PRIMARY SCHOOL STUDENTS' ATTITUDES TOWARDS COMPUTER BASED TESTING AND ASSESSMENT IN TURKEY

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ABSTRACT

This study investigated the attitudes of primary school students towards computer based testing and assessment in terms of different variables. The sample for this research is primary school students attending a computer based testing and assessment application via CITO-ÖİS. The "Scale on Attitudes towards Computer Based Testing and Assessment" to collect data and the results obtained were compared in terms of school type, gender, and grade level.

The results of this study revealed that significant differences exist between attitudes of students from different schools. Such a difference does not exist between attitudes of students when their genders, grade levels, and participation periods to computer based assessment are taken into account.

Keywords: Primary education student, computer based testing and assessment

INTRODUCTION

Recent developments in computer technologies have influenced many areas including educational testing and assessment. It is possible to group those effects under two titles. First, improvements in computer technologies have enabled more complicated statistical applications for test and scale development, which in turn have enabled discussion and development of more advanced statistical analyses.

The item response theory, which was derived against the true score theory and the confirmatory factor analysis, which is used in addition to exploratory factor analysis to test the construct validity during scale development could be set as examples. Second, those advancements in computer technologies have led to the development of web-based, computer-based, and/or computerized adaptive test applications, besides those traditional paper-pencil tests.

As now computer-based tests are started to be used especially at primary education level, for such reasons like their test results are scored instantly and reported in detail, their applications are flexible, effective and reliable, they minimize costs for long-term applications, they enable usage of different item types compared to

traditional paper-pencil tests, along with, they make the integration of audio-visual materials possible and enable the rater to easily adjust the student response time (Wang, Jiao, Young, Brooks & Olson, 2008, Bugbee, 1996; Drasgow & Olsen-Buchanan, 1999; Gvozdenko & Chambers, 2007; McKee, & Levinson, (1990); Mead & Drasgow, 1993; Parshall, Spray, Kalohn, & Davey, 2002; Smith & Caputi, 2005; Thelwall, 2000; Tseng, Macleod, & Wright, 1997). On the other hand in many countries, driving tests, military training tests, personnel staffing exams in private sectors, and certificate tests applied by vocational groups can be listed as computer-based test examples (Russo, 2002; Trotter, 2001). Similarly, though not common, such computer based testing and assessment (CBA) applications have started to be utilized in Turkey. It can be shown that such as TTnet-Vitamin, Pisa and Cito-Öis (student monitoring system) applications are examples.

CBA applications have brought up some questions. There are many studies abroad on this issue (Choi & Tinkler, 2002; Kingston, 2009; Kim, 1999; McKee, L. M., & Levinson, E. M., 1990; Mead and Drasgow, 1993; Neuman, G., & Baydoun, R., 1998; Pomplun, M., & Custer, M., 2005). Those studies mainly focus on comparisons between paper-pencil tests (PPTs) and computer-based tests (CBTs). In their meta-analysis Mazzeo and Harvey (1988), investigated the research that focused on paper-pencil and computer-based intelligence, aptitude, personality and achievement tests.

The analyses revealed varying results, but showed that computer-based applications increased the response time compared to paper-pencil ones. Additionally, the studies (Choi & Tinkler, 2002; Kim, 1999; Kingston, 2009; Mead & Drasgow, 1993; Peak, 2005) done subsequently revealed no significant differences in achievement considering computer-based and paper-pencil exams; however taking the academic content and grade levels into consideration, it was observed that students had hard times with the CBTs. Leeson (2006), identifies the factors lead to difficulties in CBA applications under two titles, as factors originating from "users" and "technology used". He states that the user's gender, his/her ability to process information, ability to use a computer, and his/her level of anxiety could have an influence on an application, whereas he gives the size and resolution of monitors, writing character and its length, the way the problem is presented, and having the option of review or not as technology originated factors. Many researchers have already done studies investigating the relationship between computer usage ability and achievement. Some of them (Goldenburg & Pedulla, 2002; Pomplun & Custer, 2005, Pomplun, Ritchie & Custer, 2006, Bennett, Braswell, Oranje, Sandene, Kaplan, & Yan, 2008) have stressed that computer usage ability is an important predictor of respondent achievement, therefore those students poor at computers may show low achievement in CBAs; however they add that with the increase in computer technologies and access opportunities, such problems may decrease.

In some of the studies investigating the difference between methods in terms of gender, race and age (Bennett et al., 2008; Clariana & Wallace, 2002) no significant difference was found in achievements, whereas in some other studies (Gallagher, Bridgeman, & Cahalan, 2000) little significant difference was observed. In their recent study Terzis and Economides (2011) describe the trends of male and female students towards CBAs.

As a result, they highlight that both genders have positive views on CBAs if they are based on games, are open and course-related. Additionally they state that the attitudes of boys and girls towards CBAs are under the influence of social environment; the boys focus on the usefulness while the girls stress the ease of use.

Some other studies investigating the "technology used", focused on the influence of the size and resolution of the monitor and characters on applications. McKee and Levinson (1990) state that such traits might vary according to the nature of the area being assessed. Additionally, Lunz (1995) and Vispoel (2000) highlight the present flexible applications inherent in PBTs (like reviewing the questions, starting from any question you'd like or skipping a question, etc.) are not observed in CBAs, therefore this can have negative effects on achievement (Wang at all. 2007).

The fact that various researches have different results can be due to methodological problems in those studies and if effects of PPTs and CBAs are to be compared, equivalent tests should be used in each application (Wang at all. 2007). The analysis of some recent studies (Cheung, Lee, & Chen, 2002; Joosten-ten Brinkeet all., 2007; Kaklauskas et all., 2010; Kesici, Sahin, & Akturk, 2009; Smith & Caputi, 2007; Terzis and Economides, 2011; Wang et all., 2008; Yuen & Ma, 2002) show that they focus on gender differences, e-learning acceptance, social influence, computer self-efficacy, computer anxiety and equivalency of computer-generated and paper-pencil scores.

One potential source of validity error that needs to be considered in computerized testing is computer anxiety. A number of researchers have discussed the importance of behavioral and cognitive aspects of computer anxiety as a potential source of interference in CBA administration (Deane et al., 1995b; Glass & Knight, 1988; Schulenberg & Yutrzenka, 1999; Shermis & Lombard, 1998; Tseng et al., 1998). On the other hand, according to Terzis and Economides (2011), researchers have realized that there are differences between men and women regarding their perceptions and effects on the relationships among the constructs that affect the behavioral intention to use computers and e-learning. However, the literature did not provide conclusive results. Concerning perceptions and attitudes, earlier studies showed that male students were more positive towards computer use in a learning context. In addition, their research have aimed to explore gender differences in perceptions and relationships among dominants affecting computer based assessment acceptance, as well as how gender influences learners' attitudes towards CBAs, which factors are affecting the use of them, and why each gender would use it. The results of study have shown that the male students have been tempted to use CBAs for their playfulness, usefulness, content, and social influence. On the other hand, female students have been mainly tempted to use CBAs for their playfulness, ease of use, content, and goal expectancy. Thus, playfulness and content are also important for females as well, but not to the same degree for males. However, female students' behavioral intention is defined also by ease of use and goal expectancy, not by usefulness and social influence as in the case of males.

It is seen that the related studies found in literature on CBAs have various results. However, there is a common perception that students approach such applications positively.

At the same time, the same topic is associated with computer skills and computer anxiety. Besides, apart from a few studies (TTNet-Vitamin, Pisa) in Turkey, one of the new applications is CITO (cache in Trash Out) ÖİS (Student Monitoring System). This application aims to provide feedback to students, teachers, schools, parents, and the Ministry of National Education (MONE) on students' difficulties in basic and sub-areas and their skills to be improved. The application provides teachers this information both on student and class level. By monitoring the needs of students for several attainments in various areas, teachers could prepare extra activities and tasks. Schools receive feedback on assessments of every students' attainments, the questioning of school performance in terms of the norms in Turkey, and taking measures on raising the quality standards; whereas parents have the opportunity to learn about the levels and developments of the kids (Berberoğlu, 2011).

Since CITO-ÖİS is an application of computer based testing and assessment, the views and attitudes of students towards it is an issue of interest. The present study aims to identify the attitudes of those primary education level students (3rd, 4th, and 5th grades) participating CITO-ÖİS towards CBA and analyze their perceptions in terms of grade, gender, and school type.

METHOD AND PARTICIPANTS

This descriptive research aims to explore and compare the attitudes of students towards CBA in terms of various variables. The population is all the schools and students participating in the CITO-ÖİS applications. There are 48 school in Turkey, 35 are private schools and 13 are state schools participating in this applications. For research purposes, layered group sampling was administered. Layers are types of schools (private or state school), groups are schools. Six schools (3 private and 3 state) were chosen as samples. 784 students (390 female, 394 male) from those sampled schools participated. 631 of those students enroll at private schools, 153 of them are from state schools. 268 of them are primary education 3rd graders, 224 are 4th graders, and 292 are 5th graders.

Instrumentation

The data collection instrument is a 35-item scale developed by the authors themselves and entitled as "Scale of Attitudes towards Computer Based Testing and Assessment". The following stages were followed during the scale development process: First, an item pool comprising of 71 statements related to computer based testing and assessment was formed, which was later presented to the views of experts from various areas like Computer and Instructional Technologies, Curriculum and Instruction, and Educational Measurement and Evaluation, eventually ended up with 54 items ready for pre-trial. The pre-trial from was given to 440 students and statistical reliability and validity analyses were done on those results. By implementing exploratory factor analysis, the construct of the scale was tested, items with high cross-loadings and items that did not load strongly (below .40) on any factor were deleted (19 items), and eventually those items loading one factor were included in the final form of the scale (35 items).

The factor has an Eigen value of 17.08, explains 50.24% of the variance, and item factor loadings range from .49 to .83. The reliability coefficient calculated by alpha internal consistency method (Yurdabakan, 2008) is .97.

FINDINGS

The Distribution of Students' Opinions towards CBA

In this section, the mean scores and standard deviations of the items from the whole scale were calculated. The results (the highest and the lowest 10 items) are presented in table 1. Later, students' attitudes were analyzed in terms of gender, school type (private and state), and grade levels (3rd, 4th, and 5th).

Table: 1
Distribution of Scale Item Mean Scores and Standard Deviations

Items	$\overline{X}$	Sx
11. It works our brains.	3.82	1.37
12. It improves me.	3.81	1.38
24. The report of this assessment shows me what I know or don't.	3.79	1.49
7. I think it is a useful application.	3.78	1.39
8. I think it measures my knowledge level.	3.76	1.37
32. People would love it if it was made more entertaining.	3.75	1.43
26. I learn my weaknesses.	3.73	1.45
18. My teachers and parents learn about my weaknesses together with me.	3.69	1.41
2. Results show my learning level.	3.66	1.40
16. It is more fun for me to do it with earphones.	3.65	1.49
30. I don't want this application.	2.43	1.54
31. I think it is a bit silly and boring.	2.37	1.48
10. I don't think it has any use for me.	2.36	1.55
4. Doing the items on computer distracts me.	2.25	1.46
1. Questions on computer seem silly to me.	2.21	1.40
28. I find it useless.	2.21	1.45
21. It is too boring for me.	2.20	1.44
6. It is too difficult for me.	2.11	1.39
19. I don't take it seriously because it seems like a game.	2.01	1.42
14. It weans me off from the courses.	2.00	1.35

The analysis of Table 1 reveals that the means and Standard deviations of item responses range between 3.82±1.37; 2.00±1.35. Students agreed mostly with positive items reflecting CBA, such as "It works our brains", "It improves me", "The report of this assessment shows me what I know or don't", "I think it is a useful application", and "I learn my weaknesses". On the other hand, they agreed less on negative items like "It weans me off from the courses", "I don't take it seriously because it seems like a game", "It is too difficult for me", "It is too boring for me", "I find it useless", "Questions on computer seem silly to me", "Doing the items on computer distracts me", and "I don't think it has any use for me".

The distribution of means and Standard deviations show that students agreed with positive items, whereas they showed little agreement with the negative ones. Depending on these results, it can be said that students generally have positive views on CBA applications.

The Comparison of Attitudes in Terms of Gender, School Type, Grade Level and Participation Period to CBA

To analyze students' attitudes towards CBA in terms of gender and school type, the mean scores were compared with unrelated/uncorrelated t-test statistics and results are presented in Table: 2.

Table: 2
The Comparison of Student Attitudes According to Genders and School Type

	Group	N	$\overline{X}$	S_x	df	t	p
Gender	Female	390	3.06	.39	782	-1.88	.06
	Male	394	3.12	.42			
School	Private	631	3.07	.41	782	-2.70	.007**
	State	153	3.18	.39			

**P<.01

The analysis of results in Table: 2 reveal that, there are no significant differences between student attitudes towards CBA in terms of gender, whereas there is a significant difference between the attitudes of private school students and state school students, where the difference is in favor of students enrolling at state schools. These results show that in terms of gender there are no differences between the attitudes of males and females; however differences exist between the attitudes of students enrolling at private and state schools. Another comparison was made to analyze the effects of grade levels and periods of participation (experience) on attitudes. First, the attitudes of students enrolling at different grade levels were compared using variance analysis.

Results are presented in Table: 3.

Table: 3
The Comparison of Student Attitudes According to Grade Levels

Grade	n	$\overline{X}$
3	268	3.08
4	224	3.07
5	292	3.12
Total	784	3.09

Source	KT	DF	KO	F	p
Within Groups	.484	2	.242	1.454	.23
Between Groups	129.89	781	.166		
Total	130.38	783			

The results in Table: 3 show that, the means of 3rd and 4th graders are close, whereas the means of 5th graders are a bit higher than the others. But the variance analysis employed exhibits no significant difference among groups. A similar comparison was made considering the period of participation to the application, in other words, students' experience with the application.

For research purposes, students were divided into three groups and their mean scores were tested using variance analysis. The results are presented in Table 4.

Table: 4
The Comparison of Student Attitudes According to Period of Participation to Application

Period	n	$\overline{X}$	S_x	Source	KT	DF	KO	F	p
New	161	3.14	.39	Within Groups	.413	2	.206	1.24	.29
1 year	154	3.07	.35	Between Groups	129.97	781	.166		
1 year>	469	3.08	.43	Total	130.38	783			
Total	784	3.09	.41						

The variance analysis results show that there is no significant difference among scores, even though the new beginners have slightly higher scores. In other words, the periods of participation to the CITO-ÖİS application have no meaningful effects on attitudes.

RESULTS AND DISCUSSION

The advancements in computer technologies have led to several innovations in many areas, including educational testing and assessment. These innovations increased opportunities both in test and scale development and application. Among those newly developed computerized educational testing and assessment practices are computerized tests, adaptive tests, computer based assessments and web-based assessments. Although this issue has gained importance in the last 30 years, it is still new in Turkey. One of the most comprehensive web-based or computer based assessment applications in Turkey is CITO-OIS. The present study aims to identify the perceptions of Turkish students towards such applications. For research purposes, the attitudes of those students participating in the CITO-OIS applications towards CBA were identified and investigated thoroughly in terms of several variables.

According to the results of descriptions and comparisons, it can be said that students generally present positive attitudes (X=3.09±.41) towards CBAs. This result parallels the results in literature (Bernard, 1997; Terzis and Economides, 2011). On the other hand, considering students gender and schools they enroll at, no significant difference was found between the attitudes of boys (X=3.12±.42) and girls (X=3.06±.39). It is possible to state that male and female students evaluate CBAs at similar levels. Although the studies in literature mostly focus on comparing the traditional paper-pencil tests and CBA applications, as authors like Bernard (1997) and Terzis and Economides (2011) put forward, such a finding is parallel to studies in which perceptions towards CBAs are compared. Another result of the present study is the difference found between the attitudes of students in state and private schools, where the difference was in favor of state schools.

Though no other study on this issue is present in literature, it is possible to explain this topic in terms of computer accession opportunities.

Even though computer accession opportunities increase students' computer competencies and CBA achievements (Goldenburg & Pedulla, 2002; Pomplun & Custer, 2005, Pomplun, Ritchie & Custer, 2006, Bennett, at all. 2008), it is possible to evaluate that such approaches could be the reason of students' limited accession opportunities. Similarly Terzis and Economides (2011) stress that, besides many other factors, attitudes towards CBA applications are under influence of social environment. On the other hand, the variance analyses done to compare the attitudes towards CBAs in terms of grade levels and periods of participation yielded no significant differences. However, 5th graders and those new starters had slightly higher mean scores. The case with the upper grades could be attributed to experience (Goldenburg & Pedulla, 2002; Pomplun & Custer, 2005, Pomplun, Ritchie & Custer, 2006, Bennett, at all. 2008), whereas the case with the new starters could be attributed to the excitement of doing something different from ordinary applications. Still, it would be useful to have further thorough studies on this issue.

As a result, this research analyzed the attitudes of primary education students towards computer or web-based testing and assessment applications in Turkey in terms of several variables. This topic is not limited to analysis of attitudes. On the contrary, especially in subsequent research it can be useful to study the influence of such practices on student achievements, customs in learning and assessment, and more importantly, on test development and application opportunities.

Notes from Author's: **This study was adapted from the unpublished Master's Thesis Report (Uzunkavak, C.), Dokuz Eylul University, Faculty of Education, 2012, Turkey.**

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APPENDIX A

1. **Could you tell me a little about yourself?**
   - **What grade are you in?**
   - **How old are you?**
   - **Where do you live?**

2. **Could you tell me a little about your school?**
   - **What part of the province are you in?**
   - **What kind of school is it (i.e., what grades does it include)?**
   - **Roughly how many students are in your school?**
   - **Roughly how many communities does your school in take from?**
3. **Could you tell me about the web-based courses have you taken?**
   - **How many?**
   - **Which ones? When?**
4. **Think about a typical day when you've had both online and offline classes. Describe for me what would look like for you.**
5. **What do you like about your web-based course(s)? What do you dislike? Why?**
6. **If you could change something(s) about your web-based course, what would it (they) be? Why?**
7. **What do you miss about face-to-face classes when you are in a web-based course? What do you miss about web-based courses when you are in a face-to-face class?**
   - **What is the difference in work load outside of class for you?**
   - **Which is more? Why do you think that is?**
8. **One of the issues related to your web-based classes raised in the surveys was that students felt that lack of time was one of the main problems. What has your experience been with the amount of time it takes in your web-based classes?**
9. **When this survey was conducted using university students, one of the issues they raised related to the notion of community or feeling like you have connections with others when you are in class together. First, do you think that this is an important aspect in a school experience? Can you talk to us about your sense of connections with others in a face-to-face classroom versus a web-based course?**
10. **What suggestions would you give to students who are taking web-based courses for the first time? What suggestions would you give to the designers of your web-based courses? What suggestions would you give to the teachers of your web-based courses?**