledge reason more profoundly and elaborate as they study and thereby learn more effectively.

Learning and more specifically chemistry learning involves the use of concepts. Concepts are building blocks of knowledge (Reif, 2008). According to Glynn and Duit (1995) scientific learning is a dynamic construction process involving *building, organising and elaborating* on knowledge of the natural phenomena through conceptual models. Conceptual models, which are cognitive representations of a real-world process, are important and, together with prior knowledge, are a prerequisite for a successful knowledge construction. Conceptual models cannot be built if there is no relevant and adequate prior knowledge for them to build on. Conceptual models are therefore the cornerstones of knowledge construction (Glynn & Duit, 1995). However this does not mean that students' mental models are necessarily valid. Students’ mental models are products of their prior knowledge. Students’ prior knowledge determines the quality of mental models students construct. Students’ mental models are not always accurate representation of the scientifically valid conceptual understanding. For example, when a student was asked to describe the concept of *an aqueous acidic solution* the student responded by indicating that it was “a solution with a high concentration of H^+ ions”. An *aqueous acidic solution* is a solution with H^+ ions concentration exceeding OH^- ions concentration in this solution. The H^+ ion concentration may be high but if it is less than that of the OH^- that solution will not be acidic. What then is the difference between conceptual models and mental models?

Barquero (1995) describes a mental model, within the teaching context as “a type of knowledge representation which is implicit, incomplete, imprecise, incoherent with normative knowledge in various domains, but it is a useful one, since it results in a powerful explicative and predictive tool for the interaction of subjects with the world, and a dependable source of knowledge, for it comes from the subjects’ own perceptive and manipulative experience with this world” (p.12). Conceptual models on the other hand are (Greca & Moreira, 2000) “precise and complete representations that are coherent with scientifically accepted knowledge… shared by a given community, and have their coherence with the scientific knowledge of that community” (p.5). The difference between these models (**Figure 2**) can be attributed to students' different interpretations of learning material as a result of the quality of their prior knowledge. Ideally, a conceptual model and a mental model should be identical. The quality of prior knowledge determines the degree to which the student's mental model corresponds to the scientifically valid conceptual models learned (Glynn & Duit, 1995).

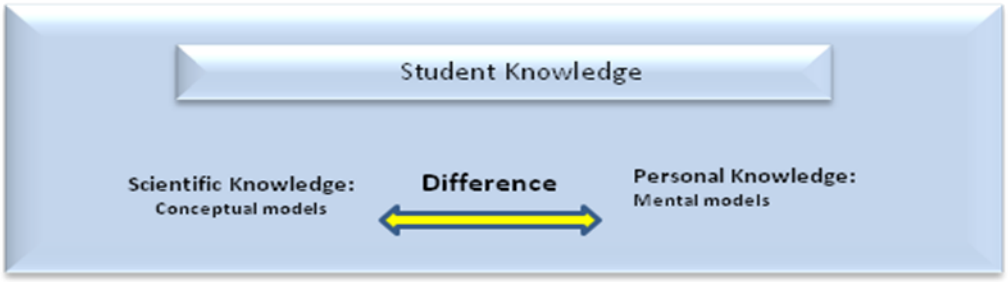

Figure 2: *Students' personal mental models and/or scientifically valid conceptual models (Adapted from Glynn & Duit, 1995)*

Students use their mental model to explain and make predictions about the object of learning represented by it. The mental model has to be functional to the student who constructs it (Greca & Moreira, 2000). Understanding conceptual and mental models during knowledge construction can be an effective tool for both the teacher and student to apply and enhance teaching and learning respectively. The teacher may use conceptual models to bridge the gap that exists between conceptual models (i.e. external representation created by researchers, teachers, etc) and the students' mental models during teaching and learning. The student may use the gap to reflect on his or her limitations in understanding a concept. Therefore prior assessment of prior knowledge is important in any teaching and learning situation. It is also important to know exactly what is it that we will be assessing.

Dochy and Alexander (1995) describe prior knowledge as (1) dynamic in nature; (2) available before a certain task; (3) structured; (4) existing in multiple states (e.g. as declarative, procedural and conditional knowledge); (5) explicit and tacit in nature and (6) containing conceptual and metacognitive components. Although these characteristics simplify the understanding of prior knowledge; they do not explain the dynamics of the individual student's prior knowledge or the interactive nature of knowledge. Of greater interest in Dochy and Alexander's (1995) characterization of prior knowledge and relevance in the context of this chapter is the demarcation of prior knowledge into three related interactive knowledge constructs. The three prior knowledge constructs are meant to simplify the understanding of the interactive nature of prior knowledge as it is easier to specify the type of knowledge to focus on in the student's knowledge base for analytical purposes. For instance,

- *Declarative knowledge* describes the knowledge of vocabulary terms and facts. A vocabulary term refers to a word or phrase about which one has 'accurate' but not necessarily a deep level of understanding. Facts on the other hand present information about specific things and events (Marzano & Kendall, 2007).
- *Procedural knowledge* describes the individual's ability to do various procedures necessary to complete some task (Shuell, 1985), and
- *Conditional knowledge* is the understanding of when and where declarative and procedural knowledge are applicable respectively (Alexander, Schallert & Hare, 1991).

Hence the individual's knowledge of any subject matter including chemistry may be described in terms of what and how much of the three types of knowledge the individual possesses (Marzano & Kendall, 2007). It is therefore partly through these three constructs and their interactive nature that an attempt will be made to demonstrate how the quality of students' prior knowledge influences the outcomes of learning of acid-base concepts. Finally,

in his response to how students' difficulties in learning in general and in science in particular may be overcome, Biggs (2003) suggests that we reflect on the way we teach by basing our thinking on what we know about how students learn. Hence we need to link students' prior knowledge and our instructional approaches since the knowledge they construct is to a large extent influenced by their prior knowledge (Ausubel, 1968) and the way we teach.

Method

Research Design

The outcome of any research study is mostly determined by the appropriateness of the methods and instruments used. That is, the methods that one uses will determine the validity and/or reliability of the study. This chapter is based on a larger composite case study conducted through qualitative methods. The choice of the qualitative approach was based on the need for an in-depth understanding of the students' concepts and their prior knowledge in the learning processes. According to Denzin and Lincoln (2003) qualitative methods have the potential to study things in their natural settings and to make sense of or to interpret phenomena in terms of the meanings people bring to them. In the study reported in this chapter the natural setting was the learning environment of science (which included a chemistry laboratory) for students studying towards a specialist course for chemical laboratory technicians. In addition, the natural setting includes students with diverse knowledge or experiences of science. This is the knowledge and/or experiences that need understanding from the teacher's perspective.

Research Context

The study reported in this chapter was conducted at a South African university of technology. The university draws most of its student population from disadvantaged science teaching and learning backgrounds. A disadvantaged science teaching and learning background refers to a background where students learn science with limited physical (e.g. laboratories, libraries) and human resources (e.g. under qualified teachers for specific subjects). The students from whom data was collected were in their first-year of study towards a Diploma in Analytical Chemistry. This is a specialist qualification for chemical laboratory technicians.

The rationale for the study was therefore based on the assumption that the students from such backgrounds may not be ready to cope with the learning content required at university considering the quality of concepts and/ or prior knowledge they bring along. According to Ferrari and Elik (2003) concepts are "internal representations…that are the vehicles for thought in the mind or brain" (p.24). That is, they mediate in knowledge construction (Reif, 2008). Therefore, understanding students' meaning and use of concepts in learning should be a priority for the teacher. The students' meaning and use of concepts reflect the quality of their prior knowledge. The insights reported in this chapter are therefore meant to demonstrate the importance of concepts as building blocks of knowledge or their influence in students' learning outcomes. That is, this report focuses on how the structure and completeness (quality) of concepts determines the learning outcomes in a teaching and learning situation.

Procedures

Studying concepts (prior knowledge) and their use is generally made difficult by the nature of knowledge. According to Dochy and Alexander (1995) prior knowledge is pervasive

and difficult to study. In fact, the two researchers consider concepts to be dynamic as they change with time when students are exposed to more information that may alter their knowledge in the process of a study. The continuous change in knowledge requires an environment that will minimise the effect of this change when studying concepts. The report in this chapter focuses on only two and related factors that characterize concepts or knowledge in the learning process. The two factors are the *structure* and *completeness* of prior knowledge. Structure of quality knowledge here would refer to when components or elements of prior knowledge are well organised, coherent and make sense (Dochy, 1992). Completeness of knowledge on the other hand (Dochy, 1992) would refer to when parts of prior knowledge especially in use are correct or valid, complete and unambiguous. These factors are important as far as construction of quality knowledge is concerned. The components or elements refer to the concepts that Reif (2008) earlier referred to as building blocks of knowledge. Both structure and completeness are continuously changing as the student is exposed to more information because prior knowledge is dynamic (Dochy & Alexander, 1995).

The timing and choice of methods for data collection was therefore of paramount importance considering the dynamic nature of knowledge in the study. For example students had to write PKDT before they could do practical work and/or be interviewed. The two latter processes were meant to be reflective of the knowledge established through the PKDT. This test was used to estimate or approximate students' prior knowledge as it is not possible to determine all knowledge from students' knowledge bases. It was important to first establish students' prior knowledge relevant to the acid-base topic. Students were further subjected to practical work activities and observed and/or interviewed (O&I) where understanding of their use of concepts could be demonstrated in practice. Students engaged in practical work in dyads to promote *social collaboration*. According to Tobin (1990) social collaboration in practical activities enables understanding to be clarified, elaborated and evaluated between partners. Collaboration ensured collection of information as it was possible to record the discussion between both members of the dyad and infer some meanings from their actions as they manipulated the apparatus. Information collected from the PKDT was used for benchmarking and to inform some of the questions posed as students engaged in their work. The assumption here was that students' actions in practice would to a large extent reflect the meanings they attach to concepts responsible for their knowledge. Furthermore students had to compile a written practical work report. The report was used as an additional source of information on students' understanding and use of concepts in the process of learning.

Information collected from the sources indicated, was to establish specific elements of the text, concepts, meanings, thoughts and interpretations as presented by individual students. The analysis was conducted through a framework (**Figure 3**) that includes constructs of prior knowledge (i.e. declarative, procedural and conditional knowledge) of the acid-base topic.

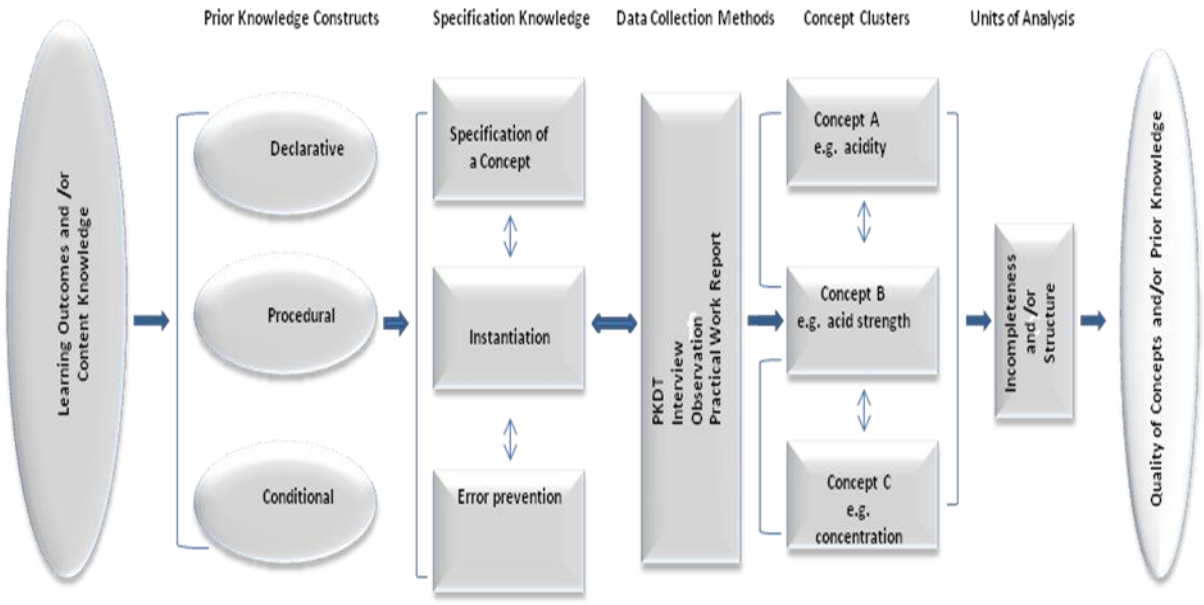

Figure 3: Framework for the analysis of quality of concepts and/or use of prior knowledge

The three constructs were meant to reveal the ability to *specify a concept* (declarative knowledge); *instantiate* knowledge (procedural knowledge) constructed from concepts and *reflect* on knowledge already in place and/or *prevent errors* (conditional knowledge) from one's knowledge. The framework was used to guide and ensure that the analysis was specific to a particular prior knowledge construct of a concept or its use. That is, the focus was on the analysis of the understanding of concepts or their meanings through usage and the potential effect the knowledge may have had on the outcomes of learning. In other words the analysis was aimed at establishing the quality of prior knowledge in terms of its structure and completeness.

Information obtained from different sources or instruments was chunked into categories or concept clusters that were deemed to contain the student's most basic knowledge required to interpret scientific concepts fully without committing errors of interpretation. The chunking process was done on different concepts for different participating students. However, not all sources of information contributed equally to the construction of a concept cluster. Information drawn from a source must however provide information representative of and useful enough to construct meanings or thoughts from students' prior knowledge.

The process of data analysis to generate meanings from data within and across concept clusters was based on Graesser, Singer and Trabasso's (1994) *search after meaning principle.* According to this principle:

- meaning that represents goals at deep levels of representation is constructed;
- a meaning that is coherent at both local (within a concept cluster e.g. acidity) and global (across concept clusters e.g. acidity and acid strength) levels is constructed. Coherence at local level refers to structures and processes that organise elements and constituents and referents of adjacent clauses or short sequences of clauses. At global level, coherence is established when local chunks of information are organised and interrelated into higher order chunks; and

- Actions, events mentioned (or inferred from practical work activities) in the text (of responses to questions) are explained.

The use of this principle made the analytical process more specific to different constructs of students' prior knowledge. That is, it was possible to focus on specific elements of the text of responses on certain concepts, thoughts, language and interpretations as presented by students. In addition, it was possible to analyse students' concepts and use of knowledge at the three constructs (declarative, procedural and conditional) of prior knowledge and three levels (macro, micro and symbolic) of conceptualisation of matter.

In the process of analysis it was important to ensure where it was appropriate and possible, to focus on the three constructs individually and/or their relationship. Analysis within the declarative construct focused on students' ability to specify concepts. This meant that students had to specify concepts according to explicit rules and to ensure that they are unambiguously identified, leading to clearly interpretable scientific knowledge (Reif, 1985). Describing a concept is not a guarantee that one has an understanding of that concept. That is, describing a concept does not make it usable in practice (Reif, 1985).

Ability to apply or instantiate a concept was the focus of analysis within the procedural construct of prior knowledge. This is where a student demonstrates a variety of ways to use his/her knowledge to identify and use the concept in various possible symbolic representations (Reif, 1985). Finally, it was also important to assess knowledge as it is reflected upon. This is a demonstration that students can prevent or avoid likely errors.

Results

The results provided in this chapter are for only one of the cases used in the larger study. The results are reported in a concept cluster for particular concepts and/or their usage. A concept cluster is a chunk of data collected from different sources with the aim of constructing students' understanding of concepts or their use. The concepts of interest in this chapter were drawn from an acid-base topic where these concepts were applied in a titration process. The titration process was used to capture both the theoretical and practical application of concepts on a topic of acids and bases.

Concept Cluster

Teacher: Q.1 Presume that you are titrating a weak acid (CH_3COOH) and a strong base (NaOH). What would the expression *equivalence point* mean in this process? (**PKDT**).
Student: *It will mean that the amount of added strong acid is equivalent to the base.*
Teacher: Q.2 What do you understand by the term *endpoint* in a titration process? (**O&I**)
Student: *It indicates physical change.*
Teacher: Q.3. Differentiate between *equivalence* point and *endpoint* in a titration process? (**O&I**)
Student: *Equivalence point indicates that amount of added standard reagent is equal to analyte*
Teacher: Q.4. Which one between *equivalence* point and *endpoint* in a titration process occurs first? (O&I)
Student: *Endpoint*
Teacher: Q.5 Why do you think *endpoint* comes before *equivalence* point?
Student: *Endpoint means after everything has happened...hmmm... No sir...this one is confusing. I am sticking to my first answer. Maybe I understand the meaning...I do*

not know what happens. **(After a while):** *hmm...I think it is equivalence point...before we see any changes (in colour).*

Snippets from the student's practical work report

Method

- ***10 cm^3*** *of vinegar solution was transferred into a* ***100 cm^3*** *volumetric flask with a pipette with distilled water up to the mark.*
- ***25cm^3*** *of vinegar was transferred into 2 conical flasks using a pipette.*
- *Three drops of phenolphthalein were added...*
- ***NaOH*** *was then titrated...until the endpoint was reached.*

Calculations (sourced from a concept cluster for a different concept)

Teacher: **Q.6** Is it possible to weigh vinegar in liquid form? (**O&I**)
Student: *Yes...but you must have a solid.*
Teacher: **Q.7** How would you determine the mass of the liquid vinegar solution? (O&I)
Student: *By using the density.*
Teacher: **Q.8** Show calculations to determine the % content of CH_3COOH in the vinegar solution given the density (1, 045 g/cm^3) of the vinegar solution to be and molecular mass (36, 45 g.mol^{-1}) of acetic acid. (PWR)
Student: $D = {}^{m}/_{v}$
mass = 1.045 g/cm^{3}x 22.7 = 23.72
% CH_3COOH = $\frac{23.72}{25}$ *x 100 = 98.88%*
Teacher: **Q.9** Differentiate between a **dilute** solution of a **weak** acid and a concentrated solution of a weak acid. Illustrate your response with a relevant example (s). (**PKDT**)
Student: *Dilute solution of a weak acid: A solution which dissolves completely is a weak acid:*
$CH_3COOH \rightleftharpoons CH_3COO^- + H^+$. *Concentrated = that ionised partly:* $NH_4 \rightarrow NH_3 + H_3O^+$.

NB: The questions (Teacher) and responses (Student) in the concept cluster are not arranged in any particular sequence.

The cluster constructed may not necessarily represent the whole of the student's knowledge or information from which her understanding of the concepts could be interpreted. However, the information in the cluster is sufficient to be used to interpret the student's basic understanding of the concepts. That is, the concept cluster is an estimation of the basic information that could be abstracted from the students' knowledge base to represent her conceptual structure about her understanding of the concepts indicated and their application. The information collected in the clusters is aimed to reflect the student's knowledge within and across the three constructs of prior knowledge at the three levels (macro, sub-micro and symbolic) at which matter may be conceptualised (**Figure 1**).

Findings and Discussion

During learning, concepts are represented from the processing of information from different perceptual systems (Hampton & Moss, 2003). That is, students represent their

concepts according to their prior knowledge. In fact, students are sources of concepts and intentional conceptual change as they progressively construct understanding of learning material (Ferrari & Elik, 2000). This chapter is a report of a student's concepts (or their construction) and their use in a chemistry learning environment that includes a chemistry laboratory. The focus of this discussion is the *structure of the student's knowledge*, its *completeness* and *effect* on the outcome of learning. The description and interpretation of the student's knowledge will therefore be within the most basic knowledge required to interpret a scientific concept fully and unambiguously. That is, the description will be within Reif's (1985) *specification knowledge* and focus on concepts that students generally confuse their meanings and usage. Specification knowledge as described earlier in this chapter constitutes specification *of concept,* its *instantiation* and *error prevention* (**Figure 3**).

Specification of a concept

Specification of a concept demonstrates one's ability to unambiguously define or describe it. It does not always indicate that one understands the concept. Ideally, the responses and the observation reported in the concept cluster should indicate or reflect the students' understanding of a concept according to the specified rules. The discussion within this part of the specification knowledge describes how this student describes, understands and use identified concepts.

The student's response to Q.1 and Q.3 demonstrates that the concepts *equivalent* and *equal* are used as synonyms. In the case of a 1:1 reaction in a titration this understanding will not have a bearing on the usage of these concepts as synonyms. However, in reactions where reaction ratios are not 1:1 the understanding will result in an incorrect usage. For example in a reaction of sodium hydroxide (NaOH) and sulphuric acid (H_2SO_4) the reacting moles will not necessarily be equal but equivalent. For amounts of different reacting substances to be *equivalent* and/or *equal* depends on their stoichiometric relationships. For example when a 0.5 M solution of NaOH reacts with a solution of HCl of the same concentration they react in a ratio of 1:1 therefore the amounts (in *ml* or in *moles*) that react for the two solutions to result in a neutral solution are equal. The same cannot be said when HCl is replaced with H_2SO_4 because of the ratio (2:1) in which NaOH reacts with H_2SO_4. From the student's response it is apparent that she confuses the two terms in the context of chemical reactions in a titration process. She can therefore not identify the concept of equivalence unambiguously. Finally, in her specification of the concept 'endpoint" (Q.2) the student does not describe the concept. Instead, she only indicates how the endpoint is indicated. Even the colour change she is referring to reflects a chemical change (i.e. the reaction between the indicator and the reactant in excess (or over titrated reactant) in a titration.

Instantiation

With the kind of descriptions of equivalence and endpoint the student provided will she be able to use them? Does the student 'see' beyond the physical change (colour change) of the indicator? In her response to Q.2 the student only indicates what happens in the reaction vessel when endpoint is reached. Endpoint is the point during titration at which reacting species are generally thought to have equivalent amounts according to the reaction ratio at which they combine. The student does not differentiate between the two concepts but only defines equivalence point. In fact, one can only differentiate objects or things if she is able to describe them fully and unambiguously. Earlier responses from the concept cluster to what equivalence point and endpoint suggest that the student may find it difficult to provide a valid and unambiguous response to Q.3. There is no indication in her responses of what could be happening inside the titration vessel. That is the student does not seem to "see' beyond the

macro level of matter (Figure 1). This view is supported by her response to Q.4. Finally the confusion and uncertainty that prevails in her attempt to respond to Q.5 clearly demonstrates that her chemistry knowledge is mostly conceived at the macro level as far as the nature of matter is concerned.

Error prevention

It is unthinkable that errors can be prevented without adequate, well structured and relevant knowledge to do so. That is, we need to use this knowledge to reflect on what we do and how we do it. In other words, the quality of this knowledge determines the extent to which errors may be prevented. This knowledge is use to distinguish between valid or invalid information and facts. In the case of the concept cluster constructed for this student on the equivalence point and endpoint, her knowledge of these concepts is not entirely convincing that it is adequate and well structured to prevent errors. Clearly the student's response in Q.5 highlights the dynamic, fluid and interactive nature of knowledge. At this point the student eventually managed to construct some understanding of when each of the two concepts is arrived at or indicated in a titration process. Finally her knowledge of the two concepts as demonstrated by her responses appears incomplete and incoherent to assist her in reflecting on errors.

Another indication of the general quality of the student's knowledge is apparent in her understanding of the concepts expressing amounts of substances. For example the student confuses acid concentration and acid strength. It is clear in her concept description (Q.9) of a dilute acid and a weak acid that the student's conception of the two concepts is invalid. Her examples of the response confirm clearly that she is confusing description of a dilute acid solution with that of a weak acid solution. In conclusion on the student's understanding of the dilute (concentration) and weak (strength) concepts in the topic of acids and bases, it is apparent that it would be difficult to apply the concepts in different contexts.

The amount (% concentration) of acetic acid estimated in the sample of vinegar was 4 to 6 %. This estimation was provided in the experimental procedure to students during a practical work activity. In her final calculation the percentage acetic acid in vinegar was 94.88 %. This clearly indicates that the description or the confusion with her description might have had an effect on how to handle the relationship of components of the equation (D = m/v) in the calculations. In fact in her final answer despite the hint (4-6%) of the estimated concentration, the student continued to reflect it as 98.44% an amount that is far more concentrated than the estimated figure. This clearly demonstrates lack of reflection on her knowledge or the provided information. The analysis outcomes on students' knowledge highlights some insights into the quality of students' knowledge in terms of its effect in *facilitating* and/or *inhibiting* (Dochy, 1992) learning.

The discussion on the *confusion* nature among some concepts clearly highlights the importance of diagnosis of students' knowledge. In addition, it also highlights the extent and the type of knowledge that should be assessed at any particular stage of learning. In the case of this student it is clear that the three stage (declarative, procedural and conditional) assessment was important as it helped in accessing not only her knowledge of concepts but also her confusion of the chemistry and English languages were brought to the fore. Therefore in reporting about the structure of knowledge and its completeness, the effect of the interaction of the chemistry and English languages will feature prominently.

The structure of knowledge is assessed in terms of coherence between and/or among concepts and their use within the three constructs of prior knowledge. This does not in any way suggest or imply that if one cannot describe a concept accurately and unambiguously

his/her ability to practically engage in a related procedure may be inhibited. Students do engage in solving problems algorithmically without a theoretical understanding of related concepts. There are however certain learning activities that need conceptual understanding of some concepts if new learning is to be enhanced as was apparent in the concept cluster responses of this student.

The completeness is assessed in terms of missing elements in the student's knowledge base when the knowledge is declared, applied or reflected on. For example in her calculation of the percent concentration the student's knowledge was incomplete as far as the application of the equation density = m/v and her conception of a dilute, concentrated and strong acids are concerned. The quality of this student's knowledge here echoes Dochy's (1992) contention that for one's prior knowledge to be effective in learning it must have certain qualities such as reasonableness, completeness and correctness. In fact he adds that it must also be available and well structured.

Generally the findings according to the framework used in the analysis can be summarised in three main findings. The findings are based on three constructs of prior knowledge and their interrelationships. In addition, the macroscopic, microscopic and symbolic representation of chemistry (nature of chemistry) is used to assess and describe the student's concepts and use of knowledge:

Firstly, it was apparent that the student's description of concepts was in some instances inadequate. That is, the descriptions were mostly at the macroscopic level of conceptualisation of matter. For example what transpired in a reaction vessel was only identified as colour change without elaboration of what that meant. The student did not use the particulate nature of matter at the microscopic level where the chemical process was unfolding to describe this colour change. This could be an indication of the level at which students are generally taught.

The second finding was on the use of the concepts as understood. The student's knowledge on applying the understanding of concepts was apparent in the uncertainty of what each of them meant during practical work. For example *equivalence point and/or endpoint* were difficult to differentiate as to when each came first during a titration. Although the student finally made her mind on further probing, it was initially clear that she was uncertain about the two concepts.

Finally, the incomplete and poorly structured or organised knowledge of the student seemed to affect her reflective capabilities in using her earlier demonstrated although not so convincing knowledge of some of the concepts such as the relationship between density (D), mass (m) and volume (v). In her calculation of percent acetic acid in vinegar she used the incorrect volume. That is, instead of using the volume of the sample of vinegar to determine the mass of the sample the student used the volume of the standard solution. Here the equation was relevant but substitutions were incorrectly made. The 94.88% should have prompted the student to rethink her approach since the percent was far too high as compared to the estimated 4 to 6% indicated in the experimental procedure. In this case the student could not prevent errors in her calculations.

Conclusions

Clearly there is no simple description of something as complex as knowledge. Earlier in this discussion the pervasive nature of knowledge was mentioned as a factor that contributes to the difficulty of studying knowledge. Reporting about its structure or completeness in this chapter was posing such a challenge. That is, the findings on concepts

could not be reported in isolation from their use as there was a need in some instances to infer meaning of what the student understood. There is therefore a need as illustrated earlier in this chapter to develop an integrated relational reporting structure of knowledge both during and after the learning process. Assessing knowledge as isolated concepts defeats the goal of enhancing transferrable knowledge among students. Knowledge is interactive, dynamic and fluid in nature and should at all times be treated as such (Dochy & Alexander, 1995).

Thus reporting knowledge within a particular structure simplifies our understanding of what the student knows and how the student's knowledge might be used to inform our teaching. In this chapter the structure and completeness of knowledge were reported according to the framework for analysis (Figure 3).

Clearly the analysis framework offered an opportunity to provide a better understanding of the quality of the students' knowledge. More information, including information about the language aspect of the student's knowledge base was highlighted through the analysis process. In conclusion assessment of student's prior knowledge before any teaching of a topic can benefit teaching in many ways.

Implications for Teaching and Learning

There are many teaching and learning lessons and/or implications that can be learned and/or drawn from this chapter. These lessons can be divided into two categories. One being lessons for teachers and/or teaching and the second being lessons for students. Lessons for teachers are on the understanding of the students and the nature of the subject matter. For students it is important that they understand what they know and how they know it if they are to engage meaningfully in the construction of their knowledge.

What does it mean for teachers to understand the students and the nature of the subject matter? Understanding students in learning means the teacher has access to their conceptions and reasoning strategies as they construct understanding or generate meanings of concepts. This puts the teacher at an advantage position to present new information at an appropriate time and level of the students' extant knowledge (Treagust, Chittleborough & Mamiala, 2003). That is, it guides the teacher's teaching sequence. The chapter encourages an in-depth assessment of students' knowledge before any teaching of a topic could be embarked upon.

Finally, the teacher's deep understanding of the student's knowledge is at the same time an opportunity for the student to understand his/her knowledge better. Obviously when the teacher who understands the student's knowledge at the level as described, will at the same time teach at the same level to his/her students. It is at this level where students will be made aware of the quality of their knowledge. Being aware of one's knowledge enhances the chance for self-reflection and consequently for self-motivation to improve one's knowledge through meaningful learning.

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The Effectiveness of an Implemented Human Rights Course Designed around Non-Governmental Organizations[1]

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[1] A small part of this research was presented at the International Affective Education in Action Conference, organized by the European Affective Education Network and Çukurova University in 28-30 June 2007, Adana, Turkey

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Abstract

The purpose of this study was to investigate the perceptions of prospective teachers regarding a human rights course that introduces non-governmental organizations. The participants in this action research study were one-hundred prospective teachers (69 females and 31 males) who were enrolled in the Human Rights course consisted two similar groups, each consisting of 50 students. The same procedures were applied to both groups. Quantitative and qualitative data was obtained by means of close and open ended items through a questionnaire. Descriptive and inferential statistics and thematic analysis were performed for the analysis of the data. The results show that employing a NGO-based course greatly affected the students in that they recognized the relationship between human rights and NGOs. No significant difference was found in the prospective teachers' perceptions about the NGOs in relation to the gender or NGO membership variables. The results also yielded positive and significant responses regarding the constructivist implementation of this course designed around the NGOs. The findings of this action research leads to conclude that, the prospective teachers realize the great contributions of the NGOs to the human rights field. Findings also suggest that teaching-learning process designed around constructivist pedagogy should be offered to other departments in teacher training institutions.

Keywords: Human rights education, non-governmental institutions, constructivism, teacher training

Introduction

This study was conducted for three reasons. The first was an observed conversation held by a group of teachers-in-training in Turkey regarding the activities of some non-governmental organizations (NGOs). Some of these students supported the activities of a particular NGO, while other students criticized it in terms of its opposition to national interests. The second motivation was that the researcher realized that most of these student teachers were not aware of their rights. These teachers-in-training were all complaining about such things as their experiences with health services, stationery just across the street, mini-bus services that take them to the school every day, instructors who do not treat them as well as they deserve, pollution in the city, terror, and corruption in the society – but all without any apparent discussion of their rights. Thirdly and lastly, the researcher's other personal experiences, including several informal conversations held with students in classes during the last three years, related to their interests. The researcher informally questioned them about their interests, attitudes, knowledge, and current societal events in the country. When informed about the history of human rights and the rights of different groups of people, the students held extensive discussions about these topics. Although they had come to the classroom from different regional parts of the country, and had different origins and different socio-cultural backgrounds, they sometimes shared common attitude and practices regarding the field of human rights, but sometimes did not. The researcher decided to make a record of their statements, mostly their complaints, and to direct them to take action in the human rights field. To facilitate this, a Human Rights course outline was designed which was heavily based on student-driven activities. The new course would have an innovative design, suggested by the selected readings, the students' backgrounds and interests, and the researcher's personal experiences. All of these influences led to a focus on non-governmental institutions.

Before World War II, human rights were considered as the domestic affairs of the countries (Bernasky, 2004). Immediately after the Charter of the U.N in 1945, national and international linkages were established in order to prevent humanity from human rights

violations through several institutions, including NGOs. Since the 1970s, people especially in democratic societies witnessed a profound shift in the organization, roles, and discourses of NGOs (Lakshmi, 2009; Srirak, 2005). The rapid increase of NGOs as social organizations supporting human rights began to an international issue and they also became critical factors influencing national and international politics. A considerable number of national and international NGOs have emerged to deal with the human rights violations around the world. Involvement in NGOs has increased dramatically and this involvement by many people from societies paved the way for the laws and international relations that aim to facilitate the lives of people (Bernasky, 2004; Pejan, 2005; Snider, 2000; Srirak, 2005).

Some NGOs are nonprofit organizations; some are related to business; and others deal more with political, social, and economic issues. Although they are intended to be action groups that primarily promote common national or international goals, several critics have been also made about them as being integrated into capitalist relations as time passes (Choudry, 2008). They are generally described as organizations that are engaged in development, and the promotion of gender and economic equity, a fair judicial system, environmental awareness, citizenship involvement in governance, human rights, and poverty reduction at national and international levels (Clark, 2001; Lewis, 2001; Martens, 2002). In addition, NGOs are currently seen as more crucial and cost-effective than governments in providing social services that reach poor or needy groups in societies (Ebrahim, cited in Bradaschia, 2008).

Human rights education at teacher training institutions and schools has long been recognized by many educators as an important element of teacher education. For example, De Moulin and Kolstad (1999) and Torney-Purta (1981) have stated that teachers should possess a mature understanding of human rights and democracy, and that teacher training institutions should contribute more to develop the democratic maturity of teachers by including human rights courses in their programs. More recently, scholars have claimed that realizing human rights is one of the most important challenges confronting contemporary societies (Moghaddam & Vuksanovic, 1990)

Some also argue that educators have a responsibility to spread knowledge about human rights. Besides, encouraging this is one of the mostly emphasized goals of NGOs (Ramos, 2008). World Bank (2009) also explains that NGOs have a crucial role to play in helping to amplify the voices of the poor in the decisions that affect their lives.

The number of NGOs has boomed especially after 1997 in Turkey and they play a major role in human rights awareness in Turkey. The number of NGOs including associations, unions, foundations, or chambers has also reached around 150.000 by the 2008 (Kamp, 2009). However, from the researcher's experiences with prospective teachers in Turkey, NGOs that promote human rights have not received sufficient attention in teacher training programs.

The purpose of this research study was to investigate the effectiveness of an undergraduate-level human rights course designed around NGOs for prospective teachers. In order to realize this aim, the following research questions guided the study.

1- What are the perceptions of prospective teachers in relation to NGOs?

2- What are the perceptions of prospective teachers in relation to the constructively designed learning-teaching process related to human rights education based on NGOs?

3- Is there a significant difference in the prospective teachers' perceptions about the NGOs in relation to the gender variable?

4- Is there a significant difference in perceptions if the participants are members of an NGO?

5- What are the most emphasized human rights issues among the prospective teachers after they have taken the new course designed around NGOs?

Method

Research Design

As the teaching profession requires continuing reflective practices to improve the instructional process, teachers may occasionally undertake the role of the researcher. Action research is the most appropriate if the researcher's primary aim is to enhance and develop practice, rather than to demonstrate knowledge (Carter & Osler, 2000; Dana, Gimbert, & Yendol-Silva, 2001; Denzin & Lincoln 2003; Gay & Airasian, 2000; Mills, 2007; Tomal, 2003; Yıldırım & Şimşek, 2008).

Sample

The study participants were one-hundred teachers-in-training (69 females and 31 males) who were enrolled in two of the researcher's Human Rights courses within a Guidance and Counseling Department in a public university in Turkey during the 2007-2008 academic year. Two similar groups were created for the study, each consisting of 50 students. Participation was required of all students enrolled in these two classes. The same procedures were applied to both groups.

Research Instruments

Data collection in action research can be quantitative, qualitative, or both (Stringer, 2008; Thomas, 2005; Waters-Adams, 2006). In this study, quantitative data was obtained by means of close-ended and qualitative information was collected through close-ended questions in the questionnaire. Three experts from the field helped with the validation process of the questionnaire items. Then the questionnaire was administered to a pilot group of 20 students. In the final version, 29 close- and open-ended questions were included in the instrument. Its Cronbach Alpha reliability value was calculated as 0.80. The questionnaire was administered to both classes at the end of the Spring semester.

Procedure

The nature of the Human Rights course

The course was elective and designed to introduce various non-governmental organizations with different goals in human rights field in Turkey. The students attended class for two hours per week, and for 14 weeks in total, during one semester of the 2007-2008 academic year.

The activities during the semester

Planning phase- in the first week

Prior to the beginning of the academic semester, the researcher examined relevant literature, media, and several public and NGO websites, and decided to include 50 NGOs representing different aspects of Human Rights as could be fit into the course framework. In the beginning week of the course, the purpose of the course, its goals and objectives, this

research study and its implementation process, and the grade evaluation criteria were all explained to the students through a course outline prepared by the researcher.

Implementation phase- subsequent activities

After two weeks of theoretical introduction (background, history, and account of the endeavors of human rights activists) through PowerPoint sessions, the students randomly drew the names of non-governmental institutions to be presented two weeks later, in accordance with certain criteria. The prospective teachers prepared ten-minute length PowerPoint presentations that introduced their selected NGOs and discussed their functions in the human rights field.

The prospective teachers then watched two documentary movies related to human rights in Turkey and abroad ("Road to Guantanamo" by Mat Whitecross, and "Human First!" by Can Dündar). In the following weeks, two guest-speakers visited the classes. The first was a lawyer who was serving as a member of the Erzurum Human Rights Coordination Committee. He specifically mentioned committee procedures to address a human rights violation, and then informed the students about consumer rights, the current state of the prisons in the city, and the rights of the prisoners. The other guest was from TEMA (the Turkish Foundation of Afforestation and Struggle with Erosion), the biggest environmentalist NGO in Turkey. The guest-speaker introduced their activities, and then informed the prospective teachers about the current situation and environmental future of Turkey and the world. The prospective teachers received leaflets and brochures, and watched a short video about the activities of TEMA.

The students were also required to choose an actual human rights violation in Turkey to analyze with regard to given criteria provided by the instructor. All of the students received a written sheet containing information about the submission procedures and evaluation rubric. This task was substituted for the final exam.

Data Analysis

The quantitative data was analyzed using SPSS 12.00. In the data analysis, the mean values of the participants' responses to each item were computed. In order to make clear comments on the data, arithmetical mean intervals of the items were recalculated. Considering that the intervals are equal, the point interval coefficient for the arithmetic mean was 0.80. Point interval = (Highest value – Lowest Value)/5 = 4/5 = 0.80. The evaluation intervals for the arithmetical means are given in Table 1. According to the table, for example, if the prospective teachers indicated their responses with a mean score of 3.80, this was considered "positive." In order to determine if there were significant differences between the responses of the prospective teachers with regard to certain variables, t-tests and ANOVAs were conducted.

Table 1. *Evaluation intervals for the arithmetical means*

Grading	**Mean intervals**	**Explanation**
Strongly disagree	1.00–1.80	Completely negative
Disagree	1.81–2.60	Negative
Undecided	2.61–3.40	Undecided/Neutral
Agree	3.41–4.20	Positive
Strongly agree	4.21–5.00	Completely positive

According to the table, for example, if the prospective teachers indicated their responses with a mean score of 3.80, this was considered "positive." These comments are presented with other descriptive findings, such as frequencies and percentages, in the tables. In order to determine if there were significant differences between the responses of the prospective teachers with regard to certain variables, t-tests and ANOVAs were conducted. The qualitative data obtained from the close-ended questions was analyzed using inductive thematic analysis. This was used to identify patterns in the prospective teachers' responses, which yielded major themes. The themes thus came from the data rather than from a pre-existing framework (Braun & Clarke, 2006; Yıldırım, A & Şimşek, 2008).

Results

As can be seen in Table 2, a vast majority of the prospective teachers ($\bar{X}$=4,51) thought that human rights and NGOs share a close relationship.

Table 2. *Responses of the Prospective Teachers in Relation to NGOs*

	SA	**A**	**U**	**D**	**SD**		
	f/%	**f/%**	**f/%**	**f/%**	**f/%**	$\bar{X}$	**S.D**
1. Human rights have close relationships with NGOs	61	29	10	--	--	4,51	,67
2. NGOs contribute to human rights and democracy in Turkey	27	54	19	--	--	4,08	,67
3. NGOs promotes the EU candidacy of Turkey	26	36	24	10	4	3,70	1,08
4. All NGOs make efforts to promote better human rights conditions in Turkey	28	28	29	11	4	3,65	1,12
5. NGOs have very clear missions and visions	16	41	33	9	1	3,62	,89
6. Some NGOs conduct harmful activities that are detrimental to national interests	14	23	27	21	15	3,00	1,27
7. Human rights are sufficiently understood by the Turkish people	5	12	24	42	17	2,46	1,06
8. Some NGOs make use of human rights in order to benefit their own organization	4	--	37	44	15	2,34	,87
					Total Mean	3,42	

Note → (5) Strongly Agree …… (1) Strongly Disagree ; N=100, t1herefore (f) and (%) values are the same

They also thought that NGOs contribute to the development of human rights and democracy in Turkey ($\bar{X}$=4,08), and that NGOs promote the candidacy of Turkey for the EU. The prospective teachers also admitted that the comprehension of human rights among Turkish people was not sufficient ($\bar{X}$=2,46). Other responses can be seen in the Table 2.

Table 3 presents the responses with regard to constructivist learning-teaching process based on NGOs. Regarding the teaching and learning process in the Human Rights course, the prospective teachers stated that the most effective element of the course was the documentary movies ($\bar{X}$=4,78). These documentaries helped them to understand the course better ($\bar{X}$=4,71). They also stated that they understood the course content better because of the involvement of the guest-speakers in the class ($\bar{X}$=4,65). Most of the prospective teachers stated that the students in other departments should be enrolled in the Human Rights course ($\bar{X}$=4,60). They thought that the course was beneficial ($\bar{X}$=4,57), and that the "Human Rights Violations Project" helped them to understand how human rights issues can be incorporated into their daily lives ($\bar{X}$=4,55). They learned many things while they were searching for their project topic ($\bar{X}$=4,43), and they regarded human rights issues more positively ($\bar{X}$=4,38). The classroom discussions ($\bar{X}$=4,44), the "Human First!" documentary ($\bar{X}$=4,41), and the

PowerPoint presentations by the prospective teachers ($\overline{X}$ =4,20) were other crucial activities in the structure of the course. Other responses can be seen in the table.

Table 3. *Responses of the prospective teachers in relation to the learning-teaching process based on NGOs*

	SA	A	U	D	SD		
	f/%	f/%	f/%	f/%	f/%	$\overline{X}$	SD
1. The movies we have seen in the course provided more amusing lessons	81	16	3	--	--	4,78	0,48
2. The movies we have seen in the course helped me to understand the course better	72	27	--	1	--	4,71	0,47
3. The involvement of the guest-speakers in the course was beneficial for understanding human rights	73	20	6	1	--	4,65	0,64
4. This course should be delivered in other departments	71	21	6	1	1	4,60	,73
5. The Introduction of this course was beneficial	65	29	4	2	--	4,57	,67
6. The "Human rights violations project" helped me to understand that human rights are integrated with daily life	62	32	5	1	--	4,55	,64
7. Classroom discussion was beneficial and helped the class to become more familiar with NGOs	58	34	5	--	3	4,44	0,84
8. I learned much about human rights during the preparation of the "Human rights violations" project	55	34	10	1	--	4,43	,71
9. I understood the NGO movement in Turkey better when I watched the "Human First!" documentary	55	33	10	2	--	4,41	0,75
10. The NGOs-based Human Rights course helped me to perceive human rights in a more positive manner	52	37	8	3	--	4,38	,76
11. I understood that there are many human rights violations that I did not consider previously	48	37	11	4	--	4,29	,82
12. The data show projections and PowerPoint presentations helped me to understand NGOs	50	26	19	4	1	4,20	0,95
13. The structure of the NGOs-based human rights course was more beneficial than a traditional lecture design	48	24	20	6	2	4,10	1,04
14. The presentation handouts helped the class to understand the role of NGOs	45	29	16	5	5	4,04	1,12
15. I never thought that human rights was such an involved and important topic	33	30	27	7	3	3,83	1,06
16. The NGOs-based human rights course should be more visual	32	26	23	14	5	3,66	1,20
17. This course should be more than 2 hours per week	27	21	25	11	16	3,32	1,39
18. The crowded classroom / class size was a barrier for the course to be more effective	20	15	26	23	16	3,00	1,35
19. The lectures were helpful for understanding NGOs and their roles in human rights	11	22	28	25	14	2,91	1,21
20. Human rights related information, concepts, and its brief history should have been discussed in more detail in lectures	10	19	26	24	21	2,73	1,27
21. The learning environment was a handicap in the delivery of the course	4	12	34	32	18	2,52	1,04
						Total Mean	4.00

Not→ (5) Strongly Agree …… (1) Strongly Disagree (M=4.00); N=100, therefore (f) and (%) values are the same

Consequently, the questionnaire included two major sections, as seen above. The responses of the prospective teachers (M=3,42) revealed that they tended to "positively" regard the roles and contributions of the NGOs in the human rights field. Their responses also show that they enjoyed the activities and the teaching-learning process in this course (M=4,00) much better than the NGO elements. Both major dimensions in the questionnaire were within the limits of "positively recognized" intervals. Thus, the introduction to NGOs through an authentic process was regarded positively by the prospective teachers.

The Prospective Teachers' Perceptions about NGOs According to the Gender Variable

A t-test was conducted to examine the differences in the prospective teachers' perceptions of NGOs in terms of the gender variable. No significant difference was found between the female and male respondents.

Table 4. *Responses of the students in relation to the gender variable*

Gender	**N**	**M**	**SD**	**t**	**p**
Female	69	27,34	3,11	.058	0.95
Male	31	27,38	3,15		

*p<0.05

Membership and Non-Membership in NGOs

As can be seen in Table 5, 33% of the prospective teachers were members of a NGO.

Table 5. *Membership and participation in NGO activities*

	Participated		**Did not participate**		**N**
	F	**%**	**f**	**%**	
Member	20	52,6	13	21	33
Non-member	18	47,4	49	79	67
	38	100	62	100	100

The prospective teachers were asked whether they had previously attended any activity of an NGO. Twenty prospective teachers (52,6%) who were all members of a NGO stated that they had attended NGO activities. Eighteen of the prospective teachers (47,4%), all of whom were not members of any NGO, did not attend to any activities of NGOs. It was assumed that the remaining 49 prospective teachers (79% of the non-members) who were not member to any NGOs never participated to any NGO event.

A t-test was conducted to examine whether membership in an NGO made a difference in the prospective teachers' perceptions of NGOs. No significant difference was found between those with membership and those with no membership in a NGO. In other words, membership is not a factor that affected the perceptions of the students in relation to NGOs (Table 6).

Table 6. *Responses of the students on perceiving the NGOs in relation to the membership*

	N	**M**	**SD**	**t**	**p**
Member	33	27,6061	3,1018	.552	0.582
Non-member	67	27,2388	3,1387		

*p<0.05

As can be seen in Table 7, another t-test was conducted to examine whether membership in a NGO made a difference in the prospective teachers' perceptions with regard to the constructivist learning-teaching process experienced during the course based on NGOs. There was no significant relationship between holding a membership and no membership in an NGO in relation to the learning-teaching process.

Table 7. *Responses of the students on the learning-teaching process based on NGOs in relation to the membership*

	N	M	SD	t	p
Member	33	30,3333	3,3323	-,675	,502
Non-member	67	30,8060	3,2764		

*p<0.05

Lastly, a correlation analysis test (0.33, p>0.01) was conducted to examine whether there is a relationship between the perceptions of the prospective teachers about NGOs and their perceptions about the learning-teaching process based on NGOs in the Human Rights course. This result shows that there is a moderate positive correlation. This means that as scores for the prospective teachers' perceptions about the learning-teaching process based on NGOs increased, their scores for perceptions about the NGOs also increased positively.

Results of the Open-Ended Questions

One goal of this study was to ascertain which three things the prospective teachers remembered most from the overall course, and why. They were asked in an open-ended question format to write down three things they remembered from the course best after the end of the semester. Their responses were analyzed and categorized into four major themes: the nature of human rights, the rights themselves, NGOs, and the course content and implementation. These themes are presented with their frequencies in Table 8.

Table 8. *Major themes identified from the open-ended question*

The Course Content & Implementation	NGOs	The Nature of Human Rights	The Rights
-Movies (N=16) -Presentations (N=8) -Positive impact of the course (respectful & peaceful atmosphere, comfortable interactions, free speech, attitude of the instructor… etc.) (N=6) -Guest-speakers (lawyer and TEMA activist)) (N=5) -Discussions (N=3)	-NGOs and their contributions to human rights (N=36) -NGOs and their negative aspects (N=4)	Positive: -Awareness of human rights (N=36) -Relationship with law (N=7) -Universal Declaration of Human Rights (N=2) -Democracy and human rights relationship (N=2) -History and the endeavors of activists for human rights (N=2) Negative: -Human rights violations (N=14) -Conditions in which human rights are lacking in Turkey (N=2)	-Right of free thought, faith and speech (N=14) -Right to live (N=12) -Right to education (N=10) -Consumer rights (N=7) -Patient rights (N=5) -Rights of children (N=3) -Rights of free press (N=2) -Right to be informed (N=2) -Economical rights (N=2) -Women's rights (N=2) Meaning of human rights: -Equality (N=14) -Freedom (N=12) -Universality (N=11) -Respect (N=6) -Peace (N=5)

At first glance, the responses of the prospective teachers show they learned that all people have rights merely because they are human beings. Regarding the course content and implementation, the responses clarified that movies were a highly beneficial and remembered activity in the course (N=16). Presentations (N=8), the positive impact of the course (N=6), guest-speakers (N=5), and class discussions (N=3) were the other important categories identified from their responses. Regarding the positive effect of the course atmosphere, one

prospective teacher stated, “this was the first time in my higher education that I felt quite confident, and it was the first time I expressed myself pretty clearly” (PT, 14).

As can be seen in table, the prospective teachers (N=36) regarded the NGOs, and their relationships with and contributions to human rights positively. Most of the responses were related to the statement, “I have never thought that human rights and NGOs are so related, and that they go hand-in-hand in most cases.” Only four prospective teachers stated that “some NGOs act against the national interests of the country.” Therefore, they viewed the roles and contributions of some NGOs negatively.

The responses of the prospective teachers (N=36) show that their awareness of human rights increased after the course. A female prospective teacher’s statement is very indicative of how and why their awareness and positive attitudes increased during the course:

> *I only knew that human rights are used to condemn my country in the news, and I had a really negative reaction to this term. I was always hearing that this term was also negatively used by terrorist organizations and their representatives, as propaganda tools. Therefore, for me, it was impossible to deal with human rights literature or activities. However, this course taught me that this was a misunderstanding or a misconception… Human rights are found in many aspects of our lives... In shopping, in traffic, in schools, in the post office, and in my job application, and anywhere else… So I will deal more with human rights related issues, and I will certainly become a member of a NGO or the NGOs. (F.4-2)*

The prospective teachers also indicated that they learned about human rights violations (N=14) that occurred in Turkey and throughout the world during this course. The responses of the prospective teachers clarified that when someone talks about rights, they mostly thought of the rights of free thought and speech, and of faith (N=14), the right to live (N=12), and the right to education (N=10). Other rights that they indicated can be seen in Table 9. The meaning of human rights, according to the prospective teachers, are equality (N=14), freedom (N=12), universality (N=11), respect (N=6), and peace (N=5). The meaning of human rights was clearly understood by the prospective teachers.

Discussion and Conclusion

This research study investigating the effectiveness of constructivist planning, implementation, and evaluation of an action-based Human Rights course that introduces NGOs. One of the crucial lessons of this study is that providing real-life situations and designing an interactive learning-teaching environment can greatly affect students’ perceptions of the course itself. Another important finding is that prospective teachers knew very little about Turkish NGOs. However, their responses to closed and open-ended questions show that, following this course, they realized the great contributions of the NGOs to the human rights field. The submitted written reports on the NGOs also reflected that they enthusiastically studied the topics they chose, and that they used interactive media, newspapers, journals, web-sites, and many other materials for their research. The open-ended responses of the prospective teachers revealed that they mainly remembered the implementation of the course, the recognition of NGOs within the human rights field, the positive endeavors of human rights activists throughout the world and in Turkey, and the recognition of a wide range of rights. This seemed to be appropriate considering the goals and objectives of the course as were stated in the course outline.

In this action research study, the researcher mainly benefited from the constructivist approach based on several authentic activities. Cochran, DeRuiter, and King (1993) stated that a constructivist learning environment in teacher training can bridge theory and practice

meaningfully, and establish opportunities for prospective teachers to develop higher order thinking skills through utilizing authentic learning activities. Research on the constructivist approach (Abdal-Haqq, 1998; Akar, 2004; Bay, 2008; Bay, Kaya, Gündoğdu, and Karakaya, 2009; Demirel et al., 2000; Deryakulu, 2001; Jonassen, 1994; Kesal & Aksu, 2005; Koç, 2007; Tynjälä, 1999; Yurdakul, 2004) shows that it can be effectively used for teacher education. Within this understanding, the researcher attempted to use contemporary, real-life based methods and materials, and also a learning environment that is in keeping with the constructivist approach. In similar but traditional courses during previous years, the researcher found that the students were merely passive receivers, taking notes and participating in question and answer sessions as unwilling participants. This study also revealed that all the students studied eagerly in all of the activities, because their lives and their rights were the topics of study. As they investigated several NGOs throughout the course, they realized that they are also parts of the democratic life in their society.

Consequently, this study also contributed to our understanding of the effects of authentic activities in teacher training. Although, the authentic activities created a heavy workload for the instructor (Akar, 2004; Aschbacher, 1994; Lawrence and Pallrand, 2000), the experiences in an authentic-styled teacher training course also helped to see both the effects of authentic activities and the difficulties involved with the process (Akar, 2004).

The paucity of empirical findings on the relationship between NGOs in Turkey and teacher training is challenging. More research is also needed to further our understanding of the civil society movement in Turkey in terms of teacher training institutions. A constructivist-based course focusing on the introduction of the NGOs in Turkey would also deepen the awareness of democracy and human rights for prospective teachers and other actors in education. Human Rights course should be offered to other departments. As Wharton (2007) suggests, students need to be taught affectively, as well as cognitively. The course may also be beneficially redesigned using constructivist pedagogy for teacher education, so that they can internalize the human rights in their lives.

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The Effect of Mental Exercise and Repetition Studies on the Mental Performance of 7th Class Students of Primary School

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Abstract

The purpose of this experimental study is, taking into consideration variables such as gender and school type, to investigate mental development of 7th grade primary school students through having the students do mental exercise and repetition studies. While the experimental group has been applied a mental development program with mental exercise and repetition studies for a 6-week time, the other group has not received the same application. In this study data related to students mental development is collected throug[1]h Cattell's mental test, developed by Cattell (1957) and adapted by Togrol (1974), and the achieved crude points are turned into points related to mental parts. In this study T-test and ANOVA are applied to analyse whether there's a meaningful differentiation between pre-test and post test scores. At the end of this study these findings have been obtained: A meaningful differentiation cannot be seen between the pre-test and post-test point averages related to mental parts of girls and boys according to their gender. In terms of being a private school or states school there is not a meaningful differentiation in mental parts between the pre-test points averages, however there is a meaningful differentiation in the post test points averages in the favour of private schools. There is not a meaningful differentiation between the experimental group and control group in mental parts pre-test point averages, however there is a meaningful differentiation in the favour of experimental group in mental parts between the point averages in post-test. Generally there's a meaningful relation in a positive way in the favour of post-test points between the pre-test and post-test point averages related to mental parts.
Key words: Mental exercise and repetition, Mental performance.

Introduction

Developing students' characteristics (personal, social, pedagogical and professional), accommodating a convenient classroom environment for students' development and creating a positive teaching and learning environment is the basis of the developmental counseling program applied in schools. In this way, the purpose is to increase the students' academic success and to develop students' characteristics in every way (Yeşilyaprak, 2007). The studies carried on schools to develop the students in every aspect are called teaching and learning activity. These activities include elements such as curriculum, teaching methods, examinations, transition to an upper grade and evaluation of academic works. Today, the meaning of the academic activities has been changed and aesthetically, socially and scientifically valuable education has come into prominence in. In this sense, it has become important that students should *learn thinking* in sophisticated, discrete, critical, creative, constructive, independent, reasonable and analytical way; *use their current knowledge* to produce new information, *solve problems* about recognition and diagnostic; *do individual work* for their interest; *develop a healthy self-concept* and *gain communication skills* to interact with their environment (Özden, 2003). The most important dimension of this new concept is mental process, activities and learning strategies. An organism encountering any stimuli carries out the processes such as: *attention* by heading to stimuli or stimulus response, *perception* by interpreting or comprehending the sensual information, *permanent repetition* by activating the knowledge to use current knowledge in the memory, *grouping* by degrading

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complicated and extended information units to a limited number, *open and implicit repetition* to pass on the information from the short-term memory to long-term memory, *encoding* by transferring and associating the information both in the long-term and short-term memory (Koptagel, 1984, Eggen and Kauchak, 1992; Senemoğlu, 1997; Ulusoy, Güngör, Akyol, Subaşı, Ünver and Koç, 2007).

Intelligence, the basic factor in mental process, has a traditional role in explaining learning and comprehension. Intelligence is the ability to learn, to make use of what is learned, to adopt new situations and to create new solutions (Yörükoğlu, 1996). It is seen that the close relationship between the intelligence shaping the mental processes and learning strategies is inevitable. Practice and repetition strategies which are the subject of this paper are also seen closely related to intelligence and mental processes. Practice and repetition has an important function in transferring the information from the short-term memory which is scant particularly in storing and time to long-term memory and thus in making the information permanent. Mental practice and repetition studies provide a basis in cognitive processes such as organising and jointing which enrich the encoding process to raise the permanency of information in memory. Thereby, an increase in intelligence and mental exercise is seen (Tomporowski, Davis, Miller and Naglieri, 2008). In this paper, the effect on primary school students' intelligence performance is examined experimentally by preparing a program related to mental exercise and repetition explained above.

The purpose of this study is, taking into consideration variables such as gender and school type, to investigate mental development of 7th grade primary school students through having the students do mental exercise and repetition studies

Method

In this section, research design, characteristics of the experimental group and control groups, the procedures applied on experimental and control groups, data collection tools, data collection process, data analysis techniques and limitations of the research are explained.

Research Design

Pre-test and post-test with control group experimental pattern is used for the purpose of the research. Experimental patterns are the research patterns which aim to explore the cause and effect relations between the variables. In this pattern, the groups which are examined are split into two groups as control group and experimental group. At the beginning of the research pre-test is applied and at the end of the research post-test is applied to these groups and results are concluded by looking through the differentiations between them.

Control and Experimental Groups

Actual sample of the research is formed with 50 students in 7 C-D classes from Şeker Primary School and to 41 students in 7 B-D from Private İstiklal Primary School. 'Group mapping' technique is used to determine the study groups. In this technique, two groups are determined with regard to the group averages which belong to the relevant variables (Büyüköztürk, 2001). In this sense, at the beginning of the study, the groups are divided into two groups as control and experimental group. In the process of determining the control and experimental groups, Cattell Intelligence Test (pre-test) is applied to the groups. Then, the results related to the intelligence score obtained from control and experimental groups are inserted to SPSS program and 't' test is applied to the independent groups. With the results of the analysis conducted, it has been seen that there is not a meaningful statistic differentiation between the groups. The table concerned with these results can be seen below.

Table 1. *The t Test Values Related to Pre-test Points of Experimental and Control Groups*

Factor (Pre-test)	**Groups**	**N**	**Mean**	**Sd**	**t**	**p**
	The experimental group	20	137.50	34.28	0.041	.968
	The control group	20	137.14	18.48		

The Procedures Applied to Experimental Group

Mental Exercise and Repetition Program

Mental exercise and repetition program include a six-week study. It is sorted as below:

First Week

1. Students are made to play chess, king and Sudoku.

2. Students are made to do exercises to improve their memory related to numbers.

3. The number chains below are given to the students and students are made to repeat them until they did not do mistakes.

Exercise: 0 3 8 5 0 4 7

Exercise: 1 6 4 9 5 6 8 3

Exercise: 6 2 3 8 4 9 3 2 4

4. Students are made to repeat the number chains from the opposite.

Exercise: 1 3 4 9

Exercise: 9 6 8 3 5

Exercise: 7 5 5 3 9 0 6

5. Students are asked to review the statistic data given to them in a critical way.

6. Before using any measurement instrument, students are provided to see 'how much' the thing to be measured is with their mental eye using only their emotions.

Exercise: Students are made to estimate their friends' height and weight.

The results are tested to be true.

Exercise: Students are made to estimate the width and height of the materials such as the blackboard, bookcase and clipboard in the classroom.

Exercise: Students are made to estimate how big the school garden is.

Second Week

1. Students are made to play chess, king and Sudoku.

2. Students are made to do exercises to improve their memory related to syntax. Students are given sentences and made to repeat the sentences word for word. The sentences below are repeated word for word.

Exercise: The superior man does not set his mind either for anything, or against anything. (Confucius)

Exercise: Anybody accepts the boundaries of their viewpoint as the boundaries of the world. (Schopenhauer)

Exercise: A man is not idle because he is absorbed in thought. There is visible labour and there is invisible labour. (Victor Hugo)

Exercise: Nobody loves freedom from the heart except good people; as for the others, they love what is allowed, not freedom. (Milton)

3. Students are asked to review the statistic data given to them in a critical way.

4. Before using any measurement instrument, students are provided to see ‘how much’ the thing to be measured is with their mental eye using only their emotions.

Exercise: Students are made to estimate their friends’ height and weight.

The results are tested to be true.

Exercise: Students are made to estimate the width and height of the materials such as the blackboard, bookcase and clipboard in the classroom.

Exercise: Students are made to estimate how big the school garden is.

Third Week

1. Students are made to play chess, king and Sudoku.

2. Students are made to do exercises to improve their memory related to paragraphs. Students are given paragraphs and are provided to recall the whole paragraph by using the important words as key words.

Exercise: People are always blaming their circumstances for what they are. I don't believe in circumstances. The people who get on in this world are the people who get up and look for the circumstances they want, and, if they can't find them, make them. (George Bernard Shaw).

Exercise: We are most likely to get angry and excited in our opposition to some idea when we ourselves are not quite certain of our own position, and are inwardly tempted to take the other side. (Thomas Mann)

Exercise: Not only does one not retain all at once the truly rare works, but even within such works it is the least precious parts that one perceives first. Less deceptive than life, these great masterpieces do not give us their best at the beginning. (Marcel Proust)

3. Students are made to solve maths problems.

4. Before using any measurement instrument, students are provided to see ‘how much’ the thing to be measured is with their mental eye using only their emotions.

Exercise: Students are made to estimate their friends’ height and weight.

The results are tested to be true.

Exercise: Students are made to estimate the width and height of the materials such as the blackboard, bookcase and clipboard in the classroom.

Exercise: Students are made to estimate how big the school garden is.

Fourth Week

1. Students are made to play chess, king and Sudoku.

2. Students are made to solve the number chains given to them.

Exercise: 4 9 25 49 81 ?

True solution is 121, that is, 11*11

Exercise: 2 9 28 65 126 ?

Exercise: 5 25 61 113 181 ?

3. Students are made to solve maths problems.

4. Before using any measurement instrument, students are provided to see ‘how much’ the thing to be measured is with their mental eye using only their emotions.

Exercise: Students are made to estimate their friends’ height and weight.

The results are tested to be true.

Exercise: Students are made to estimate the width and height of the materials such as the blackboard, bookcase and clipboard in the classroom.

Exercise: Students are made to estimate how big the school garden is.

Fifth Week

1. Students are made to play chess, king and Sudoku.

2. Students are asked to solve the codes and mind flexors with a specific order given to the students.

Exercise: nrabin dedul secisw cihwe srohe care ekils iemoh tadedu lcess iohw suin gena.

Solution: a genius who is secluded at home is like a race horse which is secluded in barn.

3. Students are made to solve math problems.

4. Students are asked to consider themselves as if they are in that problematic situation.

Exercise: A man says by looking at the portrait on the wall: "I have neither a sister nor a brother, but this man's father is my father's son." So who is in the portrait he is looking at?

Solution: The man is looking at his son's portrait. While solving the problem, we should follow: If John is the only child and Mr X's father is John's father's son, then Mr X's father should be John and if Mr X's father is John, we should think that Mr X is John's son.

Sixth Week

1. Students are made to play chess, king and Sudoku.

2. Students are made to solve maths problems.

Exercise (solution time: 1 minute): Information: 2 stars + 1 moon = 10, 1 moon + 1 sun + 1 star = 9, 1 star + 2 moon = 8, 1 star + 1 flower + 1 sun = 12. Find each symbol's mathematical equivalent.

Solution: star = 4, sun= 3, flower = 5, moon = 2

Exercise (solution time: 2 minutes): Three men decide to share a hotel room for economic reasons. The receptionist tells them the room fee is 30 $ and each of them pays 10 $. Then, the receptionist realizes that there is a mistake. The room fee is not 30 $, it is 25 $. He gives 5 $ to the housekeeper and asks him to return it to three men. The housekeeper gives 1 $ to each of them and keeps 2 $ for the charity box. In this case, each man pays 9 $. 9 $ * 3 = 27 $. The housekeeper keeps 2 $, so it counts 29 $. What about 1 $?

Solution: The room fee is 25 $. Three men give 27 $, that is, they pay extra 2 $, this 2 $ is kept for the charity box.

Exercise (solution time: 3 minutes): Two men sell ties. One sells two ties for 10 $, the other sells three ties for 10 $. Instead of competition, they decide to become partners. So each man brings thirty ties in this partnership and they have a 60-tie stock. Then they decide to sell five ties for 20 $. If the first man sold thirty ties for 10 $ for two of them, he would save 150 $. If the second man sold 30 ties for 10 $ for three of them, he would save 100 $. When counting these two sales, it is 250 $. But after they become partner, their sale results 240 $. What about 10 $?

Solution: There is no trick here; there is only the mathematical logic. When collected 10 $ for two ties and 10 $ for three ties, until "10 $ for three ties" is sold out, 5 ties is sold for 20 $ for a limited time, this is obviously quicker than the sold of the ties for 10 $. Then, some of the rest of the ties will be sold as 10 $ for three ties, but in this case instead of selling the two ties left for 10 $, there will be confusion as they sell in a complicated way.

The Procedures Applied to Control Group

A special procedure concerned with mental exercise and repetition is applied to control group cooperating family, the school management and teachers.

Data Collection Tools

Cattell Intelligence Test 2A-2B: Cattell Intelligence test was developed by Cattell (1957) and adaptation works are done by Toğrol (1974). Test is used for intelligence measurement in individuals whose age is between 7-6 or 14-20. Cattell Intelligence Test is applied in twenty five minutes. It consists of four sections and the application time of each section is different. There are separate explanations and examples for each section. Explanations are verbally made. The test can be applied on either individuals or groups. Grading the test is made according to the answer key. Each correct answer is '1' point. The total point obtained from the test shows the mental age of the individual. Intelligence section of the individual is estimated with the 'mental age/chronological age x 100' formula. No special education is needed to apply the test.

Reliability

Two Half-Test Reliability: In a number of studies, reliability factor of the test estimated with the two half-test reliability is averagely 0.80.

Parallel Form Reliability: Correlation factor of the test between 2A and 2B Forms is found above 0.50.

Validity

Criterion-Dependent Validity: The correlation between Porteus Labyrinth Test and Cattell Intelligence Test applied to 1300 children is below 0.50. The test has criterion-dependent validity (Öner, 1997).

Data Collection Process

In this paper, as explained before, data is collected depending on the experimental pattern. It has been noted that the obtained data facilitates to compare the results of the control and experimental groups and to help see the effects of the mental exercise and repetition on mental performance of the primary school children.

First, equalized 20 children for experimental group and 20 children for control group are chosen by applying Cattell Intelligence Test on 91 students from both schools. Then, experimental group is made to do mental exercise and repetition studies regularly. At the end of the sixth week, Cattell Intelligence Test is re-applied for post-test, the obtained data is ready to analyze including variables such as gender, school type, etc.

Data Analysis Techniques

The data obtained through the research is inserted into the SPSS 16.0 statistic program and it is analysed. Different statistical techniques are used in analysing the obtained data.

First of all, Independent Samples T-Test technique is used to determine if there is a meaningful differentiation in the pre-test scores of the experimental group and control group. Two-way ANOVA for Mixed Measures technique is used to see simultaneously the variation differentiations between the groups to test if there is a meaningful differentiation in point average of pre-test and post-test according to gender, school type, control group and experimental group. Besides, Pearson Moments Correlation Technique is used to determine if there is a relationship between the point average of pre-test and post-test.

The Constraints of the Research

The findings of this research are limited to the primary school students in the study groups; the effort and intimacy of the supporting teachers to apply the mental exercise and repetition studies on the children joined to control and experimental groups; the content of the program of the mental exercise and repetition studies used in this research; data related to the IQ scores measured with Cattell Intelligence Test which is used as the data collecting tool in the research.

Findings

Students' pre-test and post-test average points and standard deviation values obtained from the intelligence test according to their gender are indicated in Table 2.

Table 2. *Standard Deviation Values and Intelligence Test Points of Students' Pre-test and Post-test According to Gender*

		Pre-test			Post-test		
Groups		**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**
Male		22	139.29	4.46	22	159.74	4.32
Female		18	134.92	3.05	18	150.79	4.36
	Total	40	137.32	2.71	40	155.71	4.31

As seen in Table 2, the male students' average points from the intelligence test are 139.29 before the experiment, and they are 159.74 after the experiment. The female students' average points from the intelligence test are 134.92 before the experiment, and they are 150.79 after the experiment. In total, the average points from the intelligence test are 137.32 before the experiment, and they are 155.71 after the experiment. The multiple comparison of students' pre-test and post-test average points obtained from the intelligence test according to gender is indicated in Table 3.

Table 3. *ANOVA Table of the Averages of Student's Pre-test and Post-Test Points According to Gender*

Factor	**Source**	**SS**	**df**	**MS**	**F**	**p**
Gender (Pre-test)	Between Groups	188.634	1	188.634	.250	.620
	Within Groups	28636.621	38	753.595		
	Total	28825.255	39			
Gender (Post-test)	Between Groups	792.414	1	792.414	.420	.521
	Within Groups	71676.974	38	1886.236		
	Total	72469.388	39			

There is not a meaningful differentiation between the average points of the students' pre-test and post-test according to their gender ($F_{(1,\ 38)}$=0.250, p=.620 and $F_{(1,\ 38)}$=0.420, p=.521). This result shows that there is not a meaningful differentiation between the mental performance points according to gender.

Students' pre-test and post-test average points and standard deviation values obtained from the intelligence test according to the school type in which the students are educated are indicated in Table 4.

Table 4. *Students' Pre-Test and Post-Test Average Points and Standard Deviation Values Obtained From The Intelligence Test According to The School Type*

	Pre-test			Post-test		
Groups	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**
State School	30	133.57	2.61	30	145.48	3.84
Private School	10	148.57	2.85	10	186.43	4.34
Total	40	137.32	2.71	40	155.71	4.31

As seen in Table 4, average points of the students who are educated in state schools from the intelligence test are 133.57 before the experiment, and they are 145.48 after the experiment. Average points of the students who are educated in private schools from the intelligence test are 148.57 before the experiment, and they are 186.43 after the experiment. In total, the average points from the intelligence test are 137.32 before the experiment, and they are 155.71 after the experiment.

The multiple comparison of students' pre-test and post-test average points obtained from the intelligence test according to the school type in which the students are educated is indicated in Table 5.

Table 5. *The ANOVA Table of Students' Pre-Test And Post-Test Average Points obtained From The Intelligence Test According to The School Type In Which The Students Are educated*

Factor	**Source**	**SS**	**df**	**MS**	**F**	**p**
School Type (Pre-test)	Between Groups	1687.500	1	1687.500	2.363	.133
	Within Groups	27137.755	38	714.151		
	Total	28825.255	39			
School Type (Post-test)	Between Groups	12578.231	1	12578.231	7.981	.007
	Within Groups	59891.156	38	1576.083		
	Total	72469.388	39			

As seen in Table 5, there is not a meaningful differentiation in the average points of the students' pre-test according to the school type ($F_{(1,\ 38)}$=2.363 p=.133).There is a meaningful differentiation in the average points of the students' post-test in favour of the private school ($F_{(1,\ 38)}$=7.981, p=.007).

Pre-test and post-test average points and standard deviation values of experimental group and control group obtained from the intelligence test are indicated in Table 6.

Table 6. *Pre-Test and Post-Test Average Points and Standard Deviation Values of experimental Group and Control Group Obtained From The Intelligence Test*

	Pre-test			Post-test		
Groups	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**
The experimental group	20	137.50	3.42	20	178.21	4.35
The control group	20	137.14	1.84	20	133.21	2.91
Total	40	137.32	2.71	40	155.71	4.31

As seen in Table 6, the average points of the experimental group from the intelligence test are 137.50 before the experiment, and they are 178.21 after the experiment. The average points of the control group from the intelligence test are 133.21 before the experiment, and they are 137.14 after the experiment. In total, the average points from the intelligence test are 137.32 before the experiment, and they are 155.71 after the experiment.

The multiple comparison of pre-test and post-test average points of the experimental group and control group obtained from the intelligence test is indicated in Table 7.

Table 7. *The ANOVA Table of Students' Pre-Test And Post-Test Average Points and Standard Deviation Values Obtained From The Intelligence Test*

Factor	**Source**	**SS**	**df**	**MS**	**F**	**p**
Experimental-Control Group (Pre-test)	Between Groups	1.276	1	1.276	0.002	.968
	Within Groups	28823.980	38	758.526		
	Total	28825.255	39			
Experimental-Control Group (Post-test)	Between Groups	20250.000	1	20250.000	14.736	.000
	Within Groups	52219.388	38	1374.194		
	Total	72469.388	39			

There is not a meaningful differentiation in the average points of the students' pre-test ($F_{(1, 38)}$=0.002 p=.968). As expected, there is a meaningful differentiation in the average points of the students' post-test in favor of the experimental group ($F_{(1,38)}$=14.736, p=.000).

Results and Discussion

According to their gender, there is not a meaningful differentiation between the pre-test and post-test average points of the male and female students related to their mental performance. Many research results which have investigated the relations between the intelligence and gender exist in literature. Some studies suggest that gender is an important factor in evaluating the intelligence which is described as general ability (Murphy, Hall and Colvin 2003; Furnham and Thomas, 2004). There also exist research results which suggest intelligence does not differ according to gender (Kaufman, Kaufman, Liu and Johnson, 2009) as well as those research findings which suggest that in the performance of intelligence males (Rammstedt and Rammsayer, 2001) or females (Pascualvaca, Anthony, Arnold, Rebok, Ahearn, Kellam and Mirsky, 1997) are more advantageous. From a different perspective, Raty and Snellman, 1992; Rammstedt and Rammsayer, 2002; Rammstedt and Rammsayer, 2002; Guastello and Guastello, 2003; Petrides and Furnham, 2004; Furnham and Buchanan, 2005; Extremera, Fernandez-Berrocal and Salovey, 2006 have found that intelligence is a multiple factor; males are more talented in mental areas such as logic-maths, reasoning, numerical transactions, shape perception and problem solving; and females are more talented in mental areas such as verbal, inner, social and artistic. Besides, Konter and Yurdabakan, 2010 have found that features of nonverbal intelligence do not differ according to gender.

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According to students' being educated in state or private schools, there is a meaningful differentiation in the average points of the post-test in favour of the private school while there is not a meaningful differentiation in the average points of the pre-test related to students' mental performances. This result can be based on many reasons such as; the mental exercise and repetition studies are applied in a more relevant situation in terms of education in private schools, the attitudes of the private schools which support the students' personal development, private schools include more individual and group works and they are accustomed to this, the students in private schools have the opportunity to do mental exercise and repetition better and relatively the parents are more qualitative, etc. Students' socio-economic status and parents' qualifications affect their mental performances (Hovels-Gurich, Konrad, Skorzenski, Nacken, Minkenberg, Messmer and Seghaye, 2006; Gomez-Sanchiz, Canete, Rodero, Baeza and Gonzalez, 2004; Ramey, Bryant, Wasık, Sparling, Fendt and Lavange, 1992).

There is not a meaningful differentiation between the average points of pre-test and post-test related to the mental performance of experimental group and control group; but, as expected, there is a meaningful differentiation in the average points of the post-test related to mental performance in favour of experimental group. This result can be explained with the positive effect of the mental exercise and repetition program applied to experimental group on the mental performance points of the primary school students. There are research results which support this result in literature (Dickens, 2005; Falk, Lidor, Lander and Lang, 2004; Tomporowski and others, 2008).

According to these results, mental exercise and repetition should be taken into consideration while designing teaching and learning activities. Practices can be done by preparing classroom activities, materials and more comprehensive programs related to mental exercise and repetition. Educational programs on mental exercise and repetition can be organized for parents and teachers.

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The Impact of Field Practice on the Self-Efficacy of Prospective Psychological Counselors

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Abstract

The purpose of this research was to investigate the effect of field practice on prospective teachers' self efficacy perceptions. One group pre test - post test design was used. A researcher made Self-Efficacy Perception Scale consisted of 20 items was administered to a group of counseling students (N=59) in a public university, before and after their field practices in schools. After collecting the data from the group they were subject to statistical analysis. The results showed that school field practices in counseling department that were done in two academic semesters as the requirements of School Experience I and School Experience II courses were effective in general. This shows that guidance and counseling field experiences have a significant impact on the self-efficacy perceptions of the prospective school counselors. However, there was no difference in self efficacy perceptions of prospective school counselors in terms of the gender. Discussion and Conclusion: These findings confirmed two hypothesis in this study. These results are also similar to the related literature. The effectiveness of the practice based activities can be examined with a larger sample size throughout the country.

Keywords: Self efficacy, field practice, school guidance and counselor training, field practice

Introduction

This study aims to determine if any improvement has occurred in the self-efficacy perceptions of the last year students of Psychological Counseling and Guidance with the help of field practice activities that these students have attended. It is believed that these school field practice activities carried out in the field of psychological counseling and guidance are very important in assisting the counselors internalize their duties and fulfill these duties with self-confidence. So, this study tested the hypothesis that with the help of practice based activities the self-efficacy of guidance teachers and psychological counselor candidates will improve and people who work in this area will have more confidence and better self-conception.

Field Practice of Counseling Education

In Turkey, school counselors are assumed as the guidance teachers serving as the other teachers in schools. However their primary duty is to help and guide students with severe discipline problems or handicapped ones. Therefore they do not have responsibilities in instructing as others do have. Prior to functioning as school counselors, they need to attend to a four year undergraduate university program in several universities. The importance of field practice activities in teacher education has been increasing every day. It is widely known that what is learnt theoretically can easily be forgotten. Yet information supported by practice can prevent forgetfulness and help teachers fulfill their tasks more effectively. Practice based activities are observed being beneficial for the implementation of theoretical knowledge and construction of professional efficacy.

We believe that people who provide guidance and psychological counseling services in schools face many problems and the self-efficacy perceptions of these people are effective in overcoming these problems. It is a great problem in our country that there are limited studies on the problems of Psychological Counseling and Guidance Education in universities. For this reason we believe that it is necessary to investigate effectiveness of what we do rather than what we simply do.

Alkan (1987) discusses the contribution of practice based studies in three main headings:

1. They provide an opportunity for the application of theoretical knowledge
2. They help the candidates see their needs and deficiencies.
3. They provide an opportunity for candidates to manage the real teaching-learning situation and work with students. They also help the candidates improve their functionalities.

Looking at the findings of this study it will be appropriate to add also "4.They provide improvement in self-efficacy" to the above list.

Self Efficacy of Teachers

If studies, which test the role of practical activities in the transformation of knowledge into skills, are conducted it is believed that there will be more demand for practice based activities especially in vocational education. It is also believed that the individual's self-efficacy will help him/her act more contendently in fulfilling his/her duty and be more successful. The main reason for emphasizing self-efficacy perceptions in this study comes from our firm belief in its functionality for individuals.

Self-efficacy is decribed as the belief that related to individual's need to cope with contingency situations. Self-efficacy emphasize that it affects the individual's right or wrong activities behaviour, at the same time how much effort the individual will spend when faced with a problem and insist on (Alabay, 2006).

Indicating that there are four basic sources to determine self-efficacy, Bandura (1995) emphasizes that the most effective one among these is the information gained by the individual through his own experience; other sources include the observations related to successful or unsuccessful practices of individuals, the community effect concerning achievement and psychological conditions related to success. According to Bandura (1982), self-efficacy have an impact on emotional intensity, and in social conditions and social changes it plays a role as stimulating for success, effectiveness, career, etc. such situations.

Bandura (1995), in his study 'Self-Efficacy in Changing Societies', analyzes the effect of self-efficacy on shaping the lives of individuals in social and cultural networks. This process begins in childhood, occurs during the life, examines the human adaptation in family and educational role and cross-cultural restructuring.

According to Schunk (1990), self-effcacy belief is the most important predict of human behaviours. If the individuals believe that they have the needed skills and control power, they become more willing to choose this task, express their deteminity; act in a particular manner (Eaton and Dembo, 1997; Sharp, 2002). In comparison with the students having doubts about their learning capacity and capability, those who has high level self-efficacy beliefs adapts more easily, studies hard, looking for challenging learning experiences, more resistant to difficulties that hey encountered and successful (Pajares, 2002; Schunk, 1990, 1998; Zimmerman, 1989, 2000). Wigfield and Ecless (2000) suggests that learner's belief in achieving an activity and their evaluation for the activity can affect their individual choices, insistence in performing the activity and their performance (Cited in Üredi and Üredi, 2006).

According to Schunk (1990) satisfaction of reaching a goal doubles the self-efficacy belief and one determines more forcible targets. This process enhances the achievement of the individual.

Sharp (2002) stresses that self-efficacy beliefs provide a basis for human motivation, prosperity and personal achievements. Because, if one does not believe his actions will not lead to desirable results, he becomes reluctant in struggling against difficulties and making response.

Zimmerman (2000) emphasizes that self-efficacy is sensitive in mediation of detailed changes in context of student's performance disciplined as an individual with communication and students' academic achievement. In other words, performance changes, learning methods and academic achievement affect self efficacy.

According to Bandura (1977, 1984, 1995) self-efficacy perception involves indivual's beliefs in his/her efficiency that influences the outcome of a given task. The self-efficacy perceptions and the expectations about outcomes may not always coincide. The self-efficacy of individuals can be high but outcome expectations can be low. Outcome expectations can also be positive despite low self-efficacy perceptions.

As Kuzgun (2000) also stated self-efficacy perception is the combination of the indiviudal's successes as the result of his/her capacity, motivations and the other elements that form the self. Self-efficacy perception also determines the individual's willpower on whether to continue these attempts or not.

According to Bandura (1995) the sources of the self-efficacy perception are as follows:

a) Direct experiences

b) Social models

c) Verbal persuasion

d) The physical and emotional state of the individual

If we intend to deal with to what degree these sources influence the individual's self-efficacy we can see that "direct experiences" is the most influential factor. In our study we expect to find that practice based activities have a similar influence on the self-efficacy perception.

Bandura (1995) lists the influences of Self-efficacy perception as follows:

a) Cognitive processes

b) Motivational processes

c) Affective processes

d) Selection processes

Zimmerman (1995) lists the basic characteristics of the self-efficacy perception as follows:

1. It involves the individual's judgment of performance accomplishment
2. It is related to multi-dimensional and different domains
3. It depends on the situation, it is not stable

4. It is measured based on the criteria determined for an expected performance rather than norms and other criteria
5. It must be measured before starting an activity or a task (cited in Bıkmaz, 2004, pp290-295)

Despite the fact that studies on teachers' self efficacy generally focus on searching the self efficacy belief, as the self-efficacy belief based on private education, self efficacy belief is also being investigated nowadays. A theachers' self efficacy belief may not reflect their abilities in teaching about a definite field, besides, it is important to determine the teachers' self efficacy belief on special field. For instance, in special fields, such as, science and biology teaching and computer use, self-efficacy can be studied (Yılmaz et al. 2004)

Guidance and Psychological Counseling

It should not be denied that having these characteristics the self-efficacy perception is multi-functional in educating counseling teachers. For this purpose there should be more room for practice based activities in the curriculum of Psychological Counseling department. It can be argued that the negative outcomes in the field of Psychological guidance and counseling which is one of the most important catchment area stem from the fact that the administrators and teachers have negative attitudes towards practical activities and the quality of education offered is poor (Ültanır, 2000, pp12-13).

After 1960s psychological counseling profession has improved. In 1970s and 1980s psychological counselors were motivated to make a difference in students' achievement and performances. Guidance and Psychological Counseling is a helping process by the experts for individuals to recognize themselves, their environment and to solve their problems by using their concealed power. Guidance and Psychological Counseling services provides help for individuals to satisfy their needs, implement their plans, solve their problems and increase self-awareness and live a healthier life. (Ok 1995i, p.52) states that it is an indispensable necessity to allow for guidance services in schools in order to prepare new generations for life. The increasing discipline problems in schools expanded the importance of the staff who offers psychological counseling and guidance services.

It is more appropriate to evaluate the results obtained from research studies on the improvement of the curriculum used for training Guidance Teachers and Psychological Counselors in schools. This way the services provided by the staff can improve (Yeşilyaprak, 2000). The school counselors should embrace their roles. It is a fact that people whose self-efficacy level is low cannot satisfactorily accomplish their roles (Kuzgun,2000). The clinical dimension of the Psychological counseling education is defined as practicum and internship. Clinical education and practicum focus of both psychological guidance education and psychological counseling profession. The standards in this area involve laboratory experiences under supervision, and practices and internship.

Psychological Counseling and Guidance (PCG) Program suggests 140 hours of individual psychological counseling under the supervision of instructors, 140 hours of group counseling and guidance, 70 hours of career guidance and counseling which make total 350 hours internship. Besides it requires a total of 140 hours of internship; 70 hours in school and 70 hours in guidance center (Doğan, 2001, 347-350).

It is inevitable to shift to developmental guidance program if more effective and sufficient services are planned for students despite all estimated problems. The flexible structure of comprehensive guidance programs enables arrangements in accordance with the needs of students and available resources (Erkan, 1995, p.44). It is more appropriate that the

curriculum designed for training candidates to meet contemporary and daily needs covers practice based activities.

This study was carried out to investigate the effectiveness of field practices as part of Psychological Counseling Field Study I and II courses which are taught over two semesters, once a week in schools. In this study the effectiveness of these activities were examined through the self-efficacy perceptions of the Psychological Counselors/Guidance teachers.

For this purpose answers to the following research questions were sought:

1. Do the Psychological Counseling and Guidance internship courses affect the self-efficacy perceptions of the candidates of psychological Guidance and Counseling?
2. Are there differences in the self-efficacy perceptions of the candidates in terms of gender?

Hypothesis

1. The Psychological Counseling and Guidance and Group Psychological Counseling practice based activities affect the self efficacy perceptions of the candidates.

2. There are no differences in the self efficacy perceptions of the candidates in terms of gender.

Method

In this study pretest-post test one group design was employed.

Population and Sample

The population of this study constitutes the Psychological Counseling and Guidance students studying in the Department of Education Faculty in Atatürk University. The sample of this study includes 59 fourth-grade students (31 female and 28 male students) studying in the Department of Psychological Counseling in the 2003-2004 academic year in the Kazım Karabekir Education Faculty, Ataturk University.

Data Collection Instruments

In the study a 20-item Likert Type "Self-Efficacy Perception Scale" developed by Ilgar and Cosgun (2001) was utilized. In development of the scale, Bandura's theory was used as the theoretical base. 28-item test form was prepared and applied to 210 students of 3th and 4^{th} year students of PCG and factor analysis was done with these students. As a result, 'Guidance Counselor Self-efficacy Perception Scale' was obtained. Cronbach alpha coefficient was found .84 and test-retest reliability was calculated as .79. This scale was administered to students in a classroom environment at the beginning of the academic year (pretest) and after students attended the practice based activities (posttest)

Data Analysis

After data collection data obtained were analyzed in SPSS-11. T test and MANOVA (Multiple Analysis of Variance Analysis) was done in analyzing the data.

Findings and Discussion

The Effect of Practice Based Activities on the Self-Efficacy Perceptions of the Prospective School Counselors

Data obtained from the pre-test administered to students at the beginning of the academic year and the post-test administered at the end of the academic year are presented in the Table 1:

Table 1. *The Arithmetic Mean Standard Deviation and F Value Table*

Variable		**N**	**Mean**	**S.D.**	**df**	**t**	**p**
PCG Experience	Pretest	59	42,8667	7,0746	58	8,774	0.000*
	Posttest	59	50,5833	5,4533			

Looking at the table, it can be seen that there are differences between the pre-test and post-test scores of the candidates obtained in the practice based activities in Guidance and Psychological Counseling Internship I and II courses. This result shows that guidance and psychological counseling field experiences that were carried out in elementary and secondary schools by the 7th semester students have a significant impact on the self-efficacy perceptions of the candidates.

When the effects of school experience and teaching practice activities are examined, it can be said that similar results are found. Aytunga (2006) asserts that the course, School Experince I, affected the candidates of teaching profession positively; Şişman and Acat (2003) in their study, reveal that teacher practice activities change the perception of candidates significantly. Yiğitbaş and Yetkin (2002) argue that completing the studies in their schools and starting to practice, social service stıudents' self efficacy level is found high. In the study of William and Kobb (2002), it is stated that social service students completing the studies in their school and starting to practice have an important increase in their perceived self efficacy level. In a similar study (Veznedaroğlu, 2005), it is emphasized that Scenario Based Learning Model cause an increase in self efficacy perception level related to teaching profession of teacher candidates.

Due to our research interest in the benefits of the practiced based activities carried in different formats in Education Faculties within the framework of School Experience or Internship courses, with this study we also found an opportunity to analyze the effectiveness of our own program. This result draws attention to the significance of the practice-based activities.

The Effect of Practice Based Activities on the Self-Efficacy Perceptions of the Prospective School Counselors with Regard to Gender

We aimed to analyze if gender had an impact on these activities. We dealt with this issue in this research due to the close number of female and male students. Looking at the Table 2, it can be seen that although there is no significant difference between male and female students the differentiation between the pretest and post test scores is still obvious.

In order to determine whether or not there are differences in the self-efficacy perceptions of male and female students in terms of taking or not taking the Counseling Field Study course, MANOVA was conducted. The findings showed that there are no differences in the self-efficacy perceptions of male and female students before and after taking the course (Wilks Lambda(Λ)=1.000, F(2, 58)= 0.013, p>0.05). This finding shows that the self-efficacy perceptions of male and female students do not change in terms of attending and not attending the Psychological Guidance and Counseling Internship programs.

Table 2. *Mean and Standard Deviation Scores Regarding the Gender on the Self-Efficacy Perception*

	Gender	**N**	**Mean**	**s.d.**
Pretest	Female	31	42,7813	8,1784
	Male	28	42,9643	5,7056
	Total	59	42,8667	7,0746
Posttest	Female	31	50,5937	5,7857
	Male	28	50,5714	5,1527
	Total	59	50,5833	5,4533

The idea that gender has no effect on self efficacy perception supports this result. In the study, 'The investigation of guidance counselors' self efficacy perception related to counseling and guidance in private education' by Aksoy and Diken (2009), whether the scores obtained by Guidance counselor – private education self Efficacy Scale differ according to gender is examined with Independent Samples t-Test [t(275)=0.51, p>0.05] and it is indicated that the gender of guidance counselor does not have significant difference. In another study, (Akbulut, 2006) it is concluded that between women and men music teacher candidates' self efficacy belief related to music courses no meaningful difference is found statistically In another study by Keskin and Ongun (2006), no meaningful relation is found between gender of students and total scores and all subscale scores of self efficacy sufficiency scale.

Conclusion and Implications

The findings of this research are as follows:

* Guidance and Psychological Counseling Internship I and II programs which are offered in our Faculty but practiced in Basic Education Schools in the 7th semester and in High schools in the 8th semester created a significant change in the self-efficacy perceptions of the candidates.

* Gender of the candidates did not have any impact on the self-efficacy perceptions of the candidates.

These findings confirmed the hypothesis in this study.

* The effectiveness of the practice based activities can be examined with a larger sample size throughout the country.

* Guidance and Psychological Counseling Services Executive Board and other boards such as Guidance and Psychological Counseling Services Province Board) as part of the

National Education system should be made more functional in order to improve education.

* More practice based activities should be allowed in Guidance and Psychological Counseling education programs and more activities devoted to improving the self-efficacy perceptions of the candidates should be practiced.

* The self-efficacy perceptions of the candidates in this field should be examined and in-service training should be offered to overcome the deficiencies.

* Practice-based courses to be offered in the last two years of the program should be more emphasised in the process of curriculum development.

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The Competencies of Turkish Visual Arts Teachers in Using Performance Evaluation Methods

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Abstract

This study aims to assess the competencies of visual arts teachers in using performance evaluation methods, and to examine how these competencies vary by gender, years of service, and faculty graduated from. The study is a descriptive one, aiming to depict the present situation. The sample for the study consisted of 78 visual arts teachers working in the primary schools in Turkey. A three point Likert type scale was used as the data gathering instrument of the study. For the analysis of the data and for calculations, the SPSS 13.0 statistical package was used. Frequencies and percentages were calculated. Of the parametric tests, two samples t-test and one way ANOVA were used to test for normalcy. In all statistical analyses conducted, a $p<0.05$ significance level was used. The reliability coefficient of the scale was found to be 0.73. The findings indicate that visual arts teachers frequently engage in performance evaluation. Visual arts teachers state that they experience difficulties in finding time to prepare and evaluate development portfolios because classes are too crowded and with keeping these portfolios, that they do not have sufficient information on rubrics, and that they need assessment and evaluation experts to help with the use of this tool.

Keywords: Product portfolio, performance evaluation, rubric, visual arts education, evaluation methods.

Introduction

There is a need to create new and alternative assessment and evaluation systems that take learning and learning products, ways of thinking, and learning styles into consideration. In other words, non-conventional tools or techniques to measure what the student knows and what he or she can do, and to evaluate student development are needed. In education practices, evaluation aims to assess the level of knowledge and ability the student has prior to teaching, to monitor the level of realization of learning targets during teaching, and to produce quantitative data, after the teaching, on the level of achievement of the targets previously set.

Once the process within which the student is going to be evaluated is identified, the next step is to identify evaluation techniques appropriate for the purpose. Different methods can be used in the identification of the process within which the student is going to be evaluated and the collection of data following the identification of appropriate evaluation techniques. However, in the stage of identifying the appropriate evaluation technique, two important issues require the attention of the teacher. These are how to make the evaluation “meaningful” and “administrable”. For an evaluation to be meaningful, it needs to express the operations and criteria clearly, and produce results that provide clear guidance on how to improve teaching.The administration of the evaluation, on the other hand, involves the preparation of resources for teaching purposes (Johnson and Johnson, 2002).

When commonly used assessment-evaluation methods are examined, it can be observed that we have a system in which the results or the products are measured to evaluate the achievement of the student, and the individual achievement results are expressed relative to group achievement. The most important shortcoming of this system is that there is either insufficient information or none at all and no documents that would help the individual to assess his or her own standing and development. The achievement

of the student is expressed as a "GRADE", which usually means some combination of written exam scores and the teacher's subjective evaluation. This traditional method of evaluation, which focuses on measuring the competencies of students in terms of knowledge, comprehension, and application, fails to measure higher order competencies.

However, it is important that evaluations also assess student behaviors formed as a result of the knowledge and insights acquired during teaching. This type of an evaluation gives equal weight to the level and quality of cognitive inquiry processes, and to the skills and competencies the student has developed. In our constantly changing and developing world, we need a broad minded educational approach that does not solely focus on rote learning. Paralleling this approach, we also need to create novel learning environments in classes (Johnson and Johnson, 2002). In addition to exams, there needs to be various assessment and evaluation tools and methods to enrich the process of the evaluation of students, and the development of the student needs to be monitored, so that proper guidance can be provided.

Performance evaluation, which is an alternative evaluation method that measures actual problem solving abilities of the students by focusing upon the performance and upon the process, can serve these needs. Tekin (1991) argues that if education targets include the student following an order of operations, or coming up with a product using any or a specific method in a certain field, then performance evaluation is a must.

In this approach, which does not require the student to come up with a single correct answer, the aim is to evaluate what sort of an impact the new information has on the thinking of the student. Differently from the traditional method, this method of evaluation provides detailed feedback for the students on their development, and encourages personal development, creative activities, and social responsibility. From 1990 onwards particularly, student-centered evaluations based upon information from multiple sources became important, and various evaluation methods (performance evaluation, portfolio evaluation, etc.) and tools (rubrics, checklists, attitude scales, scoring guides, etc.) started to be used.

Evaluation and Rubrics in Visual Arts Education

In a subject like visual arts, coming up with evaluation criteria is a very difficult task. This is because expression, personal development, creativity, imagination, and originality, the improvement of which is one of main aims of arts education, are difficult to measure. The same work might be evaluated differently by different teachers. Thus, student evaluation in visual arts has to be multi-dimensional. Although there are no single correct answers to arts questions, pre-set targets based upon rubrics would lead both the student and the teacher to make sound assessments.

When evaluating, teachers should take daily performances into account as well as end-of-unit performances. Performance evaluation, defined as a function of long term learning of the students and evaluation of skills, is crucial because constant feedback is provided. With the feedback provided, students will be able to assess their own work.

Tools commonly used for recording observations on student performance include checklists and rating scales. With the development of supplemental evaluation tools, especially since 1990, rubrics, scoring guides, and reflection logs also started to be used for recording observations on performance. Mehrens (1992) defines a rubric as follows: "new approaches" that include performance evaluation and actual assessments and separate these from traditional written exams. In addition, we can say that a rubric aims

to make a performance based assessment, and to measure how well the student employs the basic knowledge he or she has acquired when performing complicated tasks under authentic conditions. If the performance evaluation is made under authentic conditions, it is called authentic evaluation. The evaluation method that includes performance evaluation and actual assessments and that separates these from traditional written exams is called the "new methods (approaches)" (Mehrens, 1992).

A book published by the Ministry of National Education of Turkey details teacher competencies, and "states that visual arts teachers identify students that show development above and below certain levels, and help them improve using various tools and methods taking individual differences into account" (MEB, 2008: 130). One of the most appropriate methods for evaluating the class level to assess student development is a rubric. A rubric, which is a scoring tool used in evaluating student performance, helps measure the quality of the student achievement (Strickland, 1998).

Dorn (2002) argues that in visual arts education evaluation, rubrics based upon certain criteria need to be used. This kind of an evaluation aims to collect information about the class level, rather than measuring artistic levels. "A rubric is an evaluation method that identifies the standards that a student needs to meet, and can be used to assess which students meet these standards and which do not" (Dorn, 2002: 235).

Huffman (1998) argues that rubric evaluation in arts education can reflect the personal, historical, and cultural understandings of the students about art, as well as their technical and intellectual abilities. This evaluation can be made on the basis of verbal, written, or visual presentation.

Stokrocki (2005), on the other hand, argues that preparing rubrics on arts education performance may influence design by giving information to the student prior to the work, and thus causing confusion. Stokrocki (2005) also argues that teachers should evaluate themselves first, based upon the rubric they prepared, so that they can detect mistakes in their own thinking. This way they would also be able to detect differences between what they teach and what the students learn.

Various studies on the use of a rubric in painting classes exist. One of these studies is Piscitello's (2002) study on evaluation and the use of rubrics in the arts. The findings of this study suggest that rubrics are successful in helping students assess themselves and develop self assessment abilities. In the process of evaluation, it was observed that over time, students' decisions on their own painting projects grew more independent of their teachers. "The researcher thus suggests that rubric systems are used in painting classes" (Piscitello 2002: 40). Based upon the results of another study on rubrics, Shepard (2005) argues that the use of rubrics in arts education should be more widespread. The results of Borden's (2008) study, titled "Rubrics as assessment and evaluation tools in arts education", indicate that rubrics help develop the self-respect and time management skills of the students, and that evaluations encourage student development both as individuals and in groups.

The holistic rubric prepared by the researcher, based upon a literature review and expert opinion, to be used in visual arts education (Borden, 2008, Huffman, 1998, McCollister, 2002, National Education Visual Arts and Sports High School Curriculum, 2009).

This study aims to examine the competencies of visual arts teachers to use these assessment and evaluation tools, which are part of the primary school curricula, to

discover the common difficulties experienced in their application, and to propose solutions for the problems identified. To this end, answers to the following research question were sought:

1. How are the competencies of visual arts teachers in using development portfolios, performance evaluation, and rubrics distributed?
2. How frequently do visual arts teachers use development portfolios, performance evaluation, and rubrics?
3. What are the problems encountered by visual arts teachers in assessment and evaluation, and what solutions can be offered?
4. Do the competencies of visual arts teachers to use development portfolios, performance evaluation, and rubrics significantly vary by gender, years of service, and faculty graduated from?

Method

Research design

Because it aims to depict the present situation, the study is a descriptive one. Research design used for the study is survey methodology. Surveys are done to reach conclusions about a universe, based upon observations on the whole or a representative sample of that universe.

Study group

The universe for the study consisted of all visual arts teachers working in the 2009-2010 academic year in public and private primary schools overseen by the Ministry of National Education.

Random sampling method was used to draw the sample. The study group consists of a total of 78 visual arts teachers working in public and private primary schools in Turkey. 42.3% of the participants are female and 57.7% are male.

Distribution of the teachers by whether they took an assessment and evaluation course in college, whether they received any in-service training on assessment and evaluation, and the size of the classes they teach is shown in separate tables.

Table 1. *Distribution of Visual Arts Teachers by the Size of Class Taught*

Size of the class taught by the teacher	**N**	**%**
50-70	12	15.4
30-50	46	58.9
10-30	20	25.7
Total	78	100

When we examine Table 1, we see that 15.4% of the teachers teach in classes consisting of 50 to 70 students, 58.50% teach in classes consisting of 30 to 50 students, and 25.7% teach in classes consisting of 10 to 30 students. Most of the teachers, then, teach classes with sizes of 30 to 50 students. Classes with sizes of 50 to 70 are the least frequent.

Table 2. *Distribution of Visual Arts Teachers by whether they took an assessment and Evaluation Course in College or in Service*

		Assessment and Evaluation Course in College					
		Yes		**No**		**Total**	
		f	**%**	**f**	**%**	**f**	**%**
In-Service raining	Yes	15	19.4	21	26.9	36	46.3
	No	37	47.5	5	6.2	42	53.7
	Total	52	66.9	26	33.1	78	100

Table 2 shows that 66.9% of the teachers took an assessment and evaluation course in college, whereas 33.2% did not. Most of those who did not take a university course on assessment and evaluation are probably graduates of visual arts faculties. It is also observed that 47.5% of those who took a course on assessment and evaluation did not have in-service training on the subject. These findings indicate that additional emphasis needs to be placed on in-service training in assessment and evaluation.

Data Collection Tools

As part of the study, a "scale for competency in using development portfolio, performance evaluation, and rubric" was developed. Prior to the development of the scale the literature on performance evaluation and how it is used in visual arts education was reviewed in detail (Stevens and Levi, 2005, Sezer, 2006, Borden, 2008).

The questionnaire developed aims to measure the competencies of visual arts teachers in using development portfolios, performance evaluation, and rubrics, and the frequency of the use of these assessment tools and methods. The questionnaire was developed taking views of visual arts teachers on the assessment and evaluation methods used in the second level of primary education into consideration.

In the first part of the questionnaire, there are items on the type of faculty the visual arts teachers graduated from, their years of service, class sizes, whether they took assessment and evaluation courses in college, and whether they received in-service training on assessment and evaluation. In the second part of the questionnaire, there are items designed to measure the competencies of visual arts teachers to use development portfolios, performance evaluation, and rubrics, in the form statements with 3-point Likert type responses "Disagree, Neither agree nor disagree, and Agree". The data thus gathered were analyzed using the SPSS 13.0 statistical package. Following the analyses, 27 items that had t-test results $p>0.05$ and correlation coefficients $r<.30$ were removed, as well as one item with an item-total correlation value lower than 0.30. Cronbach's Alpha (α) reliability coefficient of the scale was found to be 0.73.

Data Analysis

Frequencies, percentages, and averages for the items of the scale for competency in using development portfolios, performance evaluation, and rubrics were examined using descriptive statistics. In addition, one way ANOVA and when necessary Tukey's test were used to examine whether there are differences in competency by gender, years of service, and the type of faculty graduated from. To examine whether there are significant differences between the genders, an independent samples t-test was used.

Findings and Implications

This section examines the frequencies, percentages, averages, and standard deviations for the items in the second part of the scale, reflecting visual arts teachers' views on the methods of evaluation that started to be applied, reported in Table 3.

Table 3**.** *Frequencies, Percentages, Averages, and Standard deviations of the Items on Visual Arts Teachers' Competency in using Development Portfolios, Performance Evaluation, and Rubrics*

	Disagree		Neither agree nor disagree		Agree			
	f	%	F	%	F	%	$\overline{X}$	SD
1- I can use product portfolio efficiently for evaluation purposes.	27	34.6	9	11.5	42	53.8	3.02	1.13
2- I can evaluate product portfolios easily.	51	65.4	3	3.8	24	30.8	2.33	0.83
3- I can select appropriate criteria in the evaluation of product portfolios.	63	80.7	-	-	15	19.2	2.18	1.16
4- I spend too much time evaluating the product portfolios.	60	76.9	4	5.2	14	17.9	2.21	1.12
5- I need the assistance of an assessment and evaluation expert in the evaluation of product	30	38.4	19	24.3	29	37.3	3.13	1.29
6- I have sufficient information on product portfolios.	65	83.3	4	5.2	9	11.5	2.73	1.34
7- I can use product portfolios efficiently in my class.	59	75.6	-	-	19	24.3	2.16	1.27
8- I can use rubrics efficiently in evaluating product portfolios.	69	88.5	-	-	9	11.5	2.18	1.67
9- I can prepare proper rubrics for product portfolios.	63	80.7	3	3.8	12	15.3	2.10	1.21
10- I need assistance from an assessment and evaluation expert in preparing proper rubrics for	45	57.6	17	21.7	16	20.5	4.01	1.09
11- I can assign performance tasks fit for students' genders.	32	41	26	33.3	20	25.6	3.23	1.18
12- I can assign performance tasks fit for students' levels.	11	14.1	16	20.5	51	65.3	4.52	1.46
13- I can assign performance tasks designed to improve the higher order thinking abilities of the	37	47.4	31	39.7	10	12.8	3.29	1.22
14- I can prepare suitable environments to evaluate students' performance.	56	71.7	13	16.8	9	11.5	2.13	1.12
15- The performance tasks I assign involve multiple skills.	43	55.1	23	29.6	12	15.3	2.42	1.23
16- I can select performance tasks fit for learning goals mentioned in the program.	35	44.8	14	17.9	29	37.3	3.27	1.21
17- I can select proper criteria for evaluating performance tasks.	42	53.8	9	11.5	27	34.7	2.42	1.32
18- I have difficulty evaluating learning goals mentioned in the program.	39	50.0	14	17.9	25	32.1	3.70	1.16
19- I need the assistance of an assessment and evaluation expert in the evaluation of	41	52.5	4	5.2	30	38.4	4.03	1.43
20- I have sufficient information on performance evaluation.	65	83.3	2	3.6	11	14.1	2.11	1.16
21- I can use performance evaluation efficiently in class/a workshop.	28	35.9	14	17.9	36	46.2	3.23	1.59
22- I can use rubrics efficiently in performance evaluation.	53	67.9	5	6.5	20	25.6	2.42	1.83
23- I have sufficient information on rubrics.	71	91.1	-	-	7	8.9	2.02	1.18
24- I need the assistance of an assessment and evaluation expert for preparing rubrics.	56	71.7	8	10.4	14	17.9	2.88	1.49

Total X =2.48

Table 3 shows that 11.5% to 53.8% of the visual arts teachers agree with the statements designed to measure how competent they perceive themselves to be on the use of

development portfolios. 83.3% of the visual arts teachers state that they do not have sufficient information on product portfolios. 53.8% of visual arts teachers agreed with the item on efficient use of the product portfolio as an evaluation tool. These responses indicate that visual arts teachers perceive themselves to be incompetent in the use of development portfolios, performance evaluation, and rubrics (X= 2.48).

Only 17.9% of the teachers agreed with the item on having time-related difficulties in product selection for preparing product portfolios (X=2.21). 80.7% of the teachers stated that they cannot select proper criteria for evaluating product portfolios (X=2.18), 65.4% stated that they cannot evaluate product portfolios easily (X=2.33), and 88.5% stated that they cannot use rubrics efficiently in evaluating product portfolios (X=2.18). 8.9% to 65.3% of the visual arts teachers agree with the statements designed to measure how competent they perceive themselves to be on the use of performance evaluation. 83.3% of the visual arts teachers think they do not have sufficient information on performance evaluation (X=2.11). 46.2% of the visual arts teachers agree with the item on efficient use of performance evaluation in their classes (X=3.23). 12.8% to 63.5% of the visual arts teachers agreed with the items in the questionnaire on being able to assign proper performance tasks. Of these positive items, teachers who agreed with the item "I can assign performance tasks fit for students' levels" made up 65.3% of the teachers (X=4.52). Of the negative items, 38.4% agreed with the item "I need the assistance of an assessment and evaluation expert in the evaluation of performances". Finally, 91.1% of the visual arts teachers think they do not have sufficient information on rubrics (X=2.02), and 17.9% state they need assistance from an assessment and evaluation expert for preparing rubrics (X=2.88).

Visual arts teachers' frequency in using development portfolios, performance evaluation, and rubrics

Table 4 reports the frequencies and percentages of the responses given by visual arts teachers to the items in the third part of the questionnaire, designed to measure how frequently the evaluation tools and methods are used. When we examine how frequently visual arts teachers use the tools and methods of evaluation under study, we observe that 41.1% of the teachers stated that they never use performance evaluation, and 23.0% stated that they use performance evaluation often. When use of product portfolios among the teachers was examined, it was observed that 21.7% of the teachers stated that they use it often, whereas 37.2% state they never use it. 19.3% of the teachers state they often use rubrics, whereas 51.3% state they never use them. These findings show that the assessment and evaluation tool most frequently used by teachers is performance evaluation (23.0 percent), whereas a rubric is the least frequently used (19.3 percent). 21.7% of the teachers stated they often use product portfolios, coming second after performance evaluation, and 51.3% state they prefer rubrics the least.

Table 4. *Views of Visual Arts Teachers on How Frequently They Use Development Portfolios, Performance Evaluation, and Rubrics*

	Never		**Rarely**		**Often**		
	f	**%**	**f**	**%**	**f**	**%**	**Total**
Product portfolio	29	37.2	32	41.1	17	21.7	100
Performance evaluation	32	41.1	28	35.9	18	23.0	100
Rubric	40	51.3	23	29.4	15	19.3	100

Table 5. *"t" Values for Visual Arts Teachers' Views on Frequency of Use of Development Portfolios, Performance Evaluation, and Rubrics by the Independent Variable of Gender*

Gender	n	x	SD	df	t	p
Female	33	113.34	12.23	77	0.641	0.92
Male	45	115.78	10.17			

p> 0.05 Insignificant

When we examine Table 6, we can see that there are no significant differences between genders with regards to the views of visual arts teachers on frequency of use of development portfolios, performance evaluation, and rubrics (t (77)0. 641; p>0.05). These findings indicate that male and female visual arts teachers have similar views on the issue.

Table 6. *Frequency, Mean, and Standard Deviation of the Variable of Years of Service for Visual Arts Teachers' Views on Frequency of Use of Development Portfolios, Performance Evaluation, and Rubrics*

Years of Service	n	F	x	s.s.
5 and below	24	15.5	142.85	14.36
6-10	38	24.6	118.40	11.56
11-15	46	29.8	115.01	12.43
16-20	28	18.1	111.80	7.13
21 and above	20	12.9	111.46	11.43
Total	154	100	118.70	11.38

Table 7. *One Way ANOVA Results for Visual Arts Teachers' Views on Frequency of Use of Development Portfolios, Performance Evaluation, and Rubrics by the Variable of Years of Service*

Source of Variation	Sum of Squares	Sd	Mean Square	f	p
Between Groups	5692. 35	4	73.22	0.47	.000
Within Groups	167622. 27	149	138.00		
Total	173314. 63	153			

p< 0.05 significant

Table 8. *ANOVA Results for the Type of Faculty Visual Arts Teachers Graduated From*

Type of Faculty Graduated From	n	X	S	f	p
Faculty of Education	126	58.75	9.72	7.703	.000
Faculty of Fine Arts	25	53.14	9.21		
Other*	3	43.18	8.53		

*p< 0.05 significant

Discussion and Conclusion

The findings indicate that a great majority of visual arts teachers identify crowded classes and lack of assessment and evaluation experts as the main difficulties they encounter when using these tools and methods of evaluation. Most of the visual arts teachers who are currently teaching, as shown in Table 3, never took any classes on assessment and evaluation in college. What is more, 47.5% of those that did take such courses never received any in-service training on the subject. Another important issue is the size of the classes the teachers have. Distribution of the sizes of classes taught by visual arts teachers participating in the study is displayed in Table 1. Table 1 shows that 58.9% of the visual arts teachers teach classes of 30 to 50 students. The phenomenon of crowded classes negatively affects the individual assessments of the students, given that visual arts classes are offered one hour a week in the 4^{th}, 5^{th}, 6^{th}, 7^{th}, and 8th grades.

The difficulties encountered by visual arts teachers can be alleviated by having smaller class sizes and more class hours, having assessment and evaluation experts in each school, and offering in-service training seminars on assessment and evaluation tools and methods and their use. Another important issue is to have experts offer these seminars.

Mamur's (2004) study, finds that arts teachers fail to use different dimensions like testing, scaling (rating), self-criticism, and criticism, which complement each other. The findings of this study also show that as methods of teaching and learning change, assessment methods used to evaluate how much of the aims and the targets are achieved need to change as well. Otherwise, limited standards would result in limited results.

Gelbal and Kelecioğlu (2007), in their study, find that teachers mostly use traditional methods for getting to know their students and evaluating their levels of achievement, and never use methods based upon self-evaluation of the students. Teachers also find themselves to be competent in evaluating student achievement, but state that they have difficulties using assessment tools due to negative factors, such as crowded classes and lack of time. The findings of this study indicate that teachers need training on the use of assessment techniques.

Based upon the interviews made with visual arts teachers and their responses to the questionnaire, we can argue that a great majority of the teachers do not have sufficient information on the subject. For the new primary education program to be successfully applied, and for visual arts teachers to be able to make efficient use of the assessment and evaluation methods of development portfolios, performance evaluation, and rubrics, first, the teachers need to have proper training on these issues.

In-service training seminars on the subject have been organized in certain schools in some of the provinces of Turkey, and the teachers were informed about these methods, but views expressed by the teachers and the findings of the present study indicate that there is a need for more training. Ministry of National Education needs to organize more in-service training seminars, and inform visual arts teachers about both the new primary education program, and the use of new assessment techniques. The Ministry of National Education could also cooperate with faculties of education in universities on the planning and provision of these seminars.

Teachers also state that they experience difficulties due to parents completing painting homework they assign to the students. Parents who complete homework assigned to the students definitely damage the development of their children. What visual arts teachers can do

on the subject is identify the parents who engage in this kind of behavior, and talk to them in person. If that effort fails, then arrangements can be made for school guidance counselors to meet with these parents.

Finally, visual arts teachers state that they need the assistance of an assessment and evaluation expert in their schools who can help deal with evaluation problems they encounter. Setting up assessment and evaluation centers in each province and district could alleviate some of these problems. Teachers would thus be able to consult with experts in these centers on the causes of the difficulties they experience and on how to deal with them.

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Prospective Primary Mathematics Teachers' Opinions about the Use of Computers in Teaching and Learning

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Abstract

The aim of this study is to examine the effect of a computer assisted mathematics instruction course, in which Excel and dynamic mathematics software are introduced, on prospective primary mathematics teachers' perceptions regarding the use of computers in mathematics. The sample of this study was composed of 41 volunteer prospective teachers studying at the department of primary school mathematics teaching. The research data was collected via a test composed of open-ended items. In view of the study, it has been observed that a computer assisted mathematics instruction course positively affects prospective primary mathematics teachers' perceptions regarding the use of computers. Furthermore, prospective teachers expressed that computers must be used in mathematics courses, since they provide visualisation, concretisation, knowledge retention and the opportunity to provide more examples, save time, draw more accurate shapes, increase interest in the course and facilitate learning.

Keywords: Computer assisted mathematics instruction, dynamic mathematics software, GeoGebra, Excel, prospective mathematics teacher

Introduction

With today's rapidly advancing technology, the incredible changes occurring in the world of information technology and the fact that technology is day by day becoming an integral part of our lives, educators are encouraged to integrate technology into their teaching methods. Apart from the fact that the use of technology in instruction is generally a requirement, mathematics instruction is a particularly suitable area where technological resources can be utilised (Öksüz and Ak, 2010). When information and communication technologies are mentioned in mathematics instruction, they specifically refer to the mathematics instruction that is performed using computer-based cognitive tools (Baki, 2008). Of the technology available, computers are the more strongly preferred and utilised instruments in education, as they have many different features. The role of computers in mathematics instruction and learning is becoming more and more important, to the point that they are regarded as an imperative factor that lays the foundation for the progress of mathematics education (Wiest, 2001). Baki (2002) defines computer assisted instruction, which emerged as a result of computer use in the learning-teaching process, as a method for utilising computers in the education-teaching process to allow students to discover their insufficiencies and performance levels through mutual interaction; to take responsibilty for their own learning by getting feedback; and become more interested in the courses with the help of graphs, sounds, animations and shapes.

Flores (2002) stated that although computers have astonishing capabilities, they are worthless if no quality software is available. Apart from the fact that the success of computer assisted mathematics instruction in learning-teaching processes depends on a range of variables, providing lesson software that is appropriate for educational aims and objectives is important in order for the method to succeed (Uşun, 2004). This being the case, software becomes one of the important elements of computer-assisted instruction.

Spreadsheets and dynamic software are among the programmes that are preferred in mathematics learning and teaching processes. Excel, which is Microsoft Office software, is the most common spreadsheet program, and many studies have been conducted using Excel in mathematics instruction (Baki and Öztekin, 2003; Çınar and Ardahan 2002; Kutluca and

Birgin, 2007; Peker and Bağcı 2008). GeoGebra is one of the dynamic types of software. As multi-platform and open-source dynamic mathematics software, GeoGebra tries to combine ease-of-use of dynamic geometry software with the versatile possibilities of computer algebra systems (Edwards and Jones, 2006; Hohenwarter, Hohenwarter, Kreis, and Lavicza, 2008; Hohenwarter, Hohenwarter, and Lavicza, 2008; Hohenwarter and Fuchs, 2005). The software simultaneously provides an algebraic, graphic and spreadsheet representation of mathematical objects. Any changes made to one of these aspects are directly reflected in the others. GeoGebra software provides important teaching and learning opportunities for teachers and students in calculus, geometry and algebra at every stage of learning, from elementary to higher education.

Karadag and McDougall (2009) state that GeoGebra users, whether students or teachers, can utilise this setting in order to elucidate, discover and model mathematical concepts and interactions between mathematical concepts or mathematics as a whole. With this software, students can discover mathematical concepts without having to spend a great deal of classroom time on drawing figures, objects or functions, and in addition they are able to dynamically associate the algebraic, graphic and numeric representations of these concepts (Haciomeroglu, Bu, Schoen, and Hohenwarter, 2009).

There are many different studies that put forth the importance of computers in mathematics education in the literature (Campbell and Martin, 2010; Choi-Koh, 1999; Kebritchi, Hirumi, and Bai, 2010; Liao, 2007; Lopez-Morteo and Lopez, 2007; Machin and Rivero, 2002; Schumann, 1993; Schumann, 1995; Vuong, He and Hui, 2010). It is very important to improve teachers' attitudes towards using computers in the classroom, as this may improve mathematics instruction and learning, though many prospective and in-service teachers are unfamiliar with the types of technology that are available to teachers (Lin, 2008). This being the case, to determine the degree to which prospective mathematics teachers perceive and create awareness of this importance is of some significance.

The aim of this study is to examine the effect of a computer assisted mathematics instruction course in which GeoGebra, which is a type of dynamic mathematics software, and an Excel software, are introduced on prospective primary mathematics teachers' perceptions regarding the use of computers in mathematics.

Method

Participants

The sample of this study was composed of 41 volunteer prospective teachers studying in the department of primary school mathematics teaching at a faculty of education in Turkey.

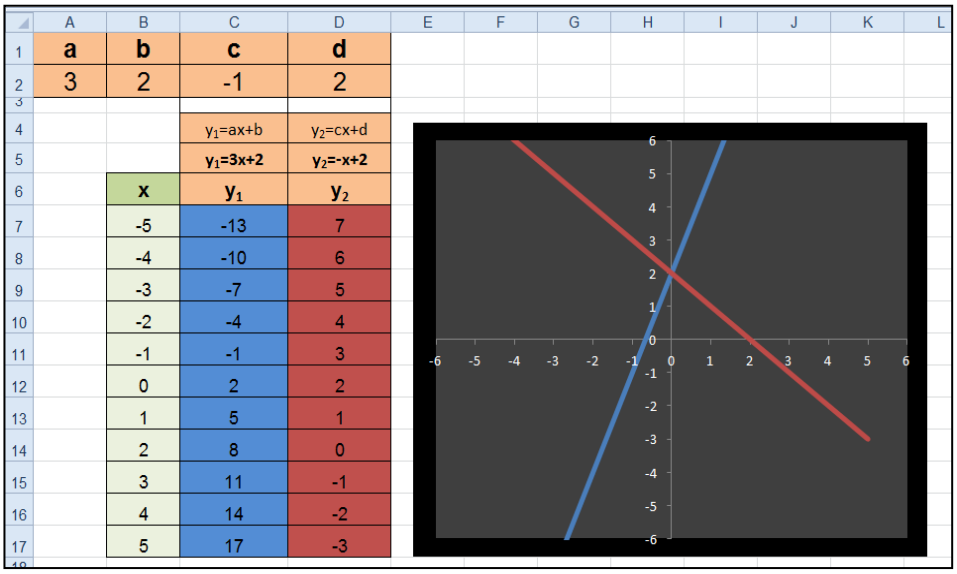
Data Collection Instrument

The research data was collected via a test (Appendix 1) composed of four open-ended questions prepared by the researcher in order to qualitatively determine prospective teachers' perceptions regarding the use of computers in mathematics education.

Procedure

Case study, which is one of the qualitative research methods, was used in this study. The study was conducted in a computer assisted mathematics instruction course, which was instructed by the researcher for two hours a week in the autumn semester (14 weeks) of the 2011-2012 academic year. Two programmes, namely MS Excel (6 weeks) and GeoGebra (8 weeks) were taught in the content of the course. Instruction has been firstly given during this

period on how to use these programmes. Information was then given on how the materials were formed, which are related to mathematics subjects and which were prepared using these programmes. A view of one of the materials, which was formed in Excel within the semester, is presented in Figure 1.



a	b	c	d
3	2	-1	2
		y_1=ax+b	y_2=cx+d
		y_1=3x+2	y_2=-x+2
	x	y_1	y_2
	-5	-13	7
	-4	-10	6
	-3	-7	5
	-2	-4	4
	-1	-1	3
	0	2	2
	1	5	1
	2	8	0
	3	11	-1
	4	14	-2
	5	17	-3

Figure 1: The view of one of the Excel materials

The relation of two lines to each other can be examined in the material, the image of which is presented in Figure 1. Notwithstanding the change of a, b, c and d coefficients in the line equations within this material, its change in its graph can also be dynamically observed. An image of one of the GeoGebra materials, which has been submitted in the scope of the study, is presented in Figure 2.

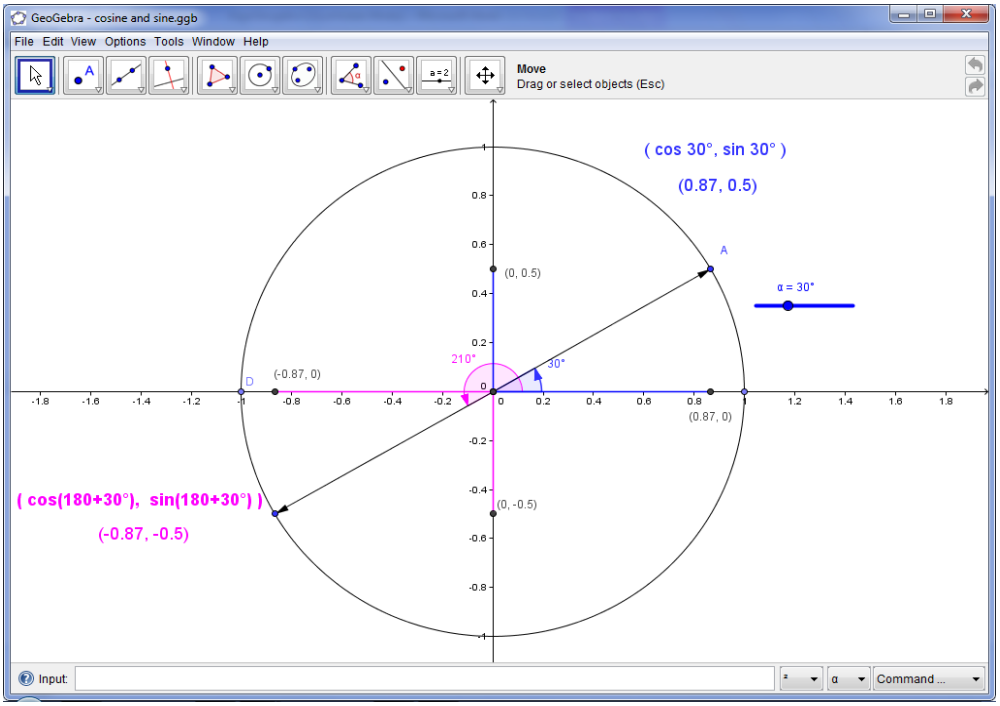


Figure 2: The view of one of the GeoGebra materials

In Figure 2, α being an acute angle, the view of the GeoGebra file prepared in order to indicate to what sine and cosine of the 180+α degree angle equal in terms of sine and cosine of α is given. In this material, α angle can be changed as connected to a slide. Despite this, the value of sine and cosine of 180+α can be dynamically seen.

Furthermore, emphasis was put on how to form a technology-assisted course environment by using Excel or GeoGebra, which is a dynamic programme. The Formed data collection instrument was applied at the end of the semester. In the study, prospective teachers are asked to elucidate the change in their perceptions regarding the use of computers in mathematics instruction. For that reason, the data was obtained with the test that was only applied at the end of the study. Prospective teachers were particularly asked not to write their names on the data collection instrument used in the study.

Data Analysis

Both content analysis and descriptive analysis were conducted in order to analyse the obtained qualitative data. The answers given to each question in the scale by the prospective teachers were individually coded, categorised and presented via tables and figures that contain frequencies and percentages. Categories expressed by at least two people were featured in these tables and figures. Furthermore, sample references from prospective teachers, who were coded in a range from PT1 to PT41, were featured in relation to the formed categories.

Results

The effects of the course on prospective primary mathematics teachers' perceptions regarding the use of computers in mathematics were examined via the data obtained from the test, which was composed of open-ended questions. The obtained findings were presented as two sub-headings, namely "The use of computers in mathematics courses" and "The contribution of computers to teaching and learning".

The Use of Computers in Mathematics Courses

Prospective teachers were asked the question "Is it necessary to use computers in mathematics courses? If so, why?". Thirty-six prospective teachers expressed the opinion that it is necessary to use computers. Their answers on the necessity of using computers are presented in Table 1.

Table 1: *Opinions on why it is necessary to use computers in mathematics courses*

Categories	f (%)
Providing convenience of visualization.	19 (46%)
Providing knowledge retention.	13 (32%)
Facilitating learning.	12 (29%)
Providing convenience of concretisation.	9 (22%)
Providing the opportunity to give more examples.	9 (22%)
Increasing interest in the course.	7 (17%)
Saving time.	5 (12%)
Enabling drawing more accurate shapes.	2 (5%)

PT22, who emphasised visualisation and giving more examples, answered the question as follows:

"Yes, I think it is necessary to use computers. That is because visualisation must be provided and many examples must be solved in order for many subjects to be understood well in mathematics lessons. That is why computers must be used in the courses."

PT15, who mentioned the contributions towards attention, exemplification, visualisation and comprehensibility, answered the question as follows:

"I think it is necessary to use computers in mathematics lessons because instructing in mathematics via computers, instead of classical methods, makes courses more interesting and comprehensible. The use of computers provides ease and comprehensibility, especially in subjects where plenty of examples must be given and visuality is important."

PT28, who mentioned saving time, answered the question as follows:

"Excessive loss of time may occur while solving appropriate examples in teaching some subjects in mathematics courses. Computers assist in saving time."

The analysis of the answers given by the prospective teachers to the question "Can you compare your opinions on the necessity of using computers in mathematics courses before taking the course with your current opinions?" are presented in Figure 3.

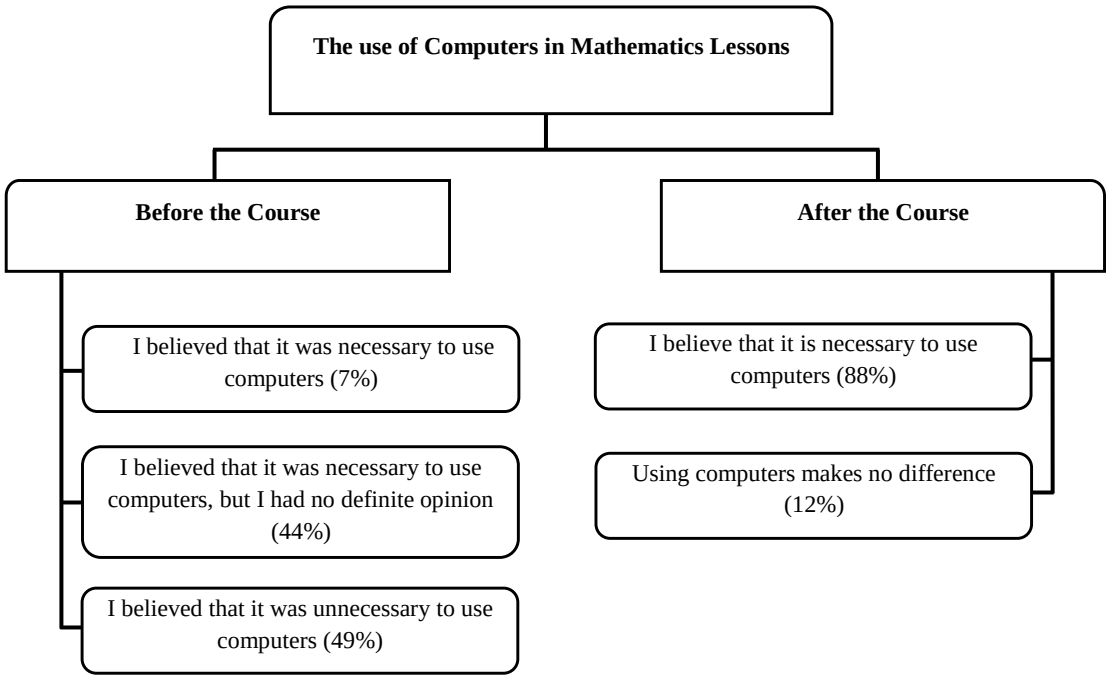


Figure 3*: Opinions on the necessity of using computers in mathematics courses*

Fifteen of the 20 prospective teachers, who had believed that it was unnecessary to use computers in mathematics courses before taking the course, stated that their opinions had completely changed by the end of the semester. That is to say, they stated that computers must be used in mathematics. The remaining five prospective teachers expressed the opinion that using computers makes no difference. Among the prospective teachers who stated that their opinions had completely changed, PT17 answered the question as follows:

"Before taking this course, I had no idea that a computer programme could be used as a material while instructing courses. This was due to the fact that I had never heard of such programmes."

PT18, PT36 and PT38, who had believed that it was unnecessary to use computers in mathematics courses before taking the course, respectively stated the following:

"Before taking this course, I had believed that utilising computer support in mathematics courses would be a waste of time and would not be that useful. However, now I think that more effective and permanent learning can be achieved via computer support."

"Before the course, I had believed that it was just a matter of choice. This was due to the fact that I had not known how to render Excel as useful as this, and I had not even heard of GeoGebra."

"To be honest, I had believed that it was unnecessary and a waste of time. However, my opinion has completely changed, especially after having learnt GeoGebra. It is very useful and even helped me, the prospective teacher, to better understand the logic of many concepts when I saw them in the programme."

PT41, who stated that his opinions on the use of computers in mathematics solidified with this course, answered the question as follows:

"I had no definite opinions on this issue. My opinions are now much more definite. I most certainly agree that mathematics and computers are a perfect pair."

The Contribution of Computers to Teaching and Learning

Prospective teachers were asked the questions "In your opinion, can computers assist teachers in teaching activities? If so, how?" and "In your opinion, can computers contribute to learning? If so, how?". Nearly all of the prospective teachers who participated in the research stated that computers would both contribute to teachers in teaching activities and to learning. The answers given to these two questions are presented in Figure 4.

PT5, who expressed the opinion that computers can contribute to teachers in teaching activities in terms of visualisation and solving more examples, stated the following:

"Computers will definitely assist teachers. That is because a teacher can only give a limited number of examples over the course of an hour, and can draw very few of these examples on the blackboard. However, he/she can give plenty of examples and clearly visualise many concepts if he/she uses a programme that is created for such purposes."

PT18, who expressed the opinion that computers facilitate teaching and save time, stated the following:

"Thanks to computer programmes, students can directly see the concepts that their teacher was trying to explain by drawing them on the blackboard. As for the teachers, I believe that computers will save time and facilitate their job, provided that the preliminary work is done well."

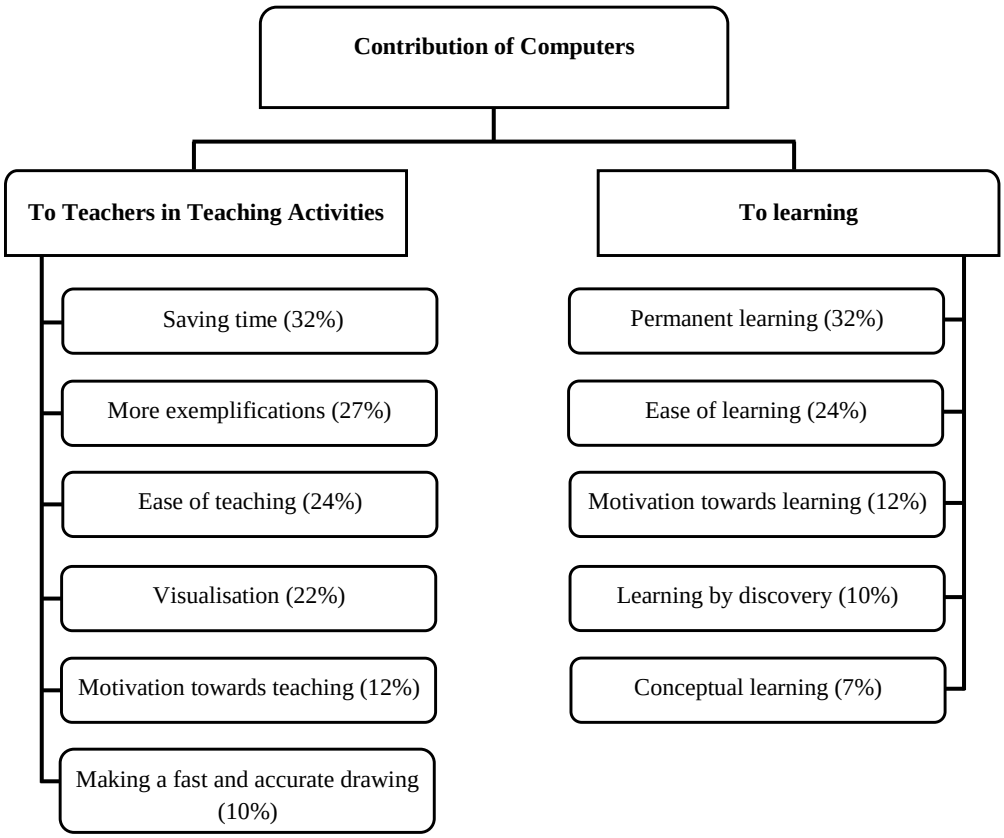


Figure 4: *The contribution of computers to teachers and learning*

PT27, who expressed the opinion that computers would contribute to giving more examples and saving time, stated the following:

"GeoGebra in particular can accelerate the work for teachers who have problems covering the curriculum in time. Computers would both enable students to see more examples and save time."

PT4, who expressed the opinion that computers would increase motivation towards learning and establish permanent learning, stated the following:

"Since computers capture the attention of students, their motivation level will be higher. Futhermore, permanent learning can be achieved thanks to these programmes."

Discussion and Suggestions

In this study, in which the effect of the computer assisted mathematics instruction course on prospective primary mathematics teachers' perceptions regarding the use of computers in mathematics was examined, 15 (37%) of the 20 (49%) prospective teachers who had believed that it was unnecessary to use computers in mathematics courses before taking this course stated that their opinions had completely changed by the end of the semester. That is to say, they stated that computers must be used in mathematics. The remaining five prospective teachers expressed the opinion that using computers makes no difference. Eighteen (44%) prospective teachers think that it is necessary to use computers in

mathematics courses. These 18 prospective teachers stated that they had no definite opinion on this issue before taking the course, but their opinions on using computers in mathematics instruction became clearer after taking the course. The results show that this course, in which software that can be used in mathematics courses is taught, positively affects teachers' perceptions regarding the use of computers.

Prospective teachers emphasised the necessity of using computers in mathematics courses, since computers ensure visualisation, concretisation and knowledge retention, and facilitate learning. Furthermore, they expressed the opinion that computers would contribute to teachers in teaching activities in terms of saving time, giving more examples and facilitating teaching. They expressed the opinion that computers would contribute to learning in terms of retention, facilitating learning, motivation and conceptual learning. These contributions, which were stated by the prospective teachers, are among the most important reasons for using computer-based environments in mathematics instruction as stated in the studies of Aktümen and Kaçar (2008), Baki (2000), Baki and Çakıroğlu (2010), Corbalan, Paas and Cuypers (2010), Lu (2008) and Seo and Woo (2010).

Although there are many technological facilities today, these facilities are not adequately utilised in schools. This is because teachers instruct courses via traditional methods, and this falls short in terms of achieving the goals intended for education. It is understood from this study that, unquestionably, teachers cannot be expected to embrace something of which they have no idea, and are bound to regard it as necessary. For this reason, the education researchers may carry out more studies in the field of mathematics education, regarding the subject of computer assisted mathematics instruction, and consequently may focus the attentions of the teachers and educators on this subject. Although the use of Excel and only one of the dynamic software packages was examined in this study, a positive change was observed in prospective teachers' perceptions about using computer in mathematics. Therefore, teachers should be provided with in-service training courses about Excel and dynamic software such as GeoGebra. Besides, pre-service teachers should definitely be provided with computer assisted mathematics instruction during their undergraduate studies; and they should be assisted in designing events that they may apply in their teaching careers.

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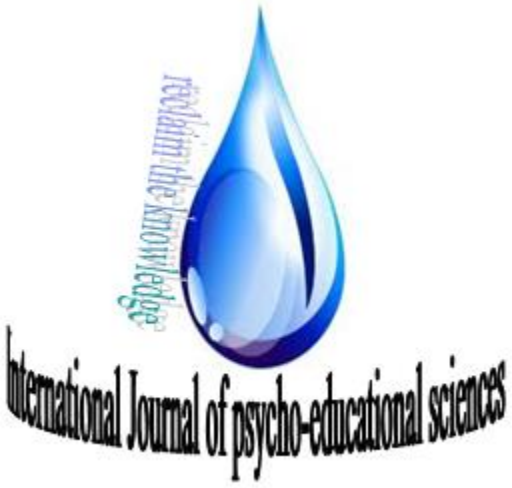
Appendix 1. The Data Collection Instrument

Is it necessary to use computers in mathematics courses? If so, why?

"Can you compare your opinions on the necessity of using computers in mathematics courses before taking the course with your current opinions?"

In your opinion, can computers assist teachers in teaching activities? If so, how?"

"In your opinion, can computers contribute to learning? If so, how?"



Early Childhood Teachers' Self-Efficacy for Supporting Development Scale

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Abstract

Purpose of this study is to develop Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale (ECTSBSCDS). The literature review provided an information base for the creation of scale items. Thus, initially 122 items were created. After experts review for content and discern validity 82 items left in the scale. Twenty-six preschool and kindergarten teachers from four different kindergartens in Erzurum and 156 preservice early childhood education teachers responded to the self-efficacy questionnaire. A series of factor analyses were applied after the data collection to extract factors. After the explanatory factor analysis 38 items were left in the scale. An analysis of the entire scale revealed a reliability score of 0.96. Findings revealed that the ECTSBSCDS is a valid and reliable instrument.

Key Words: Teacher Self-Efficacy, Early Childhood Education, Scale Development

Introduction

Bandura (1986, p. 391) defined self-efficacy as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance." Self-efficacy is a personal belief about the capacity to accomplish a certain task. Bandura suggested that in non-hazardous activities, having optimistic self-appraisals motivated individuals to improve their performance. He stated that, "If self-efficacy beliefs always reflected only what people can do routinely, people would rarely fail, but neither would they mount the extra effort needed to surpass their ordinary performance" (Bandura, 1989, p. 421).

It is important to be realistic about self-efficacy because in performance, self-efficacy beliefs work as initiators of behavior (Bandura, 1989) and increase motivation and persistence (Bouffard-Bouchard, 1990; Multon, Brown & Lent, 1991). Self-efficacy mediates the effects of other self-beliefs and other variables, such as skill, ability and knowledge (Pajares & Miller, 1994; Teti & Gelfand, 1991). Bandura (1989) claimed that people's self-efficacy beliefs determine their level of motivation—that is, the level of effort they will expend on a task and time they will spend preserving that effort. People with higher self-efficacy beliefs persist longer on a task when they face difficulties than people with lower self-efficacy beliefs. The stronger the belief in capabilities, the greater and more persistent are the efforts (Bouffard -Bouchard, 1990; Schunk, 1981; Zimmerman & Ringle, 1981). People with higher self-efficacy attribute failure to insufficient effort or deficient knowledge and skills that are acquirable and quickly recover a sense of efficacy after failures or setbacks (Bandura, 1993).

According to Bandura (1989), there is a difference between possessing skills and being able to use them effectively and consistently under varied circumstances. Even though people have enough knowledge, skills, and abilities to perform a certain task, they may have doubts about those skills and abilities. As a result, they may not even attempt to perform it. In order to perform a certain task, people should believe that their knowledge, skills, and abilities are adequate to perform it so that they may attempt to do so. If people are not fully convinced of their personal efficacy, they rapidly abandon the skills they have been taught. This is especially clear when quick results fail to appear or bothersome effort is significant (Bandura, 1989).

On the other hand, people who doubt their capabilities have a different point-of-view. They usually shy away from difficult tasks, and have low aspirations and weak commitments

to the goals that they choose to pursue. In taxing situations, they dwell on their personal deficiencies, the formidableness of the task, and the adverse consequences of failure (Bandura, 1989).

According to Bandura (1977), self-efficacy is the fundamental mediator among knowledge, other self-beliefs, and execution of behavior because it works as a catalyst. Pajares and Miller (1994) tested for the predictive and mediational role of self-efficacy beliefs on math achievement in a sample of 350 high school students. They used path analyses to analyze correlations among the variables. They found that self-efficacy mediated the effect of gender and prior experiences of mathematics self-concept, perceived usefulness of mathematics, and mathematics problem-solving performance. Also, prior experiences influence mathematics achievement through their effect on self-efficacy beliefs, which can influence performance independent of past behavior (Pajares & Miller, 1994).

Self-efficacy is an important predictor of performance and a primary cause of feelings of self-worth and perceived usefulness. Self-efficacy beliefs are major mediators of behavior and behavior change. Therefore, self-efficacy plays a critical role in the acquisition of a new skill and the performance of it. Accordingly, teachers' self-efficacy beliefs affect their and their students' performances.

Teachers' self-efficacy beliefs have been shown to predict student motivation (Midgley, Feldlaufer, & Eccles, 1989) and academic achievement (Goddard, Hoy & Hoy 2000; Muijs & Reynold, 2002). The study by Muijs and Reynold (2002) is especially important in this regard. They found that teacher self-efficacy related to students' achievement even when controlling for prior achievement and background factors. Teachers' self-efficacy beliefs also were related to their professional commitment (Ware & Kitsantas, 2007) and burnout (Skaalvik & Skaalvik, 2007). Skaalvik and Skaalvik (2007) found a positive relationship between perceived collective teacher efficacy and teacher self-efficacy. Collective teacher efficacy has been found to be a predictor of student motivation and achievement (Midgley, Feldlaufer, & Eccles, 1989; Ross, 1992). Therefore, it can be said that teachers' self-efficacy beliefs have a direct impact on students' motivation and achievement and relate directly to teachers' professional commitment and burnout and indirectly affect, through collective teacher efficacy, student achievement and motivation.

These studies reveal the importance of teachers' self-efficacy beliefs on both their and their students' performance. In order to properly measure this importance, self-efficacy scales are needed. The availability of such scales makes it possible to identify deficiencies in teachers' self-efficacy beliefs. With the findings from analyses of scale results,, programs can be developed to support and increase teachers' self-efficacy beliefs. Çapa, Çakıroğlu and Sarıkaya (2005) adapted the Teacher Sense of Efficacy Scale (TSES) created by Tschannen-Moran and Woolfolk (1998) into Turkish. Subscales of Teacher Sense of Efficacy Scale are Efficacy for Instructional Strategies, Efficacy for Classroom Management, Efficacy for Student Engagement. Therefore TSES provides scores for teachers' global sense of efficacy. However, Bandura (1986) emphasized the importance of specifying self-efficacy assessment and correspondence to criterion-based tasks. According to Bandura, self-efficacy must be specifically rather than globally assessed because self-efficacy beliefs are domain- and task-specific. The scales used in assessment must correspond directly to the criterion-based performance of a task. Therefore, special self-efficacy measurement is needed for early childhood teachers.

The purpose of this study was to develop an early childhood teachers' self-efficacy scale for supporting children's development. The study contained validity and reliability

analyses of the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale. No teacher self-efficacy beliefs scales for supporting children's development have been translated into Turkish, to the researcher's knowledge. Consequently, this study's findings are of great importance because of the study's originality and relevancy.

Method

Item Preparation

The investigator reviewed the literature on different early childhood education systems, including Montessori, Reggio Emilia and High Scope. This literature review provided an information base for the creation of scale items. All of these systems emphasize the holistic development of the child. Early childhood education should aim to develop every aspects of this development, such as cognitive, social, physical, emotional development (Barnes, 1980, 1991; Easton, 1997; Mollet, 1991; Abramson, 2000; Bennet 2001; Weikart, 1988; Schwienhart, 2002; Montessori, 1938). Therefore, items supporting the physical, socio-emotional, and cognitive development of children were developed. Some examples from the scale follow:

1. I can plan activities to support fine motor development of children.
2. I can create and environment that children can freely express themselves.
3. I can support children's creativity.

Although the systems share common values, they have a few different applications. For example, Reggio Emilia stresses parents' participation and role in the educational process. Parents are a natural confluent of educational practice and have a reciprocal relationship with teachers, partnering with them. Parents also join in school administration and work as a consultant (Rinaldi, 1994; Nelson, 1997). Certain children have special rights and share the same classroom with other children. Teachers need to be able to support these children, too (Bennett, 2001; Edmiaston & Fitzgerald, 2000). Examples of some items created with these facts in mind are:

1. I can establish good communication with parents.
2. I can support (cognitive, socio-emotional, physical) development of disable children.

Systems such as High Scope and Montessori place greater emphasis on structured educational activities than do other systems. There are key competencies in High Scope, such as creative representation, language and literacy, movement, music, classification, time, space, etc. Teachers should support the development of these key competencies with educational activities and their interactions with the children. Teacher should create an atmosphere in which children can feel safe, and which will enable them freely interact with the environment and each other (Saurino & Saurino, 1996). In the Montessori system teachers prepare structured activities that have definite ends. Children can develop a skill that enables them to engage in activities that require higher skills. Teachers should provide choices, stimuli, and a rich environment in which children can choose an activity (Lillard, 2005; Edwards, 2002). Concurrently, Reggio Emilia promotes a project-based approach in education. The teachers' task is to guide children to realize their projects (Sassalos, 1999). Followings are examples of educational activities:

1. I can help children to dramatize the stories.
2. I can prepare stimulus rich classroom environment.
3. I can help children to find appropriate materials for their projects.

As a result of an extensive literature review on early childhood education systems, the investigator selected and adapted 122 items for measuring teachers' beliefs in their capacity to support the children's achievement of their potential. The 122 items included a response scale ranging from "0: cannot do at all" to "100: highly certain can do."

To assess content and discern validity, a panel of experts reviewed the scale. Two advanced Turkish Ph.D. students from the Pennsylvania State University, experts in both early childhood education and educational psychology and one professor of early childhood education from the Hacettepe University reviewed the scale for content validity. They were asked to evaluate each item's ability to measure self-efficacy in the intended area. They graded each item on a scale from 0-100. For each item the average score of the three experts was calculated; items that had an average score of 80 or higher remained in the scale. Also, experts commented on and made suggestions about items. In response to their suggestions some items were combined and reduced to one item. For example, in the first version of the scale there were redundant items for each age group from three to five years old. For example:

1. I can support cognitive development of three years old child.
2. I can support cognitive development of four years old child.
3. I can support cognitive development of five years old child.

After an expert review, these items were reduced to one item, such as: I can support the cognitive development of children from 3-5 years of age. After the experts' evaluation, 36 items with an average score of 80 or lower were discarded from the scale. In response to experts' suggestions the first aid subscale was eliminated. Thus, 82 items remained on the scale. After the expert review to establish face validity, a randomly selected group of 30 preservice teacher participants—ten from each class level—provided feedback on each item. Each of the 30 preservice teachers read each item aloud and thought out loud about their understanding of each item. In light of students' feedback the wording of some items was changed. For example, item 57 was: "I can make children respect differences". It became: "I can make children respect individual differences." Item 74 was: "I can tell stories verbally by animating the characters in the story"; it became: "I can tell the stories without reading from the book by verbally animating the characters in the story."

Participants

Twenty-six preschool and kindergarten teachers from four different kindergartens in Erzurum and 156 pre-service early childhood education teachers participated in the study and responded to the self-efficacy questionnaire. A total of 182 participants engaged in the pilot study. All teachers were female. The ages of teachers varied from 20 years old to 47 years old and the mean age was 28.4 years old. Seventy-three percent of the teachers had 1 to 5 years teaching experience; 3%, 6 to 11 years; and one teacher, more than 17 years of teaching experience. Among 156 pre-service teachers, 62 taught the fourth grade; 49, third grade; and 45, second grade. Of the 156 pre-service teachers, 130 (83.3%) were female; 26 (16.7%) were male.

Findings

Validity Analysis

First Phase

Factor analysis is a statistical technique used to "extract as many latent factors as necessary to explain the correlations among the items" (Reise, Waller & Comrey, 2000, p.

294). Therefore, a series of factor analyses were applied after the data collection. An explanatory factor analysis (EFA) was conducted on group variables that were highly correlated and grouped into factors. The purpose was to identify subscales that related to teachers' self-efficacy for supporting children's development. EFA also revealed the unrepresentative items that should be discarded from the scale to strengthen its validity. In the early steps of the analyses, a correlation matrix revealed that item 65 did not have significant correlation with other items on the scale. Therefore, item 65 was extracted from the scale. Correlations among other variables did not exceed 0.9. Also, item total correlation was calculated to determine the internal consistency of the scale. For all items, item total correlation was significant at the 0.01 level. The lowest correlated item was item 8, with 0.446 correlation; the highest correlated item was item 36, with 0.841 correlation.

Table 1. *KMO and Barlett's Test*

Kaiser-Meyer-Olkin measure of sampling adequacy		**.938**
Barlett's Test	Approx. Chi-Square	16142,720
	Df	3321
	Sig	,000

The Kayser-Meyer-Olkin measure of sampling adequacy value was 0.94, which falls into the superb range. Therefore, it could be said that the number of participants was adequate to run factor analyses (Tabachnick & Fidell, 2007).

In the factor analysis, high correlation among variables is required. This is calculated with a Barlett Test of Sphericity. A Barlett's value under 0.05 indicates high correlation among variables on the scale and that the data have a mutiple normal distribution. As a result, the scale is eligible for factor analysis. As can be seen in Table 1, the Barlett's test revealed high significance ($p<0.001$), and therefore a factor analysis was appropriate (Tabachnick & Fidell, 2007).

Anti-image correlations are other criteria that help us to test the appropriateness of the scale for factor analysis. Anti-image correlations are expected to be over 0.50. In this study anti-image correlations ranged between 0,863 and 0,969. Just like the KMO and Barlett values, anti-image values also provide evidence that the scale is appropriate for factor analysis. Therefore, factor analysis was conducted for the remaining 81 items on the scale (Tabachnick & Fidell, 2007).

After the extraction and varimax rotation, thirteen factors with eigenvalues of 1 or higher emerged from the first factor analysis. Varimax rotation revealed that factor 1 with eigenvalue of 8.2 explained 10.1% of the variance. A total of thirteen factors explained 75.9% of the variance. Items with loadings of less than 0.40 were suppressed. Therefore, items 17, 37, 42, 74 and 76 were discarded from the scale. Factors ten, eleven, twelve and thirteen were excluded from the scale because they contained less than three items. Thus items 9, 10, 12, 14, 41, 58 and 72 were discarded from the scale. Also, items 4, 15, 16, 22, 24, 38, 47 and 68 were discarded because they were represented on more than one factor. Factor three, which contained items 2, 19, 20, 21 35, 36, and 46, was terminated because items were not related to each other.

Items 55, 57, and 59 from factor six and item 54 from factor one were combined with factor nine because they contained items about story reading, which is an educational activity

in early childhood education. Only item 56 was left in factor six, so it was removed from the scale. Seven factors remained in the scale. These factors contained the following items:

1. Factor One: 39, 48, 49, 50, 51, 52, 53, 54, 75
2. Factor Two: 11, 13, 23, 26, 27, 28, 29, 30, 31, 32, 33, 43, 44, 60
3. Factor Four: 25, 66, 67, 79, 80, 81, 82
4. Factor Five: 3, 5, 6, 7, 8
5. Factor Five: 21, 40, 69, 70, 71, 73, 77, 78
6. Factor Six: 1, 18, 34, 45
7. Factor Seven: 54, 55, 57, 59, 61, 62, 63, 64

Several items did not relate with the factors with which they were clustered. Therefore, items 39, 54, and 75 from factor one; 11, 13, 33, 44, and 60 from factor two; 25, 66, and 67 from factor three; 40, 77, and 78 from factor five were removed from the scale. Among the remaining 81 items, 40 were excluded from the scale. Second factor analysis was conducted with the remaining 41 items.

Second Phase

After the second factor analysis, seven factors with eigenvalues of 1 or higher emerged. These seven factors explained 72.4% of the variance. Again, items with loadings less than 0.40 were suppressed. Second factor analysis revealed that items 71 and 73 had loadings less than 0.40; therefore, these items were terminated. Third factor analysis was conducted after the extraction of items 71 and 73. As with the second analysis, the third analysis revealed seven factors that explained 72.4% of the variance. There were no items with loadings less than 0.40. Seven factors and 39 items were left in the scale with the third factor analysis; these factors contained the following items:

1. Factor 1: 48, 49, 50, 51, 52, 53, 54, 69
2. Factor 2: 21, 23, 26, 27, 28, 29, 30, 31, 32, 43
3. Factor 3: 3, 5, 6, 7, 8
4. Factor 4: 1, 18, 34, 45
5. Factor 5: 79, 80, 81, 82
6. Factor 6: 61, 62, 63, 64, 70
7. Factor 7: 55, 57, 59

Factor six contained items about educational activities in the classroom except for item 61. Therefore, item 61 discarded from the scale. Therefore, the fourth and final factor analysis was conducted with the remaining 38 items.

Table 2. *Total Variance Explained*

	Initial Eigenvalues			**Rotation Sum of Square Loadings**		
Components	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19,139	47,848	47,848	6,270	15,674	15,674
2	2,528	6,320	54,168	5,983	14,957	30,631
3	2,176	5,441	59,609	4,336	10,840	41,471
4	1,681	4,203	63,812	3,634	9,084	50,555
5	1,551	3,877	67,689	3,408	8,520	59,075
6	1,296	3,240	70,929	3,295	8,238	67,313
7	1,057	2,641	73,571	2,503	6,257	73,571
KMO=0,935 Barlett's test:= x^2=6375,861; p<0,01						

From the fourth analysis, seven factors with eigenvalues of 1 or more than 1 explained 73.6% of the total variance. Table 2 shows that after the varimax rotation, factor one explained % 15,674; factor two explained %14,957; factor three explained %10,840; factor four explained %9,084; factor five explained %8,520; factor six explained %8,238; and factor seven explained %6,257 of total variance. No items had loadings under 0.40 or represented more than one factor. However, item 54 from factor one and factor seven were combined with factor six because these items are about storybook reading, which is an educational activity in early childhood education. Thus, the final six factors were as follows: Factor one, Physical Development, contained items 48, 49, 50, 51, 52, 53, 69; Factor two, Socio-Emotional Development, contained items 21, 23, 26, 27, 28, 29, 30, 31, 32, 43; Factor three, Cognitive Development, contained 3, 5, 6, 7, 8; Factor four, Special Children, contained 1, 18, 34, and 45; Factor five, Cooperation with Parents, contained items 79, 80, 81, 82; and Factor six, Educational Activities in Classroom, contained 54, 55, 57, 59, 62, 63, 64 and 70.

After the pilot study the remaining items were renumbered and rearranged as follows: Factor one 48 (1), 49 (6), 50 (8), 51 (35), 52 (29), 53 (19), 69 (7); factor two 21 (11), 23 (2), 26 (10), 27 (14), 28 (36), 29 (32), 30 (13), 31 (20), 32 (4), 43 (24); factor three, 3 (5), 5 (34), 6 (25), 7 (12), 8 (17); factor four, 1 (9), 18 (18), 34 (30), 45 (23); factor five 79 (3), 80 (28), 81 (37), 82 (33); and factor six 54 (26), 55 (27), 57 (31), 59 (38), 61 (15), 62 (16), 63 (21), 70 (22). Finally, the last form of the scale contained six factors and 38 items.

1. Factor one, Physical Development, contained the following items: 1, 6, 7, 8, 19, 29, 35.
2. Factor two, Socio-Emotional Development, contained the following items: 2, 4, 10, 11, 13, 14, 20, 24, 32, 36.
3. Factor three, Cognitive Development, contained the following items: 5, 12, 17, 25, 34.
4. Factor four, Special Children, contained the following items: 9, 18, 23, 30.
5. Factor five, Cooperation with Parents, contained the following items: 3, 28, 33, 37.
6. Factor six, Educational Activities in Classroom, contained the following items: 15, 16, 21, 22, 26, 27, 31, 38.

Third Phase

After the explanatory factor analysis 38 items were left in the scale. A validity correlation between the Turkish version of the Teacher Sense of Efficacy Scale (TTSES) and the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale was investigated. Çapa, Çakıroğlu and Sarıkaya (2005) conducted a study to adapt the scale into Turkish. From six different universities, 628 preservice teachers participated in their study. They found coefficient alpha values of 0.82 for SE, 0.86 for IS, and 0.84 for CM. For the entire scale, they found 0.93 to be the reliability for the efficacy scores, indicating high reliability scores. Investigators conducted confirmatory factor analysis to determine the validity of the scale. Their findings yielded 0.99 TLI and CFI, which indicated perfect fit of the oblique three-factor model to the efficacy data. Also, an RMSEA of about 0.5 indicated a close fit of the model. These findings revealed that the TTSES with its three subscales is a reliable and valid instrument that measures the general sense of teacher efficacy via 24 items (Çapa, Çakıroğlu, & Sarıkaya, 2005). Therefore, it was expected that the TTSES would provide strong evidence for the concurrent validity of the Early Childhood Teachers Self-efficacy for Supporting Children's Development Scale.

Seventy-four new graduate preschool teachers from two major universities in Ankara and 218 preschool teachers from 18 different schools in four large cities (Istanbul, Ankara,

Bursa and Trabzon) in Turkey responded to the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale and the Turkish version of the Teachers' Sense of Efficacy Scale (TTSES). A total of 292 participants engaged in the study. Of the 74 prospective teachers, two were male (3%) and 72 were female (97%). Ages of the prospective teachers ranged from 20 to 26, with a mean age of 22.8 (SD= 1.2). All teachers were female. The ages of teachers ranged from 19 to 55, with a mean age of 30.5 (SD= 7.4).

Calculation of the Pearson correlation between TTSES and ECTSSCDS revealed 0,601 correlation, which was significant at the 0.01 level. This correlation provided strong criterion-related evidence for the concurrent validity of the scale.

This second application of the scale also enabled the calculation of subscale correlations with each other and subscale correlations with the total scale. Thus, the internal consistency of the scale had been determined. This process provides evidence of the structural validity of the scale. Table 3 exhibits the correlation scores, and reveals that all factors are significantly correlated with each other and with the entire scale. These findings show that the scale has internal consistency and structural validity.

Table 3. *Correlations Among Factors*

	Total Scale	**Phys. Dev.**	**Socio-Emo. Dev.**	**Special Child.**	**Cognitive Dev.**	**Cooperation with Parents**	**Educational Activities in Classroom**
Total Scale	-	.862*	.920	.898	.485	.844	.914
Physcial Dev.		-	,841*	,844*	,161*	,789*	,791*
Socio-Emotional Dev.			-	,901*	,219*	,791*	,859*
Special Children				-	,196*	,767*	,854*
Cognitive Dev.					-	,189*	,241*
Cooperation with Parents						-	,827*
Educational Activities in Classroom							-

*p<0,01

Reliability Analyses

Cronbach Alpha coefficients for each factor and for the whole were calculated with data from the first and second cohorts. Through these analyses, the reliability of the scale was determined. Analyses of the data from the first cohort for each factor revealed coefficients scores of 0.94, 0.94, 0.88, 0.91, 0.87 and 0.9, respectively. An analysis of the entire scale revealed a reliability score of 0.98. The same analyses were conducted with data from the second cohort. Cronbach's coefficients for the second cohort were 0.91, 0.91, 0.94, 0.94, 0.87 and 0.87, respectively. An analysis of the entire scale revealed a reliability score of 0.96. Two analyses provided consistent Cronbach's coefficients, indicating sound reliability (Isaac & Michael, 1995).

Discussion

Findings revealed that the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale (ECTSBSCDS) is a valid and reliable instrument with its physical, socio-emotional, cognitive development, special children, cooperation with parents, and educational activities subscales. Çapa, Çakıroğlu and Sarıkaya (2005) adapted the Teacher Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk (1998) into Turkish; that scale provides general information about teacher efficacy. However, according to Bandura (1986), self-efficacy is a domain- and task-specific concept. Therefore, it should be measured to determine whether it is domain- and task-specific. The Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale is in the early childhood domain and its subscales measure task-specific components of early childhood education. Therefore, it can provide domain- and task-specific information about early childhood teachers' self-efficacy for supporting children's development, which is congruent with the nature of self-efficacy measurement.

Many studies have revealed the importance of teachers' teaching efficacy for students' motivation and achievement (Muijs & Reynold, 2002; Midgley, Feldlaufer, & Eccles, 1989; Ross, 1992); teachers' professional commitment (Ware & Kitsantas, 2007); and teacher burn-out (Skaalvik & Skaalvik, 2007). Therefore, the ability to determine teachers' teaching efficacy provides us with the opportunity to intervene if teachers or prospective teachers have a low sense of teaching efficacy. Further, ECTSBSCDS enables us to determine deficiencies in early childhood teachers' teaching efficacy and intervene to eliminate them.

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The Effectiveness of a Training Program Based on Dodge's Social Information Processing Model on Social Competence of Children with ADHD

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Abstract

The purpose of the current study was to explore the effectiveness of a training program based on Dodge's social information processing model on social competence of children with ADHD. 54 students in grades five who had been identified as having ADHD and were experiencing social problems were chosen .The sample was randomly divided into two groups; experimental (n= 27; 20 boys and 7 girls) and control (n= 27, 22 boys, 5 girls). Attention-Deficit Hyperactivity Disorder Test (ADHDT), and Social Competency Rating Form were used. ANCOVA and Repeated Measures Analyses were employed for data analysis. Results from this study indicated the effectiveness of the program employed in improving social competency of the students in the experimental group.

Keywords. Dodge's social information processing model, social competence, children with ADHD

Introduction

Many children with ADHD exhibit severe social problems. These social problems often result in their being overtly rejected by their peers. Such rejection is a strong predictor of poor long-term outcomes (Parker & Asher, 1987). Children with hyperactivity appear to manifest a greater amount of aggression and resort to more aggressive solutions to social situations than normal children (Stormont, 2001).

As stated previously, hostile or reactive aggression has been documented to be less socially acceptable among the peer group and affect peer reputation status. Maladjustment of early school-age peer relationships may potentially increase a child's risk for later maladjustment in a number of different areas (e.g. social skills, relationships, self-esteem), even for those individuals who no longer meet criteria for behavioral disorders in adolescence and adulthood (DeWolfe, Byrne & Bawden, 2000).

Research in the area of social cognition has not provided much definitive evidence of deficits in children with ADHD. However, some specific findings from this research may assist in planning interventions for children with social problems. First, children with externalizing problems have been found to exhibit a hostility bias (Dodge & Feldman, 1990). That is, following an ambiguous act by another child, these children are likely to infer a hostile intent by that person while also underestimating their own responsibility for outcomes. Aggressive boys tend to underestimate their own aggressiveness, making it less likely that they will make an effort to use self-control and more likely that they will use similar responses in future interactions (Lochman, 1987).

Children with social problems also have difficulty generating behavioral solutions to interpersonal problems (Evans & Short, 1991; Guerra & Slaby, 1989). Although they can choose an appropriate first solution, when the first solution is ineffective, these children seem to have difficulty coming up with alternative solutions.

Although numerous of studies have examined the effectiveness social information processing in other children , little is known about the effect on social competence of children with ADHD.

So, the present study seeks to explore the effectiveness of a training program based on Dodge's social information processing model on social competence of children with ADHD . It addresses the following questions:

1- Are there statistically significant differences in post– test scores mean between control and experimental groups on Social Competency Rating Form?

2-If the program is effective, is this effect still evident a month later?

Literature review

Social Competence in children with ADHD

Social competence has previously been defined as: the ability to engage effectively in interpersonal interaction (Custrini & Feldman, 1989; Oppenheimer, 1989; Weinstein, 1991); the ability to employ environmental and personal resources to attain advantageous developmental outcomes (Waters & Stroufe, 1983); normative or socially sanctioned interpersonal behaviors (Bellack & Hersen, 1979); and as an evaluative term based on the judgments of others with regards to the adequacy of task performance (Gresham, 1997; McFall, 1982).

It is widely accepted that children with ADHD have deficits in many areas of social functioning (Barkley et al., 1988). The inappropriate behaviors and poor social skills characteristic of many children with ADHD are commonly met with negative reactions by others in their environment (Campbell, 1990; Guevremont & Dumas, 1994; Hubbard & Newcomb, 1991). Investigations of the relationships of children with ADHD clearly demonstrate that when compared with their peers, these children have lower sociometric status on the average and are at a greater risk for social rejection (Flicek, 1992; Landau & Moore, 1991; Pope, Bierman, & Mumma, 1989; Wheeler & Carlson, 1994).

It was estimated that more than 50% of children with ADHD have significant problems in social relationships with other children (Pelham & Bender, 1982). As mentioned above, the interpersonal behavior of children with ADHD is often characterized as more impulsive, intrusive, excessive, disorganized, engaging, aggressive, intense, and emotional. This behavior disrupts the smoothness of the ongoing stream of social interactions, reciprocity and cooperation that may constitute the children's daily life with others (Whalen & Henker, 1992).

Crick and Dodge's Information Processing Model of Social Competence in children with ADHD

The social information processing model has been applied to understanding the development of social competence among certain children, including children with ADHD (e.g., Andrade, 2007; MacBrayer et al., 2003; Dodge & Pettit, 2003; Orobio de Castro et al., 2002; Yoon, Hughes, Gaur, & Thompson, 1999). According to Crick and Dodge's (1994) reformulated Social Information-Processing Model, children come to social situations with a set of biologically determined capabilities and a "database" of memories of past experiences. The child selectively attends to particular situational and internal cues and encodes them. The child then interprets the encoded cues using filters, causal analyses, and inferences about others' intent. After the child interprets the situation, he/she selects a goal or desired outcome (i.e., focused arousal state) for the situation. Goals are revised or changed as a result of immediate social stimuli. The next step involves recalling possible responses to the situation from past experiences; however, if the situation is novel, the child may construct new behaviors as a response to the social cues. The child then evaluates all possible responses based on outcome expectations and chooses a behavioral response.

In their model, Crick and Dodge (1994) hypothesize that there are six sequential processes which lie behind competent performance in any social situation. These six

processing "steps" are hypothesized to occur in "real-time", or in other words, occur simultaneously within the context of different kinds of social situations. The six processes or "steps" are 1) encoding of relevant stimulus cues 2) accurate interpretation of those cues 3) goal selection based on an interpretation of the situation as well as memory of past experiences 4) response generation 5) response evaluation and 6) behavioral enactment of a selected response. Consistent with tenets of schema theory and contextualism (though not necessarily drawing from these theories), children are seen as coming into social situations with different sets of past experiences, as well as differentmental representations or memories of these experiences. These past experiences, along with prior knowledge, constitute latent mental structures that interact with and influence on-line or "real-time" processing (Crick & Dodge, 1994). To illustrate Crick and Dodge's Social Information Processing model, consider the following scenario taken from Arsenio and Lemerise (2004):

"…Imagine a child trips on a classmate's foot when getting up to sharpen a pencil. The child must figure out what happened ("I tripped on his feet") and why it might have happened ("he tripped me" or "it was an accident"). In the next step of the model, guided by his or her understanding or misunderstanding of the situation and 'latent mental structures' [sic], the child must clarify and select goals for the situation ("I just want to get my work done" or " I'm going to show that kid he can't do this to me"). Then, the child generates possible responses to the situation and evaluates them in terms of his or her self-efficacy and the likely consequences of performing the response. Finally…the child enacts his or her selected response." (p.989).

Characteristic patterns at each step of this model have been empirically tested and were found to significantly correlate with extreme-group differences in socially competent behavior including levels of aggression (Dodge, 1986; Rubin & Krasnor, 1986). At the first step, encoding, Dodge and Tomlin (1987) found that socially rejected, aggressive children are less attentive to relevant social cues than are their less aggressive peers. At the second step, interpretation, aggressive children have been found to make significantly less accurate depictions of peer intentions than their nonaggressive peers (Dodge, Murphy & Buchsbaum, 1984; Waldman, 1988), and show a marked bias toward hostile attributions in ambiguous situations (Dodge, 1980). When forming responses, socially rejected and incompetent children have been found to access more aggressive responses and fewer competent responses to interpersonal problems (Renshaw & Asher, 1983). When evaluating their responses, aggressive children anticipate more positive interpersonal and instrumental outcomes from aggressing, than do their nonaggressive, more competent peers (Crick & Ladd, 1990).Finally, at the last Social Information Processing step, response generation, aggressive children have been found to display relatively poor skills at performing competent behavioral responses to interpersonal situations (Dodge, McClaskey & Feldman, 1985).

However, little definitive evidence exists to support the notion that children with ADHD have social cognition deficits. However, some specific findings may be useful in intervention planning efforts. One strand of research focuses on attributional reasoning. That is, how children explain events to themselves. Children with externalizing problems, such as ADHD, are especially likely to exhibit a hostility bias (Dodge & Feldman, 1990). Following an ambiguous act by another child, these children are likely to infer a hostile intent by that person. In addition, they tend to underestimate their own responsibility for outcomes. Aggressive boys tend to underestimate their own aggressiveness, while nonaggressive boys assume greater responsibility for aggressive encounters in the early stages of a conflict (Lochman, 1987). This tendency for aggressive boys to deny their aggressiveness makes it

less likely that they will make an effort to use self-control and more likely that they will use similar responses in future interactions.

Children with social problems have difficulty generating behavioral solutions to interpersonal problems. Although they can do as well as others at identifying the first possible solution, the differences show up when they are asked to give alternative responses. Furthermore, youth with ADHD are known to have trouble attending to important social information (Mikami, Huang-Pollock, Pfiffner, McBurnett, & Hangai, 2007). In a study by Guerra and Slaby (1989), 24 high aggressive and 24 low aggressive elementary school aged boys were given three different problems and asked to generate two solutions to each. Although both groups did equally well at choosing a first solution, high aggressive boys were less likely than low aggressive boys to choose an appropriate (i.e., non-aggressive and effective) second solution. Evans and Short (1991) had 14 high aggressive, 16 low aggressive and 15 socially withdrawn boys between ages 8 and 11 generate up to 7 potential solutions each to 6 problems presented. Again, it was found that differences in generating solutions were not found for the first solution, but were for alternative solutions. Nonaggressive and nonwithdrawn boys generated a higher percentage of effective second solutions than did their aggressive and withdrawn peers. In both of these studies, aggressive bots were able to generate a first solution as well as other children; however, they were less successful than nonaggressive children at generating alternative solutions.

Research has shown that interventions using social skills training and problem solving discussions , both of which were used in the behavioural treatment, may help improve social competence in aggressive and hard to manage children (King et al., 2009) . For Example, Amori et al.(2008) investigated the relationship between social information processing and both relational and physical aggression in a longitudinally-followed sample of 228 adolescent girls (ages 11–18; 140 with ADHD and 88 comparison girls). During childhood, girls participated in naturalistic summer camps where peer rejection, overt physical aggression, and relational aggression were assessed via multiple informants and methods. Approximately 4.5 years later, these girls participated in follow-up assessments during which they completed a commonly-used vignette procedure to assess social information processing; overt and relational aggression were again assessed through multiple informants. Correlations between (a) overt and relational aggression and (b) maladaptive social information processing were modest in this female adolescent sample. However, relationships between aggression and social information processing were stronger for the comparison girls than for the girls with ADHD.

Therefore, when the first solution is ineffective, aggressive children seem to have difficulty coming up with what to do next. However, these studies focused on children with aggression and did not specify if ADHD was also present. Therefore, it is uncertain if children with ADHD or even children with ADHD and aggression would respond in the same manner.

Method

Participants

54 students in grades five who had been identified as having ADHD and were experiencing social problems were chosen .The sample was randomly divided into two groups; experimental (n= 27; 20 boys and 7 girls) and control (n= 27, 22 boys, 5 girls).They two groups were matched on age ,IQ , and Social Competencey . Table 1. shows means, standard deviations , t- value , and significance level for experimental and control groups on age (by month) , IQ , and Social Competencey (pre-test) .

Table 1. *Means, standard deviations , t- value , and significance level for experimental and control groups on age (by month),IQ, and Social Competency (pre-test).*

Variable	Group	N	M	SD	t	Sig.
Age	Experimental	27	132.24	1.96	-.121	Not sig.
	Control	27	132.41	2.01		
IQ	Experimental	27	108.34	4.45	-.221	Not sig.
	Control	27	108.89	4.24		
Social	Experimental	27	38.40	5.09	-.621	Not sig.
Competency	Control	27	39.33	7.52		

Table 1. shows that all t- values did not reach significance level. This indicated that the two groups did not differ in age , IQ , and Social Competency (pre-test).

Measures

Attention-Deficit Hyperactivity Disorder Test (ADHDT) (Jeong, 2005). To support evidence of criterion validity related to the questionnaire developed based on DSM-IV-TR criteria, the Attention-Deficit Hyperactivity Disorder Test (ADHDT) was employed. ADHDT is based on the DSM-IV. This instrument consists of three categories: Hyperactivity (13 items); Impulsivity (10 items); and Inattention (13 items). The items use a 3-point Likert scale with 0 representing no problem, 1 representing a mild problem, and 2 representing a severe problem. The author reported reliability with Cronbach.'s alpha coefficient. Cronbach alphas for hyperactivity, impulsivity and inattention were .98, .95, and .98 respectively for teacher ratings.

Social Competency Rating Form. (Gottfredson et al., 2002). The revised scale consists of 29 items, with 12 negatively worded items and 17 positively worded items. Sample items include: Hits, kicks at, or jumps on other children; If provoked by peers, shows self-control; Solves problems with peers through compromise or discussion; and Expresses concern for others. It has three subscales ; namely Social Skills , social behaviour and impulsivity .All items are answered on a 4-point Likert-type scale, with a 1 indicating “Almost Never”, 2 indicating “Sometimes”, 3 indicating “Often”, and 4 indicating “Very Often.”.A study by Allison(2007) shows an adaptation of the SCRF to be a reliable and valid measure for use with elementary school children.

Procedure

Written permission was obtained from Al Fahd primary schools, Taif in order to conduct the application in schools. Schools were visited in order to inform parents and teachers about the study. Parents of all children were interviewed and provided permission for their children to be included in the study. Attention-Deficit Hyperactivity Disorder Test ,and Social Competency Rating Form were completed. The Social Information Processing program was applied to children. Children were shown SIP Scenarios for anger, anxiety and depression . Immediately after reading each scenario, participants completed a short series of questions assessing the domains of goal selection, response evaluation, and response selection The answers given by the children were recorded using a hidden camera. This protocol was adopted from the social information-processing protocols that have shown to be reliable, to have predictive validity, and been used extensively with children, adolescents, and adults (Dodge, 1986; Dodge and Swartz, 1997). The application lasted approximately 25 min.

Design and Analysis

The effects of implementing the program on students' social competency were assessed using a repeated-measures design, pre- post- and follow up testing.

Results

Table 2. shows data on ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form. The table shows that the (F) value was (204.912) and it was significant value at the level (0.01).

Table 2. *ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Pre	10.437	1	10.437		
Group	13405.188	1	13405.188	204.912	0.01
Error	3336.378	51	65.419		
Total	16916.000	53			

Table 3 shows t test results for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form. The table shows that (t) vale was (14.52). This value is significant at the level (0.01) in the favor of experimental group.

Table 3. t-*test results for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form*

Variables	Group	N	Mean	St Deviation	t	Sig
Social Skills	Experimental	27	35.96	5.08	11.83	0.01
	Control	27	20.74	4.33		
Social	Experimental	27	23.88	5.47	12.17	0.01
Behavior	Control	27	10.92	6.11		
Impulsivity	Experimental	27	12.40	3.15	6.15	0.01
	Control	27	8.55	5.09		
Composite	Experimental	27	71.85	9.07	14.52	0.01
Score	Control	27	40.14	6.20		

The table also shows that there are differences in post-test mean scores between experimental and control groups in Social Competency in the favor of experimental group.

Table 4 shows data on repeated measures analysis for Social Competency Rating Form. The table shows that there are statistical differences between measures (pre- post- follow up) at the level (0.01).

Table 4. *Repeated measures analysis for comprehension test.*

Source	Type 111 sum of squares	df	Mean square	F	Sig.
Between groups	19317.772	1	19317.772	292.407	0.01
Error 1	3435.235	52	66.062		
Between Measures	9843.815	2	4921.907	105.956	0.01
Measures x Groups	10557.123	2	5278.562	113.633	0.01
Error 2	4831.062	104	46.453		

Table 5 shows data on Scheffe test for multi-comparisons in Social Competency Rating Form. The table shows that there are statistical differences between pre and post

measures in favor of posttest , and between pre and Follow-up measures in favor of follow up test , but no statistical differences between post and Follow –up test .

Table 5. *Scheffe test for multi- comparisons in Social Competency Rating Form*

Measure	**Pre**	**Post**	**Follow -up**
	M= 38.40	**M= 71.85**	**M= 70.14**
Pre	--	--	--
Post	33.44*	--	--
Follow-up	31.74*	1.70	--

Discussion

The main objective of the present study was to explore whether there were differences in post – test scores mean between control and experimental groups on social competency. The study also examined If the program was effective, if this effect was still evident a month later.

It was hypothesized that there would be statistically significant differences in post–test scores mean between control and experimental groups on Social Competency Rating Form in favor of the experimental group, and the effect of the program would still be evident a month later.

The results of this study as revealed in tables 3 and 5 show that the program was effective in improving social competency of students in experimental group, compared to the control group whose individuals did not receive training based on the information processing model.

Subject-related studies (Lemerise & Arsenio, 2000; Parke et al., 1989) put forth that social information processing models are effective on the emotions of children, cognitive processes, and responding to social situations. It is thought that children, who can control their emotions, have a better level of social skills and social interaction. Social goals are closely related to the social information process. In other words, children who develop relationships are not aggressive and have social goals developed using more positive strategies. These children are liked and accepted more by their peers, and are able to establish healthier relationships (Crick & Dodge, 1994; Rose & Asher, 1999). The fundamental purpose of social relations is correctly interpreting social situations, and reacting to these situations accordingly (Crick & Dodge, 1994). .

As illustrated, the study results are in line with the results obtained in previous studies. Children who are competent at all stages of social information processing display more prosocial behaviours towards their peers. These children enter their peer group easier, and develop a more cold-blooded attitude towards peer provocation. They can also respond to peer and teacher expectation, and respond accordingly to success and failure. These children are considered to be more socially competent at every stage of social information processing in comparison to inadequate peers. Social competence is an effective factor on interpersonal relationships, school readiness, and school adjustment of young children (Ladd, 2005).

The findings of this study were consistent with other studies that have demonstrated effectiveness of social information processing model with children with ADHD(Brendan et al, 2012; Jennifer et al., 2011; Tricia, 2005).

Limitations and Further Study

One limitation of the current study stems from the fact that the scope of the study is limited to the data collected from children with ADHD. Hence, further research with larger and more demographically diverse populations with random selection would strengthen the findings of the study.

Second, it may be that the length of the intervention was not sufficient to see change large enough to be measured. Sheridan et al. (1996) suggested that the training used in that study (10 weeks long) possibly was too short to produce long-range effects. The present study also used brief training (6 weeks), as is often the case with interventions in the school setting.

Despite these limitations, the present study contributes useful knowledge about the influence of social information processing model intervention on ADHD children's social competency.

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