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Full Length Research Paper

Assessment of ‘Fx’ grading system and modular curriculum implementation in Samara University, Ethiopia

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Fx grading system is a newly incorporated grading system in the Ethiopian higher education curriculum. The system started to apply in 2013, as an element of the modular curriculum, with the intention to give a second chance for students. Currently, this grading system is being implemented in Samara University, Afar, Ethiopia. This study has been conducted using a cross-sectional approach that applying a combination of both qualitative and quantitative methods. The data have been collected from students and teachers as primary sources as well as university’s registrar, departments and quality assurance office as secondary sources via interview, questioners, focus group discussion and document analysis. The data collected were analyzed by means of descriptive methods and interpreted using tables, percentages, charts, and graphs. Factors considered in the evaluation were challenges of modular curriculum, Fx grading system with its implementation, continuity of Fx grading system, and factors affecting Fx grading system implementation. The result of this investigation indicates that the contents of the harmonized modular curriculum dealing with Fx grading system, especially on the course content, course code, course ownership, mode of tutorial delivery, mode of assessment, departmental and college level supervision should be revised and modified for effectiveness of the grading system.

Key words: Fx grading system, modular curriculum implementation, Afar.

INTRODUCTION

Contemporarily, developments around the world have brought about increasingly challenging times for higher education. Higher education is becoming challenged by the pressures of mystification, increasing forms of accountability, inescapable competition, new stakeholder

expectations, and rapidly changing environment (Taylor et al., 2013).

Education is a process by which human beings of different generations transmit their experiences, new findings, and values that are accumulated over the years,

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in their struggle for survival and development. It enables individuals and society to make all-rounded participation in the development process by acquiring knowledge, ability, skills and attitudes (Federal Democratic Republic Government of Ethiopian Education and Training Policy, 2002).

The emergence of new technologies along with the internalization of higher education can be expressed as the process of integrating an international, intercultural or global dimension into the institutional purposes, functions or delivery of post-secondary education (EUA, 2014).

Indeed, higher education system is a key building block for development of our democratic societies. Teaching and learning in higher institutions should encourage students to develop confidence in their own creative abilities, strong community engagement and a sense of ethical responsibility allied to their humility that comes from learning. Learning is a lifelong phenomenon that demands a lifelong curiosity and commitment. Teaching and learning in higher education is a shared process, with responsibilities on both students and teachers. Within this shared process, higher education must engage students in questioning their preconceived ideas and their models of how the world works so that they can reach a higher level of understanding.

The classical conception of knowledge as school based and discipline oriented should be broadened. Knowledge is an integrative capability. The acquisition of knowledge in itself is not the major aim of education and training. Higher education in Ethiopia has been implemented in traditional, classical conception of knowledge, for a long time. The primary method being used is lecturing which is the oldest teaching method identified as a method of explanation or clarification of contents to students verbally. It is a method where the teacher is more active and students are passive. The method is usually a one-way communication where the teacher narrates or presents on social or natural events, processes, procedures by citing authorities in the field of the subject while providing little opportunity for students to participate. It is criticized by scholars like Paulo Freire (1970) as banking method. It implies that the teacher deposits his knowledge, skills and values into the mind of the students without their active involvement, such a questioning challenging information being deposited.

All public universities in Ethiopia are currently implementing competence based education (CBE) curricula that affected the whole design of academic programs (modularization), assessment of students, and allocation of credits (EcTS) that has brought about a shift in thinking about students' and teachers' workload (Haftu, 2014).

Higher institutions should use modern and competent ways of teaching to achieve their countries development goal. Most modern methods use gapped lecture in which the instructor gives time for students to raise questions, to respond to questions and to comment after lecturing

for a while. Another modern conceptualization is the relation between education and the world of work through competence-based education. It is not difficult to see that competence relates to the world of work. Acquiring and developing competence is more than learning a set of skills. A common term describing the acquisition and development of competence is competence based education and training (CBET), where training is associated with the mastering of skills. In this form of approach, disciplines are practiced in modular activity.

Modularization as a form of curriculum delivery is originated in North America in the second half of the 19th century. In a modular frame work, a degree program is broken down into a series of modules which are effectively self-contained blocks of learning.

Module is designed based on the competence based model where competencies are considered as the capabilities that the students should have after they complete a certain module. It is a set of printed learning materials consisting of well-planned teaching notes and activities which have been carefully laid out for students to work on independently by their own pace. The basic characteristics of good modules are instructiveness, conversational nature, self-pacing and pedagogical sound (Green Paper, 1992). All components of a module such as learning outcomes, contents, teaching methods and assessment techniques are selected based on the competencies that students are supposed to develop up on completion of a given module. In modular approach, the assessment method of each course is predetermined and stated in each syllabus.

Assessment is the process by which the instructor collects information about students that he/she will use to make educational decisions about them. Assessments are not the decisions; rather they are sources of information to the decisions. The information you obtain from assessments can help you make these decisions with more accuracy and efficiency. In modular and competence based education, the assessment is continuous. Continuous assessment is a classroom strategy implemented by teachers to ascertain the knowledge, understanding, and skills attained by pupils. It is a means for collecting information to check students' attainment of the required learning outcomes, the progresses students have made, the problems they experienced in learning, and the effectiveness of your teaching methodologies (Dunne and Carre, 1999).

As a matter of general principle, continuous assessment in the form of tests, reports, assignments, presentations, etc., should be made for every module/course which counts for not less than 50% of the total module/course mark. The remaining 50% shall be allotted for a final exam at the end of module/course. In this approach, the grading system is fixed and includes 'Fx' in addition to the previous known grading system.

On a module/course with practical course, 'Fx' grade is allowed for re-examinations since student fulfilling the

required attendance should score at least 50% to pass that course. The re-exam is given within a week after the beginning of the next semester after being given tutorial lesson for a duration that takes one fifth of the total time given for that course. Then, the grade will be calculated according to harmonized academic policy. For a student who scores 'Fx' for the second time, the grade will be converted into 'F' for status determination and a student who did not take supplementary examination having 'Fx' within two weeks' time due to unjustifiable reason, the 'Fx' shall be converted into 'F' for status determination (Samara University Handbook, 2015).

The implementation of 'Fx' in Ethiopia's higher institutions is perceived differently. Some institutions argue that 'Fx' should be removed from the grading system; while others argue that it should be continued with a limited grade after 'Fx' re-exam. In addition, there are also some assumptions indicating 'Fx' grade is misunderstood and misused by some students and instructors. Hence, Samara University has taken the commencement and decided to assess the 'Fx' grading system and modular curriculum implementation in the university. These reasons are the motives behind this study.

Objectives of the study

General objective

To assess the 'Fx' grading system and modular curriculum implementation in Samara University.

Specific objectives

- (1) To review the level of modular curriculum implementation in Samara University
- (2) To evaluate the 'Fx' grading system implementation
- (3) To investigate the impact of 'Fx' grading system on attrition rate and capacitating students
- (4) To assess the attitude of students and instructors towards 'Fx' grading system
- (5) To propose possible alternative solution on the continuity of 'Fx' grading system

METHODOLOGY

Organizational profile

Samara University is one of the public universities established by the Government of the Federal Democratic Republic of Ethiopia to provide higher education in the country through teaching, research and community service. It was established in 2006 in Samara town, the capital for Afar National Regional State. The university launched the teaching learning process in 2008 by three faculties and twelve departments enrolling 1867 undergraduate students.

Within five consecutive graduation periods, a total of 4,123 and

189 students have graduated in the regular and in the continuing education program, respectively. Currently, the university has diversified its programs to seven colleges and thirty nine departments. In the undergraduate regular program, the enrollment has grown to 4,594 while the continuing education and summer program have grown to 958 and 654, respectively. In addition to undergraduate programs, the university has launched post graduate programs in masters of business administration and masters of public health programs by enrolling 159 students. As a result, the total enrollment has reached 6,365 both in undergraduate and post graduate programs.

At the beginning, there were 21 academic and 6 support staffs. Currently, the academic staff has expanded to 737 of which 681 are males and the remaining 56 are females. Besides, the number of support staff members has reached 751.

Study approach

The study has utilized a cross-sectional approach applying a combination of both qualitative and quantitative methods as mixing of these methods is often considered as the best way of handling research questions through triangulation. Therefore, in this survey study, endeavors were exerted to use both methods in order to generate information from the study subjects and utilize the benefits of each method. In addition, the study has used a descriptive study approach.

Data sources

Both primary and secondary data sources have been used for the current study. Primary data have been collected from instructors and students using interview, questioners and focus group discussion. Secondary data, on the other hand, have been collected from registrar, departments and academic quality assurance director offices as well as from different reports or documents in the university.

Sampling techniques

The sampling techniques used for the study was purposive sampling. Hence, the assessors judgmentally decided to collect the data from the mentioned agents.

For the questionnaire based assessment

- (1) Three students who got 'Fx' grade were selected purposively from each department of all batches.
- (2) Three students who did not score 'Fx' were taken randomly from each department of all batches.
- (3) Three instructors who delivered the 'Fx' tutorial were selected purposively from each department.
- (4) Three instructors who did not deliver the 'Fx' tutorial were selected randomly from each department.

For the focused group discussion

- (1) Academic quality assurance director, and
- (2) All department heads were included.

For the document review

- (1) Registrar, academic quality assurance and all department head

offices were utilized for the document based evaluation.

For the interview

(1) Student representatives were consulted.

Data management and analysis

The primary data obtained from the questionnaire, interview and focused group discussions and secondary data from different documents and reports were organized and fed into Microsoft excel software for making the data ready and analyzed further. Descriptive methods including table, percentage, chart, and graphs were utilized to summarize both the primary and secondary data. Furthermore, data collected from interview, focused group discussion and document review were transcribed into word document and analyzed through triangulating with the data collected through questionnaires.

RESULTS AND DISCUSSION

Personal details of the respondents

To achieve the stated objectives, four types of questionnaires were prepared and distributed for all selected respondents. Those questionnaires included students who scored Fx and who did not scored Fx as well as for instructors who provided and did not provide Fx tutorial. Totally, 408 questionnaires were distributed and 356 which is 87.25% has been collected from all respondents.

Modular curriculum implementation and factors affecting its implementation

Challenges of modular curriculum

According to Crosier and Parveva (2013) guideline, there are a number of reasons why higher education institutions opted for modularizations. The existing curricula are discipline based and courses are fragmented. These curricula do not say anything about student workload which is important for student's success and also there is a loose connection between the world of education and the world of work because of the inherent problem of the existing curricula.

However, our finding showed that the harmonized modular curriculum implementation also have major challenges like course ownership, course content, course sequence, course code, mode of delivery, assessment problem, clear and sufficient time allocation for practical credit hours and absence of updated references.

Regarding course ownership, some courses which belong to one department are coded as other departments. Thus, the courses are delivered to students without their required specialization which in turn affects

quality of education.

In relation to course content, some courses have missed the content which is important and mandatory to achieve the objective of the course. Furthermore, in some courses, the content which are not relevant to course were included and also there are courses sequence problems.

The other major problem of modularization is mode of delivery for the courses, especially in hard science course which are very difficult to deliver in block mode. This results in difficulty of implementing continuous assessment as well as inability of students to acquire the required knowledge from the given courses. Furthermore, there are limitations of facilities and resources such as lack of active and well organized laboratory rooms, absence of updated text books, and harmonized modules and laboratory manuals in the library. Large class sizes are also additional factors that affect the implementation of the existing modular curriculum.

Fx grading system and its implementation

Factors lead to scoring Fx grade

Personal factors: According to Marshall (2014), to reduce the attrition rate of the students, interventions such as enhancing students' vigilance to study, improving their personal communication skills, providing advice to them, supporting them when they are at risk, improving their quality of learning experience and increasing their engagement in practical tasks are found necessary. Our findings, as derived from responses of the majority of respondents (students who scored Fx (38.46%) and those who did not score Fx (47.79%)), the reason for scoring Fx by students was because of their poor preparation. On the other hand, the rest of respondents replied that the reason for scoring Fx by the students was due to illness, poor performance and cheating (Figure 1).

Mode of course delivery: As shown in Figure 2, students who scored Fx (65.06%) and students who did not score Fx (63.11%) responded that students mostly score Fx grade in parallel mode of delivery. In contrary, 7.23 and 7.76% of the students who have and have not taken Fx, respectively, responded that students mostly score Fx in semi block mode of delivery. As it was raised during focus group discussion, the most important reasons for scoring Fx in parallel mode of delivery were: inadequate students' attention to parallel courses as they are busy by block courses and loose grade provision of teachers in block mode of delivery by simplifying modes of assessments due to shortage of time.

Academic status of students: Teachers who gave Fx responded that Fx grade is mostly scored by low, medium and high achievers the share of which are 88.75, 10 and 1.43%, respectively (Figure 3). This result was

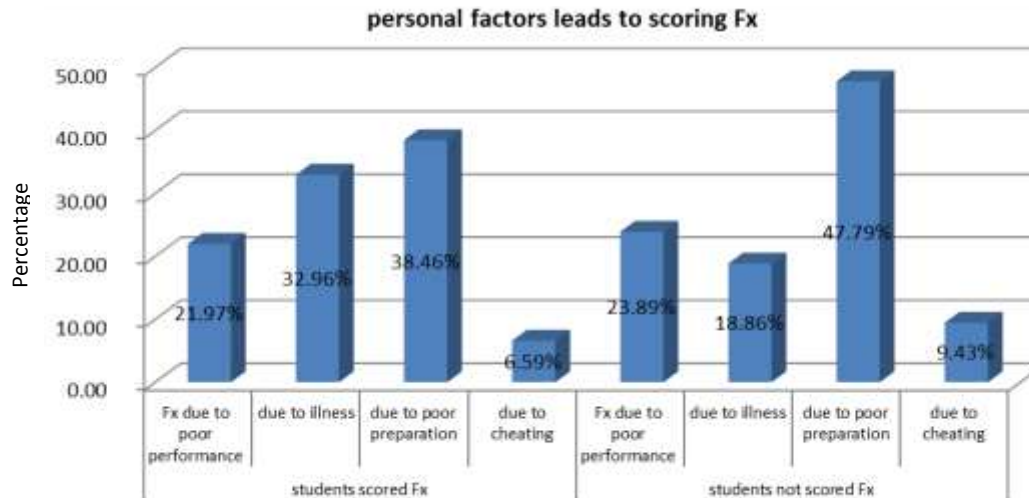


Figure 1. Personal factors leading to scoring Fx.

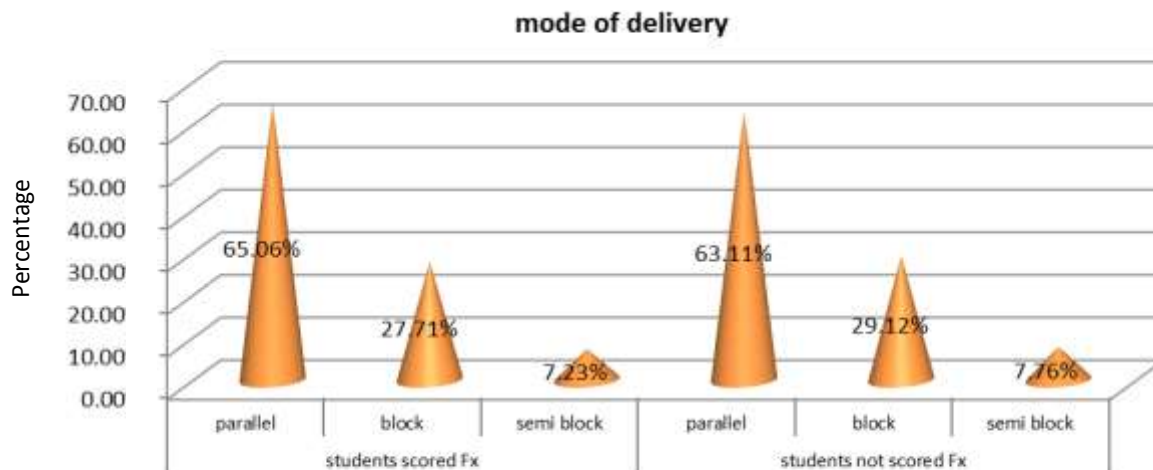


Figure 2. Mode of delivery vs. scoring Fx.

Table 1. Number of students who scored Fx in each semester.

Status	2014 1st semester		2015 1st semester		2015 2nd semester		Total
	No.	%	No.	%	No.	%	
Fail Before FX	168	36.7	34	20.1	114	36.7	316
Pass Before FX	290	63.3	135	79.9	196	63.3	621
Total	458	100%	169	100%	310	100%	937
Fail After FX	64	13.9	14	8.2	59	19	137
Pass After FX	394	86.1	155	91.8	251	81	800
Total	458	100%	169	100%	310	100%	937
Total No. of students in each semester	4,232		4,452		4,132		-

similar with the information obtained from Samara University Registrar Office (2015). As shown in Table 1,

on 2014 first semester 458 students scored Fx, out of these, 36.7% failed before taking Fx exam and the

Table 2. Student scored Fx in 2014 and 2015 in each college.

CET		CBE		CSSH		CNCS		CHS		CVM		CDA	
Department	No.	Department	No.	Department	No.	Department	No.	Department	No.	Department	No.	Department	No.
Civil	42	Accounting	44	Amharic	13	Biology	21	Nursing	9	cvm	6	ABVM	14
Chemical	26	Economics	20	English	6	Chemistry	23	Midwifery	9	-	-	Horticulture	20
Electrical	6	Mgmt	129	Geography	25	Physics	15	Health officer	8	-	-	Animal	4
Mechanical	14	-	-	Anthropology	28	Maths	18	-	-	-	-	Plant	31
Computer	59	-	-	Sociology	37	Statistics	20	-	-	-	-	Narm	23
It	27	-	-	History	8	Geology	28	-	-	-	-	-	-
Pre engineering	159	-	-	Civics	19	-	-	-	-	-	-	-	-
-	-	-	-	Law	9	-	-	-	-	-	-	-	-
-	-	-	-	Arabic	2	-	-	-	-	-	-	-	-
-	-	-	-	Afarf	2	-	-	-	-	-	-	-	-
Total st scored fx	333	-	193	-	149	-	125	-	26	-	6	-	92
Total No. students	2,868	-	2,210	-	2,718	-	1,651	-	963	-	305	-	1,915
% age of scoring Fx in each college	11.6%	-	8.7%	-	5.5%	-	7.6%	-	2.7%	-	1.9%	-	4.8%

remaining 63.3% passed. However, after taking Fx exam, 86.1% passed and 13.9% failed. This indicated that the presence of Fx tutorial and exam reduced number of students who failed from 168 to 64. Therefore, the inclusion of Fx grading system contributed to reduce the attrition rate by 2.5%. Similarly, in 2015 1st and 2nd semester, from 34 and 114 students who failed before taking Fx tutorial were reduced to 14 and 59 students in first and second semesters, respectively. This indicated that the Fx grading system reduced the attrition rate by 0.5 and 1.4% in the consecutive semesters.

As indicated in Table 2, in 2014 and 2015, out of the total students, 11.6 and 8.7% of the students scored Fx in engineering and Technology College and Business and Economics College, respectively whereas 2.7 and 1.9% of students scored Fx in college of health science and college of veterinary medicine, respectively.

Course category: As indicated in Figure 4, 50, 29.07 and 20.92% of students who scored Fx replied that they mostly score Fx grade in common, major and supportive courses, respectively. As it was explained during the focus group discussion, students mostly scored Fx grade in common courses since they give less attention to these course categories.

Attitude of students and instructors towards Fx Grade preference: The result indicated that, 92.94 and 93.04% of students who scored and did not score Fx, respectively replied that students prefer Fx grade than D grade. Similarly, 92.94 and 93.04% of teachers who gave and did not give Fx, respectively replied that students prefer grade Fx than D. The respondents further explained that students prefer Fx than D to improve their knowledge and grade.

Importance of Fx

The Fx grading system in the university is considered as an important system for students as it was explained by 81.8% of students who did not score Fx grade as shown in Figure 6. However, the rest (18.2%) of respondents said that it was not important (Figure 5). On other hand, 42.99, 42.05 and 14.95% of respondents replied that it was important for improving knowledge, grade and survival, respectively. Similarly, 57.6% of teachers who gave Fx grade said Fx grading system is important for students. Moreover, they explained that it may give a second chance for the students who have some difficulties due to different acceptable reasons during an exam to improve their knowledge and grade whereas 42.4% of teachers who have implemented Fx grade responded that Fx grading system is not important for students since the

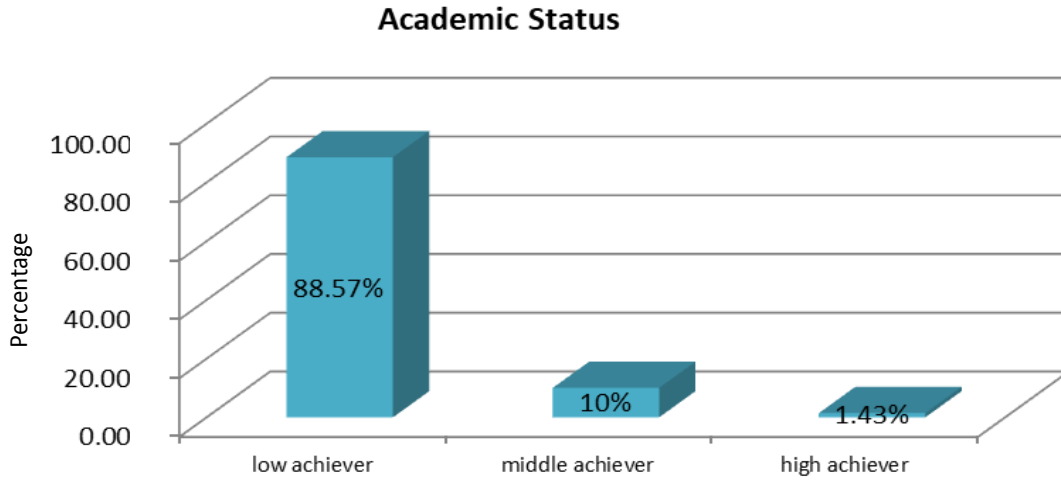


Figure 3. Academic status of students scoring Fx.

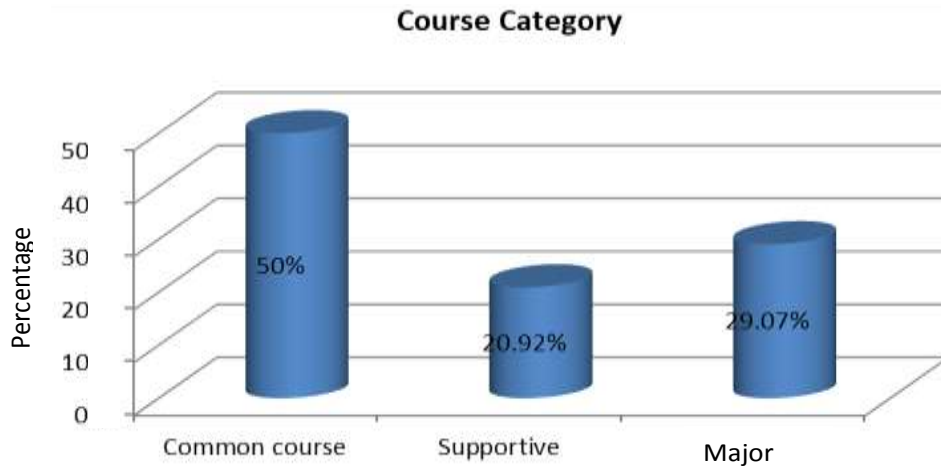


Figure 4. Scoring Fx in different course categories.

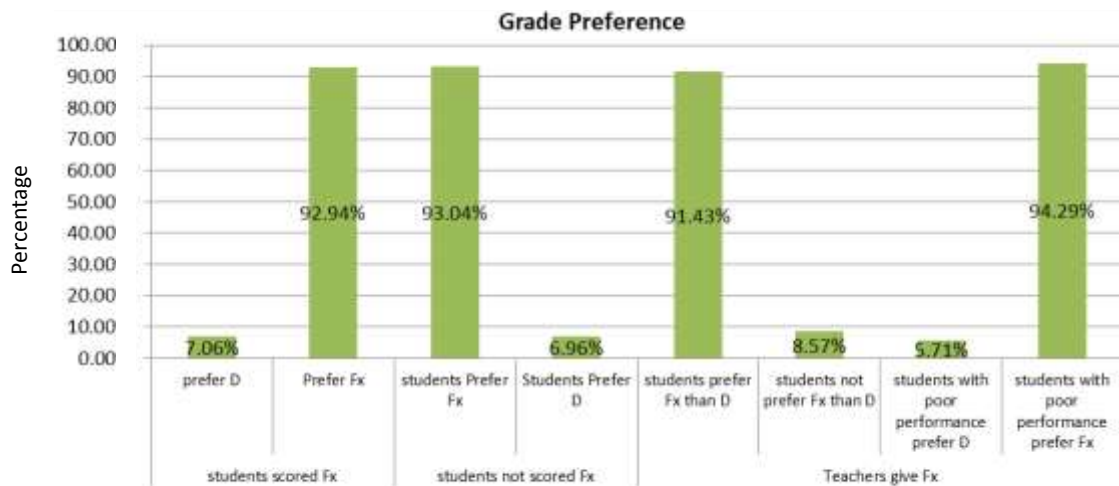


Figure 5. Students' grade preference.

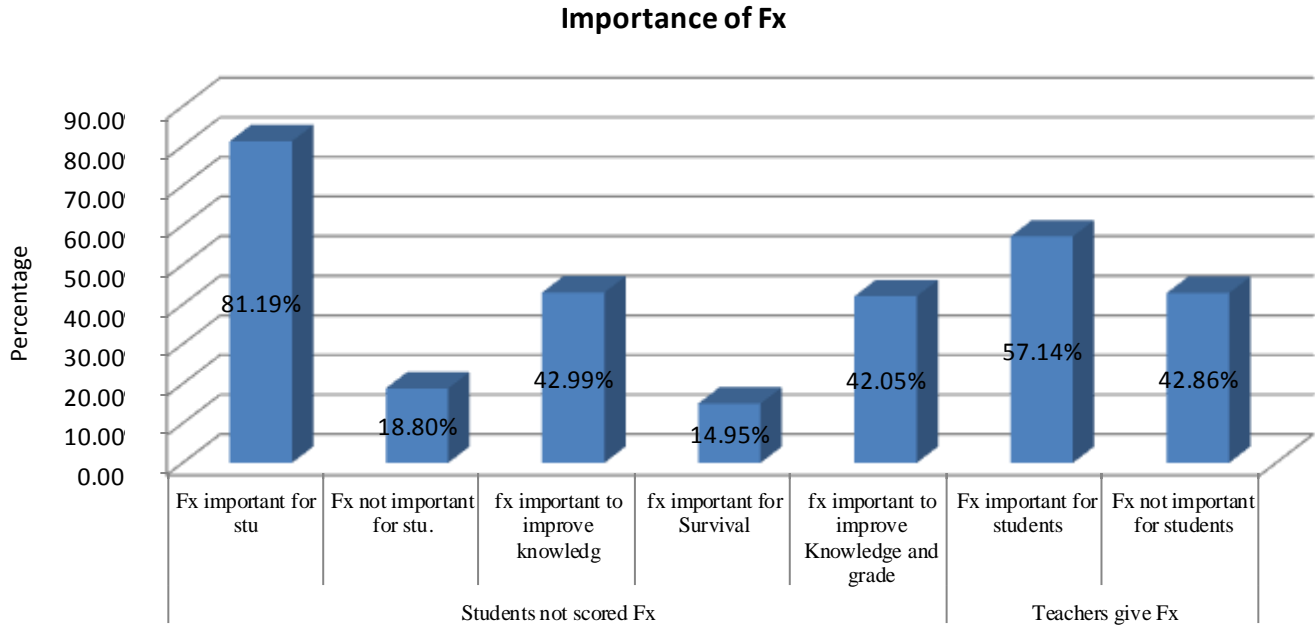


Figure 6. Importance of Fx for the students.

system pushes the students towards misusing the system.

Factors affecting Fx grading system implementation

Tutorial implementation: The result revealed that 62.19% of students who scored Fx grade responded that they took tutorial while the rest respondents replied that they were not given tutorial during reexamination. Furthermore, 42.68 and 50.62% of the students who scored Fx responded that there is a problem regarding supervision by concerned bodies and time schedule, respectively. Similarly, 72.86, 80 and 87.14% of teacher respondents who implemented Fx grade indicated that there were problems in supervision, clear evaluation criteria and time sufficiency, respectively (Figure 7).

On the other hand, 53.16 and 32.1% of the students who scored Fx replied that there is poor status and time of tutorial, respectively, in Fx implementation. Similarly, 32.39% of teachers who were giving Fx grade explained that there was poor interest of students to take tutor whereas there is poor interest of teachers in giving tutorial as 37.04% of teachers who did not give Fx grade responded (Table 3).

Misuse of Fx by teachers and students: Regarding the misuse of Fx grading system, different perceptions have been figured out from students and teachers (Figure 8). The result showed that, 39.64% of students who did not score Fx and 55.71% of teacher who gave Fx said that students scored Fx purposely whereas 60.36% of

students scored Fx and 44.49% of teachers who gave Fx grade responded that students cannot score Fx purposely. Similarly, 58.02% of teachers who did not give Fx expresses as Fx was misused by students and 41.98% of them said it was not misused by students; whereas 66.25% of those instructors who did not give Fx said Fx was not misused by teachers and 33.75% of them said it was misused by teachers.

Continuity of Fx grading system

Teachers who gave (54.29%) and did not give (56.25%) Fx grade said that Fx should not be continued as a grading system. The opinion of these respondents about the continuity of Fx was due to the fact that Fx has poor implementation in the university; it makes students to be dependent (carelessness) and students may misuse the system. On the contrary, 72.84 and 70.18% of students who scored and did not score Fx, respectively, replied that Fx grading system should be continued. The argue that students prefer continuity of Fx grading system wishing to score a good grade and to improve their knowledge (Figure 9).

Maximum grade of students score after 'Fx' re-exam

As responded by 57.14 and 65% of teachers who gave and did not give Fx, limiting grade after Fx re-exam is necessary (Figure 10). Moreover, teachers who gave Fx (95%) and did not give Fx (73.08%) prefer grade `C` as a limit after Fx re-exam while other respondents of 5.76

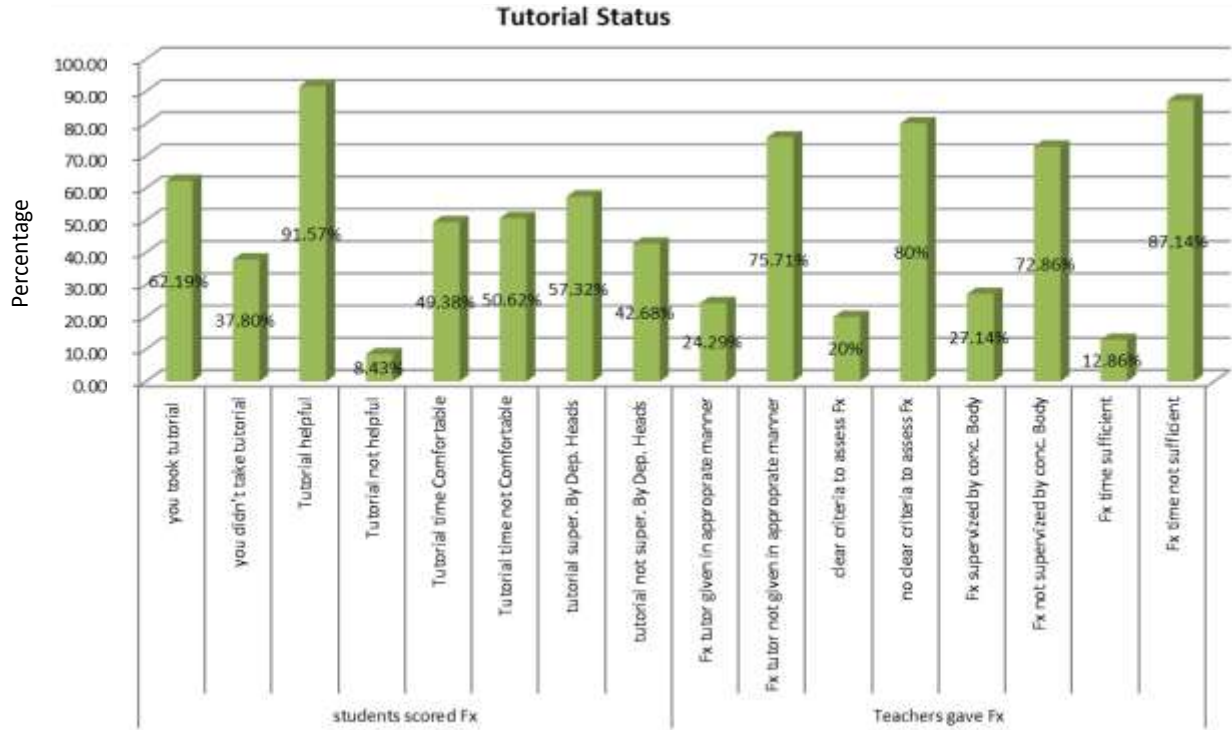


Figure 7. Implementation of Fx tutorial.

Table 3. Response of tutorial status and time by different respondents.

Respondent	Description	V.P (%)	PR. (%)	GD (%)	V.G (%)	EX (%)
St Fx	Tutor Status	10.12	53.16	13.92	15.19	7.59
St Fx	Tutor Time	22.22	32.1	17.28	24.69	3.7
Tchfx	Fx supervision	13.04	47.82	17.39	17.39	4.34
Tchfx	Students` Interest to take Fx tutor	14.08	32.39	25.35	22.54	2.81
Tchnfx	Teachers` Interest to give Fx tutor	19.75	37.04	25.93	9.87	7.4

**V.P: Very poor; PR.: Poor; GD: good; V.G: very good; Ex: Excellent.

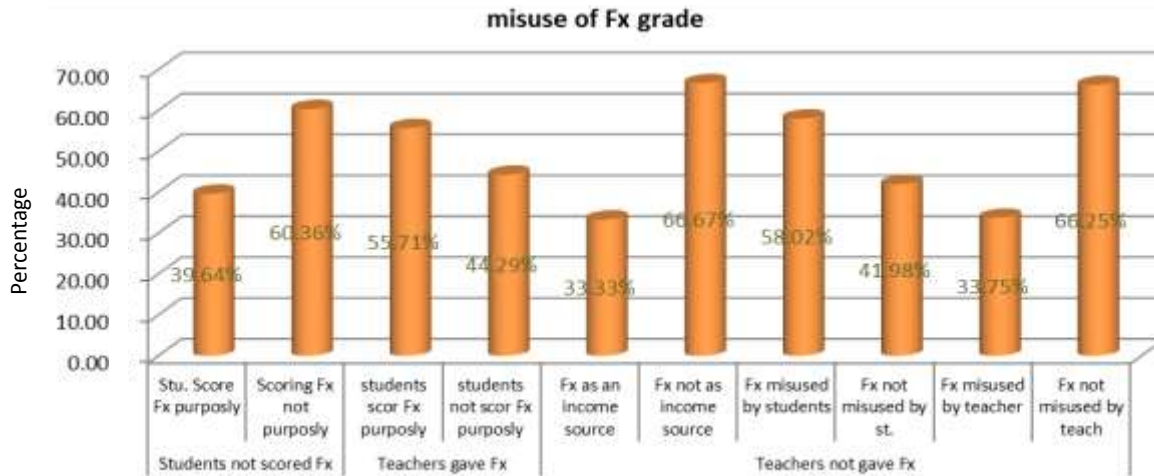


Figure 8. Misuse of grading system.

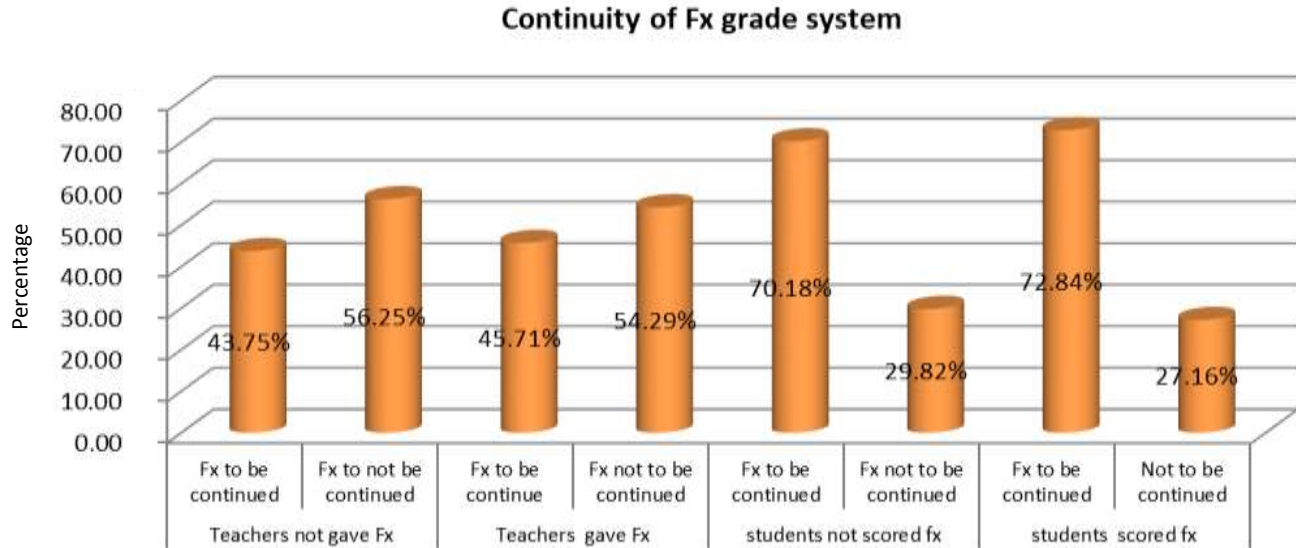


Figure 9. Continuity of Fx grading system in modular curriculum.

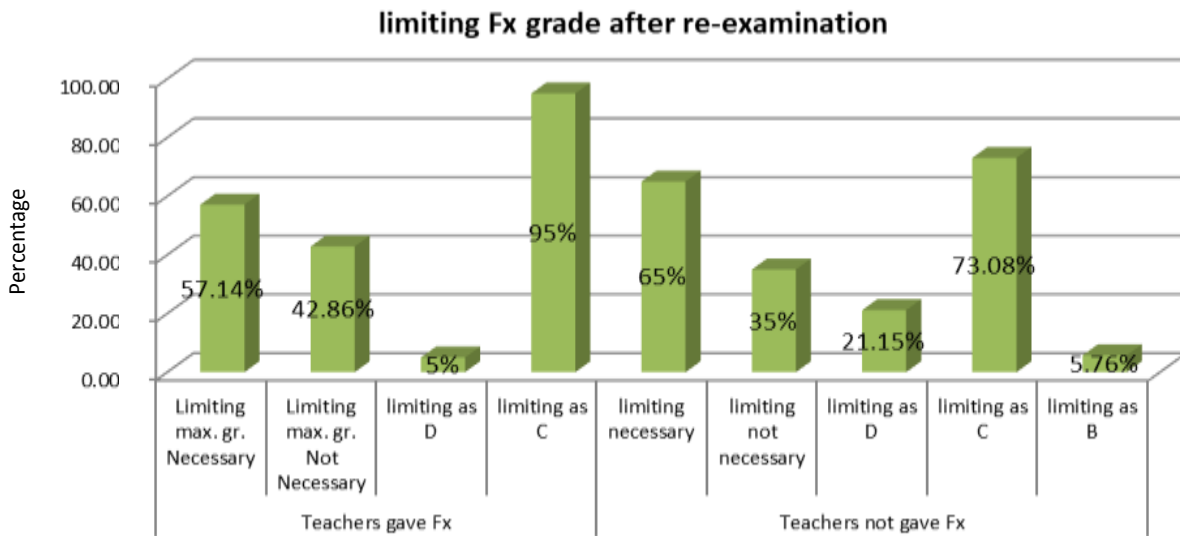


Figure 10. Limiting Fx grade after re-examination.

students was poor preparation. Regarding the mode of delivery, parallel mode of delivery ' was selected as a delivery system by which most of the students scored Fx. On the other hand, Fx grade is mostly scored by low achiever students. Concerning course category, it is identified that students mostly scored Fx in common courses. In case of grade preference, students mostly found to prefer Fx to D grade. The Fx grading system in the university was considered as an important system for students to improve knowledge and grade as well as for academic survival as it may give a second chance for the students who have some difficulties due to different acceptable reasons during an exam. However, it was

indicated that there is a problem regarding supervision, evaluation criteria and time sufficiency during Fx implementation. In this regard, the implementation of Fx is also being influenced by other factors such as time of tutorial, poor interest of student and teachers to take and give Fx tutorial, respectively. The result showed that there is a misuse of Fx grade both by the students and teachers. Indeed, it was described that there is poor status of Fx implementation in Samara University. According to teacher respondents, Fx grading system shall not be continued due to poor implementation status; however, if it is continued, limiting grade after Fx re-exam is necessary as grade `C`. On the contrary, students are

interested in the continuity of Fx with improved implementation. As the study showed, Fx grading system reduced the attrition rate. Regarding the frequency of Fx grade, most of the students that have scored Fx were found in technology and engineering college while the lowest Fx grade was recorded in the college veterinary medicine.

RECOMMENDATIONS

- (1) There should be a revision on harmonized modular curriculum especially on the mode of delivery, course contents, course code, ownership and mode of assessment.
- (2) There has to be supervision by department heads, college quality assurance and college deans during Fx tutorial implementation.
- (3) The university needs to have clear evaluation criteria with sufficient time during Fx grading system implementation.
- (4) Students should use Fx grading system whenever they face some difficulties due to different acceptable reasons during an exam instead of poor preparation.
- (5) Teachers and department heads should identify students who scored Fx purposely and warn them not to do so.
- (6) The department heads, college quality assurance coordinators and college deans should supervise the teachers not to misuse the Fx grading system.
- (7) For Fx grading system to be continued, limiting grade after Fx re-exam not exceeding grade `C` is necessary.
- (8) Even if the Fx grading system has a contribution on reducing attrition rate, the implementation should be reconsidered by the university through continuous supervision, putting a clear criteria for evaluation and fixing the grade after Fx tutorial.
- (9) Further studies shall be made to assess modes of delivery and why students score Fx on common courses.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Effect of nature-activities education program on the multiple intelligence level of children in the age group of 8 to 12 years

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Research population consists of 15 children who attended a 5 week (3 days a week) nature-activities course with the consent of their parents during the summer term of 2016 - 2017 academic year. Participants were selected from children who had never taken part in a nature activity before. Measurement tool of this study was "Development of Self-Assessment Scale in Multiple Intelligence Fields" of which validity and reliability test was conducted in 2001 by Gonca Seber. Since participants aged under 18, official consents of their parents were obtained to initiate the research. Next, scales were applied to all participants face-to-face for twice as before and after the implementation of education program. Obtained data were contrasted with the current multiple intelligence level and distribution of students via analyzing the changes was also measured at the end of 5-week education process. Changes detected in each of the multiple intelligence fields were explored and interpreted. Throughout the education process, 4 instructors supervised the participants. As a result linguistic intelligence ($t=-5.20$; $p<0.05$), visual intelligence ($t=-8.29$; $p<0.05$), mathematical intelligence ($t=-13.72$; $p<0.05$), kinesthetic intelligence ($t=-6.96$; $p<0.05$), social intelligence ($t=-6.16$; $p<0.05$), intrapersonal intelligence ($t=-11.01$; $p<0.05$), naturalistic intelligence ($t=-8.46$; $p<0.05$) and musical intelligence ($t=-12.08$; $p<0.05$) posttest scores of all participants are significantly higher than their pretest scores. A positive and significant relationship was measured between linguistic intelligence and naturalistic intelligence scores ($r=0.59$; $p<0.01$). Yet not any significant relationship existed between linguistic intelligence and other types of intelligence. A negative and significant relationship was measured between the scores of kinesthetic intelligence and social intelligence ($r=-0.59$; $p<0.01$). A negative and significant relationship was identified between the scores of social intelligence and intrapersonal intelligence ($r=-0.52$; $p<0.01$).

Key words: Nature-activities, outdoor, multiple intelligence.

INTRODUCTION

Louv (2005), in his book titled as "Last Child in the Woods", directed this question to one of the kids; "Do you

like playing outdoors?" and here is the answer he received from the respondent child; "I prefer playing

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indoors because that is where all the power outlets are on”.

In an increasingly modernized society, accessing electronic devices and valuing them as inseparable parts of everyday life has gained a rising popularity among children. In parallel with the extension of time dedicated to electronic devices, the length of time children could spend outside playing with their peers has almost decreased to zero. Inarguably, this entire change cannot merely be attributed to electronic devices. Global researches highlight that various causes accounting for the decrease in children’s mobility level and engaging in outdoor games are heavy traffic, fewer play grounds and impoverished social contact with neighbors. A myriad of families have witnessed that recently natural habitat shed its former gravity as an independent play and social meeting centers for their kids.

A relevant study indicated that children aged 15 in Norway spent an average of 44 h watching TV when not at school and this length of TV-time was comparatively smaller among girls and teenagers (Samdal et al., 1998)

Louv (2005) and Hendricks (2001) claimed that less contact with the nature (outdoors) and play-time triggered adverse effects on children’s physical and mental development and the distortion in children’s attitudes and conceptions about major ecological relations led to a weaker environmental awareness and commitment for nature. Louv (2005) and Hendricks (2001) also argued that disconnection with the nature, woods and mountains in childhood could result in a higher apathy for the nature and lower empathy for the negative environmental transformation. Studies conducted by Chawla (1998, 2006) underscored that a vast majority of adult environmentalists had spent their childhood days in close connection with the nature and in wild-life habitats. In a study implemented in Norway among 630 teenagers for a period of subsequent 10 years the gravity of recreational outdoor activities between the age group of 13-23 was validated (Kjønniksen et al., 2008). This finding is further supported by the report of Finnish authors Tammelin et al. (2003) having put forth that children who spent longer time outside during adolescence period age were more disposed to spend more time outside than their peers once they reached age twenties.

It is a valid and acknowledged fact that free-time activities in the nature contributed to the physical and mental development of children (Faber Taylor and Kuo, 2006). Natural habitats can assist children in honing skills related to the process of scientific research such making inferences, evaluation and observation. Further to that objects in the nature could stimulate learning new words by rising curiosity. Stone and Faulkner (2014) stated that spending time outdoor enhanced the level of physical activity; thereby lowering inertia and excessive weight gain. Hence, it is evident that connecting the children with nature, with plants, animals and earth in short and integrating open spaces to formal education programs is

quite a valued process for overall development.

Natural environments are immensely critical since they provide a chance to the children to recognize themselves, their surrounding and their own feelings (Ouvry, 2003). This contact improves children’s sense of sharing, self-expression of feelings and autonomous decision-making skills; thereby paving the way for success in life. Nature also offers a learning environment for experiments, findings and research. Free from limits, children enjoy themselves in a healthy environment that can unite autonomous learning with the nature and stimulate all senses. Employing learning materials without teachers’ limitations could help to boost creativity and empathy of preschool children.

In Turkey, there is scarcity of studies dealing with outdoor education among children at preschool age. Alat et al. (2012) implemented a research to identify ideas, attitudes and behaviors of preschool teachers as regards outdoor education. Data were collected from 25 preschool teachers employed in the Ministry of National Education schools. Findings revealed that although teachers maintained a positive attitude towards outdoor education they failed to spare sufficient time to outdoor activities for reasons such as unfavorable physical conditions, inadequate security measures, crowded classes, parents’ concerns and negative reactions out of fear that their children might get sick outside.

Gair (1997) listed six basics of an outdoor education program:

1. Education is implemented outside. It does not have to take place in class environment.
2. Participants directly take place in the said activity.
3. Tangible things are utilized. Activities are implemented via using actual objects and human senses.
4. Instead of memorizing given information, relations between objects or events are explored and explained.
5. Learning by doing and experimenting stimulates multiple senses.
6. Since the environment of an outdoor education program differs from a closed classroom setting children find outdoor activities more interesting and enjoyable.

It is an evident fact that outdoor education program can boost students’ time management and social relations, motivation for success, leadership and emotional control, and help children to grasp scientific concepts more easily and engage in higher number of physical activities (Berberoğlu and Uygur, 2013).

LITERATURE REVIEWS

In relevant literature, it has been reported that education programs involving outdoor activities at early childhood period developed cognitive, socio-emotional and physical

motor skills, awareness, identifying cause-effect relations, observation skills, creative thinking skills, concentration and imagination of learners. Studies have been reached that different sports branches provide positive contributions to the development of children's physical, physiological, and intelligence areas, but no research has been found that examines the effects of nature activities on directly intelligence areas. This research was conducted in order to determine the effects of activities performed in nature directly on multiple intelligences.

Multiple Intelligence Theory

Subsequent to analyzing traditional intelligence approach, neuropsychology and development expert Gardner started to research cognitive capacity of humans in the 70s and 80s. In his research he claimed to have observed inexplicable things that could not be clarified from a psychometric perspective and stated thus: "*Daily studies I implemented among children and adults with brain disorders have immensely affected me about a physical phenomenon on human nature; human beings are blessed with a large number of extensive skills. A person's mastery in one field is not as simple as to predict or to compare with his/her mastery in a different field!*" (Bümen, 2005). This perspective was the originating point of Multiple Intelligence Theory. In 1983, Gardner published the book *Frames of Mind* in which Multiple Intelligence Theory was introduced alongside with seven distinctive universal capacity frames. He initially created a list of seven logical capacity fields namely linguistic, logical-mathematical, visual-spatial, bodily, interpersonal, kinesthetic and intrapersonal, musical intelligence capacity fields. Next, he added the eighth capacity as naturalistic intelligence and stated that existential intelligence domain was still in research process hence was not in the list yet.

In the proposed intelligence approach of multiple intelligence theory the key word is "multiple"; that means intelligence is multidimensional. In addition a person's inborn intelligence can be improved or transformed; that is to say any individual is capable of learning how to be intelligent. Hence, as has been a common point of focus in a number of modern educational institutes today, Multiple Intelligence Theory advocates that a human's intelligence capacity goes way beyond certain linguistic and mathematical skills merely (Saban, 2001).

In the view of Gardner intelligence is;

1. A set of abilities required to solve an actual problem,
2. The ability to generate a product or service valued in one (or more than) culture,
3. The capacity to identify and solve (or create a problem) to produce some new information.

As regards intelligence capacity of human beings

Gardner suggested the ideas below:

- Every human being has the capacity to improve and elevate his/her own intelligence,
- Intelligence can not only change, but it can also be taught to others,
- Intelligence is a multi-dimensional phenomenon that emerges as an effect of the interaction between mental and intellectual system of humans,
- Despite presenting a multidimensional aspect, intelligence is a unified phenomenon in itself,
- Each person can possess all of the many intelligence fields,
- Each person can develop all of the many intelligence fields to a certain extent,
- Different intelligence fields generically function in unity and in coordination,
- There are a number of ways for a human being to be intelligent in any given domain.

Distinctive features of Multiple Intelligence Theory have been listed such;

1. Definition of intelligence is based on intelligence in real life,
2. The theory examines intelligence from a multidimensional perspective,
3. All intelligence types (intelligence fields) can also increase universally,
4. The holistic profile of intelligence is subject to improvement and change,
5. Any given intelligence encompasses subskills or secondary abilities and can be manifested in various forms.
6. Intelligence categories function not in isolation but in coordination and cooperation.

In the processing of intelligences Armstrong (1994) listed environmental factors that caused an advantage or disadvantage as below:

1. *Opportunity to access resources:* Since a child raised in a financially-disadvantaged family has limited/no means to play instruments such as violin or piano, it may be a challenge to develop his/her musical intelligence capacity.
2. *Historical-cultural factors:* In the event that a child's school prioritizes mathematics and science-based curriculum, his/her logical-mathematical intelligence is likely to develop more.
3. *Geographical factors:* A child raised in a village is likely to better develop his/her kinesthetic and naturalistic intelligence compared to a kid living/raised in an apartment.
4. *Family factors:* The family of a child aspiring to be an artist would, in contrast, develop his/her verbal intelligence if they desire the child to be a lawyer in the

future.

5. *Situational factors*: Individuals raised or living in a crowded family would likely have limited time for self-development unless they are innately social people.

In relevant literature, there was no identified study that directly analyzed the effects of nature sports on multiple intelligence. Yet, as we take into account the overall benefits provided by nature sports, it is viable to consider many positive potential effects on multiple intelligence; hence it is assumed that this research is valuable by means of its projected contributions to increased participation to nature sports in addition to intelligence in general.

METHODS

Participants

Research population consists of 15 children who attended a 5-week (3 days a week) nature-activities course with the consent of their parents during the summer term of 2016 - 2017 academic year. Participants were selected from children who had never taken part in a nature activity before.

Procedure

Measurement tool of this study was "Development of Self-Assessment Scale in Multiple Intelligence Fields" of which validity and reliability test was conducted in 2001 by Gonca Seber. Since participants aged under 18, official consents of their parents were obtained to initiate the research. Next, scales were applied to all participants face-to-face for twice as before and after the implementation of education program.

As regards subdimensions of the scale, in her study, Seber listed internal consistency coefficients in the order of; for Linguistic Intelligence: 0.65; for Mathematical Intelligence: 0.64; for Visual Intelligence: 0.61; for Kinesthetic Intelligence: 0.51; for Musical Intelligence: 0.62; for Social Intelligence: 0.67; for Intrapersonal Intelligence: 0.58 and for Naturalistic Intelligence: 0.72.

Responses to the inventory employed in designating multiple intelligence fields consisted of three sections as "yes" "partially" and "no". In this inventory, a total of 64 items containing 8 individual questions for every single intelligence type were stated. In the process of applying the inventory, participants were verbally informed about expected answers. Participants were requested to read all items attentively and select the best option for them. Every "yes" answer was scored as (3), "no" answer as (1) and "partially" answer as (2).

In the inventory, via adding mathematical values of the answers provided to items in each of the intelligence type, overall intelligence type scores of the participants were computed. At the final inventory, maximum score that participants could receive from any given intelligence type was computed as 24 while minimum score as 8. High test score that could be received from each dimension of the inventory referred to this student's strength in this particular intelligence field while lower test score signified that the student was comparatively weaker in this particular intelligence field.

Obtained data were contrasted with the current multiple intelligence level and distribution of students via analyzing the changes was also measured at the end of 5-week education process. Changes detected in each of the multiple intelligence

fields were explored and interpreted. Throughout the education process, 4 instructors supervised the participants.

Data analysis

In testing the normality between pretest and posttest scores of students' intelligence types, Skewness coefficient was employed. Skewness coefficient is used to test normal distribution of scores obtained from a constant variable and provided that this coefficient stays within the limits of ± 1 , it is viable to claim that scores did not significantly deviate from normal distribution limits (Büyüköztürk, 2011:40). Since pretest and posttest scores maintained a normal distribution matched t test was used in the comparison of pretest-posttest scores; in gender-based comparison independent two sample t test was used; in the analysis of relationship between intelligence dimension scores Pearson Correlation Analysis was harnessed. Significance level of the analyses was accepted as 0.05.

Nature activities implemented throughout the 5-Week Education Program

1st Week: As the first activity all participants were taken to a trekking activity (walk in the nature). While trekking with the group, some information on the natural flora and fauna of the region was conveyed. Nature courses were offered to show students how to make use of materials in nature (using dried tree branches as rods, building a shelter etc.), finding food and water, traces of animal, tracking as well as making different knot forms with ropes, and also instilling orientation skills such as map-reading to plan a fun and correct activity, route planning and basic navigation skills. In the first week, all participants stayed in the tents set by their instructors.

2nd Week: During the second week, an active course on camping was offered. Via identifying camp sites, important factors to focus on and the way to set up a tent were instructed to participants all of whom were given a chance to set up their own tent. In the ensuing days of the education program, participants were informed about basic camping materials and their use, starting a fire in the woods and accessing food and water resources. In addition, first-aid training was given for any potential injuries and/or sicknesses that could occur while exercising in the wild nature and to take necessary precautions at the interval between the transfer of casualty/patient to a health institute and organization from the site. During the 2nd week of education program, each participant spent the night in the tent s/he set up and they collected their own camp materials in the last morning.

3rd Week: A course on canoes was offered. Initially, related materials were introduced; next rowing techniques, safety and cooperation briefing was shared. As the last activity of third week, building a raft from natural materials was taught. In order to inform about accommodation techniques in the nature, to secure safety and comfort and to instill the necessities and fine tunes of a nature-friendly camping experiment, entire details on camping were communicated to the participants who stayed in their own tents on the 3rd week again.

4th Week: Jungle trekking was practiced and participants were instructed to collect the leaves in the woods. Next, they were asked to classify collected leaves with respect to color, form and size. Following activity demanded participants to work in groups of 3 and by collecting stones, tree branches, plants, seeds, soil and any other natural material they were asked to draw a picture. As the last activity of this week, participants were grouped in teams of 5 and asked to build a shelter from natural materials. On the last day of education program, participants stayed in their shelters at night.

Table 1. Distribution of participants with respect to gender.

Groups	N	%
Girl	7	46.7
Boy	8	53.3

Table 2. Results of matched t test with respect to pretest and posttest scores that participants received from intelligence types.

Intelligence type	Timing of the Test	N	\bar{X}	SS	T	P
Linguistic intelligence	Pretest	15	16.60	3.14	-5.20	0.000
	Posttest	15	19.60	2.20		
Visual intelligence	Pretest	15	17.53	1.13	-8.29	0.000
	Posttest	15	19.93	1.49		
Mathematical intelligence	Pretest	15	13.73	2.15	-13.72	0.000
	Posttest	15	18.13	1.51		
Kinesthetic intelligence	Pretest	15	15.80	2.37	-6.96	0.000
	Posttest	15	19.00	1.36		
Social intelligence	Pretest	15	17.07	2.79	-6.16	0.000
	Posttest	15	19.73	1.83		
Intrapersonal intelligence	Pretest	15	17.53	1.06	-11.01	0.000
	Posttest	15	20.27	1.03		
Naturalistic intelligence	Pretest	15	16.47	1.92	-8.46	0.000
	Posttest	15	20.20	1.70		
Musical intelligence	Pretest	15	17.07	2.46	-12.08	0.000
	Posttest	15	20.73	1.71		

5th Week: Canoes were built for transportation and an antique city was visited. Alongside the trekking route to the antique city, some information on the history of the region, antique structures, cave walls and images were communicated to students. At break times, participants were asked to share their ideas about the reason "for selecting the region as a settlement location" and their opinions were listened in a friendly atmosphere. On the last day of the program, a farewell party was organized with the participants and instructors and feedbacks of all participants were received on the overall program.

- i) Throughout all 5-weeks, except the 1st week, every participant stayed overnight either in their tents or shelters built by themselves.
- ii) Throughout the entire education program all of the essential safety measures were taken, security units were notified about camping site and emergency plans were devised.
- iii) Throughout the entire education program all of the information transfers were performed in the natural environment with the active participation of children.
- iv) In the transfer of education it was foregrounded to perform the entire learning process as if in a game setting.

FINDINGS

Demographic and descriptive findings

Table 1 showed that out of a total of 15 children participating in the research, 7 students (46.7%) are girls, while 8 students are boys (53.3%).

Table 2 revealed that Linguistic intelligence ($t=-5.20$; $p<0.05$), visual intelligence ($t=-8.29$; $p<0.05$), mathematical intelligence ($t=-13.72$; $p<0.05$), kinesthetic intelligence ($t=-6.96$; $p<0.05$), social intelligence ($t=-6.16$; $p<0.05$), intrapersonal intelligence ($t=-11.01$; $p<0.05$), naturalistic intelligence ($t=-8.46$; $p<0.05$) and musical intelligence ($t=-12.08$; $p<0.05$) posttest scores of all participants are significantly higher than their pretest scores.

In Table 3, a positive and significant relationship was measured between linguistic intelligence and naturalistic

Table 3. Results of correlation analysis between types of intelligence.

Types of intelligence	2	3	4	5	6	7	8
1-Linguistic intelligence	0.19	-0.19	0.08	0.04	0.03	0.59**	-0.02
2-Visual intelligence	1	0.03	0.39	-0.22	0.28	0.14	0.09
3-Mathematical intelligence		1	-0.03	-0.04	0.10	0.00	0.26
4-Kinesthetic intelligence			1	-0.59**	0.30	0.01	-0.44
5-Social intelligence				1	-0.52**	-0.13	0.50
6-Intrapersonal intelligence					1	0.04	0.12
7-Naturalistic intelligence						1	0.08
8-Musical intelligence							1

* $p < 0.05$ and ** $p < 0.01$.

Table 4. With respect to gender comparison; results of independent two sample t test of the posttest scores participants received from types of intelligence.

Types of Intelligence	Gender	N	\bar{X}	SD	T	P
Linguistic intelligence	Girl	7	18.14	2.34	-3.02	0.010
	Boy	8	20.88	0.99		
Visual intelligence	Girl	7	19.57	1.90	-0.87	0.398
	Boy	8	20.25	1.04		
Mathematical intelligence	Girl	7	18.43	1.72	0.70	0.498
	Boy	8	17.88	1.36		
Kinesthetic intelligence	Girl	7	19.57	1.40	1.60	0.133
	Boy	8	18.50	1.20		
Social intelligence	Girl	7	19.57	2.37	-0.31	0.762
	Boy	8	19.88	1.36		
Intrapersonal intelligence	Girl	7	20.29	0.49	0.06	0.950
	Boy	8	20.25	1.39		
Naturalistic intelligence	Girl	7	20.14	2.04	-0.12	0.908
	Boy	8	20.25	1.49		
Musical intelligence	Girl	7	20.29	1.50	-0.94	0.362
	Boy	8	21.13	1.89		

intelligence scores ($r=0.59$; $p < 0.01$). Yet no significant relationship existed between linguistic intelligence and other types of intelligence. No significant relationship could be detected among the scores obtained from visual intelligence, mathematical intelligence and musical intelligence as well as the scores of other types of intelligence. A negative and significant relationship was measured between the scores of kinesthetic intelligence and social intelligence ($r=-0.59$; $p < 0.01$); whereas a negative and significant relationship was identified

between the scores of social intelligence and intrapersonal intelligence ($r=-0.52$; $p < 0.01$).

From Table 4, it was determined that with respect to gender posttest scores participants received from linguistic intelligence varied significantly ($t=-3.02$; $p < 0.05$). Posttest linguistic intelligence scores of boys (20.88 ± 0.99) were significantly higher than girls' scores (18.14 ± 2.34). It was also manifested that with respect to gender posttest scores participants received from types of visual, mathematical, kinesthetic, social, intrapersonal,

naturalistic and musical intelligence did not significantly differ ($p > 0.05$). The next finding is that pretest scores that participants received from types of intelligence did not significantly differ with respect to gender.

DISCUSSION

In literature review conducted within the context of this study, a list of studies emphasizing the positive contributions of different branches of sport on the development of children's physical, physiological and intelligence capacity have been identified; yet there has been not any detected study analyzing the direct effects of outdoor activities on intelligence fields of kids.

Data collected from pretest and posttest scores of this study reveal there has been a noteworthy improvement in all of the intelligence types. Gardner (1999) also argued that not any performance can simply be explained with the use of one intelligence solely. Children, while harnessing their multi-dimensional intelligence, not only display their stronger intelligence capacity but they can also contribute to the development of other fields of intelligence. One of the most effective principles of multiple intelligence theory is that intelligence is subject to development. Just because students can excel in a specific intelligence field does not necessarily mean that they would not progress in other fields of intelligence. Provided they have received adequate education, a good number of individuals can develop any intelligence field to a certain competency level since these fields of intelligence function in unison.

The biggest objective that Gardner (2004) aimed in introducing Multiple Intelligence Theory was to design "learning societies". This theory advocates that children attracted to lifelong learning and development are inclined to cultivate positive feelings to education from childhood and can operate their mind actively and maximally; they question any received knowledge, criticize, reflect without falling into the trap of biases or stereotypical patterns, and are good at building bridges between their learning and real-life experiences. With the utilization of Multiple Intelligence Theory in academic programs, interpersonal differences are exalted and favorable environments to improve these differences are designed since "The sole mission of education is extolling variety in place of raising uniformed minds."

In his research, Ville (1979) outlined similar findings in support of this study and claimed that a person's lowest and highest limits of intelligence and abilities are genetics; but the extent a person can develop his/her intelligence and abilities within the range of these limits is subject to environmental factors, life experiences and received education.

In this study, a positive relationship was detected between linguistic intelligence and naturalistic intelligence but the relationship was significantly negative between

kinesthetic intelligence and social intelligence as well as social intelligence and intrapersonal intelligence. Naturalistic intelligence (nature, intelligence of the environment and creatures) refers to recognizing all creatures in the nature and researching and reflecting on their creation; linguistic intelligence (reading, writing and speaking capacity) points to abstract and symbolic thinking with words, concept formation and language-related skills. Conducting a research about a wondered topic in the nature would concurrently activate linguistic intelligence. From this aspect it is an expected finding that a positive relationship exists between these two types of intelligence. Intrapersonal intelligence (self, character and personality intelligence) refers to a person's self-assessment of personal feelings, level of emotional reaction, self-evaluation, creating personal goals; social intelligence (humans, relations and adjustment intelligence) is about group work, verbal and nonverbal communication, empathizing with others' feelings, thoughts and behaviors. It is also identified that a negative relationship existed between social intelligence and kinesthetic intelligence (body, movement and balance intelligence); hence it is argued that this negative relationship stemmed from the conflict between a person's autonomous and social aspects. Sarıcaoğlu and Arıkan (2009), in their study titled; "report on intelligence types, students' foreign language skills and select variables" identified that with respect to intelligence types, no significant relationship existed between girls and boys and yet a positive relationship was also determined between gender and linguistic intelligence. The findings of the same research also manifested that a negative but significant relationship existed between kinesthetic-sensory, spatial and personal-intrapersonal intelligence and linguistics intelligence while the relationship between musical intelligence and writing skill is positive and significant.

The findings revealed that with respect to gender, posttest scores participants received from linguistic intelligence type varied significantly and linguistic intelligence scores of boys were measured to be drastically higher than the scores of girl participants. Gardner listed the traits of linguistic intelligence as (reading, writing and speaking capacity); thinking and communicating with words, evaluating complex linguistic meanings, grasping the syntax and semantics of words, poem reading, telling jokes and stories, grammar knowledge, figurative expression, simile, abstract and symbolic thinking, concept formation and writing which refer to complex skills in the production and effective use of language. Fischer-Tietze (2001) underscored that due to the lack of social bonds, a good number of children are deprived of social abilities that can facilitate communal living, linguistic capacity and behavioral forms essential for communication; thereby triggering a diminished level of self-confidence.

Linguistic abilities, cognitive skills including inference,

planning, observation, recognition and making decisions and motor skills including coordination, endurance and balance become better as a result of interactions with nature. In addition, antisocial behaviors decrease and cooperation, solidarity, agreement and conflict solving skills are enhanced. Developmental levels of the children were evaluated in terms of cognitive, linguistic, social-emotional and motor skills, which are required to improve in the Turkish education program. The pre-test and the post-test results for these skills were compared. The children were found to have significantly enhanced cognitive, linguistic, social-emotional and motor skills, considered as target aspects of development in Preschool Education Programme of the Turkish Ministry of Education, after a ten-week outdoor education programme (Yıldırım and Özyılmaz, 2017).

Throughout the implementation of this research, nature activities promoted social communication among all participants and that interaction provided a feasible setting for self-expression and freedom to share personal opinions. This finding suggests that in the high linguistic intelligence scores measured among boys, feeling comfortable in the designated environment might have played a vital role. In a study applied to high-school students, it was revealed that girl students had greater self-confidence in intrapersonal, linguistic and musical intelligence fields whilst boy students perceived themselves more skillful in mathematical, visual and kinesthetic intelligence fields (Snyder, 2000). In a research directed by Çeliköz (2009) it was concluded that girl students were more skilled in linguistic, visual, musical and social intelligence fields while boy students had an elevated capacity in mathematics-logic, kinesthetic and naturalistic intelligence. Çeliköz (2009) explained this diversion with the attributed social gender roles to men/women in Turkey. On the other hand, a number of studies also manifested that no statistically significant difference was present between girls and boys.

As reported herein above, different researchers provided quite dissimilar results in their studies. However, the fact that in this particular study linguistic intelligence posttest scores of boys was above girls is one finding that distinguishes our study from the earlier research reports. Philosopher Schiller (1976) was a huge proponent of playing games as a vital component of human life. Schiller argued that playing games enables human beings to make their highest objectives and ideals real. Other authors defined games as the most essential dynamic of linguistics, literature and game theory (Derrida, 1972; Wilson, 1990). Considering that during this 5-week nature education program all of the knowledge and skill transfer was performed as if in a game, it is reasonable to argue that nature activities and games at most could have a positive effect on the development of boy participants' linguistic intelligence.

Natural environments not only nourish children's physical development, but they are also beneficial for

learners' cognitive development. They improve children's skills for sharing their knowledge, expressing their feelings and making their own decisions without asking for help, which make them more successful in their lives. They also offer learning environments for experiments, discoveries and research. Children learn freely and have fun in a health environment, incorporate nature and stimulate all the senses. They discover themselves and their abilities while playing freely. Ouvry (2003) and Rivkin (2000) emphasized that children's observation skills can be improved by watching changes in the weather, animal behaviors or even the progress of a building a structure that all take place outside. Gleitman and Lieberman (1995) also highlighted that open fields are equipped with various means that can stimulate children's intellectual development, creativity and imagination.

Moore reported that natural environment provoked all senses and outdoor experiences; activating more than one sense assisted in forging cognitive structures essential for uninterrupted mental development and by offering an open site and relevant materials for "design and production" activities for children, the kids' imagination is further stimulated.

Civelek (2016) investigated the effects of outdoor activities on scientific process skills of preschool children in an experimental study as a Master of Science dissertation. The researcher showed positive effects of a ten-week outdoor activities on the children's scientific process skills, which is consistent with the results of the present study.

Taylor et al. (1998) suggested that outdoor sites in the nature promoted creative games and in addition, it elevated the interaction between children and adults. Nature also alleviated attention deficit disorder and the greener the environment the stronger was the positive effect.

Dowdell et al. (2011) showed in their experimental study that nature and natural environments had a positive effect not only on play but also on the social behavior of children. They stated that such environments encouraged children to play imaginary games, helped children to have a positive relationship with both their peers and teachers and provided children with a different learning environment.

Outdoor environments not only increased psychomotor and cognitive development of children but also contributed to raising their socio-emotional skills. Rivkin (2000) pointed that children have the opportunity to meet other people or animals when playing outside and at the same time children are given a chance to co-experience an event with their peers and via these experiences they would most likely compare each other's behaviors (Creasey et al., 1998). Furthermore, they can interact with their peers during outdoor activities, thereby honing their skills of communication and empathy (Hartle, 1994; Richardson, 2007).

Outdoor physical activities are a precondition for the acquisition of skills necessary for life, while creative thinking promotes the development of these skills in the further use of the various life-changing situations (Krauksta et al., 2016).

It is believed that the results obtained from the research will encourage parents and educators to direct them to nature activities in order to contribute to the development of multiple intelligences. The research is also a source for other future research on the topic. For other research on the subject, the following recommendations can be made;

1. This survey was restricted to 15 participants due to the number of items to be used in activities to be carried out in the nature. It may be advisable to include more participants in the next research.
2. Pre-test and post-test were performed in the study. In subsequent studies, these tests may also be tested for permanence.
3. Research has included activities that can be done in the summer. Subsequent surveys may also include winter activities and spread over longer periods.

In the light of research findings suggestions listed below can be rendered to educators and families;

- 1) Meeting children with the nature should be valued as one of the most significant life events for a child.
- 2) The time children spend outside is, by no means, a waste of time; rather it is an invaluable investment for their well-being.
- 3) Nature, is in a sense, the antidote of stress, nature activities should not only be addressed to children but to children and their parents as well.
- 4) Plants and animals should decidedly be integrated to children's lives.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Full Length Research Paper

Turkish adaptation of children's perceived use of self-regulated learning inventory

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This research aims to adapt the Children's Perceived Use of Self-Regulated Learning Inventory developed by Vandavelde. The inventory was developed to understand children's self-regulated learning. The sampling in this research included 500 children who are attending primary school at İstanbul in Turkey. First of all, the inventory was translated into Turkish. After the data collection, to understand the factor structure of the data exploratory and confirmatory factor analysis were utilised. Statistical package for social science (SPSS) 22 and Lisrel 8.80 was used to analyse the data. Throughout the exploratory factor analysis, the items of the scale were reduced to 32 items and 3 factor. Confirmatory factor analysis also showed that the structure of the scale was valid. Cronbach alpha coefficient for the total score of the scale was calculated as 0.972. Test re-test reliability was also calculated as 0.999. This study showed that the inventory adapted into Turkish can be considered as valid and reliable.

Key words: Self-regulated learning, primary students, scale adaptation.

INTRODUCTION

Today, the importance of children's taking responsibility for their own learning is emphasized in the learning-teaching process. According to Açıkgöz (2003), a student-centered learning-teaching process is a process in which learners are responsible for the learning process; opportunities for decision-making and self-regulation through different aspects of the learning process are given to learners; and learners are forced to use their mental abilities during learning through complex instructional tasks.

In this context, the concept of self-regulation gains importance. It is defined as an active and constructive process in which students attempt to monitor, organize and control their cognitions, motivations and behaviors within their own learning goals and other environmental conditions once they have established those goals (Pintrich, 2000). The development of students' self-regulation skills provides opportunities to efficiently help them in order to ensure that they effectively fulfill their responsibilities in the learning process (Dignath et al.,

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2008). It is emphasized that students with advanced self-regulation skills can control their learning processes themselves; therefore, they can achieve permanent and meaningful learning independently of others (Israel, 2007).

Zimmerman (2000) noted that self-regulation skills can be learned like other skills (Chung, 2000; Paris and Paris, 2001; Winne, 1995; Zimmerman, 1990; Zimmerman and Bandura, 1994; Zimmerman and Martinez-Pons, 1988). Nevertheless, he emphasized that students' self-regulatory competencies should be determined in order to improve their self-regulation skills. In the light of this explanation, it is considered necessary to determine the competence of primary school students in self-regulation.

Research has shown that so far, studies on self-regulation have been conducted with teacher candidates and adult university students in general. For example, Kert (2008) examined the impact of the Electronic Performance Support Systems, which can be defined as computer-based environments facilitating the acquisition of knowledge and skills, on university students' self-regulated learning skills. Moreover, Saribaş (2009) examined the effect of the laboratory environment designed to improve self-regulated learning strategies on science teacher candidates' conceptual understanding, scientific process skills and attitudes towards chemistry. Kalaycı (2010) examined the relationship between "cyber idleness" behaviors – that can be defined as the use of the internet in the workplace and the school environment for personal purposes – and self-regulation strategies with regard to university students. Nevertheless, no study could be found in the literature, focusing on self-regulated learning of students at the primary school level, especially in Turkey.

However, determining students' perceptions of self-regulated learning will contribute to their awareness of self-regulated learning. This can be considered as a prerequisite for enhancing students' competence in self-regulation. It will be seen that individuals' being aware of their own self-regulation skills during the primary school age – when their perceptions of learning process and self-efficacy develop – has great importance in terms of educators, students and families in the face of the difficulty of reversing this situation in later ages (Dignath et al., 2008; Whitebread, 2000).

According to Schraw (1998), what a student knows about himself also affects his self-regulating process. It will be useful for students to know factors affecting their performance, their attitudes towards strategy use, and their opinions about the effectiveness of all of those; this way, they can acquire the competence to use appropriate strategies for the content presented to them for their goals (Georgiadis and Efklides, 2000).

According to Schunk (1990), in order for learners to reach their learning goals through self-regulated learning, they need to systematically activate their cognitions and behaviors, and continue to do so. Students may have

academic knowledge of strategies for self-regulatory skills, but there will be difficulty in assuring qualified learning if they cannot use these strategies systematically and regularly. If students also misinterpret behaviors and their effects, self-regulatory learning strategies will leave them with an effort of no avail in terms of instructional objectives (Winne and Noel, 2002).

At this point, not knowing students' perceptions of self-regulated learning creates limitations in terms of developing these skills in order for them to have self-regulatory competence and in transferring these to the learning environment in a way that contributes to their academic development. No inventory study has been found in Turkey, evaluating the perceptions about the extent to which primary school students use self-regulated learning. In this direction, it was necessary to have a measurement instrument that enables studying self-regulated learning levels of primary school students. For this reason, the purpose of this study was to adapt the "Children's Perceived use of Self-Regulated Learning Inventory" (CP-SRLI) developed by Vandeveldel et al. (2013) to Turkish.

METHODOLOGY

Sample

The population of the study consisted of approximately 10,000 4th-grade primary school students who were studying in 43 primary schools in the Bağcılar district of Istanbul province in the 2014 to 2015 academic year. Cohen et al. (2000) states that selecting a sample in the same way as the current study is a generally accepted method in scientific research, and thus calculating the number of subjects in this way has the ability to represent the population. In this direction, the sample of the research consisted of 500 students who were determined by the cluster sampling method for 95% confidence level with 3% confidence interval.

Translation work

The "Children's Perceived Use of Self-Regulated Learning Inventory" developed by Vandeveldel et al. (2013) was obtained from the researchers themselves, and the permission was obtained from the researchers for the adaptation to the Turkish language. The following steps were taken when adapting the instrument to the conditions in Turkey: First of all, the English scale was translated into Turkish in two stages. The scale was first translated into Turkish by three educators who knew English well. This translation was evaluated by an educational science expert and a translation expert, and the final shape of the Turkish form was created. In the second stage, the back-translation technique was used. The created Turkish form was once again translated into English by three educators who were fluent in Turkish and English, and a final form was given to the English form by working together with an expert in educational sciences and a translation expert. Finally, the English form – obtained by back-translation – and the original form were evaluated by an expert who was fluent in English. The items that differed according to the evaluation result were reviewed again, the necessary corrections were made, and the form was given its final shape.

Table 1. Kaiser-Meyer-Olkin (KMO) value.

KMO value		0.980
	Approximate chi-square value	26546.554
Bartlett's test for sphericity	SD	2775
	p	0.001

Data collection

In this study, the "Children's Perceived use of Self-Regulated Learning Inventory" developed by Vandeveldt et al. (2013) was adapted to Turkish. Within the scope of this adaptation study, data were collected from 4th-grade primary school students in the Bağcılar district of Istanbul province.

Data analysis

In this study, Statistical Package for the Social Sciences (SPSS) and Lisrel software programs were used to analyze the obtained data. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test for Sphericity were performed to determine the suitability of the data for factor analysis. Then, exploratory factor analysis was applied to the data. In order to determine the construct validity of the scale, the principal components factor analysis was applied to the data, and the factors with an Eigen value greater than 1 were taken into consideration. Next, the resultant factor structure was tested using confirmatory factor analysis. Within the scope of the test retest, the scale was applied to the 4th grade primary school students for a second time after a twelve week interval. The Pearson product-moment correlation coefficient was calculated for the reliability of the scale. In addition, the Cronbach alpha internal consistency coefficient was calculated for the entire scale.

RESULTS

In this study, first of all, KMO and Bartlett's Test for Sphericity were applied to determine whether the Children's Perceived use of Self-Regulated Learning Inventory was appropriate for the factor analysis. The KMO value associated with the Children's Perceived use of Self-Regulated Learning Inventory was calculated as 0.980. The value of KMO greater than 60 shows that it is acceptable. The result of the Bartlett's Test for Sphericity of the inventory was found to be significant ($\chi^2=26546.554$, $p<.001$). High results of the both values indicate that the data were suitable for factor analysis. In the light of these findings, an exploratory factor analysis was applied to the data. KMO value and Bartlett's Test for Sphericity result are shown in Table 1.

KMO value associated with the Children's Perceived use of Self-Regulated Learning Inventory was calculated as 0.980. These values were high and thus indicated that a factor analysis could be applied and that there was a correlation between the items (Ntoumanis, 2001). The value of KMO greater than 60 shows that it is acceptable. The result of the Bartlett's Test for Sphericity of the inventory was found to be significant ($\chi^2=26546.554$,

$p<.001$). High results of the both values indicate that the data were suitable for factor analysis. In the light of these findings, an exploratory factor analysis was applied to the data.

In this direction, a rotation was applied using the varimax technique to the factor matrix representing the factor loadings of the items, and a rotated component matrix was obtained. When we evaluated the rotated component matrix in terms of overlaps by determining the factor load acceptance level as 0.40, the items that did not form a factor alone and had no factor load above the acceptance level were removed from the inventory. Şencan (2005) states that this process should be repeated step by step until the item overlaps are eliminated. Accordingly, the analysis process was repeated until the items that were overlapping and did not constitute a factor on their own were eliminated. The rotated component matrix obtained as a result of these analyzes is shown in Table 2.

If a variable has a large load as an absolute value under a certain factor, it means that that variable is in close relation with that factor (Kalayci, 2010). If there are 350 or more cases, the factor load should be 0.30 or above. Factor loads of 0.50 or above are considered to be quite good, so the factor load acceptance level for the exploratory factor analysis of the scale was set at 0.40 (Hair et al., 1998; Kalayci, 2010). In line with that, the items that had a factor load value of less than 0.40 and were overlapping were eliminated. For this reason, the following items were removed from the scale: 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 22, 25, 26, 27, 28, 33, 34, 36, 37, 38, 40, 41, 42, 44, 45, 46, 49, 51, 52, 53, 54, 55, 56, 60, 61, 62, 68, 69, 71, 75. Moreover, when determining the number of factors, it is necessary to evaluate each factor's contribution to the total variance (Çokluk et al., 2014). Accordingly, the total variance values obtained as a result of the analysis are shown in the Table 3.

When the data in Table 3 are examined, it is seen that the 32 items in the scale were collected under 3 factors that had Eigen Values greater than 1. It is seen that the first factor in the scale contributed 38.375% to the variance. The first and second factors together accounted for 51.834% of the total variance. 3 factors – the first, second and third factors together – accounted for 63.307% of the total variance. Confirmatory factor analysis was applied to the data obtained from the exploratory factor analysis. The path diagram obtained as a result of the confirmatory factor analysis is presented in Figure 1.

Table 2. Rotated component matrix table.

Items	Factors		
	1	2	3
M11	0.818	-	-
M19	0.811	-	-
M18	0.797	-	-
M20	0.783	-	-
M1	0.771	-	-
M65	0.770	-	-
M67	0.757	-	-
M66	0.748	-	-
M64	0.747	-	-
M17	0.736	-	-
M24	0.720	-	-
M21	0.705	-	-
M57	0.699	-	-
M23	0.695	-	-
M50	0.684	-	-
M63	0.680	-	-
M70	0.672	-	-
M29	0.668	-	-
M32	0.657	-	-
M30	0.631	-	-
M9	0.621	-	-
M31	0.558	-	-
M73	-	0.720	-
M74	-	0.660	-
M58	-	0.660	-
M59	-	0.640	-
M72	-	0.632	-
M48	-	-	0.816
M43	-	-	0.714
M35	-	-	0.685
M39	-	-	0.555
M47	-	-	0.421

For the confirmatory factor analysis, χ^2/sd ratio was assessed first. This ratio stands out as 1.72 in the model and corresponds to a perfect fit for the model, as it is below 3 (Kline, 2005). When the RMSEA value of the analysis results is examined, it is seen that a fit index of 0.039 was obtained. A RMSEA value smaller than 0.05 indicates an excellent fit (Jöreskog and Sörbom, 1993). When the GFI and AGFI indices of the table are examined, it is seen that their values are 0.91 and 0.90, respectively. Hooper et al. (2008) noted that these values point to a good fit for the model. The table shows that the RMR fit index is 0.053 and the fit index of the standardized RMR is 0.035. It can be said that the RMR and standardized RMR fit indices in terms of these values indicate a perfect fit (Brown, 2006). When the NFI, NNFI and CFI fit indices in the table are examined, it is seen

that NFI has a value of 0.98, NNFI and CFI have a value of 0.99. According to Çokluk et al. (2014), NFI indicate a perfect fit. According to Sumer (2000), NNFI and CFI indicate a perfect fit for the model. As a result, it is seen that the model obtained through the factor analysis, as was, was confirmed and valid.

Reliability

Cronbach's Alpha provides information on whether all of the items included in the inventory are measuring the characteristics to be measured by the whole of the inventory. Cronbach's Alpha also provides information on whether the items in each factor in the inventory measure the characteristic to be measured by the relevant factor. Cronbach's Alpha coefficients of the items in the study were calculated. The Cronbach's Alpha internal consistency coefficient of the inventory was calculated as .973 for the first factor, .839 for the second factor, .794 for the third factor, and .972 for the entire inventory. These coefficients were at a good level for the factors individually as well as for the entire inventory. They show that the inventory has internal consistency reliability. The 106 students who participated in the first implementation were tested again after twelve weeks. The Pearson correlation coefficient was calculated using the total test scores based on the data obtained from this test application. The Pearson correlation coefficient answers the question whether there is a significant relationship between two variables (Kalaycı, 2010). In this study, the Pearson correlation coefficient was found to be $r = 0.999$. This value suggests that there is a high, positive and significant relationship between test - retest total test scores of the scale.

DISCUSSION

Research shows that the effective use of self-regulation skills has a positive influence on the academic development of individuals. However, it shows that these skills can be transferred to individuals just like the other skills; and for that to happen, the primary school period is very important. Moreover, in conveying these skills, it has a special importance for educators to assess students' perceptions about self-regulated learning and their ability to use such skills in order for students to acquire these skills.

In their study with form teachers on the development of self-regulated learning skills of primary school students, Doğan and Şahin-Taşkın (2014) reached the conclusion that teachers have an important role in the development of students' self-regulation skills. Studies of Boekaerts (1999) and Zimmerman (2002) also support this. Zimmerman (2000) stated that it is necessary to have knowledge about students' use of self-regulation skills.

Table 3. Total variance values obtained.

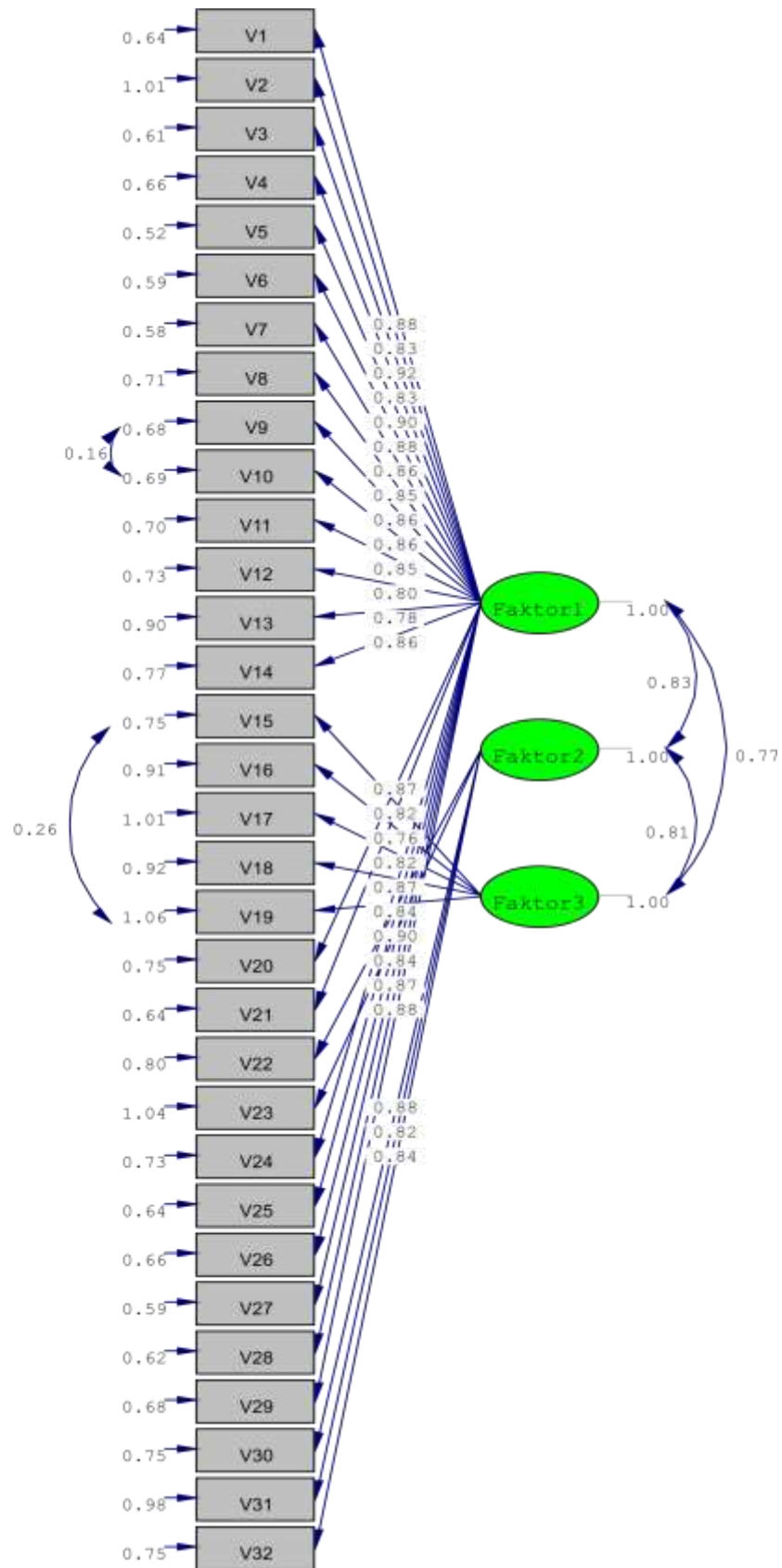
Item	Initial Eigen values			Extraction sum of squares			Rotation sum of squares		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	17.502	54.693	54.693	17.502	54.693	54.693	12.280	38.375	38.375
2	1.717	5.366	60.059	1.717	5.366	60.059	4.307	13.459	51.834
3	1.039	3.248	63.307	1.039	3.248	63.307	3.671	11.473	63.307
4	0.756	2.362	65.669	-	-	-	-	-	-
5	0.712	2.224	67.893	-	-	-	-	-	-
6	0.653	2.039	69.933	-	-	-	-	-	-
7	0.629	1.966	71.898	-	-	-	-	-	-
8	0.610	1.907	73.806	-	-	-	-	-	-
9	0.563	1.758	75.564	-	-	-	-	-	-
10	0.544	1.701	77.265	-	-	-	-	-	-
11	0.539	1.686	78.950	-	-	-	-	-	-
12	0.508	1.586	80.536	-	-	-	-	-	-
13	0.492	1.537	82.074	-	-	-	-	-	-
14	0.452	1.413	83.486	-	-	-	-	-	-
15	0.434	1.356	84.842	-	-	-	-	-	-
16	0.413	1.290	86.132	-	-	-	-	-	-
17	0.399	1.248	87.380	-	-	-	-	-	-
18	0.376	1.174	88.554	-	-	-	-	-	-
19	0.349	1.090	89.644	-	-	-	-	-	-
20	0.337	1.052	90.696	-	-	-	-	-	-
21	0.310	0.970	91.667	-	-	-	-	-	-
22	0.308	0.962	92.628	-	-	-	-	-	-
23	0.294	0.918	93.547	-	-	-	-	-	-
24	0.292	0.911	94.458	-	-	-	-	-	-
25	0.272	0.850	95.307	-	-	-	-	-	-
26	0.255	0.797	96.105	-	-	-	-	-	-
27	0.253	0.792	96.897	-	-	-	-	-	-
28	0.221	0.692	97.589	-	-	-	-	-	-
29	0.210	0.657	98.245	-	-	-	-	-	-
30	0.202	0.633	98.878	-	-	-	-	-	-
31	0.199	0.621	99.499	-	-	-	-	-	-
32	0.160	0.501	100.000	-	-	-	-	-	-

This necessitates a valid and reliable inventory that is appropriate for primary school students. In the Turkish literature, no inventory study was found measuring the self-regulation skills of especially the primary school students. For this reason, it is thought that this study made a significant contribution to the literature.

In this study, the inventory developed by Vandavelde et al. (2013) with the original name "Children's Perceived use of Self-Regulated Learning Inventory" (CP-SRLI) was adapted for 4th grade primary school students to Turkish with the following name: "Çocukların Öz-düzenlemeli Öğrenmeyi Kullanımı Envanteri" (ÇÖÖKE). In order to adapt the inventory to Turkish, studies were first made to ensure the language validity. In this process, translation and back translation processes were carried out by academicians who were fluent in English language.

During the administration of the inventory, one-to-one interactions took place with students, and the suitability of the translation was determined for the students' vocabulary level. The data obtained by administering the inventory on the sample were tested in terms of validity and reliability through the SPSS and LISREL programs in the computer environment. It was concluded that the inventory was a valid and reliable measurement instrument. With the validity and reliability values obtained in the direction of the research objectives, it was concluded that the Turkish form "Çocukların Öz-düzenlemeli Öğrenmeyi Kullanımı Envanteri" (ÇÖÖKE) is appropriate to use for 4th grade primary school students.

This inventory study, adapted to Turkish, will enable educators to determine the self-regulation skills of primary school students and students' perceptions of



Chi-Square=791.15, df=459, P-value=0.001, RMSEA=0.039

Figure 1. Path diagram.

these skills. This will contribute to the development of students' self-regulatory skills and thus to their academic development. For this reason, it is considered that this study should be taken into account in determining the self-regulation skills and perceptions of primary school students.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Determining the readiness levels of pre-service teachers towards mobile learning in classroom management

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Mobile Technologies are used in many areas of education, but they can be used for many purposes towards mobile learning such as the most supporting and developing learning, accessing information, being independent from time and space, increasing motivation, conducting research and preparing for examinations. The fact that mobile technology and mobile learning are independent from time and space means that they are always ready to use, and being practical and potable has made mobile events accepted all over the world. The aim of this study is to determine the level of readiness of the pre-service teachers studying in education faculties towards mobile learning. In the study, general survey model was used. The sample of the study is composed of 934 prospective teachers studying at the education faculty of Mustafa Kemal University, Turkey. The mobile learning readiness scale was used as data collection tool in the research. The validity and reability study of the scale used in the research was calculated in general terms of the scale and the Cronbach Alpha coefficient is reported as 0.95. As a result of the research, it was determined that the readiness level of the prospective teachers does not change depending on the gender and the students use the mobile technologies most in communication, studying, acquiring information and making plans. In addition, in the study, the results have been reached, such as both theoretical and practical training should be given in universities in order to increase the availability of prospective teachers on mobile learning.

Key words: Mobile learning, online learning, mobile technology, readiness, classroom management.

INTRODUCTION

With the rapid development and widespread use of technology, wired and stationary devices are fixed and made portable (Elçiçek and Bahçeci, 2017). These devices which are used as mobile, removable or portable are nowadays called mobile devices. Mobile technologies

that are developing very rapidly carry learning activities such as research and practice in the field of education out of the classroom environment thanks to their easy accessibility and portability (Crowley and Heyer, 2015; Saran et al., 2009).

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The history of mobile technology dates back to the 1970s. Mobile technologies are constantly evolving from day to day, developing and being added to these mobile devices every day (Sezal, 2018; Crompton, 2014; Polat and Odabaşı, 2008; Sharples et al., 2005). The first serious study of mobile learning is based on the concept of the device named as dynabook developed in 1972 with the slogan 'personal computer for all children' (Kukulka-Hulme et al., 2009).

Some of these devices used in education today are mobile phones, smartphones, handhelds, iPods, MP₃ players, tablet PCs, lap-tops, flash drives, personal media players and portable hard drives (Koşar, 2018; Ekren and Kesim, 2016; Kukulka-Hulme and Traxler, 2005; Lan and Sie, 2010; Caudill, 2007; Yuen and Wang, 2004; Jacob and Isaac, 2014). These mobile devices can make synchronized voices easier and less costly than other online technologies, depending on the content generated by the learning styles, files such as radio programs and videos that are automatically downloaded over the internet can be used both in formal education and distance education through educational materials (Keengwe and Bhergava, 2014; Shunye, 2014; Brown, 2003; Traxler and Vosloo, 2014; Traxler, 2005).

According to Crompton (2013), mobile learning occurred with the combination of mobile devices with softwares and the combination of these adapted to the educational environments is the learning that takes place in a multifaceted context through social interaction and content interaction using personal electronic devices. Mobile learning is defined, according to Quinn (2000), as effective use of mobile devices in e-learning activities, according to Traxler (2013), as any kind of learning activity that can be carried out by mobile devices, according to Wyne (2015), as learning and teaching activities carried out through wearable or portable technologies. With a general definition, mobile learning is a period in which communicative and collaborative environments can be accessed through mobile technologies without content and time constraints, which will meet the learning needs of individuals (Baran, 2014; Mouza and Barrett-Greenly, 2015; Clark and Mayer, 2016).

Firstly, there is a need for learning management system software which will be updated continuously to reach information with mobile devices, to increase learning and to make information easily manageable by everyone (Ozan, 2009; Tekerek and Bay, 2009). Learning management system is the management software that keeps statistics about topics such as sharing of course content and materials prepared for educational purposes between teachers and students, sending and collecting assignments, attendance level of students, success level and enabling online communication (McGill and Klobas, 2008). The learning management system is a substructure that transmits and distributes educational content, identifies and evaluates

personal and organizational learning and educational goals, follows the process towards these goals and collects and presents data to supervise the organizational learning process as a whole (Szabo and Flesher, 2002). The Learning Management Systems also provide user and administrator interface support for mobile devices for users (Elçiçek and Bahçeci, 2017). These systems have become a focus of interest in education as well as in every area of our lives where technology is heavily used (Raua et al., 2008).

Mobile learning has many benefits for learners. Some of them can be listed as instantly getting the latest information, getting support, gaining time, being independent from time and space, increasing motivation, managing learners, spreading knowledge quickly, communicating with the environment (Bolat, 2016). Mobile learning can make learning environments for students more attractive, motivating and more interesting (Vinci and Cucci, 2007). Thanks to mobile technology and mobile learning, teachers can reach their students at any time and direct them by giving ideas or information on each topic. Teachers and students can contact simultaneously or asynchronously by mobile technologies (Zhang and Nunamaker, 2003). Teachers can manage the students in their classes through various games through mobile technology and can increase the motivation and motivation of the students. According to Yıldırım and Demir (2014), in classroom management, the arrangement of learning environments with play items will ensure that students are motivated in the positive direction.

Students can learn by transforming their moments into advantages when walking, doing sports, traveling, doing daily work or resting as they are independent of the place, can maximize their skill acquisition and manage the learning period better than to mobile learning (Tonga, 2015). However, mobile technologies with such an advantage can cause information pollution because information can be spread very quickly and easily. It has also been found that in the areas of limited bandwidth with the spread of new mobile devices and learning environments, the fact that synchronized voices are delivered easier and less costly than other online technologies increase existing information, which also makes management of information more difficult (Brown, 2003; Şendağ, 2008).

The world states have moved into the information society as a new social phenomenon with the influence of mobile technologies in the last century. The most important feature of the information society like in mobile education is the creation and rapid dissemination of information through the virtual environment. The world states have improved mobile devices at this stage by first producing mobile devices and then developing systems or softwares that are necessary for the use of mobile devices. These carefully developed systems have been equipped with continuously renewed technologies, have

been opened up to countries that are advancing towards the information society (Duran et al., 2006; Vaishnavi and Kuechler, 2015).

Countries that have been transformed into knowledge societies have developed some competencies under the name of lifelong learning for decades to come to an end during the lives of individuals since 2000s. Lifelong learning developed by the European Commission (2002), is all activities aimed at improving individual's knowledge, competencies, competences individually, socially or professionally throughout life. The European Commission has also identified some knowledge, skills and attitudes they need to have in order for them to be lifelong learners within lifelong learning (Karakuş, 2013). Lifelong learning has identified eight key competencies that need to be developed for personal achievement, active citizenship, social inclusion and employment within the information society in terms of core qualifications (European Commission, 2007). One of these qualifications is digital competence. Digital competence according to Özgür (2016), covers both the self-confident and critical use of information society technologies for business, entertainment and communication, as well as the use of computers; including the use of basic information and communication technologies, including information acquisition, measurement and evaluation, production, presentation, sharing and use in online environments by the internet. Digital competencies should be supported by basic information communication technologies to enable computers to communicate, evaluate, store, produce, share and collaborate on the internet through open networks (European Commission, 2007). To be a lifelong learner, it is necessary to have current literacy such as information literacy, media literacy, internet and computer literacy at a basic level (European Commission, 2007; Bryce, 2006; Adams, 2007; Candy et al., 1994).

As a result, mobile learning is a form of learning that sharing of learning resources among teachers and learners in the same or different places based on flexibility of time and space, instruction of students or students by using mobile devices, utilization of internet services by evaluating e-learning areas and allows to communicate with others (Tarimer and Okumuş, 2007; Tick, 2006).

The impact on learning and teaching is undoubtedly crucial in terms of education and training in mobile and mobile learning, where the level of readiness of prospective teachers is at a level and whether the demographic variables affect prospective teachers' readiness for mobile learning. For this reason, it was considered necessary for the researcher to conduct this research both in terms of providing information and ideas to teachers, inspectors, academicians, trainers, administrators and students.

METHODOLOGY

Here, place to the problem cluster has been given, the purpose, the

universe and sample, the data collection tool, the method and the model of the research.

Problem sentence

What level of readiness of the pre-service teachers studying at the faculty of education is for mobile learning? Does the readiness of the candidates for mobile learning differ according to gender, program type and grade level variables?

Purpose of the research

The purpose of this research is to try to determine the readiness of the pre-service teachers studying in the faculty of education by taking into consideration the gender, program type and class level demographic variables and to find out some inferences from the arithmetic mean of the responses given to the scale items.

Universe and sample

This study's universe constitutes all the students who study in the programs of Mustafa Kemal University, Faculty of Education and the sample of this study is 934 pre-service teachers who are studying in Mustafa Kemal University, Faculty of Education, Turkish Language Teaching, English Language Teaching, Science Education, Computer Teaching Technology and Classroom Teaching programs.

Research model

This research was carried out in order to determine the readiness of the pre-service teachers studying in the education faculties for mobile learning by taking into consideration the gender, program type and class level demographic variables. For this purpose, the questionnaires and scales used in the previous researches on mobile learning were scanned and the mobile learning readiness scale developed by Lin et al. (2016) and adapted to Turkish by Gökçearslan et al. (2017), was used as data collection tool in the research. For the scale developed by Lin et al. (2016), a pool of 55 questions about mobile learning, readiness, mobile anxiety, and basic characteristics of mobile learning was established and scale items were administered to 319 participants for validity and reliability analyses and a 19-item mobile learning readiness scale consisting of 3 sub-dimensions was developed.

Turkish adaptation studies was made by Gökçearsla et al. (2017), in order to be used in Turkey. Studies on adaptation of the scale to the Turkish language were carried out on 698 students studying in the university and undergraduate. Kaiser Mayer Olkin test result was determined as 0.95, Barlett sphericity test result as ($X_2=12779.55$; $p=0.000$) in Turkish adaptation studies of the scale. Also, it was determined that the factor loadings of 17 items of 19 items were 0.651 and above, the variance caused by the first factor was 54.9%, and that the return result was composed of 3 sub-dimensions consisting of items with a scale greater than 1. It has been determined that the size of the optimism, the 1st dimension of the scale, accounts for 28.8% of the total variance of the scale, the second sub-dimension, self-efficacy dimension, accounts for 27.7% of the total variance, the third dimension, the self-learning dimension, accounts for 18.5% of the total variance and the third subscale discloses 75.1% of the common variance.

When an experts opinion is sought in order to examine the scale items in terms of meaning, it has been determined that article 7 covers article 6, article 18 covers article 19 and it has been decided to dispose of items 6 and 19 in the scale and then analyzed over 17

Table 1. t-test analysis results according to gender variable of answers given by prospective teachers to the readiness scale for mobile learning.

Gender	N	\bar{x}	Ss	Sd	-t	p
Mobile learning						
1. Female	576	103.953	6.365	932	1.408	0.159
2. Male	358	103.338	6.686			
Total	934	-	-	-	-	p>0.05

articles. As in general terms of the scale consisting of 17 matters, Cronbach Alpha internal consistency coefficient was calculated as 0.95, first sub-dimension as 0.95, second sub-dimension as 0.94 and third sub-dimension as 0.89. The internal consistency coefficients greater than 0.70 indicate that the scale is reliable (Karasar, 2010). The Pearson moment product correlation coefficient was calculated as 0.68 in the analysis for the determination of the scale. Correlation coefficients between 0.30 and 0.70 indicate that the scale has moderate stability (Büyükoztürk, 2008).

The responses of the participants to the scale according to the demographic variables were calculated using the t-test with the help of the SPSS 20 statistical package program and the ANOVA test with one-way analysis of variance. The scale used in the research consists of 17 items in the type of the seven likert (1) Strongly disagree, (2) Not agree, (3) Partially not agree, (4) Undecided, (5) Partially agree, (6) Agree and (7) Strongly agree. The general assessment of the scale used in the research is as follows (Dönger et al., 2016):

$$OR = \frac{HV - LV}{NO} = \frac{7 - 1}{7} = 0.85$$

where OR: option range, HV: highest value, LV: lowest value, and NO: number of options. 1.00 - 1.85: Strongly disagree, 1.86 - 2.71: Not agree, 2.72 - 3.57: Partially not agree, 3.58 - 4.43: Undecided, 4.44 - 5.29: Partially agree, 5.30 - 6.15: Agree, and 6.16 - 7.00: Strongly agree.

In the study, the general survey model, which is one of the descriptive scanning methods, was used. The general survey model is a screening of the whole universe or a set of samples or samples taken from it, in order to arrive at a judgment about the universe in an environment composed of a large number of elements (Karasar, 2010).

FINDINGS

Here, it was tried to determine the readiness levels of the pre-service teachers for mobile learning depending on the gender, program type and class level demographic variables and also the answers that the pre-service teachers gave to the scale items were tabled and interpreted.

From the analysis of the data in Table 1, depending on the answers given by the pre-service teachers participating in the survey to the Readiness Survey for Mobile Learning scale, depending on the gender variable; it has been determined that there is no statistically significant difference between male and female pre-

service teachers ($p < 0.05$). Therefore, it can be said that the readiness of male pre-service teachers and female pre-service teachers are close to or equal to those of mobile learners.

In the analysis of the data in Table 2, by using the answers given by prospective teachers to the Preparedness Survey for Mobile Learning, it was determined from the Tukey test analysis results that among the pre-service teachers who study at different grade levels, there was a statistically significant difference in opinion between the students studying in the 4th grade and the students in the 1st grade which was in favor of the students studying in the 4th grade [$F_{(3,16)}$, $p_{(.024)}$; $p < 0.05$]. Therefore, it can be said that the readiness level of the pre-service teachers who study in the 4th grade is higher than the prospective teachers who study in the 1st grade.

When the data in Table 3 were examined, from the answers given by the pre-service teachers participating in the survey to the Preparedness Survey for Mobile Learning, it was determined from Tukey test results that among the prospective teachers who read in different types of programs, there is a statistically significant difference in opinion in favor of prospective teachers who are studying in Computer and Teaching Technology (CTE), Teaching English (TE) and Teaching Science (TS) and Teaching Computer Science Teaching (CTE) [$F_{(2,736)}$, $p_{(.028)}$; $p < 0.05$]. Based on the results of the research, it can be said that the pre-service teachers who study in the Teaching Technology Teaching Program have higher readiness of using mobile technology than the pre-service teachers who study in other programs because of the program they have studied.

When the analyses of the data in Table 4 were examined, moving from the answers given by the pre-service teachers participating in the survey to the Preparedness Survey for Mobile Learning, it was determined from ANOVA test analysis results that there was no statistically significant difference in opinion among the prospective teachers with different monthly maternity incomes [$F_{(.587)}$, $p_{(.623)}$; $p > 0.05$]. Therefore, it can be said that monthly income of the family does not affect the readiness of the pre-service teachers towards mobile learning.

Table 2. Analysis results of Anova test according to the grade level variable of answers given by prospective teachers to the readiness scale for mobile learning.

Grade level	N	\bar{x}	Ss	Source of variance	Sum of squares	Sd	Squares average	F	P (Tukey)
1. Grade	250	102.72	6.17	Between groups	396.97	4	132.32	3.16	0.024
2. Grade	244	104.13	6.49	In groups	38940.41	342	41.87		
3. Grade	227	103.72	6.67	Total	39337.38	346		4-1	
4. Grade	213	104.42	6.57	-	-	-		-	
Total	934	103.72	6.49	-	-	-	-	-	p<0.05

Table 3. Analysis results of Anova test according to program type variable of answers given by prospective teachers to the readiness scale for mobile learning.

Program type	N	\bar{x}	Ss	Source of variance	Sum of squares	Sd	Squares average	F	P (Tukey)
1. TT.	105	104.05	6.98	Between groups	458.09	4	114.52	2.736	0.028
2. TE.	135	103.36	6.54	In groups	38879.29	929	41.85		
3. TS.	119	102.92	6.07	Total	39337.38	933			
4. CTE	121	105.37	6.85	-	-	-		4-2	
5. CT.	354	103.65	6.26	-	-	-		4-3	
Total	934	103.72	6.49	-	-	-	-	-	p<0.05

Table 4. ANOVA test analysis results according to the variable of the monthly earnings of the answers of the pre-service teachers to the readiness scale for mobile learning.

Family income	N	\bar{x}	Ss	Source of variance	Sum of squares	Sd	Squares average	F	P (Tukey)
1. 1-2000	267	104.05	6.92	Between groups	74.39	3	24.80	0.587	0.623
2. 2001-4000	285	103.33	6.34	In groups	39262.99	930	42.22		
3. 4001-6000	165	103.76	6.35	Total	39337.38	933			
4. 6001-up.	217	103.79	6.27						
Total	934	103.72	6.49						p>0.05

Table 5 shows the arithmetic mean of the answers given by the prospective teachers studying in the Faculty of Education to the Preparedness Survey for Mobile Learning.

When the arithmetic averages of the answers to the items of the self-sufficiency dimension which is the first sub-dimension of the scale were examined, it was determined that the items with the highest arithmetic mean in the sub-dimension are the third item ($\bar{x} = 6.52$), the fourth item ($\bar{x} = 6.47$) and the fifth item ($\bar{x} = 6.37$). In addition, it was determined that the sub-dimension ($\bar{x} = 6.15$), which has the highest arithmetic mean of the scale, is again the self-sufficiency dimension.

When the arithmetic averages of the responses to the second subscale of optimism were examined, it was determined that the 7th item ($\bar{x} = 6.50$), the 10th item ($\bar{x} = 6.36$) and the 8th item ($\bar{x} = 6.16$) have the highest arithmetic mean. The arithmetic average ($\bar{x} = 6.12$) of the optimistic subscale of your scale was calculated.

When the arithmetic mean of the responses to the self-learning subdimension, which is the third subdimension of the scale, was examined, it was determined that the 16th item ($\bar{x} = 6.26$), the 15th item ($\bar{x} = 6.01$) and the 14th item ($\bar{x} = 5.93$) have the highest arithmetic mean. The arithmetic mean ($\bar{x} = 5.98$) of the self-learning sub-dimension was calculated as the lowest arithmetic mean of the scale. Moreover, when the arithmetic mean of the scale items is taken into consideration, it is determined that the 17th item with the lowest arithmetic average is again in this dimension with good time ($\bar{x} = 6.26$).

When the correlation analysis of the sub-dimensions of the Mobile Learning Readiness Scale of Table 6 was examined, it was found that there was a positive correlation at the weak level ($r = 0.156$) between the self-efficacy subscale with the subscales of the scale and the optimistic subscale, self- ($r = 0.117$) between positive dimension and weak dimension ($r = 0.217$) between self esteem subscale and self learning subdimension ($r =$

Table 5. The arithmetic mean and skill levels of answers given by prospective teachers to the readiness scale for mobile learning.

Mobile learning readiness scale	\bar{x}	Level of skills
Self-sufficiency		
3. I am self-reliant on using mobile learning systems to communicate effectively with others.	6.52	Strongly agree
4. I am self-reliant when using the internet to acquire knowledge or to collect for mobile learning.	6.47	Strongly agree
5. I am self-reliant while working on using mobile learning systems.	6.37	Strongly agree
11. I am self-reliant on using the basic functions of mobile learning systems.	5.88	Agree
6. I am self-reliant in knowing how mobile learning systems work.	5.84	Agree
2. I rely on my knowledge and skills about mobile learning systems.	5.83	Agree
Optimism		
7. I like working with mobile learning systems because I can work whenever I want.	6.50	Strongly agree
10. I like mobile learning systems.	6.36	Strongly agree
8. Mobile learning systems allow me to work more effectively.	6.16	Strongly agree
12. The newest mobile learning systems are much more useful.	6.08	Strongly agree
13. Mobile learning systems give me more freedom to work.	6.04	Agree
9. I like mobile learning systems that I can tailor to my needs.	5.98	Agree
11. Mobile learning systems enable people to have more control over their working times.	5.75	Agree
Self Learning		
16. I set goals in my work and take high responsibility.	6.26	Strongly agree
15. I have my own work plan.	6.01	Agree
14. I can manage my own learning process.	5.93	Agree
17. I manage time well.	5.74	Agree

General Arithmetic Average of the Scale: 6.101 (Agree).

Table 6. Correlations analysis results according to the subscales of the answers given by the prospective teachers to the readiness scale for mobile learning.

Lower dimensions of the scale		Self-sufficiency	Optimism	Self learning
Self-sufficiency	Pearson correlation	1	0.156**	0.117**
	p		0.000	0.000
	N	934	934	934
Optimism	Pearson correlation	0.156**	1	0.242**
	p	0.000		0.000
	N	934	934	934
Self learning	Pearson correlation	0.117**	0.242**	1
	p	0.000	0.000	
	N	934	934	934

0.217). It has been determined that there is a weak or a relationship between each dimension of the scale and the movement from the obtained data.

DISCUSSION

Here, the results obtained without the research and the

recommendations developed for the results are given.

In the study, there was no significant difference in the level of readiness for mobile learning between female and male pre-service teachers due to gender. Therefore, it can be said that the prospective teachers' prospects for mobile learning are close to each other or at the same level. In a survey conducted by Elçiçek and Bahçeci (2015), there was no difference in the attitudes of mobile

vocational high school students towards mobile learning depending on gender. There was no significant difference between male and female teachers in the study of determining the level of perception of mobile learning by Kuşkonmaz (2011). In a study conducted by Kantaroğlu and Akbıyık (2017), the students' attitudes towards mobile learning were determined and there was no significant difference between female and male students in the study.

In the study, it was determined that the students who study in the 4th grade have higher mobile learning readiness than the students who study in the 1st grade. In interviews with students, it has been found that the reasons for this situation are that students studying in the first semester do not have any purpose such as preparing for exams to be engaged in a job or life, whereas students studying in the fourth semester are prepared for continuous exams in order to become a profession. It has been determined that they are ready to use mobile technology because they are forced to use mobile technologies continuously in order to exchange information or communicate with their friends about the questions to be asked during the exams. In a study conducted by Sirakaya and Sirakaya (2017), the mobile learning attitudes of the students studying at vocational school were examined and there was no significant difference between the students who study in the first grade and the students who study in the second grade.

In the study, among the students who study in different types of programs, the students who study in Computer Education and Instructional Technology Teachers were found to have higher readiness on mobile learning than the students who study in other sections. When the reason for this situation was investigated, it was determined that most of the students studying in Computer Education and Instructional Technology Teachers graduated in the computer department of the vocational high schools and therefore the information about the mobile technologies studied more than other students because they study in the computer related sections for 4 years before they settled in the university. In a research conducted by Kantaroğlu and Akbıyık (2017), the attitudes of students in different faculties on mobile learning were examined and there was no statistically significant difference between the students studying in different faculties.

In the study, it was determined that the monthly income of the family does not affect the readiness of the students on mobile learning. This is because today's students have all the mobile devices that they use, and because their families have received at least one mobile device for their children who study their lessons, regardless of their monthly earnings, and because of this they partially fulfill the duty of the family it has been determined that the availability of mobile learning remains in the child's own skill rather than their family. However, although there is no connection between the monthly income of the family

and the use of mobile technology, the fact that mobile phones are constantly and monthly fixed in terms of both speaking and communicating and using the internet, and that this fee is directly proportional to usage, depends on the monthly income of the family.

Based on the highest arithmetic mean of the research, it was determined that the prospective teachers preferred mobile technologies because of communication, academic achievement, knowledge acquisition, learning to work with mobile technology, lesson plans made by mobile technology, and effective study. When examining the research data, it can be said that the pre-service teachers are familiar with mobile technologies and they use mobile technologies to improve themselves in academic and cultural sense. In some researches, it has been determined that mobile learning increases the academic success of the students (Enriquez, 2010; Çavus and Doğan, 2009; Fetaji and Fetaji, 2010; Chena et al., 2008; Korkmaz, 2010).

In the study, the overall arithmetic mean of the scale used was 6.01 (Agree). However, it was expected that the arithmetic average of the scale would be between 6.16 and 7.00 (Strongly agree). Based on the interviews with the students, it has been determined that the reason of this situation is that the students are informed about mobile learning, mobile technology or mobile applications, in part, but not on the desired level of mobile learning. According to Asher and Miller (2011), students often have access to information but have difficulty understanding, comprehending, synthesizing and evaluating online information.

RECOMMENDATIONS

Mobile devices have entered life in all areas of life. For this reason, all our students should be equipped with the skills necessary to use mobile technology even at the level of literacy. Since these skills are often available at school, students should be given both theoretical and practical lessons in mobile technology at every level, from primary education to university.

To be able to effectively use mobile technologies and reach the latest, most accurate and most advanced knowledge, students must know at least one of the universal languages widely used in the world. Students should be supported in this subject.

Students who are able to use mobile technology effectively will want to access the information easily. For this reason, libraries must be translated into e-libraries, and access to these libraries should be either cheap or free.

Thanks to mobile technology, teachers' dominance in classroom management is increasing, and motivation and motivation of students are increased, thanks to some games played in class. For this reason, all classes in education should be equipped with digital or mobile

technologies in order to raise the morale and motivation of both teachers in classroom management or in control and morale.

Teaching programs that are used effectively in schools should be designed from scratch and made to include mobile technologies. Therefore, either the necessary changes should be made in existing teaching programs or the teaching programs should be prepared from scratch.

In-service trainings should be given to all teachers who are studying at universities' education faculties or working in schools by institutions or organizations that are in charge of mobile technology so that both pre-service teachers and teachers working at schools should be made more knowledgeable and competent about mobile learning and mobile technologies.

CONFLICT OF INTERESTS

The authors has not declared any conflict of interests.

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