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Incarcerated Mothers and Fathers: How their Absences Disrupt Children's High School Graduation

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ABSTRACT

The United States is faced with a growing number of children who have incarcerated parents and nearly one quarter of children who fail to complete high school. It has been shown that parental incarceration negatively impacts academic outcomes. This study examined whether parental incarceration affects children's high school graduation. Data on 12,418 young adults was drawn from the Add Health Wave IV dataset. Logistic regression analyses examined differences between maternal and paternal incarceration and the effects of chronicity of incarceration. Whereas both were found to reduce the likelihood that children will complete high school, maternal incarceration had a greater impact. This study fills gaps in the literature examining differences in parental incarceration. Practice and policy implications are discussed.

Keywords:
high school graduation, parental incarceration, academic outcomes

1. Introduction

The United States has the largest prison population and highest rate of imprisonment (756 per 1000) in the world (Walmsley, 2009). Relatedly, there is a growing number of children with incarcerated parents in the United States (Sentencing Project, 2009). In 2007, 809,800 parents were incarcerated of which 92% were fathers and 8% were mothers (Sentencing Project, 2009). The number of incarcerated fathers and mothers increased by 76% and 122% respectively from 1997 to 2007 (Sentencing Project, 2009). By 2007, over 1.7 million children had an incarcerated parent (U.S. Department of Justice, 2008).

Parental incarceration has come under particular scrutiny because of its negative effects on children's academic outcomes (Dallaire, Ciccone, & Wilson, 2010; Foster & Hagan, 2009; Hagan & Foster, 2012; Trice & Brewster, 2004). For instance, adolescents whose mothers had been incarcerated were more likely to be suspended from school (Hanlon et al., 2005; Trice and Brewster, 2004). Trice and Brewster (2004) also found that adolescents with incarcerated mothers dropped out of school and failed classes at higher rates than their best friends whose mothers were not incarcerated. Although there are studies that have investigated the effects of parental incarceration on children's academic outcomes, there is limited research linking parental incarceration with children's high school graduation.

Great emphasis is placed on the importance of high school graduation in the United States. In the past 20 years, although high school dropout rates have declined steadily to 7.4% of the noninstitutionalized 16-24 year old civilian population in 2010, the United States still ranks only 22nd out of 27 countries in completion of upper secondary education amongst developed nations (OECD, 2012). The U.S. Department of Education (2012) indicated that nearly one quarter of American children fail to complete high school.

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There are several reasons why high school graduation is important. First, high school graduates are significantly more likely to gain employment than high school drop-outs, whose unemployment rate is one third higher than those with a high school diploma (U.S. Department of Labor, 2012). Secondly, the average annual income for high school graduates can be more than 40% higher than for those who do not complete high school (U.S. Department of Education, 2012b). Lastly, students who do not graduate high school are more likely to be overrepresented in state prisons (U.S. Department of Justice, 2003) and become homeless (The National Center on Family Homelessness, n.d.). These negative outcomes make it all more important to understand the barriers to high school graduation for American children.

The increasing number of incarcerated parents and the rapid increase in the rate of maternal incarceration may have significant implications for over 1.7 million children. The educational level of young adults has been shown to have a mediating influence on their socioeconomic attainment. Wickrama, Simons, and Baltimore (2012) found the influences of early socioeconomic adversity were buffered by young adults' educational attainment, which also helped to accentuate the positive influences of family resources.

1.1. Parental Incarceration

Studies on how parental incarceration affects academic indicators, such as grade retention (Cho, 2009a), reading, math, or vocabulary skills (Cho 2009b; Dallaire & Wilson, 2010), school performance (Foster & Hagan, 2009; Hagan & Foster, 2012), extended school absences (Nichols & Loper, 2012), and school exclusion (Phillips et al., 2002; Trice & Brewster, 2004), with a specific emphasis on high school dropout rates (Cho, 2010; Cho, 2011; Dallaire, et al., 2010; Nichols & Loper, 2012; Trice & Brewster, 2004), contributed in understanding how parental incarceration has direct consequences for children's high school graduation. Although many studies on the impact of parental incarceration on academic outcomes made no distinction between the sexes of incarcerated parents (Hagan & Foster, 2012; Murray, Farrington, & Sekol, 2012; Murray et al., 2012b; Phillips et al., 2002), others were informative in determining whether disparities in negative outcomes existed between maternal and paternal incarceration (Cho, 2009a, 2009b; Cho, 2010; Cho, 2011; Dallaire et al., 2010; Dallaire & Wilson, 2010; Tasca, Rodriguez, & Zatz, 2011; Foster & Hagan, 2009; Trice & Brewster, 2004).

The majority of literature examining the association between parental incarceration and high school dropout rates (as opposed to educational outcomes in general) focused on maternal incarceration rather than paternal incarceration. It was found that maternal imprisonment had more detrimental effects on children than paternal imprisonment (Foster & Hagan, 2009) because of the mother's role as primary caregiver before imprisonment (Murray & Farrington, 2008). Mothers were more likely than fathers to have lived with their children before incarceration, and mothers in prison identified the child's grandparents, relatives, or foster home as the current caregiver, whereas fathers in prison identified the child's mothers as the current caregiver (U.S. Department of Justice, 2000).

1.2. School Outcomes

Several studies have examined the effects of parental incarceration on children's school outcomes (Cho, 2009a, 2009b; Dallaire et al., 2010; Dallaire & Wilson, 2010; Foster & Hagan, 2009; Hagan & Foster, 2012; Murray et al., 2012a, 2012b; Nichols & Loper, 2012; Trice & Brewster, 2004; Phillips et al., 2002). Trice and Brewster (2004) showed that 13-20 year olds were four times more likely to fail classes and get suspended and three times more likely to be absent from school if their mother was incarcerated. Foster & Hagan (2009) found that there were long-term negative effects on educational attainment in emerging adulthood if a child's father was incarcerated. Hagan and Foster (2012) demonstrated that both maternal and paternal incarceration had significant effects on children's GPA and college graduation, but the effect of maternal incarceration was greater than paternal incarceration in both instances. There have been few other studies to support Hagan and Foster's findings that having an incarcerated mother has more impact on a child's education than having an incarcerated father, although maternal incarceration has been found to have greater impact in areas that have been associated with poorer educational outcomes, such as familial incarceration, placement in foster or nonfamilial care, and adult child incarceration (Dallaire, 2007).

Dallaire et al. (2010) explained why children of incarcerated parents tend to experience negative school outcomes. They observed an increase in school stigmatization amongst children with incarcerated parents. Teachers believed that maternal incarceration would have a greater effect on school outcomes than paternal incarceration, a potentially stigmatizing attitude that could fulfill its own prophecy. The mere knowledge of parental incarceration provided a disadvantage to children because teachers associated the child's experience of parental incarceration with less competence. The stigmatization effect was more pronounced for children with incarcerated mothers than for children with incarcerated fathers.

Not all research has found an association between parental incarceration and negative school outcomes (Cho 2009a, 2009b; Murray et al., 2012a, 2012b; Nichols & Loper, 2012). For example, it was found that maternal incarceration had no relationship with children's low reading and math standardized test scores (Cho, 2009b), or grade retention (Cho, 2009a). Cho (2009a) posited that children might have a better living environment when they were removed from their mothers and lived with alternative caregivers (mostly grandmothers) who were more involved in children's school activities. Interestingly, Nichols and Loper (2012) found that incarceration of an extended household member had a more significant effect on extended school absences than incarceration of a parent. The authors speculated that families allowing criminally involved extended family members into the household created a chaotic environment.

1.3. Dropout Rates

A factor directly associated with graduating high school is dropout rates. Previous studies have found that the children of incarcerated parents were at greater risk of school dropout than children without incarcerated parents (Cho, 2010; Cho, 2011; Dallaire et al., 2010; Trice & Brewster, 2004). Although both paternal and maternal incarceration was associated with greater risk of school dropout, Dallaire et al. (2010) demonstrated that the risk was greater if the mother was incarcerated. Trice & Brewster (2004) also revealed that adolescents with incarcerated mothers dropped out of school at four times the rate of their best friends whose mothers were not incarcerated. Additionally, Cho (2011) calculated that dropout hazard rates were 20-28% higher amongst youths with currently incarcerated mothers during the year of incapacitation compared to youths whose mothers were not incarcerated. These results indicate that absence of a mother as a result of incarceration is a strong predictor of high school dropout.

In measuring the length of time youth were absent from school, Nichols and Loper (2012) found that parental incarceration was associated with youth dropout-return, defined as an extended period of absence from school followed by return to school. This suggests that high school dropout rates may increase with the chronicity of parental incarceration, resulting in a greater likelihood that the child will fail to complete high school. Interestingly, Cho (2010) found that children displayed better school outcomes as the chronicity of maternal incarceration increased. The author postulated that after four incarcerations, children were more likely to be placed with another caregiver, such as a family member, thereby reducing the impact of maternal incarceration.

1.4. Hypotheses

The goal of this study was to test three hypotheses relating to the association between parental incarceration and high school graduation status.

1. Children whose mothers and or fathers have been incarcerated are less likely to complete high school than children whose mothers and or fathers have not been incarcerated.
2. In addition to being incarcerated, the chronicity of parental incarceration will decrease the likelihood of the child's high school graduation status.
3. Maternal incarceration will have a greater impact on high school graduation status than paternal incarceration.

2. Methods

2.1. Sample

The current study utilized Waves III and IV of the National Longitudinal Study of Adolescent Health (Add Health) private dataset. This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis. This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

Add Health is a nationally representative school-based study of health related behaviors of adolescents and their outcomes in young adulthood. Add Health's Wave I nationally representative sample consisted of adolescents from 7th to 12th grade. Eighty high schools were selected and categorized by size, grade span (K-12, 7-12, 9-12, 10-12 and other), school type (public, other private, and Catholic), level of urbanization (urban, suburban and rural), census region (Northeast, South, Midwest, and West), and percentage of white. In Wave I, 20,745 adolescents completed in-home interviews. In 2001-2002, when Wave III was collected with 15,170 Wave I respondents, who were now between the 18 and 26 years old. At Wave III, the Add Health sample was dispersed across the nation with respondents living in all 50 states. Wave IV was conducted between 2008-2009 and respondents were between 24 and 32 years old. Over 90% of the Wave IV sample was located and 80.3% of eligible sample members were interviewed. Survey data was collected using a 90-minute CAPI/CASI instrument. Less sensitive questionnaire sections were administered with the assistance of an interviewer (computer-assisted personal interview, or CAPI). More sensitive questionnaire sections were self-administered using CASI technology (computer-assisted self interview). More detailed information about the sample and procedures can be found at the Add Health website http://www.cpc.unc.edu/projects/addhealth/design. The sample size for this study consisted of all eligible Wave IV participants (N = 15,412).

2.2. Measures

2.2.1. High school graduation status (Wave IV). Respondents selected from four different options to determine their educational status: (a) finished school with a high school diploma; (b) earned a high school equivalency degree (GED); (c) earned a certificate of attendance or a certificate of completion; and, (d) did not receive a high school diploma, equivalency degree (GED), or other certificate. High school graduation status was created by dichotomizing the options so that *1 = high school graduate* and *0 = no high school diploma* (all other answer choices).

2.2.2. Maternal and paternal incarceration. Respondents were asked to indicate if their biological mother or biological father had ever spent time in jail or prison by selecting yes or no.

2.2.3. Number of times incarcerated-maternal/paternal. Respondents were asked about the number of times their biological mother/father was incarcerated. This ranged from 0-20 for mothers and 0-53 for fathers.

2.3. Covariates

2.3.1. Parental education (Wave 1). Parental education was created as a dichotomous variable that measured whether the respondents' mother or father graduated from high school. Parent was the biological parent

unless the respondents did not know anything about their biological mother or father; in those cases, respondents answered about their resident mother or father. The following answer choices were coded as 0 (no high school diploma): "eighth grade or less," "more than eighth grade, but did not graduate from high school," "went to business, trade, or vocational school instead of high school," completed a GED," and "S/he never went to school." The following answer choices were coded as 1 (high school diploma): "high school graduate," "went to business, trade, or vocational school after high school," "went to college, but did not graduate," "graduated from a college or university," and "professional training beyond a four-year college or university."

Race and ethnicity was assessed by six dummy variables, including White (reference category), Hispanic, African American, Asian, Native American, and Other. Gender was code as *1 = male* and *2 = female*.

3. Data Analysis

In order to test our hypotheses, two logistic regression analyses were performed. The first model looked at mother and father incarceration to test H_1, which proposed that individuals whose mother and or father were incarcerated were less likely to get a high school diploma compared to those whose parents were not incarcerated. To test H_2, Model 2 looked at the chronicity of incarceration for mother and father.

4. Results

4.1. Descriptive Statistics

Descriptive statistics are provided in Table 1. More than half of the participants were women (53.2%). The average age was 29.1. Regarding race and ethnicity, the majority were White (67.2%), followed by Black (23%) and then Hispanic (16.3%). Asian Americans (7.1%) and Native Americans (5.5%) were the smallest represented groups. The vast majority of participants graduated from high school (84.8%). Regarding parental incarceration, 82.6% had neither parent incarcerated, 13.8% had a father incarcerated, 2.0% had a mother incarcerated, and 1.7% had both parents incarcerated.

Table 1. Description of Sample

Variable		N=15,701
		%
	Female	53.2
	Male	46.8
Age		Years
	Mean	29.104
	SD	1.747
	Range	25.0 – 34.0
Race[1]		%
	Hispanic	16.3
	White	67.2
	Black or African American	23.0
	American Indian or Native American	5.5
	Asian	7.1
High School Graduation Status		%
	Graduate	84.8
	Non-graduate	15.2
Parental Incarceration Status		%
	Neither parent incarcerated	82.6
	Mother incarcerated	2.0
	Father incarcerated	13.8
	Both parents incarcerated	1.7

[1] Percentages add up to more than 100% because participants were able to select more than one race.

The results in Table 2 show that fathers were incarcerated (*m = 2.70, sd = 4.07*) more often than mothers (*m = 2.28, sd = 2.53*). Children of incarcerated mothers were older at the time of incarceration (*m = 13.06, sd = 7.74*) and at the time of last release (*m = 16.95, sd = 7.59*) than children of incarcerated fathers (*m = 9.47, sd = 7.65* and *m = 14.52, sd = 8.69*). The effect of children's age at time of parental incarceration and or release was not significantly related to high school graduation status.

Table 2. Descriptive Statistics

	High School Diploma		No High School Diploma				
	M	*SD*	*M*	*SD*	*df*	*t*	
No. times parent incarcerated							
Mother	2.24	2.40	2.35	2.74	544	.45	652
Father	2.55	3.90	3.11	4.49	1765	2.60	010
Child's age when parent first incarcerated							
Mother	13.03	7.59	13.12	8.02	538	.14	893
Father	9.64	7.76	9.03	7.33	1611	-1.43	.153
Child's age when parent last released							
Mother	17.03	7.58	16.80	7.64	532	-.335	738
Father	14.46	8.75	14.66	8.52	1579	.356	684

4.2. Logistic Regression Models

Logistic regression models were conducted to predict whether individuals would receive a high school diploma using parental incarceration, chronicity of parental incarcerations, parental education, gender, and race as predictors. Table 3 presents the logistic regression coefficients. Model 1 shows both maternal and paternal incarceration significantly decreased (55.8% and 53.1% respectively) the likelihood that the respondent would get a high school diploma. The covariates all were significant predictors. Maternal and paternal high school graduation statuses were both significant predictors. Individuals whose mothers had a high school diploma were 106% more likely to have a high school diploma and those whose fathers had a high school diploma were 94.5% more likely. With respect to race, non-Hispanic Whites were the reference group. There was a 79.5% decrease in odds that Hispanics would get a high school diploma. Asians were 65.2% more likely and those who marked Other were 49% more likely than Whites to get a high school diploma. Finally, women were 47.6% more likely to get a high school diploma than men.

Table 3. Logistic Regressions

	Model 1			Model 2		
	B	**SE**	**Exp (B)**	**B**	**SE**	**Exp (B)**
Mother in prison	-.816***	.199	.442			
Father in prison	-.756***	.066	.469			
Chronicity of prison-mom				-.183***	.045	.833
Chronicity of prison-dad				-.085***	.015	.919
Mom education	.722***	.067	2.058	.797***	.069	2.220
Dad education	.665***	.067	1.945	.683***	.069	1.979
Race						
White	R			R		
Hispanic	-1.586*	.781	.205	-1.589*	.786	.204
African American	-.042	.071	.959	-.083	.073	.929
Asian American	.502***	.143	1.652	.545***	.143	1.725
Native American	-.137	.204	.872	-.192	.212	.825
Other	.399***	.106	1.490	.441***	.109	1.554
Gender	.389***	.055	1.476	.396***	.056	1.486
-2 log likelihood	9145.570			8787.145		
Chi-square	693.946			542.064		
Nagelkerke R^2	.098			.081		

*p<0.05 **p<0.01 ***p<0.001

Model 2 shows that chronicity of prison for mother and father decreases the likelihood of high school graduation. Every time a mother was incarcerated, individuals were 16.7% less likely to get a high school diploma. Every time a father was incarcerated, individuals were 8.1% less likely to get a high school diploma. Similar to Model 1, the covariates all were significant predictors. Individuals whose mothers had a high school diploma were 122% more likely to have a high school diploma and those whose fathers had a high school diploma were 97.9% more likely. With respect to race, non-Hispanic Whites were the reference group. There was a 79.6% decrease in odds that Hispanics would get a high school diploma. Asians were 72.5% more likely and those who marked "Other" were 55.4% more likely than Whites to get a high school diploma. Finally, women were 48.6% more likely to get a high school diploma than men.

5. Discussion

Using Add Health data, this study hypothesized that children whose mother and or father were incarcerated were less likely to obtain a high school diploma compared to those who did not have an incarcerated parent. The second hypothesis stated as the chronicity of parental incarcerations increased, individuals were less likely to get a high school diploma. Finally, the third hypothesis was that maternal incarceration had a greater impact on high school graduation status than paternal incarceration. This study's findings supported all three hypotheses.

Many factors influence a child's potential for academic success, but this study mainly focused on incarceration of a parent. The results indicate that the likelihood a child will fail to graduate from high

school increases with each parental incarceration. The study's findings are consistent with the literature showing that maternal incarceration increased dropout rates (Cho, 2010; 2011; Dallaire et al., 2010; Nichols & Loper, 2012; Trice & Brewster, 2004), dropout hazard rates (Cho, 2011), and grade retention (Cho, 2009a). Consistent with Dallaire et al.'s study (2010), children with incarcerated fathers were also found to be at high risk of high school dropout. The impact of paternal incarceration was likely to accumulate over time if the father was incarcerated more than once, as this study found.

An analysis of the data also revealed that incarceration of mothers (both one time incarceration and chronicity) had a greater impact on high school graduation status than the incarceration of fathers. Davies et al. (2008) reported that disruption to a child caused by maternal incarceration was greater than disruption caused by paternal incarceration. Although there are few studies that compare the effects of maternal and paternal incarceration on educational outcomes, there is evidence indicating that maternal incarceration is more likely than paternal incarceration to result in familial incarceration, placement in foster or nonfamilial care, and adult child incarceration (Dallaire, 2007), which are areas that are also predictive of poorer educational achievement (U.S. Department of Justice, 2003; Nichols & Loper, 2012; McMillen & Tucker, 1999).

The larger effect of maternal incarceration on graduation status may also be explained by examining the children's living arrangements prior to incarceration. Mothers were found to be more likely than fathers to play a greater role in their children's care and be primary caregivers prior to incarceration (Davies et al., 2008). Children might be more likely to experience greater distress when their mothers are absent; therefore, it is possible that children will experience an immediate and severe impact that may affect their ability to complete high school. It was found that children of incarcerated fathers were much more likely to be living in a stable environment, suggesting less disruption when the father is incarcerated (Davies et al., 2008).

6. Implications for Policy and Practice

The results of this study suggest a number of practice implications in a variety of settings, including education and child welfare. Educators and practitioners who identify children as having an incarcerated parent should treat their status as a risk factor requiring interventions. Given the cumulative effect of multiple parental incarcerations, these interventions should be maintained until a child has graduated, regardless of the parent's current incarceration status. More immediate and intensive interventions to address the impact of maternal incarceration should also be considered. Incarceration of a parent may be symptomatic of other problems within the household, including parental substance abuse and child maltreatment.

Similarly, child welfare practitioners should consider parents' incarceration status when providing services to families who are involved in the child welfare system. States not currently providing educational services as part of independent living programs should take this into consideration. Those states, where educational services are provided as part of independent living programs, should consider lowering the age at which these services begin for children with incarcerated parents, given the cumulative effects on children of parental incarceration.

Finally, it is important to note that one of the largest predictors of child's high school graduation status is the mother's and or father's high school graduation status, even after controlling for parental incarceration and chronicity of incarceration. It was found that not only did education reduce the risk of incarceration for the children of prisoners, but it also decreased the risk of imprisonment for the individual (Lochner & Moretti, 2003). Therefore, the benefits of education appear to have both short-term and long-term effects. This has policy implications when considering the funding of education compared to corrections systems.

7. Implications for Future Research

This study emphasizes the need for further research to be conducted to examine the effects of parental incarceration on high school completion. Further research should focus on whether the child was living with the incarcerated parent at the time of incarceration, and whether the child moved in with the nonincarcerated parent at the time of incarceration, in order to explore further the role of parental absence as a factor in the effects of parental incarceration.

This study differed from other studies that focused on high school dropout rates by examining high school graduation. Further research should examine whether there are different effects on dropout rates and completion rates, particularly considering the long-term, cumulative effects of parental incarceration found in this study. The impact of dropout on high school completion amongst children of incarcerated parents would also be a valuable addition to the literature.

Finally, this study differed from other studies by examining varying effects of maternal and paternal incarceration on educational outcomes. As mentioned earlier, there is a dearth of literature looking at differential impacts of maternal and paternal incarceration, specifically on educational outcomes. Future research should continue to explore the unique impact of maternal and paternal incarceration and the different effects it may have on the sex of the child.

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Teachers Views On Variations At Organization Structure Of National Education

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ABSTRACT

The aim of this study is to examine how the changes occurred at national education organization structure are perceived by teachers according to gender, professional career and the institution which schooling grade the teachers work. The study was carried out with the correlational research method. According to results obtained in study; It's found that Gender parameter has shown significant difference on deciding organizational need and evaluating organizational variations of Organization Structure of National Education. It's observed that there is no significant difference on planning, applying and philosophical aspects of Organizational Variation At National Education Organizational Structure, there exist significant difference at variable of Professional seniority and this variation was observed for the teachers who have 1-5 and 16-20 years' service period. It's observed that there is no significant difference on planning, applying and philosophical aspects of Organizational Variation At Organization Structure of National Education, there exist significant difference at variations of organization structure of National Education, there exist significant difference on planning and evaluating organizational variation according to school type and this difference is found between primary and high school teachers. It's found that there is no significant difference on planning, applying and philosophical aspects of Organizational Variation.

Keywords:
Education, Variation, Organization, National Education

INTRODUCTION

Every country has social systems responsible for sustaining the order of social life in accordance with economic, social, cultural, technological and scientific changes. Educational systems that are responsible for raising qualified manpower necessary for the management of these social systems are affected by country's own social dynamics as well as variations in several areas such as scientific and technological developments and globalization, international and political formations. Therefore, every country makes an effort to adapt its educational system into these variations occurred in various areas (Gizir, 2008).

Change in social structure compel institutional organizations by affecting qualities, opinions on political-social and cultural phenomena and events, manufacturing types and therefore relationships of manufacturing and property of individuals who play a role in the organizations of that society, their

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achieved technological level, the laws they abide by and the political order they live in. In addition, demographic and ecological (environmental) circumstances affect the organizational structure in terms of change (Özyılmaz, 2013).

As a result of all these interactions, structure in the institutions (institutional framework and relationship network formed by the individuals at the institution) starts to change naturally and gradually in spite of certain resistances. However, this change which started naturally or by itself sometimes cannot adapt to the social change or happens not to meet the emergent need. Meanwhile, some actors reorganize both the framework of the institution and target, content and "structure" of that institution in a planned and programmed way in parallel with the social change and in a way that can meet the emergent social need; that is called "Reconstruction" (Özyılmaz, 2013).

Educational systems are criticized by falling behind the society almost all over the world. Variations in the educational system and the working of schools should stem from the nature of education and the specific conditions of schools. Serving as "an Architecture of Change" for the educational leaders, providing opportunity and capacity are the most important points in educational change. Teachers are disturbed by individuals who give lecture to them about change although they have no or very little information on what they do (Özden, 2005).

There were comprehensive changes in Turkish educational system in 2012. Radical changes were made in the structure and duties of the ministry with Decree Law No. 652 and in the educational system with Elementary and Educational Law No. 6287 and law concerning the change in certain laws.

Changes made in the central organization the ministry with Decree Law No. 652 had been anticipated by educational community and public. However, changes called "4+4+4" made with the law no. 6287 in the educational stages altered the system radically. Changes such as Project Fatih, reconstruction of secondary education, vocational education, education of teachers lasted one day. Radical decisions concerning the education of teachers and Pedagogical Formation lasted for only one week. The educators have been doing projects after projects without focusing. The enigmatic issue of Age 5 is yet to be solved; were the program, capacity of teacher, physical infrastructure inquired thoroughly? (Özdemir, 2012).

Innovative strategies applied by the organizations, the features of the environment they are within, the leadership style within the organization, way of internal and external communication of the organization, the organization norms are possible if only customer satisfaction and the expectations are met (Kabakçı, 2008).

In a social structure such as education in which planned changes and institutionalization is so hard to get, it is very hard to foreseen how these regulations will result in future. However, the structure and operation of the educational system must be run according to this changed, new legal framework. The roles and responsibilities of directors have increased even more within this structure. In our country where a consistent tradition of raising educational directors could not been adopted, urgent issues may prevent the important issues. We seem to have left the solution to time among many dilemmas. Will the picture be completed over time? Or will it be devastated? (Özdemir, 2012).

The aim of this study is to examine how the changes occurred at national education organization structure are perceived by teachers according to gender, professional career and the institution which schooling grade the teachers work.

METHOD

Participants

The population of the research consists of the teachers who serve at central primary, secondary and high schools affiliated with the Ministry of National Education in Gebze, Kocaeli. For the sample, total 287 teachers - 162 of them are females, 125 of them are male- were chosen randomly with cluster sampling method from 8 primary schools (33%), 8 secondary schools (33%) and 4 high schools (34%).

Instrument

Organizational Variation Scale

Survey of organizational change is composed of two sections: In the first section, there are questions concerning the parameters such as gender, professional seniority, branch, type of school, etc. The second section includes question concerning the determination of teachers' opinions on organizational change. Teachers are asked to choose one of the following answers: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree.

Ranges of participation degree were calculated with n-1/n formula. As a result, the range between 1 and 5 was calculated to be 0.8. Content validity scale was used for the validity of the scale. Content validity is to determine according to expert opinion whether the items of measuring tool are suitable for the tool, whether it represents the area to be measured. The scale items were examined, and necessary changes were made in accordance with the expert opinion.

The reliability of the scale was calculated in two stages, pilot study and actual study, by Tanrıöğen and Kurşunoğlu who developed the scale. The results obtained during the actual execution of the research, Reliability Coefficient for the Whole Survey is Alpha Cronbach 0.94.

Analysis of Data

SPSS (Statistical Package for Social Sciences) software package was used for the analysis of the data. Statistical methods such as standard deviation, t-test, Anova test was used to answer the sub problems of the research.

Results

Teachers' opinions on changes in the organizational structure of National Education differs according to their gender, educational stages and professional seniority.

Table 1. t-test results about the changes in the organization structure of National Education

Organizational Variation Scale	Gender	N	$\bar{X}$	Ss	t	p
Determination of the need	Female	162	32.93	4.33	2.226	0.027
	Male	125	31.75	4.60		
Planning	Female	162	82.22	9.39	-0.749	0.455
	Male	125	83.09	10.26		
Application	Female	162	37.59	4.68	1.378	0.169
	Male	125	36.86	4.22		
Assessment	Female	162	36.74	3.90	-2.145	0.033
	Male	125	37.95	5.65		
Philosophy	Female	162	51.20	5.82	1.305	0.193
	Male	125	50.35	4.90		

When Table 1 is examined, it is seen that the following score averages for the sub dimensions of the participant female teachers' opinions on the change in the organizational structure of National Education are higher than male teachers': $\bar{X}$=32.93 for determination of the need, $\bar{X}$ = 37.59 for the application and $\bar{X}$ =51.20 for the philosophy. Accordingly, it is seen that the following score averages for the male teachers' opinions on the organizational change are higher than female teachers' $\bar{X}$= 83.09 for the planning and $\bar{X}$ = 37.95 for the assessment.

The fact whether there is a significant difference between these score averages was tested with t-test. As a result of the analyses, it was found that there was no significant differences between female teachers' and male teachers' opinions on planning, application and philosophy dimensions of the organizational change; and a significant difference in the determination of the need for organizational change sub dimension (p<.027) and assessment of the organizational change sub dimension (p<.033).

Table 2. Results of one way variance analysis concerning whether scores of assessment of the organizational variation sub dimension differ according to the professional seniority parameter

Assessment of Organizational Variation			
Year of Professional Seniority	N	$\bar{X}$	Ss
1-5 years	81	35.89	0.490
6-10 years	97	37.52	0.457
11-15 years	37	37.65	0.968
16-20 years	33	39.61	0.671
21 years and above	39	37.18	0.797
Total	287	37.27	0.282

Source of Variance	K.T.	Sd	K.O.	F	P
Intergroup	346.060	4	86.515	3.955	0.04
Intragroup	6168.282	282	21.873		
Total	6514.341	286			

When Table 2 is examined, it is seen that there is a significant difference between the score averages of the assessment of the organizational variation sub dimensions for the participant teachers (p<.04). "Scheffe Test" to find between which groups this difference is is given in Table 4.12.

Table 3. Results of Scheffe Test comparison which shows the source of the significant difference of scores of the assessment of the organizational variation sub dimension according to the professional seniority parameter

DIMENSION	SENIORITY (I)	SENIORITY (J)	AV. DIFF. (I-J)	Ss	p
Assessment of Organizational Variation	1-5 years	6-10 years	-1.627	0.704	0.257
		11-15 years	-1.760	0.928	0.465
		16-20 years	-3.717*	0.966	0.006
		21 years and above	-1.291	0.912	0.735
	6-10 years	1-5 years	1.627	0.704	0.257
		11-15 years	-0.133	0.904	1.000

DIMENSION	SENIORITY (I)	SENIORITY (J)	AV. DIFF. (I-J)	Ss	p
	11-15 years	16-20 years	-2.091	0.943	0.298
		21 years and above	0.336	0.887	0.998
		1-5 years	1.760	0.928	0.465
		6-10 years	0.133	0.904	1.000
		16-20 years	-1.957	1.120	0.550
		21 years and above	0.459	1.073	0.995
	16-20 years	1-5 years	-3.717*	0.966	0.006
		6-10 years	2.091	0.943	0.298
		11-15 years	1.957	1.120	0.550
		21 years and above	2.427	1.105	0.310
	21 years and above	1-5 years	1.291	0.912	0.735
		6-10 years	-0.336	0.887	0.998
		11-15 years	-0.459	1.073	0.995
		16-20 years	-2.427	1.105	0.310

When Table 3 is examined, there is a difference between teachers with service time of 1-5 years and 16-20 years (p<.006).

Table 4. Results of one way variance analysis concerning whether scores of planning of the organizational variation sub dimension differ according to the educational stage parameter

Planning of Organizational Variation			
School Types	N	$\bar{X}$	Ss
Primary School	93	84.18	1.016
Secondary School	95	83.26	0.870
High School	99	80.46	1.065
Total	287	82.60	0.577

Source of Variance	K.T.	Sd	K.O.	F	P
Intergroup	726.175	2	363.088	3.878	0.022
Intragroup	26590.940	284	93.63		
Total	27317.115	286			

When Table 4 is examined, it is seen that the following scores were obtained for the planning of organizational variation sub dimension $\bar{X}$= 84.18 for the primary school teachers, $\bar{X}$= 83.26 for the secondary school teachers, and $\bar{X}$ = 80.46 for the high school teachers. The general average of the scores of organizational planning dimension was found to be $\bar{X}$= 82.60.

As a result of the statistical analyses, it is seen that there is a significant difference (p<.022) between the educational stages for the planning of organizational change sub dimension. "Scheffe Test" to find between which groups this difference is is given in Table 4.16.

Table 5. Results of Scheffe Test comparison which shows the source of the significant difference of scores of the planning of the organizational variation sub dimension according to the educational stages parameter

DIMENSION	School Types (I)	School Types (J)	AV. DIFF. (I-J)	Ss	p
Planning of Organizational Variation	Primary School	Secondary School	0.920	1.412	0.809
		High School	3.718*	1.397	0.030
	Secondary School	Primary School	-0.920	1.412	0.809
		High School	2.799	1.390	0.134
	High School	Primary School	-3.718*	1.397	0.030
		Secondary School	-2.799	1.390	0.134

When Table 5 is examined, it is seen that teachers participated in the study for the sub dimension of "planning of the organizational change" are among primary school teachers and high school teachers according to the educational stages they are working at. It was determined that score average of primary school teachers ($\bar{X}$=84.16) are higher than high school teachers' $\bar{X}$ (=80.46). As a result of the statistical analyses, it is seen that there is a significant difference (p<.022) between primary school and high school among the educational stages for the planning of organizational change sub dimension.

Table 6. Results of one way variance analysis concerning whether scores of assessment of the organizational variation sub dimension differ according to the educational stage parameter

Assessment of Organizational Variation			
School Types	N	$\bar{X}$	Ss
Primary School	93	38.27	0.454
Secondary School	95	37.02	0.518
High School	99	36.57	0.477
Total	287	37.27	0.282

Source of Variance	K.T.	Sd	K.O.	F	P
Intergroup	147.781	2	73.89	3.296	0.038
Intragroup	6366.561	284	22.417		
Total	6514.341	286			

When Table 6 is examined, it is seen that the following scores were obtained for the assessment of organizational variation sub dimension: $\bar{X}$= 38.27 for the primary school teachers, $\bar{X}$ = 37.02 for the

secondary school teachers, and $\bar{X}$= 36.57 for the high school teachers. The general average of the scores for the assessment of organizational change sub dimension was found to be $\bar{X}$= 37.27.

As a result of the statistical analyses, it is seen that there is a significant difference (p<.038) between the educational stages for the planning of organizational change sub dimension. "Scheffe Test" to find between which groups this difference is is given in Table 7.

Table 7. Results of Scheffe Test comparison which shows the source of the significant difference of scores of the assessment of the organizational variation sub dimension according to the educational stages parameter

DIMENSION	School Types (I)	School Types (J)	AV. DIFF. (I-J)	Ss	p
Assessment of Organizational Variation	Primary School	Secondary School	1.248	0.69	0.197
		High School	1.703*	0.68	0.046
	Secondary School	Primary School	-1.248	0.69	0.197
		High School	0.455	0.68	0.799
	High School	Primary School	-1.703*	0.68	0.046
		Secondary School	-0.455	0.68	0.799

When Table 7 is examined, it is seen that teachers participated in the study for the sub dimension of "assessment of the organizational change" are among primary school teachers and high school teachers according to the educational stages they are working at. It was determined that score average of primary school teachers ($\bar{X}$=38.27) are higher than high school teachers' ($\bar{X}$=36.57). As a result of the statistical analyses, it is seen that there is a significant difference (p<.046) between primary school and high school among the educational stages for the planning of organizational change sub dimension.

CONCLUSION AND DISCUSSION

According to the results, it seems that there is a significant relationship between determination of the need for organizational variation and the assessment levels according to gender; between the professional seniority of teachers and the assessment of the organizational change; and between the educational stages at which the teachers work and the planning and assessment of the organizational change.

Kurşunoğlu (2006) found in the study on "Primary School Teachers' Attitudes towards Organizational Variation" that there is no significant difference between teachers' attitude towards organizational variation according to gender parameter. In present study, it was found that there is a significant difference between the determination of the need for organizational change and the assessment sub dimensions; therefore it does not support the study. It was found that there is no significant difference between their attitudes towards organizational variation according to the professional seniority parameter. In present study, it was determined that there is a significant difference between teachers who have 1-5 and 16-20 years' service period for the assessment of the organizational change. It does not support the study in terms of this dimension.

The fact that it was found that there is no significant difference for all parameters in terms of the philosophy of the organizational change in Tekin's (2012) organizational change survey used in the study supports our survey study. There is no significant difference in terms of the planning, application, assessment and philosophy of the organizational change for the professional seniority parameter. In our study, it was found

that there is a significant difference in terms of the assessment of the organizational change for all parameters. It does not support the study in terms of this dimension.

In the Akpınar and Aydın (2007) study, teachers find the changes in terms of constructivism in education positive and embrace the thought that they are reflected on the Turkish educational system. This actually shows that teachers who were brought up with the mentality of "behaviorist" education are not affiliated much with this approach. Moreover the fact that teachers find the changes occurred in education may mean that they are not content with the current educational mentality, and open to innovation. In our study, it was concluded that determination of the need for organizational change, its planning, application and philosophy are deemed well and supported in terms of organizational change. The results can be considered as that teachers respond to the organizational change well and support the change in education, and this result support the study by Akpınar and Aydın (2007).

According to the results of the analysis performed on the difference between having a learning organization in terms of individual, team and organizational dimensions and teachers' opinion in the study "Primary School Teachers' Opinion on a Learning Organization (2013), it was found that there are significant differences in terms of participation levels to be a learning organization according to gender, branch and service period. It was concluded that there is a difference between new and senior teachers in terms of service period, and they are open to learning. The fact that schools at which primary school teachers serve are highly the learning organizations and have low levels of hindrance status was considered as a positive development.

According to the results of our survey study concerning the changes in the organizational structure National Education, the fact that it was found there is no significant difference in the gender, seniority and educational stages of teachers in terms of the application and philosophy of the organizational variation support the results obtained from the organizational learning.

Özmen and Sönmez (2007) came to the conclusion in their study "Roles of Agents in the Educational Organizations during the Changing Period" that it is important for the success of the changing period that teachers are brought up as individuals who are open to innovations, sharing and collaborative about the change. The fact that majority of the parameters positively support in terms of determination of need for organizational change, its planning, application and philosophy also supports the study by Özmen and Sönmez (2007).

It can be concluded that it is important to determine the deficiencies in the analysis, provide trainings for needs and earn competence.

In the study by Yaman (2010), it was concluded that since the change, according to the results of "Changing Period" analysis is a process that can be realized in the leadership of top management and in accordance with their directives, distribution of information is not much important. In our survey study of organizational change, the fact that there is no significant difference in all parameters in terms of the application of organizational change supports this study.

In the study by Çalık (2003) about the change management in education, it was found that the success of the change in education highly depends on that teachers, students, directors and other related parties who are the participants of the change believe in change and participate in the changing period voluntarily. In our study, it was concluded that the change is desirable, and this supports this study.

In the study "Strategic Planning in Educational Management" by Ereş (2004), Education has a social responsibility that protects the interests of Turkish Society. Strategic decision making in education is primarily the responsibility of senior directors of education. Since the decision made will be related to the educational institutions, it is highly critical to be aware of the responsibility of this important duty. Educational institutions should be considered as whole in strategic decision making, and the meronymy should be taken into consideration. Educational directors should handle with a strategy as a concept instead of making daily decisions in strategic planning and identify the possible problems in achieving the goals before the application and take the necessary precautions. The decision makers should realize that today's problems stem from yesterday's solutions and reshape the decision making mechanisms. Because the structure of the system will be reshaped, individuals will act according to the structure and, maybe, try to

see the forest as whole instead of a single tree. Within this context, leverage is needed. The decision makers should see the structure in the foundation but the events and arrive at a starting point, thinking within the terms of the changing period (Senge, 1993: 275).

The result obtained from this study, along with our survey study, support this through the significant differences in the determination of the needs for organizational change, its planning, and assessment.

According to Kuzubaşoğlu (2008), it is seen that female teachers' perceptions on the change management and effective school according to the averages based on the gender parameter have higher levels. Female teachers have opinions on good levels for both dimensions. In our study, it was found that there is a significant difference in the gender parameter for the determination of the needs for organizational change, and female teachers have opinions on good levels. While this result supports the study by Kuzubaşoğlu (2008), it was found that male teachers have opinions on good levels about the assessment of the organizational change.

Individual will be ready for the future to the extent that they know what is waiting for them. Planned approach towards the change, especially participation of teachers in decision making during the planning process may be effective in breaking the possible resistance against the change. And it is important that new roles highlighted by the changes in education are realized by teachers and the assessment is performed very well to adapt to these roles. In our survey study, it is meaningful that it was found there is a significant difference in all parameters (gender, professional seniority and educational stages) in terms of the assessment of organizational change.

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Pre-service Science Teachers' Views on Conceptual Change Strategies and Practices Carried out

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ABSTRACT

This research was conducted to determine pre-service science teachers' views related to misconceptions and conceptual change strategies at an urban university in Aegean Region, Turkey. It was a 5-week study with 28 students. Before the implementation, students were given a test which consisted of open-ended questions aiming to determine the pre-service science teachers' ideas about misconceptions and conceptual change strategies. On the first week of the study, students were given information on how to identify and remove the misconceptions by using conceptual change strategies. Different kinds of activities based on conceptual change strategies were also presented to them. Seven groups were formed with 28 people and they were asked to prepare activities based on conceptual change strategies related to a unit in middle school science curriculum. They chose a unit and prepared activities for two weeks. Secondly, they presented their activities in the classrom during two weeks. After presentations, a test which had the same questions with the 1st test was given to the pre-service science teachers. Also the 2nd test had three different questions, which was related to their opinions about the applications from the 1st test. The results of tests were analyzed qualitatively. Before the study, pre-service science teachers didn't know how to identify and remove misconceptions exactly. Thanks to this study, they learned conceptual change strategies and their applications. After the study, they said that they liked the activities based on conceptual change strategies.

Keywords:
Pre-service science teachers, conceptual change

1. Introduction

One of the main objectives of science education is to make students learn concepts meaningfully. Science subjects include many concepts and the relationships between these concepts; and internalizing the ideas that these concepts represent and using these concepts with their correct meaning is necessary in order to reach the upper steps of Science teaching. Misconceptions in students could cause to future problems in Science teaching. In order to make meaningful learning possible, these misconceptions should be removed. Conceptual change strategies can be used for removing students' misconceptions in science education. Provided that science teachers teach scientific concepts correctly, students can be expected to learn meaningfully. Therefore, pre-service science teachers should learn conceptual change strategies and how to apply them. According to the conceptual change model developed by Posner, Strike, Hewson & Gertzog (1982), first of all, there should be dissatisfaction with the existing conceptions; secondly, a new conception must be intelligible; thirdly, a new conception must appear initially plausible; and finally, a new concept should be fruitful (useful). If the new concept entails all these four features it is easily learned. Yet, if the new concept is in contradiction with existing concepts, it is acceptable and meaningful (Chiu, Chou & Liu, 2002;

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Duit & Treagust, 2003). Learners actively construct new knowledge by making use of their existing knowledge and experiences (Windschitl, 2002). The constructivist approach accepts that the learner constructs the knowledge him/herself both individually and socially. The objective of the Science and Technology course is to enable the students to understand the concepts and correlate them with the natural events which surround themselves. Therefore, the concept maps, mind maps, conceptual change texts, analogies, models and concept cartoons on which the mental constructions and organizations are shown, are significant as being tools that support the constructivist approach.

1.1. Concept Maps

Concept maps are defined as the schematic drawings which are used for showing the meaningful relations among the concepts in a proposition form (Novak & Gowin, 1984). The concept map is a practical technique as it helps students relate their previous knowledge with the new knowledge (Gürdal, Şahin & Çağlar, 2001). It is known that a concept can be remembered more easily if it is kept in mind both verbally and visually (Yalın, 2004). In science teaching, concept maps can be used in organizing the knowledge, discussing the meanings of concepts, identifying the misconceptions and remediating them, developing advanced level thinking skills and evaluating the things learnt (Atasoy, 2002; Ölmez & Geban, 2001). Students can use this mind tool as an organizational strategy to identify important concepts of a content domain and the interrelations among them (Dabbagh, 2001). Concept mapping is helpful in understanding what a concept entails and in promoting meaningful learning (Tekkaya, 2003). In general, it is a tool that is used to facilitate meaningful learning and help students to represent their knowledge in a visual form (Habok, 2012).

1.2. Mind Maps

Mind mapping is a visual technique that enables students to express their ideas and share their knowledge freely. By means of key concepts and codes on the subject and making use of pictures and figures, this technique gets both lobes of the brain active. Presenting the ideas that come to students' minds on a schema related to a specific structure of knowledge makes it easier for students to correlate them with the other structures of knowledge and see all the dimensions of the knowledge concerned as a whole (Keskinkılıç, 2009).

As the learner reflects all s/he knows on the subject on a piece of paper, it is possible to observe the concepts and relations among them as a whole. Mind maps cover a significant place in identifying students' misconceptions as they are the visual expressions of the schemas that the students have constructed in their minds. Because mind maps are the visual expressions of the schemas which students construct in their minds, mind maps are of great importance in identifying the students' misconceptions. Basically, making of a mind map starts with the expression of the main topic by a picture or image, then branches that go outwards from the main idea are drawn. On every branch, a keyword representing the topic or phrase is written to see the branches that are related to eachother (Ladge, 2002).

1.3. Conceptual Change Texts

In conceptual change texts, firstly students are given the misconceptions related to the subject and then they are scientifically explained why those misconceptions are wrong (Tekkaya, 2003). In conceptual change texts, students are asked a question in order to activate their misconceptions on the subject. Then students are shown their misconceptions and explained why their comprehension of the concepts is wrong. Students are given examples with scientific explanations of the subject and concepts so that the conceptual change would occur. Conceptual change texts are usually handed in to the students during the presentation of the subject and they are asked to analyze the texts either on their own or in groups. After making sure that students complete their reading and analysis of the text, they are expected to start a class discussion on the subject and have an exact and correct comprehension of the concepts (Ayas, Çepni & Ayvacı, 2005).

1.4. Analogies

Scientist use analogies to concentrate attention on specific aspects in order to explain something unfamiliar using something familiar. Analogies can help students identify what their misconceptions are, change their viewpoints and accept the concepts that are scientifically correct. In science teaching, the use of analogies can enable meaningful learning while teaching concepts and facts that are partly difficult to understand (Atav, Erdem, Yılmaz & Gücüm, 2004).

1.5. Models

A model is the name given to the supplementary teaching materials used in science teaching to make an object be better understood because the object is either too big or too small for students to comprehend. Models are especially important in science, because many real objects, systems, processes, or mental phenomena that scientists deal with cannot be observed and manipulated directly (Rotbain, Marbach-Ad & Stavy, 2006).
Models can be used in concretizing the abstract concepts and simplifying complex subjects (Şahin, Öztuna & Sağlamer, 2001). It is necessary to understand and create some specific similiar relations to form a model.

1.6. Concept Cartoons

Concept cartoons were created by Brenda Keogh & Stuart Naylor in 1991. Concept cartoons are among the useful tools that can be used to show different viewpoints to students and motivate them to start a discussion with the use of scientific method (Naylor, Keogh & Downing, 2007). The concept cartoon makes it possible to find out the students' previous way of thinking on a subject before teaching and remove their misconceptions (Saka, Akdeniz, Bayrak & Asilsoy, 2006). It is an effective technique that is used for both identifying and removing misconceptions. In teaching with concept cartoons, some alternative viewpoints on a scientific fact are drawn/reflected on a poster/piece of paper in a cartoon character form, however only one of the alternative viewpoints is scientifically correct. Ideas are represented by means of cartoon characters and then discussed in the classroom to find out the scientifically correct one. In this discussion, each character defends a different idea.

This study aims to identify misconceptions among 4th grade university students who will graduate as Science teachers and to reveal their ideas about removing misconceptions by ensuring conceptual change. The study also aims to reveal the efficiency of the practices carried out with pre-service teachers on conceptual change techniques together with pre-service Science teachers. During Special Teaching Methods course, a 5-week-practice was carried out towards developing conceptual change activities and the use of conceptual change strategies in Science classes. The aim of this was to help pre-service teachers understand the importance of conceptual change and have positive opinions towards using conceptual change activities during their classes after they start their job as a teacher.

2. Method

2.1. Participants

This research was conducted to determine the pre-service science teachers' views related to misconceptions and conceptual change strategies at at a urban university in Aegean Region. This study took five weeks and 28 students (21 female, 7 male) joined the study. Each group had three female and one male student. Also these groups were heterogeneousin terms of academic achievement inSpecial Teaching Methods I course.This 5-week study was carried out during Special Teaching Methods II course.

2.2. Research Design

This is a qualitative study. First, a qualitative assessment tool entailing 5 open-ended questions was administered to pre-service teachers in order to find out their ideas and prior knowledge on identifying misconceptions. For one week, trainings on definition and classification of misconceptions, the importance of identifying misconceptions, misconceptions in science teaching among students (i.e Sugar dissolves in water." "As the temperature of a substance increases, so does its mass."), how to remove misconceptions and conceptual change strategies were provided. For a 2-week period, 28 pre-service teachers-in groups of 4-prepared activities based on conceptual change strategies on a certain Science unit they chose and in another 2-week period, the pre-service teachers presented the activities they prepared. Later, the open-ended questions that were initially asked to the pre-service teachers were administered again together with other open-ended questions about the implementation carried out.

2.3. Data Collection

The data in the study were collected using open-ended questions on conceptual change strategies. Expert opinions from three academics working in the field of science education were taken for the open-ended questions prepared. Organized based on the expert opinions, this assessment tool was implemented on four pre-service science teachers to finalize it. Five open-ended questions on conceptual change strategies were administered on students. Before the implementation, pre-service science teachers were given the test which contains open-ended questions to determine their ideas about misconceptions and conceptual change strategies. The open-ended questions are given as follows:

1. What is your understanding of the term "misconceptions"? As a pre-service science teacher, do you think it is important for the teacher to know the misconceptions of his/her students? Why? How do you think you can identify the misconceptions of middle school students?

2. What is your understanding of the term conceptual change? How do you think that a learner can have the conceptual change on a subject?

3. What sort of special features should the new concept bear in order to realize the conceptual change and learning of the subject by the student?

4. Do you think it is important to remove the students' misconceptions? Why?

5. What kind of studies do you think can be done in order to remove students' misconceptions? What techniques can be used in removing misconceptions?

On the first week of the study, pre-service science teachers were explained about misconceptions on science subjects, determining and removing the misconceptions by using conceptual change strategies. The examples of activities related to concept mapping, mind mapping, conceptual change texts, analogies, models and concept cartoons on the unit of "Cell Division and Heredity" based on conceptual change strategies were also presented to them. 28 people formed seven groups of four people each and they were asked to prepare activities based on conceptual change strategies related to a unit in middle school science program. They chose a unit and prepared activities during two weeks and they presented their activities in classrom environment for two weeks.

After presentations, a test which had the same questions with the 1sttest was given to the pre-service science teachers.After this test was administered, three open-ended questions were carried out to the students in order to find out their opinions on the practices carried out. The open-ended questions related to practices carried out are given as follows:

6. What do you think about the applications which are related to the conceptual change approach and techniques?

7. Which technique do you like best while you are preparing activities using conceptual change techniques? What makes you like this technique best? (Which conceptual change technique did you use to prepare your activity?)."

8. When you become a teacher, do you think that you would use conceptual change techniques in your classes? What benefits do you think the activities would provide by using these techniques?

2.4. Data Analysis

The results of the tests were analyzed qualitatively. The descriptive analyses of the data collected via open-ended questions were made; the data were reduced, categorized and put into tables. The decoding of the semi-structured interviews, recorded using a voice recorder was controlled by an independent academician, as well as the researcher to ensure the correctness of the decoding. The data from the open-ended questions were examined by one more Science academician; and themes and codes of these were formedby two experts; and the reliability percent between the two was found as 91%. As for Miles & Huberman (1994), the analysis of

the data collected from an interview follows three consecutive steps, each affected by another; reduction of data, data display and drawing conclusions and validation. In order to reduce the data, raw data are coded based on certain categories (Patton, 1990). Within the framework of these categories, the data was coded, the essential parts were extracted and the remaining parts were discarded. Besides, in order to reflect the pre-service science teachers' opinions, direct quotations were included.

3. Results

Pre-service science teachers' answers to the open-ended questions at the beginning of the study (1st test)/at the end of the study (2nd test)and the frequencies related to them are given in this section of the study. The answers and related frequencies that students haveon thefirst question are shown in Table 1.

Table 1. Students' Views related to 1st Question

Themes	1st test (f)	2ndtest (f)	
The definition of misconceptions	Wrong knowledge about the subject	12	14
	Lack of knowledge about the subject	6	5
	A concept is used out of its real meaning	5	3
	A concept is misunderstood or understood in a different way	2	7
	The concepts about the subjects are put in wrong schemas by students.	1	5
	The students confuse their knowledge about a concept with other concepts	3	4
	Wrong acquisitions gained by daily experience or previous knowledge	3	3
	Wrong construction of concepts in mind	2	5
The importance of knowing the students' misconceptions	The clash of the students' previously acquired knowledge and daily experience with the scientific knowledge	4	11
	Teaching strategies, methods and techniques are chosen accordingly	5	9
	To remove misconceptions	1	6
	To avoid an imcomplete or wrong learning of the subject	9	7
	To avoid difficulties in understanding the subject/constructing the knowledge	2	1
	Because it is the teacher's duty to provide feedback and remove misconceptions	1	2
	To realize meaningful learning	2	8
	To prevent a possible mental confusion or cognitive imbalance on the subject	4	7
	To assure students' self-confidence	-	2
	To avoid waste of time	1	3
	To realize an effective teaching	_	2
How the misconceptions are identified	Asking questions/ question-answer technique	18	20
	The students are asked to use concepts in a sentence	2	_
	The students are asked to give definitions of concepts	5	_
	Activities	2	1
	Scenario	3	-
	Plays	1	-
	Words matching	2	2
	Active learning	2	-
	Discussion	1	1
	Brain storming	2	-
	Drama	1	-

Experiment	2	1
Observation	2	-
Constructed grid	-	1
Concept maps	7	17
Concept cartoons	-	9
Mind maps	2	9
Conceptual change texts	-	7
Analogy	-	6
Model	-	4

When Table 1 is examined, it is seen that pre-service teachers have more scientifically correct answers on the definition of misconceptions and the importance of knowing students' misconceptions in the 2ndtest.

It was indicated that misconceptions could be identified with question-answer technique; and it was stated in the 2ndtest that it could also be identified using concept maps, concept cartoons, mind maps, conceptual change texts, analogy and models. Examples of pre-service teacher expressions in the 2ndtest are given below:

Misconceptions are the wrong knowledge of concepts on a subject, and wrong organization of information in wrong schemes. It is important to know the misconceptions of students because new information is constructed over the previous ones. If there are problems in the foundation of a building, it will collapse in time (12th pre-service science teacher).
In the first class when we start a new unit, I can ask students what certain concepts mean to them and ask them to draw concept maps related to the subject. I can also ask them to create mind maps and examine these maps and identify misconceptions. After they learn the subject and question meaningful learning, I can ask students evaluate their own mind maps and thus, make them see their own misconceptions. I think this will be effective in the process of meaningful learning (25th pre-service science teacher).
We can identify students' misconceptions via such techniques as concept maps, mind maps, concept cartoons and models (17th pre-service science teacher).

The answers and related frequencies that students have on the second question are shown in Table 2.

Table 2. Students' Views related to 2nd Question

Themes		1sttest (f)	2ndtest (f)
The definition of conceptual change	Internalizationand adaptation	5	-
	Removing the learner's misconceptions and correcting them	13	18
	Replacing old concepts by new ones	3	6
	Different meanings are put on something already known	4	-
	Learning new concepts	1	-
	Reconstruction of knowledge related to a concept	1	1
	To replace a mental schema by another one	2	1

When Table 2 is analyzed, it is seen that in the 2ndtest, pre-service teachers have more scientifically correct answers on the definition of conceptual change and the features that the new concept should have in order for conceptual change to occur. Examples of pre-service teacher expressions in the 2ndtest are given below:

Conceptual change is the changing of old knowledge of the students' with the new one through various methods (17th pre-service science teacher).
For conceptual change to occur, people should first come across with a condition that does not fit with their existing shemas in their minds. At this point, there will be an imbalance. And then, they will make evaluations on the new case and will organize their existing schemas again. For example, a child's "Birds fly" schema will change to "Some birds fly" after they learn ostrich"(18th pre-service science teacher).

The answers and related frequencies that students have on the third question are shown in Table 3.

Table 3. Students' Views related to 3rd Question

Themes		1st test (f)	2nd test (f)
The features which the new concept must carry for the conceptual change to occur	Be realistic	2	1
	Be easy to remember	1	-
	Be useful	2	18
	Be easily understandable	5	15
	Be persuasive	2	2
	It must be related to the previous concepts	1	-
	It must be suitable for the level of the students	1	-
	Be stable	2	1
	Be acceptable.	2	14
	Be correctable	1	8
	Be verifiable	2	6
	Be clear and concise	4	7
	Be logical	5	17
	Must draw attention	2	3
	Must be aware of the lacking and wrong parts of the previous knowledge	2	-
	Must be suitable for the daily life.	-	2

When Table 3 is examined, it is seen that pre-service teachers have more scientifically correct answers on the features which the new concept must carry for the conceptual change to occur in the 2nd test. Examples of pre-service teacher expressions in the 2nd test are given below:

The new concept should be easy to keep in mind. It should be relevant to real-life. The student should be able to use this information. It should be practical. It should not contradict with certain concepts and should provide benefits to the student (2nd pre-service science teacher).

The new concept should be logical (15th pre-service science teacher).

The answers and related frequencies that students have on the third question are shown in Table 4.

Table 4. Students' Views related to 4th Question

Theme		1st test (f)	2nd test (f)
The importance of removing students' misconceptions	Understanding and learning the lesson	5	3
	In solving the problem	1	4
	To use the knowledge in future	1	1
	For meaningful learning	4	15
	To prevent wrong learning and construction	10	21
	To prevent misconceptions from blocking the new knowledge	1	3
	To increase the students' academic success	1	4
	To prevent the mental confusion	5	12
	To provide more effective education and learning.	1	8
	For the realizaion of exact and correct learning	2	6
	For permanent learning	3	10

All pre-service teachers indicated that removing the misconceptions of the students was important. When Table 4 is examined, it is seen that in the 2nd test all pre-service teachers have more scientifically correct answers

regarding the importance of removing students' misconceptions. Most of the pre-service teacher (f=21) indicated that removing misconceptions was important to prevent wrong learning and constructing. Examples of pre-service teacher statement in the 2ndtest are given below:

It is important to remove students' misconceptions. Because adding new information on existing wrong knowledge is like useless and makes learning more difficult (15th pre-service science teacher).
It is important to remove misconceptions. As it is known, our teaching programme has a helical structure organized with the principle of continuity of the subjects. For example, a student who did not learn the meaning and importance of substance or learn it wrong will never learn the granulous structure of the substance (19th pre-service science teacher).
It is important to remove misconceptions. Because these misconceptions inhibit new information and the child would not be open to change. Wrong knowledge will direct to wrong ways and creates barriers for new cases (22nd pre-service science teacher).
The answers and related frequencies that students have on the fourth question are shown in Table 5.

Table 5. Students' Views related to 5th Question

Theme		1sttest (f)	2ndtest (f)
The techniques which are removed the misconceptions	Concept cartoons	-	14
	Conceptual change texts	-	10
	Concept maps	1	12
	Mind maps	-	8
	Analogy	-	12
	Model	-	9

When Table 5 is examined, it is seen that in the 2ndtest, pre-service teachers have more scientifically correct answers related to the techniques used to remove misconceptions and their use. Pre-service teachers stated that they used these techniques at the beginning of lesson for determining students' misconceptions and at the end of lesson for evaluation and feedback. Examples of pre-service teachers' statement in the 2ndtest are given below:

Conceptual change text, concept cartoons and analogies could be used (20th pre-service science teacher).
I believe that concept cartoons will attract students' interest more and will make students see the subject as a game and make understanding easier. Also, concept and mind maps could be used (27th pre-service science teacher).

The answers and related frequencies that students have on the fifth question are shown in Table 6.

Table 6. Students' Views related to 6th Question

Theme	Codes	f
The ideas about the presentation and applicatios	Efficient	7
	Fun	3
	Explanatory	6
	Nice	3
	Comprehensible	5
	Useful	8

When Table 6 is examined, it is seen that pre-service teachers found the practices towards conceptual change techniques efficient, fun, explanatory, nice, comprehensible and useful. Examples of pre-service teacher statements are given below:

I did not know much about this subject before. I can say that things that I wonder have been clear now. It was nice and efficient (18th pre-service science teacher).

I see this practice useful. I did not know what to do to remove misconceptions and now I learned. It is possible to make a class fun with different strategies (24th pre-service science teacher).

The answers, related frequencies that students have on the sixth question are shown in Table 7.

Table 7. Students' Views related to 7th Question

Theme		Codes	f
The best technique is liked	Conceptual change text	Useful	2
		It identifies the misconceptions that occur.	1
	Analogy	Meaningful	1
		It increases the remaining.	1
		Misconceptions can be removed easily.	1
		It improves the power of imagination.	1
		It increases the creativity.	1
		Enjoyable	1
		Permanent	1
	Concept cartoon	The aim is clear, short.	3
		Attractive	1
		Fun	3
		Useful	3
		Easy to remember	1
		It increases the creativity	1
		Visual	1
	Model	Student centered	1
		Visual	1
		Permanent	1
		It is effective to understand concept or any subject.	1
	Mind map	It improves the creativity	2
		Useful	1

When Table 7 is examined, it is seen that while pre-service teachers prepare conceptual change activities they liked concept cartoons, analogies, models, mind maps and conceptual change texts most. Examples of pre-service teacher statements are given below:

Cartoon and analogies. Because cartoons are both fun and visual and also because these activities are based on creativity, it was fun to generate ideas (12th pre-service science teacher).
What I liked most was "the trip of food" analogyy activity. We used analogy technique. We associated digestive system with workers doing road work and created the material (18thpre-service science teacher).
I liked concept cartoon most. Because it enables to remove misconceptions without any tools and in an enjoyable way. It is a practical technique. It can be used in every school (19th pre-service science teacher).

The answers, related frequencies that students have on the seventh question are shown in Table 8.

Table 8. Students' Views related to 8th Question

Theme	Codes	f
The benefits of conceptual change activities	To remove misconceptions	18
	To provide meaningful learning	10
	It helps to identify misconceptions.	8
	To make students more active	7
	To help students learn more easily	4
	It is enjoyable.	4
	It saves time.	2
	It draws attention of the students.	10
	To provide permanent learning.	12
	It makes teacher and students creative.	8

All pre-service teachers indicated that they were thinking to use conceptual change techniques in their classes after they start working. When Table 8 is examined, it is seen that most of the teachers stated that these techniques will enable identifying, removing misconceptions and ensure meaningful learning. Examples of pre-service teacher statements are given below:

…While preparing activities, I thought that I was a student and recognized that it would be useful. I think that when they are attractive, they are also easy to remember and fun (12th pre-service teacher).
…Identifying misconceptions of students and removing them will increase the efficiency of instruction. And this will make both the teacher and the student creative(19th pre-service science teacher).
…I think that they are techniques that save students from memorizing, make them think and ensure permanent learning (27th pre-service science teacher).

4. Discussion and Conclusions

The aim of the study, carried out with pre-service Science Teachers, was to reveal the efficiency of the practices related to conceptual change techniques. This study also includes pre-service science teachers' views about misconceptions, conceptual change strategies and identifying and removing misconceptions. The descriptive analysis of the data collected from open-ended questions in the assessment tool administered to the pre-service science teachers indicated that most of them did not know conceptual change approach precisely as well as how to identify misconceptions. Before the study, the participants didn't know how to identify and remove misconceptions exactly. During the study, they prepared conceptual change activities aiming at removing misconceptions such as "In a cold place, metal materials are colder than wooden materials though being in the same environment.", "Temperature is transferred.", "Hard substances transmit heat more slowly.", "Heat is transmitted the most rapidly in air." Thanks to this study, they learned conceptual change strategies and their applications. After the study, they said that they liked the activities based on conceptual change strategies and they also expressed that they would use conceptual change strategies in their classes in future.Recognizing that students have misconceptions and knowing the ways to remove these misconceptions is the first step taken towards meaningful and permanent learning (Chiu, Guo & Treagust, 2007). Science Curriculum is a helical programme; and those subjects or concepts that are not learned meaningfully will make it difficult to learn other concepts and subjects in the next years. Therefore, it is important that teachers identify the misconceptions of their students relating to Science subjects and use conceptual change approach towards removing these misconceptions for meaningful and permanent learning. Learning Science concepts clearly will make it easier to learn the future subjects (Hewson & Hewson, 2003). Learning basic concepts in a wrong way will cause to the wrong learning of the knowledge to be constructed (Bayram, Sökmen & Savcı, 1997). Using techniques based on conceptual change strategies, the efficiency of which has been proved in studies (Şahin, 2002; Holland, Holland & Davies, 2004; Sağırlı & Macaroğlu-Akgül, 2004; Öner & Arslan, 2005; Candan, Türkmen & Çardak, 2006; Yaşar, 2006; Şaşmaz-Ören, Ormancı, Babacan, Çiçek & Koparan, 2010) will be more effective in removing misconceptions. Conceptual change strategies ensure meaningful learning and replacement of misconceptions by scientifically-accepted concepts (Geban & Ertepınar, 2001). Using concept maps and conceptual change texts in teaching Science is among the leading techniques in removing misconceptions (Ölmez & Geban, 2001). Analogies, mind maps, concepts cartoons and models could also be

used to remove misconceptions. Identifying students' misconceptions in Science classes and using methods and techniques based on conceptual change strategies to remove these misconceptions (conceptual change texts, concept maps, mind maps, concept cartoons, analogies, models etc.) will ensure meaningful learning. Identifying student misconceptions on a subject by making literature review, implementing concept tests on students, asking open-ended questions and semi-structured interview questions or by making them prepare concept maps; and organizing activities towards removing students' misconceptions are necessary for meaningful learning. Teaching concepts meaningfully is of great importance for science education. It is necessary for meaningful learning to identify, remove and correct students' misconceptions. This study helped the pre-service science teachers learn conceptual change strategies and they prepared and presented conceptual change texts, concept cartoons, , concept maps, mind maps, analogies and models. Informing pre-service science teachers on identifying misconceptions and on the strategies that could be used to remove misconceptions; and preparing sample activities on this topic will ensure that the students they will teach will learn meaningfully.

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Pre-service Teachers' Perceptions of Technology and Multiliteracy Within the Inclusive Classroom

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ABSTRACT

The increased use of technology in today's schools has created new possibilities for pre-service teachers and their students. Rather than limiting the use of technology based on student ability, it is now possible for pre-service teachers to develop integrated multiliteracy lessons that integrate technology and enhance student learning. Technology in the form of apps for iPads, iPods, and desktop computers enable teachers to achieve this goal; however, pre-service teacher's perceptions of technology and teacher self-efficacy in relation to technology may influence whether technology is integrated into their lessons. This paper examines 144 primary/junior pre-service teacher's self-efficacy and perceptions of technology before and after developing an app based multiliteracy lesson plan. Findings suggest that new teachers were more comfortable with the idea of integrating technology into their lessons after researching and completing a lesson plan focusing on the use of apps within an inclusive classroom.

Keywords:
literacy, pre-service education, technology

1. Introduction

While the development of students' literacy skills (Sandford & Madill, 2007) has always been a focus of education, the emergence of new technologies has changed both the nature of literacy and its corresponding pedagogy. Research has demonstrated (Garcia & Friedman, 2011) that the integration of technology into the curriculum is beneficial for the development of critical thinking, problem-solving skills and multiliteracies. It is imperative that teacher education programs adjust to meet the changing nature of literacy by providing instruction in multiliteracy and creating opportunities for pre-service teachers to practice new literacy methodologies (Ajayi, 2011). This paper examines how providing pre-service teachers with the opportunity to develop a multiliteracy lesson plan for an inclusive classroom influences their understanding of multiliteracy and their self-efficacy and perceptions of technology.

The inclusive classroom is being embraced globally (Flewitt, Nind, & Payler, 2009) to ensure that all students regardless of exceptionality, socioeconomic status, culture, ethnicity, or any other trait that may influence an individual's ability to access an education is adequately supported in the classroom. As a result, the teaching and learning environment of the regular classroom has evolved to ensure that all students receive a common, quality education (Leyser, Zeiger, & Romi, 2011) particularly in the area of literacy (Flewitt et al., 2009). However, students from diverse populations may encounter difficulties with literacy when it is viewed as simply the act of reading and comprehending printed material.

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Literacy is not defined by a set of skills learned independently in schools that are then transferrable to the outside world. Learning and teaching are now occurring in new digital landscapes that allow students to represent their ideas and thoughts usingmultimodal formats to a global audience (Lam, 2007). In addition, literacy instruction is being modified to encompass the skills of creativity, innovation, critical thinking, problem solving, communication and collaboration (Potts, Schlichting, Prigden, & Hatch, 2010). These skills are fundamental to a curriculum integrated with technology and encompass many of the essential learning goals deemed necessary for today's learner (Ontario Ministry of Education, 2012).

Lankshear and Knobel (2003) have created the term 'new literacies' in consideration of the fact that, "being literate involves much more than simply knowing how to operate the language system" (p. 12). New literacies involve processes such as judging the value of various Web sites or maneuvering through hypertext (Kulikowich, 2008). For example, today's students are interacting with new literacies on a daily basis, including Web based reading and writing, e-books, participating in social networking spaces, instant messaging, and blogging to name just a few (Lankshear & Knobel, 2003). In this world of new literacies, students are using a number of different technology systems (cell phones to Internet) in order to solve a problem or complete a task (Kulikowich, 2008): "All of these practices impact our conceptions of literacy and, ultimately, influence the definitions of literacies in the classrooms, at home, and at work" (Leu et al., 2004).

Currently there is a disconnect between the traditional view of literacy as a linear, text-based process that can be measured by formal assessments of academic achievement (Giampapa, 2010) and the view of literacy as a multifaceted complex set of skills and resources, which enable the development of meaning from all types and forms of text (Ontario Ministry of Education, 2004). The New London Group (2000) recommended that literacy pedagogy change from the "formalized, monolingual, monocultural, and rule-governed forms of language" to one that is much more expansive (p. 61). As a result, the New London Group introduced the term *multiliteracy* to acknowledge the culturally and linguistically unique interrelationship between print, visual, and audio texts, and communication forms of reading, writing, speaking, and listening. The term multiliteracy, therefore, emphasizes the fact that literacy can no longer be viewed as simply the act of reading and comprehending printed material, but must embrace the multimodal approaches through which the consumption, production, evaluation and distribution of text changes the way individuals interact with text, as well as the nature of the text itself (Borsheim, Merritt, & Reed, 2008; Pianfetti, 2001).

Since it is no longer enough to prepare students for a world of literacy that deals primarily with paper and pencil, it is imperative that pre-service teachers are provided with opportunities to practice using technology as a tool for developing students' multiliteracy skills. According to Barone and Wright (2008), today, effective literacy teaching should include a variety of text formats (e.g., digital and hybrid texts), an adjustment of reader expectations (reading nonlinearly; Warschauer, 2006), and new literacy activities (blogs, wikis, podcasts). However, research has demonstrated that bringing new literacies into the classroom is not always easy for educators especially when the literature has revealed that 66% of teachers believe they are not prepared to use this new, emerging technology (Kajder, 2005). Compounding the situation is the fact that teachers have reported problems with a lack of technology, time, resources, knowledge and skills (Barone & Wright, 2008). As a result teachers may refrain from using technology and the Internet in their daily classroom lessons and experience difficulty connecting standards-based assessment with the use of technology (Davis & McClain, 2003; Friedman, 2006).

A distinguishing factor in whether a teacher will embrace multiliteracy and technology, despite the aforementioned barriers, is their level of teacher self-efficacy. Teacher self-efficacy refers to a teacher's belief that he/she can perform a certain action in order to achieve a given goal (Bandura, 2006; Browne, 2009; Teo, 2009). As a result, teachers who have a high sense of self-efficacy are more open to new ideas and more willing to try new methodologies (Leyser, et al., 2011). Thus, a teacher's level of self-efficacy is an important variable within the classroom environment because it affects the effort teachers will invest in their teaching, which directly impacts student achievement, motivation and the students' own self-efficacy (Tschannen-Moran & Hoy, 2001). In terms of technology, a teacher's self-efficacy refers to a teacher's belief that he/she has the ability to work effectively with technology.If a teacher's self-efficacy is low, the teacher will become easily frustrated and will be less likely to persevere when faced with technological challenges or difficulties (Anderson & Maninger, 2007; Kumar, Rose, & D'Silva, 2008; Teo, 2009). Currently, many teachers are still not prepared to effectively integrate these devices into their teaching and levels of self-efficacy generally remain quite low. As

Graham and Richardson (2012) have stated, "within the current public education schooling experience, there would still appear to be a distinct emphasis on putting the technology well before the pedagogy" (p. 7). Harris and Hofer (2009) refer to the need for a grounded approach to technology integration based on content, pedagogy, and instructional planning.

One promising and popular model that has been developed to address the various levels of technology integration in classrooms is the SAMR model. Developed by Puentedura (2003), SAMR is an acronym for substitution, augmentation, modification, and redefinition. Working through these levels allows teachers to build on their comfort with the integration of technology in their own learning environment and thus their self-efficacy. The goal is to have teachers work towards the higher levels of augmentation and modification, which is reflective of transformative teaching (Puentedura, 2003).

To develop pre-service teachers' self-efficacy for teaching with technology, teacher education programs must integrate the technological skills and perspectives that pre-service teachers currently hold with pedagogical practice (Ajayi, 2011; Puckett, Judge, & Brozo, 2009). In addition, research suggests that pre-service teachers who participate in a technology-enhanced teacher education program are less anxious about computers, their belief in the value of using technology to enhance teaching and learning as well as their self-efficacy toward integrating technology in the classroom significantly improve (Lambert & Gong, 2010). One way to integrate technology into education programs is to encourage pre-service teachers to analyse technology and media to determine how it can support and expand learning opportunities of all students within the inclusive classroom environment. Such an approach would enable pre-service teachers to formulate new and innovative approaches to enhance literacy development through multi-modal learning environments. Multi-modal learning supports the implementation of individualized learning strategies (Brown & Lockyer, 2005/2006) thereby fostering the cognitive processing and critical thinking skills that students need for life long learning.

Ajayi (2011) examined pre-service teachers' attitudes and perceptions towards teaching multi-literacies and found that pre-service teachers are aware that the nature of literacy has evolved to correspond with technological development. In particular, the pre-service teachers acknowledged and accepted that accessing and reading information from multi-media technologies are an important aspect of literacy. Despite this acknowledgement, Ajayi's participants reported that they were concerned about their preparedness to teach in a multiliteracy classroom. Ajayi's findings correspond to other research (i.e., Judge & Simms, 2009; Teo, 2009), which indicates that teacher training is one of the key attributes for the integration of technology into the classroom.

A main limitation of both Ajayi's (2011) and Teo's (2009) research is that the pre-service teachers were not enrolled in a technology-based teacher education program. Therefore, unless pre-service teachers develop confidence in their ability to use and integrate technology in the classroom, they will be unlikely to attempt to use it or will do so with limited effort, perseverance and resiliency (Albion, 1999). Furthermore, pre-service teachers should be introduced to technology during their teacher education program by integrating technology throughout all aspects of their studies (Corkett, Kariuki, Brackenreed, & Waller, 2011). Such an approach may increase the likelihood that pre-service teachers will integrate technology into their future classrooms.

Similarly, Mouza and Karchmer-Klein (2013) have recognized the need for ongoing professional development in learning to teach with technology for educators. The instability of technology requires that teachers need to be made explicitly aware of the constant changes to both the hardware and software applications. In addition, teaching with technology is a complex process and involves the interaction between content, pedagogy and technology (Koehler & Mishra, 2008). This new and distinct knowledge of the integration of technology into teaching has been named the Technological Pedagogical Content Knowledge (TPACK) (Angeli & Valanides, 2009; Mishra & Koheler, 2006; Mouza & Karchmer-Klein, 2013). However, the TPACK model differs from the SAMR model in that it does not distinguish specific stages of technology integration, rather, it provides a more holistic lens for studying the development of technology integration amongst educators (Mouza & Karchmer-Klein, 2013).

Further, Mouza and Karchmer-Klein (2013) found case development that integrated the elements of TPACK was an effective way for pre-service teachers to draw connections between content, pedagogy, and technology and foster retrospective reflection-on-action. It is important that, "In their professional preparation, teachers

need to acquire skills to reflect both in the moment of teaching and retrospectively" (p. 131). Reflection is an important component of teacher preparation programs since it is through the act of reflecting that teachers' can consider why they made the certain choices in their teaching practice and ways of improving their instructional strategies to improve student learning (Lee, 2005).

According to Mouza and Karchmer-Klein (2013), the case study method provides opportunities for per-service teachers to participate in focused reflection that allows them to discern and create relationships with technology, content, and pedagogy. To begin, pre-service teachers are required to create and implement technology-integrated lessons, reflect on the execution of their planned lessons with their students, and finally compose a narrative, which fosters the consideration of their teaching practice in a methodical fashion. "These activities are critical to helping pre-service teachers make insightful shifts in their thinking about technology and its relation to specific content and pedagogy" (p. 131). In their study, Mouza and Karchmer-Klein (2013) found that the case study approach was in fact beneficial for assisting pre-service teachers in understanding the connections between technology, content, and pedagogy, and strengthening their TPACK.

In one northern Ontario University, technology (e.g., Smartboards, computers, iPads, assistive technology programs and devices) is integrated throughout all aspects of its education program. Providing pre-service teachers with the opportunity to explore and use technology both within their courses and while on practicum, may influence their perception and self-efficacy with integrating technology into their lesson plans for the purpose of mulitliteracy instruction. The current study examines whether pre-service teachers who develop a multiliteracy lesson plan that integrates technology report changes in their (a) perceptions of technology, (b) self-efficacy for technology and (c) understanding of multiliteracy.

2. Method

2.1 Participants

The participants consisted of 143 pre-service teachers (female = 122; male = 21; age range 22-44) enrolled in the primary/junior division of a northern Ontario university's Bachelor of Education degree program. The participants were recruited from their mandatory Special Education/Educational Psychology class. All of the participants owned a MacBook Pro computer, 61% owned an iPhone, 77% owned an iPod, and 1% owned an iPad. Participants reported spending an average of 46 hours per week on the computer and an average of 8 hours per week on iTunes. All participants completed an assignment for the course that required the pre-service teachers to create a multiliteracy-based lesson that incorporated one or more special education App with one or more curriculum-based App (e.g., language, geography, science, math, etc.).

2.2 Task

To determine pre-service teachers' preceptions and self-efficacy with integrating technology into lesson planning for the purposes of mulitliterate instruction within an inclusive classroom, the pre-service teachers who participated in the study completed a 63 five-point Likert-scale questionnaire. The five-point Likert scale was broken down into the following categories; (1) not at all; (2) not really; (3) undecided; (4) somewhat; (5) very much. The questionnaire was administered prior to completing the assignment (November, 2011) and upon completion of the assignment (December, 2011).

3. Results

Table 1. Total percentage of responses to 'Very Much' for Self-Efficacy Questions

Questions	Pre-Test	Post-Test
1. I believe that a variety of technologies are important for student learning.	44%	52%
2. I believe that incorporating technology into instruction helps students learn.	43%	50%
3. I believe that student motivation increases when technology is integrated into the curriculum.	42%	46%
4. I believe that technology helps teachers do things with their classes that they would not be able to do without it.	38%	36%
5. I believe that knowledge about technology will improve my teaching.	51%	46%
6. I believe that technology facilitates the use of a wide variety of instructional strategies designed to maximize learning.	31%	34%
7. I believe that students should be required to use a variety of software tools and electronic resources to support learning.	12%	20%
8. How confident are you that you can use technology to focus classroom activities on the needs of each learner.	17%	24%
9. Technology helps me meet the individual needs of students in my classroom.	18%	27%
10. Do you believe you could use technology to address needs of students with exceptionalities?	18%	21%
11. I am aware of a variety of apps that address needs of students	4%	15%
12. I believe that technology might interfere with "human" interactions between teachers and students.	4%	4%
13. I believe that I can integrate computer activities into the curriculum whenever possible.	20%	29%
14. I believe that technology plays an integral role in supporting content learning in my class.	13%	28%

Responses to the pre-test questions pertaining to pre-service teachers' perceptions of technology revealed that more than half of the participants surveyed believed that technology was not important to either student learning (56%) or student motivation (58%). Additionally, slightly more than half of the respondents (51%) believed that an understanding of technology would improve their teaching. Despite the fact that the

participants reported spending an average of 46 hours per week using the computer, the responses to the pre-test questions pertaining to pre-service teachers' technological self-efficacy revealed and a very small percentage of pre-service educators (17%) reported feeling confident about using technology to address the needs of each student. Furthermore, 80% of those surveyed reported a lack of confidence in integrating computer activities into their instruction (see Table 1).

Table 2. Total percentage of 'Very Much' responses to beliefs about multiliteracy

Questions	Pre-test	Post-test
1. I believe that a multiliterate student is one who can read and write on paper.	15%	23%
2. I believe that a multiliterate student is one who can read critically.	23%	30%
3. I believe that a multiliterate student is one who can use computers.	23%	30%
4. I believe that a multiliterate student is one who can work with numbers.	19%	28%
5. I believe that a multiliterate student is one who can understand visual information.	19%	32%
6. I believe that a multiliterate student is one who can understand symbolic information.	19%	31%
7. I believe that a multiliterate student is one who can read music.	15%	28%
8. I believe that a multiliterate student is one who can use the Internet.	21%	32%
9. I believe that a multiliterate student is one who can play video games.	10%	25%
10. I plan to continue searching for resources on the Internet to help me teach a subject matter with technology.	28%	33%

The post-test results revealed a slight decrease in the number of participants who believed that technology was not important to either student learning (48%) or student motivation (54%). Even after the completion of the App assignment, less than half (46%) of the pre-service teachers believed that an understanding of technology would improve their teaching. In relation to pre-service teachers' technological self-efficacy, the post-test results revealed a slight increase in the number of participants (24%) who reported feeling confident using technology to address individual student needs. Finally, results revealed a slight decrease in the number of pre-service teachers (71%) that reported a lack of confidence in integrating computer activities into their instruction (see Table 1).Responses to the pre-test questions pertaining to pre-service teachers' understanding of multiliteracy revealed that only a small percentage of the participants surveyed (close to 20%) understood the concept of a multiliterate student. For example, only 19% of respondents believed that a multiliterate student was one who could understand visual information and only 21% of pre-service teachers believed a

multiliterate student could use the Internet. Additionally, only 10% of the participants considered a multiliterate student to be one who played video games (see Table 2).

Post-test results revealed a slight increase in the number of pre-service educators who understood the concept of a multiliterate student (close to 30%). Specifically, there was an increase in the number (32%) for those who believed that a multiliterate student was one who could understand visual information and a significant increase in the number of pre-service teachers (32%) who believed that a multiliterate student could use the Internet. Post-test results also revealed a significant increase in the number of participants (33%) that considered a multiliterate student to be one who played video games (see Table 2).

Further analysis including paired t-tests revealed a significant increase in the mean Likert scale scores between the pre- and post-questionnaires (see Table 3). Specifically, the questionnaire data showed that pre-service candidates were more aware of subject specific Apps ($t(89)=-6.901$, $p<0.05$) and were able to describe five Apps that they would use in their teaching ($t(141)=-7.023$, $p<0.05$). Additionally, teacher candidates reported a greater ability to identify Apps that would address the needs of students with exceptionalities ($t(142)=-10.588$, $p<0.05$) and the use of these Apps in their teaching ($t(142)=-7.486$, $p<0.05$). Post-test results revealed a significant increase in the number of pre-service educators ($t(142)= -4.136$, $p<0.05$) that believed that they could incorporate computer activities into the curriculum and could effectively use technology to support problem-based learning in their classroom ($t(142)=-3.235$, $p<0.05$). Finally, with respect to the use of technology, teacher candidates reported a significantly greater awareness of a variety of assistive technology devices for students with exceptionalities ($t(142)=-5.784$, $p<0.05$).

Table 3. Summary of mean responses to the Apps questionnaire

Questions	Pre-Test Mean	Post-Test Mean
1. How computer literate do you believe you are?	4.11	4.23
2. I am aware of a variety of subject-specific apps.	2.54	3.38*
3. I feel confident that I could find apps that I can use in my teaching.	3.25	3.70
4. I feel confident that I could describe 5 software programs (apps) that I would use in my teaching.	2.88	3.53*
5. I believe that a variety of technologies are important for student learning.	4.33	4.41
6. I believe that incorporating technology into instruction helps students learn.	4.34	4.39
7. I believe that student motivation increases when technology is integrated into the curriculum.	4.30	4.29
8. I believe that I can integrate computer activities into the curriculum whenever possible.	3.73	4.10
9. How confident are you that you can use technology to focus classroom activities on the needs of each learner?	3.75	4.02

10.Technology helps me meet the individual needs of a variety of students in my classroom.	3.71	4.05
11.How well do you believe you could use technology to address needs of students with exceptionalities?	3.80	3.99
12. I am aware of a variety of apps that address the needs of students with exceptionalities.	2.44	3.77*
13. I am aware of a variety of assistive technology devices for students with exceptionalities.	2.99	3.77*
14. I am aware of how teachers might use technology and particularly Apps in their teaching.	3.13	3.67*
15. I feel confident that I could find Apps on my own that could help me teach a subject matter in an integrated manner with technology.	3.44	3.76
16. I believe that I can integrate computer activities into the curriculum wherever possible.	3.73	4.09*

* represents significantly different $p<0.05$

4. Discussion

The results of this study suggest that requiring pre-service teachers to create a multiliteracy lesson may positively affect their understanding of multiliteracy. However, a single activity in one required course is not sufficient for developing pre-service teachers' understanding of multiliteracy. Interesting, the most significant change in the pre-service teachers understanding of multiliteracy pertained to the use of video games as an aspect of multiliteracy. This is an important finding since it suggests that today's teachers are broadening their definition of literacy to include the literate behaviours demonstrated by the individuals who participate in video games. Further, this will assist in strengthening the literacy connection between in-school and out-of-school literacy practices. Therefore, the results of this study indicate the need for a curriculum that integrates new and traditional literacies and allows new teachers to practice and prepare lessons that embrace the multimodality of multiliteracy.

While completing this assignment resulted in a greater awareness of the technology available to assist students only 52% of the pre-service teachers perceived technology as being important to student learning and student motivation. As stipulated by TAM, if pre-service teachers do not perceive technology as useful, they are unlikely to implement it in their classrooms. "Users do not use technology simply because they perceive it to be easy. Users have to possess a positive attitude towards computer use and perceived technology to be useful at the same time" (Teo, 2009, p. 309). Asking the participants of this study to complete an assignment that focused on multiliteracy integration for the benefit of their future students allowed these future teachers to gain insight into the usefulness of technology to support differentiated instruction in educational settings. In addition, despite the pre-service teachers reporting that they spend more than 46 hours per week using computers, the results of the pre- and post-test indicated that a significant number of pre-service teachers did not feel confident with using or integrating technology into their future practice. While the results of the current study revealed a slight increase in the number of pre-service teachers (9%) who reported confidence in their ability to integrate computer activities in their instruction, the lack of a significant change may be attributed to the fact that the pre-service teachers could not implement their lessons during their practica because many schools do not have the required technology. Thus, while education programs are evolving to

include the integration of technology, this evolution may be irrelevant if the schools do not have the required technology.

The findings of the current study also suggest that teacher education programs cannot assume that just because their pre-service teachers are extensive users of technology, that they will be confident in integrating technology in their lessons. As theorized by Teo (2009), it is clear that behavioural intention is a significant determinant in the use of technology as evidenced by the number of pre-service teachers in this investigation who reported lower computer self-efficacy scores before completing the multimodal assignment. Thus, as Teo (2009) suggests, teacher education programs should provide pre-service teachers with access to all the different types of technology that they will encounter in the schools. This will assist in improving their computer self-efficacy which has been shown to be linked to both prior experience and attitudes toward technology. Taken together, the results of this study and previous research (Yuen, Law, & Chan, 1999) support the recommendation that an essential component of a pre-service education programs should be providing the required experiences and skills with technology in a classroom setting in order that these future teachers can maximize their students' learning.

Although care was taken to ensure proper methodology in this investigation, there are three main limitations in this study that prevent generalizations from being made. First, the participants in this study were not randomly selected. Second, social desirability bias may be present due to the use of a self-reporting questionnaire and from the fact that one of the researchers was the participants' professor. Third, we did not ask our participants to consider if the app they selected would allow for new student learning or was the app simply representative of the substitution level of the SAMR model (Puentedura, 2003). That is, did the app selected simply offer a substitution for something that could have been taught otherwise? This is an important consideration for future studies in this area.

Overall the results of the current research has the potential to inform teacher preparation programs and in particular, suggests that a more advanced technology-focused curriculum paired with opportunity to implement new skills is warranted in order to continue to meet the evolving needs of all students within an inclusive classroom.

5. Conclusion

Teachers can be the leaders of the educational reform that is needed to fully integrate technology into the classroom (Teo, 2009; Lambert & Gong, 2010). As Lambert and Gong (2010) stipulate, it is essential that pre-service teachers be trained in the 21st century reasons for using technology. Technology can no longer be simply viewed as a research tool or a communication device, but must be viewed as an aspect of literacy. In order to meet the mandates outlined by State Educational Technology Directors Association (2007) technology must not only be a part of the general school system it must be incorporated into teacher preparation programs. If pre-service teachers have high self-efficacy in technology integration, they will bring this skill into their classrooms and to their peers. As Chen (2010) states, "Since preservice teachers work very closely with their cooperating teachers during student teaching, teacher education programs can deliberately train cooperating teachers so they can provide necessary support and facilitate technology integration" (p. 40). A symbiotic partnership that allows for the integration of technology throughout all levels of education may be the most effective and efficient method to ensure that students have the necessary literacy skills for the 21st century.

It is clear that there remains a need for continued research in this area so that greater understanding can be developed of the changing skills required for new literacy teachers in contemporary educational settings. As suggested, future research might investigate technology self-efficacy in teacher education programs with respect to new and emerging technologies such as tablets, iPods, and smartphones. In addition, research in technology integration is warranted in all subject areas and should not be limited to literacy and language courses. Finally, there is a need for longitudinal research that would examine the effectiveness of technology integration in pre-service education and the potential outcomes in the classrooms of these future teachers.

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Testing your Tests: Reliability Issues of Academic English Exams

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ABSTRACT

A testing unit or a tester when writing exam questions generally have millions of issues in mind such as, the reliability, validity, clarity of instructions, design, layout, organization, quality, and many more. However, testing units preparing tests for EAP (English for Academic Purposes) has some other concerns about their exams such as, appropriate topics for listening and reading texts, authenticity, etc. Test writers also have to consider the focus on language skills development, the full coverage of skills, effective learning tasks and the variation in the activity types for all faculties. The main purpose of the study in hand is to investigate the quality of the tests written for the freshman students of Izmir University of Economics. One of the other main purposes of the study is to evaluate the EAP tests written for this institution according to Olaofe's (1994) eight criterion for good EAP tests.

Keywords:
Testing, Assessment and Evaluation, EAP tests, reliability

1.Introduction

The whole idea in writing a test item is to ensure that test items measure the construct they are intended to measure. According to Osterlind (1997) "A test item in an examination of mental attributes is a unit of measurement with a stimulus and a prescriptive form of answering; and is intended to yield a response from an examinee from which performance in some psychological construct (such as knowledge, ability, predisposition, or trait) may be inferred." Different types of tests, test different knowledge and abilities. In an EAP (English for Academic Purposes) context, what is required from the examinees is to present some knowledge of the abilities of academic skills needed in their own study fields.

Dudley-Evans and St. John (1998) define EAP as "…any English teaching that refers to a study purpose and the concerns of EAP are needs analysis, text analysis, and preparing learners to communicate effectively in the tasks prescribed by their study situation" (p. 34). According to Fulcher (1999) EAP tests have three main purposes: proficiency, placement and achievement. Proficiency tests in EAP are used to select students for entrance to academic courses, placement tests, on the other hand, are given to place students into appropriate courses before or during academic courses. The last purpose is to measure the achievement of the students' on EAP courses. Whatever the purpose, a good EAP test should consider the abilities the examiners need to be successful in their departments.

A major issue in EAP testing as Dunworth (2008) summarizes, EAP professionals, who are themselves frequently graduates from humanities, education, or social science disciplines, are not automatically aware of the range of disciplinary distinctions that exist. When we consider the great attention spent on the teaching of the academic literacy skills the students need to succeed in their study fields, the attention paid to the testing

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of these study fields is understandable. Professionals both teaching EAP and/or writing tests for EAP need to consider some specific situations only relevant to EAP.

The main purpose of the study is twofold. First of all, it is aimed to analyze the quality of the EAP tests written for 5 faculties and 1 school in İzmir University of Economics taking Olaofe (1994) as a reference and testing the reliability of one of these faculties' tests.

1.1.Developing a Good EAP Test

Even though there are different criteria in the literature to test the quality of an EAP test, from the variety of literature Olaofe (1994) lists the qualities of a good EAP test as outlined below:

1. An EAP test is expected to have a definite target which is to determine how near students are to achieving adequate performance, using English in their academic subject areas.

Not just EAP tests, but all tests written for any group should have a target, or in other words each test should be written to test the objectives of the course. In our tests, the course objectives listed are what our tests aims to test. Each faculty's tests are written to test the objectives of the course. Below is the list of objectives for the Administrative Sciences faculty:

- identify conversation markers
- identify speaker's opinions
- distinguish between main ideas and other information in a spoken text
- use a suggested method while taking notes
- demonstrate effective note taking ability
- identify the important points of a lecture
- identify the main idea in a written text
- scan texts to find specific information
- differentiate between important and irrelevant information

When preparing a test, the above objectives are taken as the base of the test and each item on the test has the purpose of testing one of the aims.

(2) It should reflect the real-life situation in which the students are expected to use the language, that is, the pertinent aspects of real-life use context (Wesche, 1987:cited in Olaofe, 1994).

The tests written in our context are written for five different faculties and one school. Since the items on the list are written to test the course objectives, and since the course objectives were reached as a result of the needs analysis conducted, it is possible to say that the students are expected to use the language that they will use in their real academic life.

(3) The EAP test must be based on extensive research into the needs of the students who are supposed to take the test (Hughes, 1988).

Within the field of English for academic purposes (EAP), one issue that attracts consensus in the literature is the importance of needs analysis. As Benesch (2001, cited in Dunworth, 2008) observes, "Needs analysis offers detailed information about the linguistic and cognitive challenges students face in academic settings".

In our case, in 2005-2006 academic year a needs analysis survey was administered. As a part of this analysis, semi-structured interviews with faculty were conducted to learn the needs of the students. Other than that, students themselves were asked for their department-based language needs. As a result, the skills and the academic words which considered to be necessary for students for their academic life were listed.

(4) The test should simulate or reflect the various activities and tasks for which English is used in the students' respective academic disciplines (Weir, 1988: cited in Olaofe, 1994).

There are some language tasks often performed by students irrespective of their academic disciplines. These include: writing essays, speaking, reading, listening, studying, explaining, illustrating, exemplifying, comparing, contrasting, observing, accepting, rejecting, and so on. There are also some discipline-specific

language tasks: engineering students, for example, may use English for converting verbal forms into concrete objects (as in engineering drawing); converting concrete objects to verbal forms (as in analysis and interpretation of data and diagrams and description of block engines) which are quite different from the description of main characters in drama, for example. Medical and paramedical students need English for diagnosing illness, interviewing patients, reading and writing technical reports, describing the characteristics of a disease, and so on.

(5) A good EAP test should be valid.

By this we mean that it should measure what it is supposed to measure or be suitable for the purposes for which it is intended. The following validity types are crucial to EAP tests: content validity which suggests the degree to which the test adequately and sufficiently measures the particular skills and subskills, linguistic items and functional aspects of communication; predictive validity, the extent to which the test can predict future academic performance in terms of the degree of correlation that exists between the language proficiency attained in the course and academic success (Davies, 1988b; Robinson, 1991), and face validity which is how suitably well structured the test is.

(6) The test should also achieve some measure of reliability, that is, measuring consistently what it purports to measure.

The tests written for our students are analyzed in terms of reliability and validity before they are conducted with the results collected during the piloting session and after they are given to the real audience that they are written for. Each test undergoes some analyses by the assessment and evaluation office.

(7) It should be capable of measuring communicative competence, which includes socio-linguistic competence, cultural competence, strategic competence, and grammatical/linguistic, as well as discourse competence (Canale & Swain, 1979: cited in Olaofe, 1994).

Davies has summarized a good communicative language test this way:

(it) tests communicative and not only grammatical competence, it tests the ability to meet target language needs; it tests performance in a range of situations; it tests for particular objectives; and it controls as all tests must, the necessary requirements of reliability and feasibility … a communicative test must at the same time be broad-based and narrowly focused … communicative testing like communicative teaching, must be context-based and cannot be generalized from one of the idealized situations. What becomes increasingly clear is that the thrust of communicative language testing is realism. (Davies, 1984: *cited in Olaofe, 1994*)

(8) Variety is also a characteristic of a good test.

Olaofe (1994) states that this includes variety of test types: multiple choice and subjective; variety of tasks within each test: writing, reading, speaking, listening, rewriting, transcoding, reordering, interpreting, blank filling, matching, extracting points, drawing inferences, predicting, and so on; and using a variety of test materials, authentic and non-authentic.

In our exams almost all of the task types mentioned above are used. In order not to cause any subjectivity problem, since 2008 it has been decided to include more matching, multiple choice, filling the blanks questions for each of the skills to be tested.

2. The Study

2.1.Purpose of Study

The main purpose of the study in hand is to investigate the quality of the tests written for the freshman students of Izmir University of Economics. Formed 2 years ago, the members of the Testing Unit wanted to evaluate the reliability of the tests that they have written and take necessary precautions if the tests were not found to be reliable. One of the other main purposes of the study is to evaluate the EAP tests written for this institution according to Olaofe's (1994) eight criterion for good EAP tests and present the results to the audience.

2.2. Methodology

In order to investigate the problem stated, tests written for the 2011-2012 fall semester midterm was analyzed. Among six faculties only the results of Administrative Sciences test has been used here. The sample consisted of 38 multiple choice questions taken by 430 Faculty of Administrative Sciences students. There were no open-ended questions on the test. Kuder-Richardson Formula 20 (KR-20) was used to calculate the reliability coefficients of the test data. SPSS was used to calculate all possible internal consistency coefficients of the KR20 data set.

3. Results

The KR20 reliability coefficient of the entire test was 0.70, suggesting that the 38 items on the test were internally consistent based on the data set and a single composite score was reasonably reliable. As Tucker (2007) mentions "the range of reliability measures are rated as follows: a) Less than 0.50, the reliability is low, b) Between 0.50 and 0.80 the reliability is moderate and c) Greater than 0.80, the reliability is high". As a general rule, values of KR 20 for professionally developed and widely administered tests such as the SAT or GRE are expected to be greater than or equal to .80. Values of KR 20 for tests developed by instructors are not held to the same standard; one rule of thumb states that values greater than or equal to .70 are acceptable. Values of KR 20 for tests that assess several content areas or topics are expected to be lower than values of KR 20 than tests that assess a single content area.

Having a score of .70 was considered to have moderately reliable tests. At the same, having higher KR20 value states that the test is error-free and reflects the real knowledge of the students who took the exam. This basically states that all the items on the test, test the same construct; therefore reliable and it can be taken as an estimation that is – an indication of extent to which students taking the exam again would achieve the same scores.Below is a list of the task types used in the test.

Table-1 Categories of Tasks

Task Type	Task Category
Speaking Based	Formal Presentation In-class Presentations Participation
Listening Based	Note-Taking Summarizing Multiple Choice Matching
Writing Based	Summaries of texts Timed Essays (usually as parts of a test) Documented Essay
Reading Based	Multiple Choice Matching
AWL	Multiple Choice Matching

Apart from the Kuder-Richardson Formula 20, an item analysis was run to test the item difficulty of the 38 questions used in the exam. Item difficulty, according to (Allen & Yen, 1979; Mehrens & Lehmann, 1991: cited in Watering, G. & Rijt. J., 2006) can mathematically be defined as the proportion of assesssees who answered the item corretly, and assessment difficulty can be defined as the avarage of the item diffcilties or the ratio between the average score and the total assessment score. Item difficulty can range from 0.0 (none of the

students answered the item correctly) to 1.0 (all of the students answered the item correctly). Experts recommend that the average level of difficulty for a four-option multiple choice test should be between 60% and 80%; an average level of difficulty within this range can be obtained, of course, when the difficulty of individual items falls outside of this range. An item must be of appropriate difficulty for the students to whom it is administered. Depending on the purpose of the assessment, the constitution of the group and the item formats used in the assessment, the item difficulty or the assessment difficulty should lie between a specific minimum and a maximum value.If possible, experts suggest that items should have indices of difficulty no less than 20 and no greater than 80. lt is desirable to have most items in the 30 to 50 range of difficulty. Very hard or very easy items contribute little to the discriminating power of a test.

When we have a look at the item difficulty results of the test subject to this paper, we see that the value is .60 which means it is close to the ideal level. Ideal difficulty levels for multiple-choice items in terms of discrimination potential are:

Table-2 Ideal Difficulty Levels

Format	Ideal Difficulty
Five-response multiple-choice	70
Four-response multiple-choice	74
Three-response multiple-choice	77
True-false (two-response multiple-choice)	85

from Lord, F.M. "The Relationship of the Reliability of Multiple-Choice Test to the Distribution of Item Difficulties," Psychometrika, 1952, 18, 181-194.)

4. Conclusions and Recommendations

In today's world, in all levels of education, but especially in higher education, apart from the quality of the education, high quality assessments play an important role. Considering the last decade, some substantial changes and developments in higher education have been observed. New teaching methods have been started to be used to emphasize the importance of the learning process and the construction of knowledge. Assessment is a crucial part of this new era and it plays a major role in these innovative processes. As a result, high quality assessment should assess the desired performance standards, academic standards or the students' levels of competence in such a way that students' knowledge, skills, abilities and aspects of professional expertise can be judged.

This brings us to the point of writing high quality tests. Writing tests is not easy, especially if you are writing achievement tests in English for academic purposes (EAP) for six different faculties with only four test writers. EAP testing has its own challenges like using the needs analyses as the bases for test construction, the need to include both macro and micro language skills, as well as tasks and subtasks, not included in the traditional use of English tests but relevant to testing in higher education. At the same time, EAP tests are required to be communicative, integrative, authentic and natural in outlook.

In the construction of assessment items and the composition of an assessment, attention should be paid to the difficulty level. An assessment can contain some easy items as well as some difficult items, but the overall difficulty of the assessment should be adjusted to the level of the student population taking the assessment. To evaluate whether the difficulty of an item, or the whole assessment, is suited to the level of the students taking the assessment, a measure of the item difficulty is very useful.

To return back to Dunworth's (2008) comment about the background of the test writers, it here possible to mention that these test writers should have access to such data. With this knowledge it is possible that they incorporate the most featured and relevant tasks into the syllabus and testing.

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