

Portfolio Assessment in Cooperation with Teachers, Students and Parents in a Science and Technology Course

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Abstract

Problem Statement: Due to the differences in students' learning styles, the use of alternative measurement and evaluation methods has become necessary. The assessment of students involves more than their responses to a series of test items. Measurement and evaluation is not just grading students through exam results. Thus, a new approach has become essential in measurement and evaluation within the reconstruction of curricula for an effective educational process.

Purpose of Study: The aim of this study is to examine the effects of portfolio assessment on the achievements and progress of students for the chapters 'Systems of Our Body' and 'Breeding, Growth and Development in Living Organisms' in the Science and Technology course.

Methods: An experimental method was used in the study. The method of pre-test and post-test design with a control group was employed. This study involved 6th grade students from public and private schools in Samsun, 108 for the spring and 114 for the fall semester. "Achievement Test", "Portfolio Attitude Form" and "Student Portfolio Assessment Rubric" were applied. Paired-sample t-tests were employed, and the reliability was examined for the analysis of data using SPSS13. Open-ended and semi-

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structured questions were also used as a qualitative data collection tool for teachers and parents. The findings obtained were evaluated using description, content analysis and interpretation.

Findings and Results: Findings indicated significant differences between pre and post tests in the fall semester and no differences in the spring semester for both schools. Both public school students and private school students stated that they are happy with portfolio applications and they want them to continue. In the applied rubrics to assess self-efficacy, a significant difference was observed between the scores of experimental group students and researchers for both semesters in public and private schools. According to the answers from letters, it appears that the majority of students and parents are satisfied with this implementation.

Conclusions and Recommendations: Portfolio assessment allows different characteristics and talents of students to emerge, and also allows the evaluation of students with different features. The students will be more motivated and focused on related topics due to participating in their own evaluating period. Therefore, a more frequent employment of portfolio assessment in many units will be useful for students' development.

Keywords: Portfolio assessment, achievement test, attitude, science education

One of the main features of the new curriculum, developed in the light of a constructivist approach and put into effect in 2004, is its concern with alternative assessment methods. Use of such alternative methods makes it possible to evaluate not only to what extent students possess knowledge and skills, but also to what extent they can apply them to real life (Bahar et al., 2006). Learner-oriented alternative measurement and evaluation methods are more realistic approaches which enable the assessment of both the products and the process. Use of many new methods together ensures evaluations to have features like being more realistic, reliable, performance-based, cooperative, and applicable to real life. Portfolios step forward among performance-based evaluation approaches with recent attitudinal changes in measurement and evaluation. Portfolio evaluation is a dynamic process in which learning and evaluation processes are integrated, and students are encouraged to gain the ability of observing their learning process and criticizing themselves (Asturias, 1994; Bekiroğlu, 2005; Kuhs, 1994; Spady & Marshall, 1991; Wortham, Barbour & Desjean-Prrotta, 1998). By use of portfolio assessment, learning processes become more student-centered, and since there is no single scoring method, the evaluation process becomes more appropriate for different learning styles and hence becomes more accurate (Gilman, Andrew & Rafferty, 1995; Kan, 2007; Midkiff & Thomasson, 1993). Using portfolios is a viable option for assessing student skills and achievements, but portfolios are also powerful tools for authentic assessment. If the teacher wishes to understand the student's development over a semester or over a year, a portfolio would probably be the most appropriate tool to achieve this (Duffy, Jones & Thomas, 1999).

According to Valencia (1990), portfolios assess student achievements in a more accurate and viable way only when compared with the standard and quantitative features of the evaluation. Portfolios, which are a collection of dynamic, targeted and systematic works, demonstrate the effort, progress and performance of an individual (Ediger, 2000). They have long been in use in fields like arts, architecture and journalism but are only quite lately recognized in education (Korkmaz & Kaptan, 2005). As of 1995, use of portfolios and portfolio assessment has been accepted as one of the national evaluation criteria in the USA. The concept of portfolios is not only appropriate for a constructivist approach (Read & Cafolla, 1999), but is also recommended for an evaluation of the educational process from a different perspective and as a reaction to traditional evaluation (Adams, 1995; O'Malley & Valdez Pierce, 1996). While Herman, Aschacherand, Winters (1992) defines portfolios as a collection of works of a learner to demonstrate the achievements in a certain field to the learner him/herself and to others, Stiggins (1994) defines them as a collection of student works brought together with the purpose of presentation of achievements or improvements of the student in one or more fields. According to Meiselsand, Steele (1991), portfolios allow students to participate in the evaluation of their works, monitor their progress, and create a basis for the individual evaluation of students. Korkmaz & Kaptan (2002) asserted that portfolios can be utilized to identify qualified students in science and technology courses, improve learning-teaching processes, and monitor scientific growth. Some other research emphasizes that portfolio applications positively affect student achievements and attitudes compared with traditional evaluation techniques, and teacher and student opinions on portfolios are found to be affirmative (Birgin, 2008; Bahçeci, 2006; Gözüm, 2008; Güven, 2007; Mıhladı, 2007; Okçu, 2007). Moreover, it is concluded that portfolios are favourable for cognitive and affective domain characteristics like test anxiety, self-efficacy, attitude, and studying characteristics (Bahçeci, 2006; İnce, 2007). In light of these studies, portfolios, which are one of the suitable alternative measurement and evaluation methods to the philosophy of the 2004 Science and Technology Course Curriculum, are important in establishing communication between students, parents and teachers and in positively influencing student achievements. Thus, the aim of this study is to examine the effects of portfolio assessment on the achievements and progress of students for the 'Systems of Our Body' and 'Breeding, Growth and Development in Living Organisms' chapters of the Science and Technology course. Student teacher and parent opinions on the alternative measurement and evaluation methods of the new curriculum were also identified.

Methods

Research Design

Utilizing both qualitative and quantitative techniques, the study was performed on the elementary education of 6th graders for the Science and Technology course chapters of 'Systems of Our Body' and 'Breeding, Growth and Development in Living Organisms'. Students were taught for 6 weeks for each of the chapters.

In the quantitative part of the study, a quasi-experimental design is utilized with experimental and control groups. Experimental and control groups of the study were randomly determined between the two classes of study schools. In the experimental group of the study, portfolios were utilized in addition to traditional teaching methods, whereas in the control group, traditional teaching methods were utilized alone. Before and after the implementation, pre-post achievement tests were applied to both experimental and control groups. Investigation of difference in the evaluation of portfolios between teachers and students was performed and qualitatively analyzed in light of student and teacher views, collected with a questionnaire.

Sample

The population of the study consists of the 6th grade students in the province of Samsun. There were a total of 108 students (78 public and 30 private school students) in the spring semester (March) of the 2007-2008 academic year, and a total of 108 students (88 public and 20 private school students) in the fall semester (September) of the 2008-2009 academic year. In the spring semester, 38 parents from public and 14 parents from private schools participated in the study. In the fall semester, 44 parents from public and 8 parents from private schools participated in the study. In both of the semesters, 2 Science and Technology teachers participated in the study.

Research Instruments

The problem statement: What are the effects of portfolios on students' achievements and development in two selected Science and Technology Course chapters, and what are the views of students, teachers and parents on the portfolios?

1. Do the portfolio applications, in addition to traditional teaching methods, influence the student achievements in the 'Systems of Our Body' and 'Breeding, Growth and Development in Living Organisms' chapters?
2. Is there any meaningful variation in the achievements of students according to the gender variable?
3. What are the student, parent and teacher views on the portfolio applications?
4. What is the magnitude of the correlation between the self-evaluation of the portfolios by students and evaluation by teachers?

Validity and Reliability: Quantitative data collection tools utilized in the study are;

-*"Science Technology Achievement Test"*

-*"Portfolio Attitude Scale"* (Bahçeci, 2006)

-*"Student Portfolio Assessment Rubric"*

The achievement test utilized in the study is developed by the researcher and approved by an expert (Güneş, 2007, oral interview), paying attention to the inclusion of basic concepts included in the chapters to students during the 6 week application period. The final form of the 'Systems of Our Body' chapter achievement test, which consists of 27 true-false items and 48 multiple-choice items, is applied in the spring

semester. The second achievement test on the 'Breeding, Growth and Development in Living Organisms' chapter consists of 37 true-false items and 63 multiple-choice items and is applied in the fall semester. Achievement tests were applied to 90 students as a preliminary study. Cronbach's Alpha reliability coefficients of the tests were calculated with the SPSS 13 statistical software and were found to be $\alpha=0,900$ for the first (spring) and $\alpha=0,950$ for the second (fall) test.

In order to collect student views, the 'portfolio attitude scale' developed by Bahçeci (2006) was utilized after modifications. Cronbach's Alpha reliability coefficients of the scale calculated to be $\alpha= 0,803$ when applied in the spring semester, and $\alpha= 0,673$ when applied in the fall semester.

A 'Student portfolio assessment rubric (1 and 2)' provided from the internet was modified and utilized as a data collection tool. Students filled out the form with both their parents and the researcher.

'Opinion Forms of Students, Teachers and Parents on Portfolios' included two open-ended questions applied as a structured questionnaire and utilized as a qualitative data collection tool. Data were collected and analyzed with descriptive and content-analysis methods (Büyüköztürk, 2007).

Results

Post-test achievement scores of public and private school students are shown below in charts1 and 2. Experimental and control groups were compared within schools. Both semesters were separately evaluated within both schools.

Table 1

t-Test Results: Post-Test Achievement Scores of Public School Students

Post-Tests	Group	N	X	Sd	df	T	p
Spring	Experiment	39	58,33	15,079	38	1,399	,170
Term	Control	39	63,15	15,816			
Fall	Experiment	44	62,68	20,494	43	-2,012	,050
Term	Control	44	55,50	15,913			

Table 2

Wilcoxon Test Results: Post-Tests Achievement Scores of Private School Students

Post-Tests	Group	N	X	Sd	Z	P
Spring	Experiment	15	73,53	12,065	-1,759 ^a	,079
Term	Control	15	61,87	16,501		
Fall	Experiment	10	83,60	9,155	-1,988 ^a	,047
Term	Control	10	71,20	10,922		

It is found that there is no meaningful difference (Table 1) between the experimental and control groups of the public school students in the spring semester ($p > .05$ and $t = 1,399$). Similarly, since $N < 20$, a Wilcoxon independent samples test, which is a non-parametric test, was utilized for the private school students. No statistically meaningful difference ($p > .05$ and $Z = -1,759$) between the experimental and control groups were found (Table 2). However, in the fall semester, statistically meaningful differences were found between post-test scores, favoring the experimental groups in both public ($p = .05$ and $t = -2,012$) and private schools ($p < .05$ and $Z = -1,988$) (Table 1, Table 2).

Table 3
Views of Spring Semester Students on Portfolios

Items:	Frequency -Percentage							
	Public School				Private School			
	No		Yes		No		Yes	
	f	%	f	%	f	%	f	%
1- Provided an in-depth and permanent learning for me	1	2,6	37	97,4	2	14,3	12	85,7
2- Helped me improve my personal skills	1	2,6	37	97,4	5	35,7	9	64,3
3- Contributed to my communication with the teacher	7	18,4	31	81,6	10	71,4	4	28,6
4- Provided new visions on different ways of learning	3	7,9	35	92,1	3	21,4	11	78,6
5- Helped me become organized in my out-of-school works	4	10,5	34	89,5	4	28,6	10	71,4
6- Helped me present my works better	1	2,6	37	97,4	4	28,6	10	71,4
7- Increased my enthusiasm towards studying	3	7,9	35	92,1	6	42,9	8	57,1
8- Increased my classroom performance	5	13,2	33	86,8	4	28,6	10	71,4
9- Made me study more consciously	2	5,3	36	94,7	5	35,7	9	64,3
10- I find it more effective compared with tests or essay type exams	16	42,1	22	57,9	8	57,1	6	42,9
11- I'd rather portfolios if I had a chance	17	44,7	21	55,3	12	85,7	2	14,3
12- I think portfolios are reducing success	31	81,6	7	18,4	7	50,0	7	50,0
13- I think portfolios are just waste of time	26	68,4	12	31,6	3	21,4	11	78,6

As can be seen in Table 3, most of both public school students and private school students stated that they are happy with portfolio applications and they want them to continue.

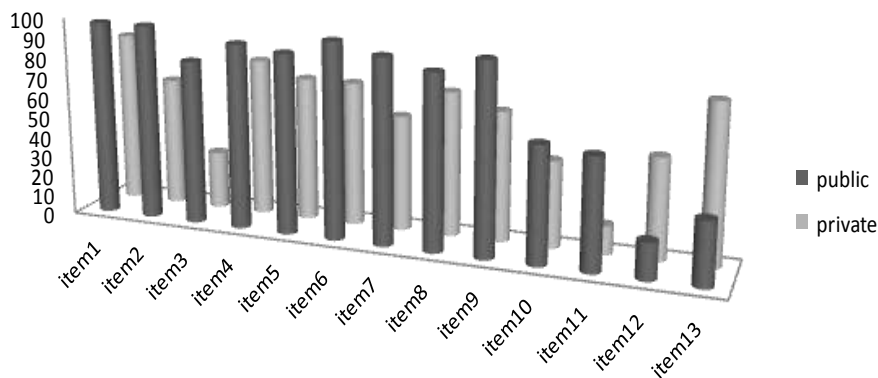


Figure 1. Views of Spring Students on Portfolios

According to the results obtained from 'portfolio assessment questionnaire' (Figure 1), especially for items 12 and 13, public school students' views on portfolios are more positive than the private school students.

Table 4

Views of Fall Semester Students on Portfolios

Items:	Frequency -Percentage							
	Public School				Private School			
	No		Yes		No		Yes	
	f	%	f	%	f	%	f	%
1- Provided an in-depth and permanent learning for me.	3	7,3	38	92,7	2	16,7	10	83,3
2- Helped me improve my personal skills	3	7,3	38	92,7	2	16,7	10	83,3
3- Contributed to my communication with the teacher	7	17,1	34	82,9	3	25,0	9	75,0
4-Provided new visions on different ways of learning	2	4,9	39	95,1	2	16,7	10	83,3
5-Helped me become organized in my out-of-school works	7	17,1	34	82,9	2	16,7	10	83,3
6-Helped me present my Works better	6	14,6	35	85,4	3	25,0	9	75,0
7-Increased my enthusiasm towards studying	3	7,3	38	92,7	6	50,0	6	50,0
8-Increased my classroom performance	13	31,7	28	68,3	2	16,7	10	83,3

Table 4 Countine

9-Made me study more consciously	7	17,1	34	82,9	2	16,7	10	83,3
10-I find it more effective compared with tests or essay type exams	12	29,3	29	70,7	4	33,3	8	66,7
11-I'd rather portfolios if I had a chance	11	26,8	30	73,2	9	75,0	3	25,0
12-I think portfolios are reducing success	34	82,9	7	17,1	9	75,0	3	25,0
13-I think portfolios are just waste of time	36	87,8	5	12,2	6	50,0	6	50,0

Referring to table 2, we can interpret that both public school and private school students in the fall semester fancy portfolio applications. These findings are in parallel with the spring semester findings above.

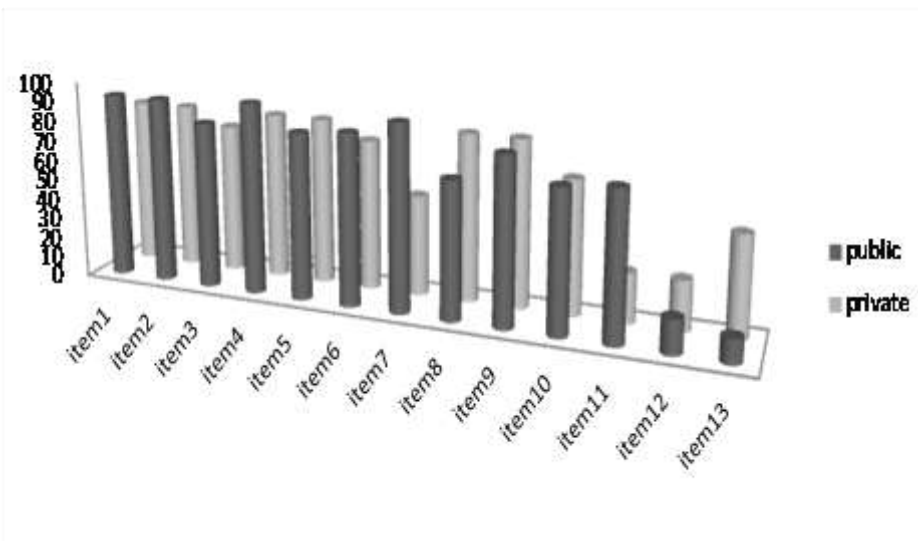


Figure 2. Views of fall semester students on portfolios

Table 5

t-Test Results of Student Responses to Portfolio Evaluation Rubric 1 and 2 and Responses of the Researcher

Rubric1	Rater	N	X	Sd	df	t	p
Spring Semester	Researcher	33	20,79	2,619	32	-8,543	,000
	Students	33	25,91	2,898			
Fall Semester	Researcher	30	22,77	3,370	29	-7,870	,000
	Students	30	27,37	2,710			
Rubric2							
Spring Semester	Researcher	33	71,94	10,747	32	8,846	,000
	Students	33	90,03	11,857			
Fall Semester	Researcher	30	76,70	12,595	29	8,401	,000
	Students	30	93,90	11,339			

Table 6

Wilcoxon test Results of Private School Students Ratings of the Portfolio Evaluation Rubric 1 and 2 and Researcher Ratings

Rubric 1	Rater	N	Mean Rank	Mean Deviation	Z	p
Spring Semester	Researcher	13	17,38	4,234	-3,185	,001
	Students	13	24,85	5,383		
Fall Semester	Researcher	11	22,64	4,056	-2,304	,021
	Students	11	25,64	3,957		
Rubric 2						
Spring Semester	Researcher	13	66,15	19,634	-2,378	,017
	Students	13	82,15	21,338		
Fall Semester	Researcher	11	76,27	13,447	-2,403	,016
	Students	11	92,09	14,652		

It can be inferred from Table 5 that there is a statistically meaningful difference in the ratings of public school students and the researcher for the sum of integrity, order and creativity items of the rubric 1 [$t_{(32)} = -8,543, p < ,05$]. Similarly, the sum of rat-

ings for the fall semester also differs meaningfully [$t_{(30)} = -7,870$, $p < ,05$]. Regarding Table 6, there is a statistically meaningful difference in the ratings of private school students and the researcher for the sum of integrity, order and creativity items of the rubric 1 [$Z = -3,185$, $p < ,05$]. Similarly, the sum of ratings for the fall semester also differs meaningfully [$Z = -2,304$, $p < ,05$].

According to Table 5, for the spring semester, the total ratings of the researcher according to rubric 2 differ significantly from the total self-ratings of the public school students [$t_{(32)} = 8,846$, $p < ,05$]. Similar results were observed for the fall semester [$t_{(29)} = 8,401$, $p < ,05$]. According to Table 6, for private school students, the total ratings of the teachers according to rubric 2 differ significantly from the total self-ratings of the students [$Z = -2,378$, $p < ,05$]. In the fall semester of the private school, the significance level was calculated to be [$Z = -2,403$, $p < ,05$].

Table 7

Spring Semester Public and Private School Student and Parent Views on Portfolio Application

Question 1) "Please write your opinions on the applications for the 'Breeding, Growth and Development in Living Organisms' chapters of the Science and Technology course	Male Students		Female Students		Parents of the Student	
	Public School (f)	Private School (f)	Public School (f)	Private School (f)	Public School (f)	Private School (f)
The ones that stated that they are pleased with portfolio applications.	15	2	13	4	35	8
The ones that stated that they are pleased with the portfolio applications but are convinced that they are waste of time.	4	3	1	1	1	4
The ones that stated that they are not happy with the portfolio applications.	3	2	2	2	2	2
Question 2) "Do you feel any difference in the applications of this chapter compared with previous applications?"						
The ones that stated that they find the applications to be different.	18	3	14	6	36	12
The ones that stated that they find the applications to not be different.	4	4	2	1	2	2
Total (N)	22	7	16	7	38	14

In the spring semester, an open-ended questionnaire given to students and parents and their opinions on the portfolio applications were collected. Taking the first question, 43 students stated that they are pleased with the portfolio applications, 9 students stated that they think they are time consuming and 9 students stated that they are not happy with them. According to parent responses, on the other hand, most parents stated that they are quite happy with the portfolio applications (Table 7).

Taking the second question, 41 students stated that they find the portfolio applications to be different from previous applications, and 11 students stated that they do not see any difference. Also, 48 parents stated that they find the applications different from other applications, and 4 parents stated they do not see any difference.

Table 8

Fall Semester Public and Private School Student and Teacher Views on Portfolio Applications

Question:1) "Please write your opinions on the portfolio applications for the 'Breeding, Growth and Development in Living Organisms' chapters of the Science and Technology course.	Male Students		Female Students		Parents of the Student	
	Public School (f)	Private School (f)	Public School (f)	Private School (f)	Public School (f)	Private School (f)
The ones that stated that they are pleased with the portfolio applications.	14	4	21	2	38	6
The ones that stated that they are pleased with the portfolio applications but are convinced that they are waste of time.	4	3	2	-	5	2
The ones that stated that they are not happy with portfolio applications.	2	1	1	-	1	-
Question: 2) "Do you feel any difference in the applications of this chapter compared with previous applications?"						
The ones that stated that they find the applications to be different.	12	7	22	2	38	7
The ones that stated that they find the applications to not be different.	6	1	2	-	6	1
Total (N)	18	8	24	2	44	8

In the fall semester, an open-ended questionnaire was given to students and parents and their opinions on the portfolio applications were collected. Taking the first question in the above table, 50 students stated that they are pleased with the portfolio applications, and this can be interpreted as most of the students are pleased with the applications. It was found that 41 students are happy with the portfolio applications, and 9 students stated that they find them waste of time. According to parent responses, on the other hand, most of the parents stated that they are quite happy with the portfolio applications, while a very few stated that it is just a waste of time.

Taking the second question, most of the students stated that they find the portfolio applications to be different from previous applications. 43 students stated that they find the applications different and 9 students stated that they do not see any difference. Also, 45 parents stated that they find the applications entirely different from other applications and 7 parents stated they do not see any difference. The results of the spring and fall semesters were parallel with each other.

The responses of students to the *'Please write your opinions on the portfolio applications for the 'Breeding, Growth and Development in Living Organisms' chapters of the Science and Technology course'* reveals that most students are happy with the portfolio applications. They stated that the portfolios *'help them review the topics, help them make researches, help them understand the concepts easier and have more permanent learning, reinforce their learning, help them realize misconceptions'*. The results of this part of the study support the results of the portfolio opinion scale of the fall semester (Table 4).

Taking teacher views on portfolio applications, a public school teacher stated that *'the portfolios can help to reinforce learning but the difference is minor and they are time consuming'*. A private school teacher stated that *'it saves time in understanding the concepts, learning occurs without much repetition, more than one sense organ are activated and hence learning become easier'*.

Discussion and Conclusion

Applications of portfolios reveal different results in various subjects. Such differences are observed in Science Lessons on the chapter base. After the application of our study, students' achievement scores found to be similar are similar in the spring semester after the post-test achievement scores (Table 1, Table 2). In previous studies (Bahçeci 2006, Erdoğan 2006, Okçu, 2007, Parlakyıldız, 2008), it was observed that portfolio assessment has not increased student success. These results are supported by our findings for the spring semester. One reason for these findings is that there is no statistically significant difference between the experimental and control groups, which can be because it was a busy period for the students. For example, students have regular examinations quite often, like a Placement Exam (SBS), and the portfolio applications had to proceed along with these exams and students may have difficulty in paying attention to their portfolios. Furthermore, we are convinced that students had difficulty in focusing on portfolios, which is one of the alternative assessment methods, because they are encouraged to pay attention to their regular examinations, which are traditional assessment methods, by their both teachers and parents.

According to the findings of the fall semester, experimental group achievement scores were found to be significantly higher than the achievement scores of the control group for both public and private schools. **Similar to our findings, Güven (2007) and Mıhladı (2007) found statistically significant differences in favour of the experimental group in terms of achievements when portfolios were applied.** The reason for contradictory findings with the spring semester in the fall semester can be because the 6th grade students of the fall semester has just passed to the second stage of the elementary school, yet have not experienced test anxiety, and have not yet been in the heavy pace of work for the SBS examination, and hence they can better concentrate on their portfolio works.

Most of the students of both the spring and fall semesters were found to be happy with the portfolio applications (Table 3, Table 4). Some previous studies' results support our findings (Bahçeci, 2006; Birgin, 2008; Ekmekçi, 2006; Gözüm, 2008; Güven, 2007; İnce, 2007; Korkmaz&Kaptan, 2002; Mıhladı 2007, Okçu 2007). In the studies of Okan (2005) and Ekmekçi (2006), researchers collected student opinions on portfolio applications and they found that students think that these applications contributed to their achievements, and they have positive opinions about portfolio applications. According to the study performed by Mıhladı (2007), researchers concluded that students in the experimental group where portfolios were utilized developed positive attitudes towards the science and technology course. In the study of Gözüm (2008), students stated that portfolios are necessary applications. In the study performed by Birgin (2008), students stated that portfolio applications encourage them to study, allow them to realize their deficiencies in the course, and to self-evaluate themselves, and that they wish such applications will continue.

According to the results of especially the 11th, 12th and 13th items of the "*Portfolio Attitude Form*", public school students were found to be more positive towards portfolios than private school students. The reason for this finding can be explained by the fact that private schools criticize student success only with test scores and consider portfolios a waste of time. The reason for this is obvious though; the success of private school students in the central exams like SBS is advertising.

Taking rubric scores into consideration, it is seen that students score themselves higher than the researcher. The reason behind this may be that they encountered such an application for the first time in their lives, and the application took only 6 weeks. Considering they are self-evaluating for the first time ever, this can be taken as reasonable. In case the applications continue, students will gain the self-evaluation ability and hence they will score themselves more accurately (Bahçeci, 2006), and the difference between the scores of the researcher and students will reduce.

According to the questionnaire results with 2 open-ended questions, both parents and students were found to be pleased with the application. Similarly, Mıhladı (2007) gave 5 open-ended questions to students, and students responded that portfolios helped them in their academic achievements, they are pleased with the applications, and they wish that they would continue. Okan (2005) forwarded some ques-

tions to parents and found that most of the parents think that portfolio applications **altered their children's' attitudes** towards the science and technology course, and they wish such applications would continue.

Students can be assessed in a versatile way with portfolio assessment by considering practices, events which have done during a semester, and through observing and interacting with them instead of administering exams for a specific day and time. Additionally, individual differences can be taken into consideration, which would not be possible in traditional assessment methods. Thus Korkmaz (2004) indicated that the assessment of students in the limited time was not true. Also, we have thought that to assess the student with one type exams in a specific day and an hour was not a successful assessment. Portfolio implementation allows a wide range of evaluation in a long process and allows the students to actively participate in the assessment process. Also, students need to be actively engaged in the growth and development of their knowledge base. By their design, portfolios require students to take an active role in their learning (Murnane, 1993). In the portfolio file creation, the students have put events and practices selected from their own studies, and also the students have filled in prepared evaluation forms themselves, besides the teacher. Thus, the students take responsibility by observing their development process in this application. Even the parents can also participate in this portfolio implementation, participate in the development process, and observe their children and communicate with them.

Portfolio assessment can be used for formative assessment (Borthwick, 1995), for summative assessment (Davis et al., 2001), or both (Campbell & Murray, 1996a; Campbell & Murray, 1996b). This makes the portfolio a flexible and robust assessment method (Wilkinson et al., 2002). According to the results of our study, portfolio assessment should be used as an alternative assessment method because the majority of private and public school students were satisfied with the portfolio implementation in both fall and spring semester. Also, the students argued that portfolio implementation allowed them to learn the topics permanently, develop individual skills, help them to be more willing to work and doing the work out of the course regularly, and increased their interaction with the teacher. If he/she had a choice, he/she would prefer portfolios in many courses (Table 3, Table 4). The teachers were generally satisfied, but when we looked at the teachers' opinions, the class size was important in terms of implementation. Earlier studies showed the same results, that students were satisfied with portfolios (Bahçeci, 2006; Ekmekçi, 2006; Erdemir, 2007; Güven, 2007; Kabaş, 2007; Okan, 2005).

'*The Portfolio Assessment Rubric*' that was filled by both students and researcher was taken into account to evaluate the portfolios of students (Table 5, Table 6). According to our results, the students' participation into the assessment process should be provided because the students can evaluate themselves more objective perspective and they can have the expected self-evaluation features. Simon & Johnson's (2008) work with portfolios suggests that teachers can be used to develop the skills of reflection, self-evaluation and analysis, and hence contribute to an individual's meta-cognitive development.

The portfolio assessment is a very demanding implementation, inconveniencing the teachers, requiring more work and time inside and outside of classroom, and often necessitates communication with students and parents during portfolio implementation. But the teacher can have the opportunity to evaluate the student in a multi-faced way, thanks to portfolio assessment, and enables teachers to find an opportunity to evaluate his students with different events and practices addressed to various types of intelligence. And also, the portfolio assessment allows students much more concentration on related topics by being motivated and endeavoring for progress, due to participating in their own evaluating period. In the light of this discussion, the following recommendations are presented:

- Portfolio assessment should cover and apply to the entirety of the education and training period, due to this success.
- The maximum class size should be 15; the minimum class size should be 10 to apply portfolio assessment efficiently and accurately towards a designated purpose.
- Teachers who will execute this implementation should be active, alert, and good observers; and they should also be prepared with a plan to observe **students' files which they should execute with the students in full, and observe the files meticulously**. In addition, students should be motivated by their teachers to prepare their portfolio files in an organized and rigorous way; this is because students could not concentrate for a long time. Teachers should do small-scale follow-ups to overcome these disadvantages, and should be giving feedback. Students must try to solve these deficiencies with the teacher. This should be cooperating with other courses in the framework of an integrated approach, should be developing creativity with conjunct practices, and should be connecting between other lessons to increase the effectiveness of portfolio assessment.
- Planning and programming of portfolio implementation should be prepared by teachers and school management together. To apply the portfolio assessment, the students, parents and teachers should be informed and the equipment and resources should be revised.
- Today, it is observed that the portfolio, which provides many positive results in the schools, such as the return of a modern approach and education system, is preferred to be used as a teaching method and material, but we thought the use of portfolios should also increase the processes of assessment and evaluation.

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Fen ve Teknoloji Dersinde Öğretmen, Öğrenci, Veli İşbirliği ile Portfolyo Uygulaması

Atıf:

Balaban, M., Güneş, M. H. (2012). Portfolio Assessment in Cooperation with Teachers, Students and Parents in a Science and Technology Course***. *Eğitim Araştırmaları-Eurasian Journal of Educational Research*, 49/A, 289-310.

(Özet)

Problem Durumu

Öğrenme stillerinin farklılığı nedeniyle günümüzde alternatif ölçme ve değerlendirme yöntemlerinin kullanılması neredeyse zorunlu bir hale gelmiştir. Öğrencilerin değerlendirilmesi bir dizi test sorusuna cevap vermekten çok daha geniş bir anlam taşımaktadır. Ölçme ve değerlendirme sınav sonrası öğrencilere sadece not vermek değildir. Bu nedenle yeniden yapılanma çerçevesinde etkili bir eğitim ve öğretim süreci içerisinde ölçme değerlendirme konusunda da yeni bir yaklaşıma gidilmeli ve alternatif ölçme ve değerlendirme yöntemlerine de yer verilmelidir.

Araştırmanın Amacı

Bu çalışmada, "Vücutumuzda Sistemler" ve "Canlılarda Üreme, Büyüme ve Gelişme" ünitelerinde portfolyo uygulamasının öğrenci başarısı ve gelişimi üzerindeki etkisinin incelenmesi amaçlanmıştır.

Araştırmanın Yöntemi

Araştırmanın evrenini Samsun ili 6. sınıf öğrencileri oluşturmaktadır. Çalışmanın bahar dönemi (Mart ayı) örneklemini özel okul ve devlet okulundan toplam 108, güz dönemi (Eylül ayı) örneklemini ise toplam 114 öğrenci oluşturmaktadır. Bahar döneminde devlet okulu için ulaşılan veli sayısı 38, özel okul için 14 olup, öğretmen sayısı 2'dir; güz döneminde ise devlet okulu için ulaşılan veli sayısı 44, özel okul için 8 iken öğretmen sayısı ise 2'dir. Nicel kısımda, deney ve kontrol gruplarının bulunduğu yarı deneysel desen kullanılmıştır. Araştırmada deney grubunu geleneksel öğretim yöntemlerine ek olarak portfolyonun uygulandığı grup, kontrol grubunu ise geleneksel öğretim yöntemlerinin uygulandığı grup oluşturmaktadır. Deney ve kontrol gruplarına uygulama öncesinde ve sonrasında ön test - son test başarı testleri uygulanmıştır. Bahar döneminde 75, güz döneminde 100 sorudan oluşan başarı testleri ön çalışma olarak 90 kişiye uygulanmıştır. Her iki döneme ait testlerde soruların güvenilirliği Cronbach $\alpha = 0,900$ 'ün üzerinde çıkmıştır. İlgili ünitelerde hazırlanan başarı testi öğrencilere ön test, son test olarak uygulanmıştır. Testlerin güvenilir-

*** This article was prepared from post graduate thesis of the first author

lik değerleri, SPSS 13 programı kullanılarak bahar dönemi için Cronbach $\alpha=0,900$ olarak, güz dönemi için ise Cronbach $\alpha=0,950$ olarak bulunmuştur.

Çalışmada öğrenci görüşlerini almak için Bahçeci (2006) tarafından geliştirilen "Portfolyo Tutum Formu" modifiye edilerek uygulanmıştır. Bahar döneminde uygulanan bu formun güvenilirliği Cronbach $\alpha= 0,803$; güz döneminde ise Cronbach $\alpha= 0,673$ olarak hesaplanmıştır.

Öğrencilerin kazanacakları öz yeterlilik açısından, portfolyolarının öğrenci ve araştırmacı tarafından değerlendirilmesi arasında fark olup olmadığına bakılmıştır. İnternet adresinden sağlanan "Öğrenci Portfolyo Değerlendirme Rubriği (1 ve 2)" modifiye edilmiş ve hem öğrencilerin velileri ile birlikte bu rubrikleri doldurmaları sağlanmış hem de araştırmacı tarafından doldurularak bir veri toplama aracı olarak kullanılmıştır. Araştırmada, uygulanan portfolyoya yönelik görüş elde etmek için yapılandırılmış anket yöntemi ile öğrenci, öğretmen ve veli görüşleri alınarak nitel analiz yapılmıştır. Bu anketler öğrenci ve öğretmenlere araştırmacı tarafından uygulanmıştır. Velilere ise öğrenciler aracılığı ile ulaştırılmıştır. Elde edilen bulgular içerik analizi ve yorumlama şeklinde değerlendirilmiştir.

Araştırmanın Bulguları

Bahar dönemi hem devlet hem de özel okuldaki deney ve kontrol grubu öğrencilerinin son test başarı puanları arasında anlamlı bir farklılık olmadığı görülmüştür. Güz döneminde ise hem devlet okulundaki hem de özel okuldaki deney ve kontrol grubu öğrencilerinin son test başarı düzeyleri arasında istatistiksel olarak deney grubu lehine anlamlı farklılıklar olduğu gözlenmiştir. Tutum ölçeklerine baktığımızda ise öğrencilerin çoğunluğu portfolyo uygulamasından memnun olduklarını ve devam etmesini istediklerini belirtmişlerdir; ancak bazı maddeler için devlet okulu öğrencilerinin özel okul öğrencilerinden daha olumlu yaklaştıkları görülmüştür. Hazırlanan dosyaları değerlendiren araştırmacı ve öğrencilerin puanlaması arasında önemli farklar vardır. Öğrenciler kendi dosyalarını değerlendirirken yüksek puanlar vermişlerdir. Öğrencilerin öz değerlendirmede yetersiz kaldıkları görülmektedir. Her iki dönemde devlet ve özel okul öğrencileri ile velilerine gönderilen mektupların cevaplarına bakıldığında öğrencilerin ve velilerin çoğunluğunun bu uygulamadan memnun olduğu görülmektedir.

Araştırmanın Sonuç ve Önerileri

Çalışmanın güz döneminde deney grubu öğrencileri ile kontrol grubu öğrencilerinin başarı testleri arasında deney grubu lehine bir anlamlılık söz konusuysen, bahar döneminde de beklenen farkın oluşmaması, bahar dönemi sonunda öğrencilerin girmek zorunda oldukları SBS gibi önemli bir sınav nedeniyle olduğu düşünülmektedir. Yine bu sınav nedeniyle bazı öğrenciler yapılan uygulamayı zaman kaybı olarak görmekteyiz. Öğrencilerin kendi dosyalarını değerlendirmelerinde araştırmacıya göre daha fazla puanlar vermeleri, böyle bir uygulama ile ilk defa karşılaştıkları için kısa sürede öz değerlendirme becerisi kazanamadıklarını göstermektedir. Öğrenciyi belirli bir gün ve saat içerisinde yapılan sınavlarla değerlendirme yerine,

gerekli düzenlemeler yapılarak, bir dönem boyunca yaptığı etkinlik ve uygulamaları dikkate alarak ve öğrenciyle etkileşime girip onu gözlemleyerek çok yönlü bir şekilde değerlendirebilme fırsatı veren portfolyo uygulamasının kullanılabilceği görüşündeyiz.

Anahtar Sözcükler: Portfolyo değerlendirme, başarı testi, tutum, fen eğitimi