Investigation of the Effect of Chess Game on the Development of Acquisitions within Renewed Curriculum According to Pre-service Teachers

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Abstract: The Ministry of Education put in practice a renewed curriculum which includes many elective courses in order to allow students to develop key competencies and to acquire many skills. One of them is an elective chess course. Therefore, the aim of the study is to investigate whether the chess lesson allows students to develop key competencies and to acquire basic skills of the renewed curriculum according to the opinions of pre-service teachers who take up elective chess courses. Research is a descriptive study which was conducted with 141 pre-service teachers from three departments of an education faculty. Data was obtained with a scale established by the researcher. The results show that there is a statistical difference between pre-service teachers' thoughts about chess that would have a positive effect on the students' skills and acquisitions. And there is no statistical difference between their beliefs in terms of their gender and departments. As the teachers' experiences of chess playing increased, it also positively affected their beliefs that chess would have a positive effect on the skills and acquisitions envisaged in the program. It is advised that pre-service teachers must take elective courses to improve their skills during university education to improve their prospective students' potential.

Keywords: Chess Game, Competency, Skills, Elective Courses

1. Introduction

The Education Curriculum in Turkey has been revised in accordance with the general objectives of Turkish National Education along with the main principles of the Constructivist Learning Approach (CLA) (MEB, 2019a; MEB, 2019). CLA indicates that learners construct knowledge rather than passively receive it. As people experience and reflect on the world, they create their own knowledge into their pre-existing knowledge (Bada & Olusegun, 2015). CLA expects teachers to encourage their students to share in decisions, to believe in their capacity to lead, and to remember how it feels to learn (Gömleksiz, 2007).

Everyone has the right to quality and inclusive education training and lifelong learning that develops core competencies and core skills (Stubbs, 2008). Thus, educational programs in Turkey give importance to individual differences as stated in CLA (MEB, 2006). It attaches importance to providing students with

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the basic skills and key competencies that every citizen should acquire in the formal education process (MEB, 2006). The term "educational acquisitions" was used instead of "educational objectives" in the revised curriculum.

Educational acquisitions include key competencies and basic skills are needed by all for personal fulfillment and development, employability, social inclusion and active citizenship (Chiarle, 2013). According to Semerci and Yanpar-Yelken, (2010), common basic skills are the characteristics that a modern individual should have. The distribution of basic skills and key competencies within the programs has also changed the scope of the subjects and the way they are presented to the students. For example, the science program states that the purpose of science courses is not only a collection of facts about the world (MEB, 2018), or even the systematic study of nature, although both are common definitions of science (Sanduleac, 2010). Similarly, one of the general aims of the social studies course, which is directly related to life, is as follows: “students are expected to use research, information and communication technologies while considering ethical principles in using, reaching and accessing scientific knowledge at the end of 7th grade” (Narin & Aybek, 2010; MEB, 2012).

In addition to the required courses, the renewed primary education program also includes various elective courses for personal development. One of the elective courses in the renewed curriculum is chess course. A relationship was established between educational acquisitions of chess course and required courses such as Turkish, mathematics, social studies and life studies lessons, and the achievements of all lessons were ensured to support each other (MEB, 2019a; MEB, 2019).

The results of the studies on the game of chess have shown that chess has a positive effect on students’ success, mental capacities, creativity, critical thinking, decision making and problem solving skills and it is a good sport to use the time we have more wisely (Jankovic & Novak, 2019). Based on the research results, the chess program doesn’t consider chess teaching as just a game. The aim of the chess course (1-8th Grades) curriculum claims playing chess helps the individual's mental development including the ability to improve their intelligence, empathy, memory, planning and problem-solving skills", and to directly gain the key competencies and basic skills (MEB, 2019a; MEB, 2019). The skills in the chess program can be grouped under two headings. The first of these is mental skills, and the second is affective features that will contribute to the emotional development of students (TTK, 2006).

Studies have stated that playing chess helps individuals to develop their mental capacities such as critical thinking, problem solving, creativity, reasoning, concentration, planning strategies, decision making, and their ability to solve mathematical problems and use time (Krogius, 1972; Storey, 2000; Kulaç & Daban, 2012; Trinchero, 2013). It has been determined that there is not enough research on chess education in our country. Among them, Erhan, Hazar and Tekin (2009) compared the problem solving skills of students who take up chess and those who do not. As a result of the research, it has been determined that students who take up chess are more successful in problem solving and planning. Kaynar (2014) concluded that chess education given in early childhood affected children's general school maturity, social skills and focusing skills significantly, and also created a significant difference in students' ability to form sentences, use numbers. Özkütük et al. (2003) examined the problem-solving skills of 180 pre-service teachers. As a result of this descriptive research, they found differences between participants’ problem solving skills, frequency of attending professional meetings, perceiving themselves as creative and their studying methods they used. There was no difference between participants' age, gender and problem solving skills.

When the studies are examined, it is seen that the studies mostly investigate the effect of the chess course on the cognitive achievements of the students. It is seen that there are few studies investigating the opinions of teachers about the contribution of the chess game to directly allow for developing the key competencies and basic skills of programs. For example, Manak (2007) examined the contribution of primary school chess program achievements to students in line with the opinions of teachers, administrators and inspectors. According to the study, teachers who participate in chess-related activities have a more positive view about whether chess courses have an effect on skills acquisition than the teachers who don't participate in chess-related activities. However, there is no difference between the views of the participants according to their gender and teaching branch.

The common outcomes of the elective chess program are similar to those in required courses' programs. For this reason, it is thought that teachers and teacher candidates should receive chess training. Therefore, the aim of the study is to investigate whether the chess lesson allows students to develop key competencies and basic skills of the renewed curriculum according to pre-service teachers who take up elective chess courses. In this context, the below are the sub-problems of the research:

1. Do chess lessons allow students to develop key competencies and basic skills of the renewed curriculum according to pre-service teachers' chess competencies?
2. Do chess lessons allow students to develop key competencies and basic skills of the renewed curriculum according to the departments of the pre-service teachers?
3. Do chess lessons allow students to develop key competencies and basic skills of the renewed curriculum according to their gender?

2. Method

2.1 Research Design

This research is a descriptive study designed in the screening model. Screening models aim to describe a past or present situation as it is, and therefore this model is considered to be suitable for the purpose of the study (Karasar, 2000).

2.2 Survey Participants

This study was carried out in a total of 141 pre services teachers. The distribution of pre-service teachers according to their chess playing competencies after the chess course, department and gender is given in Table 1.

Table 1: Chess competencies of pre-service teachers by department and gender

Chess playing competencies of pre-service teachers			Department						Total
			Science		Classroom		Social		
			f	%	f	%	f	%	
Insufficient	Gender	Female	19	33,9	16	28,6	21	37,5	56
		Male	4	13,3	16	53,3	10	33,3	30
	Total		23	26,7	32	37,2	31	36,0	86
Sufficient	Gender	Female	17	48,6	8	22,9	10	28,6	35
		Male	4	20,0	10	50,0	6	30,0	20
	Total		21	38,2	18	32,7	16	29,1	55

After the chess course, 55 (35 females, 20 males) of the pre-service teachers stated that they play chess well, and 86 (56 females and 30 males) of the participants who stated that they could not play chess very well. When analyzing participants who took chess courses by gender, it is seen that 64.5% of the participants are female and 35.5% of them are male. Further, when analyzed participants by study department 31.2% of them are pre-service science teachers, 35.5% of them are pre-service classroom teachers and 33.3% of them are pre-service social studies teachers. The pre-service teachers participating in the study were selected from the 3rd and 4th grades. The mean age of teacher candidates (n=141) was 20.89±2.22 (19- 26).

2.3 Data Collection Tool

The data of this study were collected through a scale form prepared by the researcher. Likert type questions of the scale form were created by adapting the skill acquisitions of the chess program. Before the scale was applied to the sample group, it was applied as a pilot study on a group of 50 pre-service teachers who took elective chess courses and after the necessary corrections were made, the scale was put into the final form. During the pilot study, principal components and factor analysis techniques were preferred in the analysis of scale structures.

The test initially consisted of 24 propositions. As a result of validity and reliability studies, 4 propositions with factor loads below 0.30 were removed from the test. KMO (Kaiser-Meyer-Olkin) and Bartlett test analyzes were performed to determine the suitability of the scales for factor analysis, the adequacy of the sample size and whether the data were normally distributed. The KMO value of the entire study was 0.87 and the Bartlett's sphericity test significance level was 0.00. These data indicate the adequacy of the selected sample size.

The questionnaire form was finalized in line with the opinions of two experts in educational sciences. In the final version of the questionnaire, there are four propositions that reveal the demographic information of the students and 20 propositions for the common skill acquisitions of the chess curriculum. Except for demographic expressions, all other propositions were arranged as a five-point Likert scale. For the purpose of the research, the most positive statement represents the highest score, and the most negative statement represents the lowest score. Some propositions were asked negatively and reverse coded in order to ensure the reliability of the research. As a result of the reliability analysis performed after this stage, the reliability of the scale was calculated as (Cronbach Alpha,) $\alpha = 0.89$.

2.4 Data Collection and Analysis

Data were obtained online from students. In this context, the researcher uploaded the scale to google docs. The researcher sent the link of the scale to the e-mail addresses of the teacher candidates, and they were invited to fill in the scale. The collected data were transferred to the table by google.doc. The data were also digitized so that they could be analyzed in the SPSS program. While the statements were digitized, they were scored as “Strongly Agree= 5”, “Agree=4”, “Undecided-no idea=3, “Disagree=2 and “Strongly disagree=1”.

The highest score that can be obtained from the scale is 100 and the lowest score is 20. Scores above 60 indicate positive attitudes, and scores below 40 indicate negative attitudes. These data were evaluated with appropriate statistical methods in the SPSS program (using SPSS 17.0 statistical package program in computer environment). In order to determine the differences between the views of the pre-service teachers, the t-test (two groups) according to the variables of gender and chess knowledge, and the analysis of variance (ANOVA) according to the department they studied (more than two groups) were used and the statistical significance level was accepted as 0.05. The data are given in the tables as percentage and frequency.

3. Findings

Under this title, first of all, the results of evaluating of teacher candidates about the chess game as a means of developing educational acquisitions of the curriculum will be presented. Then, the distribution of pre-service teachers' perceptions about chess as a means of developing the educational acquisitions of the curriculum according to different variables such as gender, age and the department they are studying will be presented.

3.1 The Effect of the Chess Game on the Development of the Educational Acquisitions According to the Pre-Service Teachers

The analysis results of the evaluation of chess as a means of developing educational acquisitions in the curriculum for pre-service teachers’ views, which constitutes the main problem statement of the study, are given in Table 2.

Table 2: The effectiveness of the game of chess in developing educational acquisitions according to pre-service teachers

Educational acquisitions of Curriculums		I totally agree		Agree		No idea		Disagree		Strongly disagree	
		f	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***
1	Enhances creativity	96	68,1	40	28,4	1	0,7	1	0,7	3	2,1
2	Affects mental development positively	84	59,6	53	37,6	2	1,4	2	1,4	0	0
3	Improves problem solving skills	88	62,4	47	33,3	4	2,8	2	1,4	0	0
4	Develops the ability to act in a planned manner.	84	59,6	53	37,6	4	2,8	0	0	0	0
5	Develops quick and accurate thinking skills.	99	70,2	34	24,1	5	3,5	2	1,4	0	0
6	* Affects socialization negatively.	0	0	15	10,6	7	5	68	48,2	51	36,2
7	Develops critical thinking skills	80	56,7	50	35,5	10	7,1	1	0,7	0	0
8	*Does not affect multidimensional thinking.	0	0	9	6,4	11	7,8	72	51,1	49	34,8
9	* It does not develop the ability to take risks.	0	0	13	9,2	16	11,3	70	49,6	42	29,8
10	Develops the ability to interpret events correctly.	64	45,4	53	37,6	18	12,8	6	4,3	0	0
11	It improves the ability to deal with problems.	66	46,8	50	35,5	21	14,9	4	2,8	0	0
12	Develops the ability to recognize individual talents.	57	40,4	55	39	23	16,3	4	2,8	2	1,4
13	Develops entrepreneurial skills.	53	37,6	55	39	24	17	6	4,3	3	2,1

14	Develops sense of responsibility	50	35,5	53	37,6	24	17	14	9,9	0	0
15	Develops systematic and disciplined working skills.	50	35,5	63	44,7	24	17	4	2,8	0	0
16	Develops questioning skills.	59	41,8	45	31,9	28	19,9	6	4,3	3	2,1
17	Improves affective skills	43	30,5	50	35,5	28	19,9	16	11,3	3	2,1
18	Affects personality and character positively.	46	32,6	54	38,3	29	20,6	10	7,1	2	1,4
18	It positively affects the behavior of obeying democratic rules.	47	33,3	50	35,5	32	22,7	10	7,1	2	1,4
20	*Does not affect research skill	0	0	20	14,2	37	26,2	51	36,2	33	23,4

* These statements are negative

When Table 3 is examined, majority of the pre-service teachers strongly agree that the chess game develops the students' quick and correct thinking skills (70.2%), improves students' creativity (68.1%), improve students' problem solving skills (62.4%), develops students' planned acting skills (59.6%). Some of the pre-service teachers agree that playing chess affects students' researching skills (23.4%)", improves students' risk-taking skills (29.8%), improves students' affective skills (30.5%), and affects students' personality and character positively (32.6%). However, their opinions are not at the level of "certainty". There is a small number of prospective teachers (2.1%) who think that playing chess definitely does not improve the "creativity, questioning, affective and entrepreneurial skills' ' of the students.

3.2 Comparison of Teacher Candidates' Perceptions of Chess as a Means of Developing Educational Acquisitions According to Their Chess Competencies

Under this title, comparison of teacher candidates' perceptions of playing chess develops educational acquisitions of students which show a significant difference according to their chess competencies". Findings which is a sub-problem of research is presented in Table 3.

Table 3: Independent t-test results on the usability of chess game as a tool for developing skills according to pre-service teachers' chess competencies

Chess competencies	N	Mean	S.D.	S.E.	t	p
Insufficient	86	36,04	10,87	1,17	-,13	,011
Sufficient	55	36,27	8,50	1,14		

Pre-service teachers' opinions on the usability of chess as a tool for developing skills according to their chess competencies were evaluated. According to Table 2, it was observed that the average scores of those who stated that they were experts in the game of chess ($\overline{X}$=36,27) were higher than the others ($\overline{X}$=36,04).

When this difference was analyzed with the t test at the significance level of 0.05, the p value was found as 0.011 [p = 0.11, p>0.05]. This result shows that the difference between the arithmetic means of both groups is significant. In other words, there is a significant difference in the opinions of prospective teachers regarding the usability of chess as a tool for gaining skills according to their chess knowledge.

3.3 Comparison of Pre-Service Teachers' Perception of Chess as A Means of Gaining Common Skills According to Gender Variable

Under this title, comparison of teacher candidates' perceptions of playing chess develops educational acquisitions of students which show a significant difference according to their gender". Findings which is a sub-problem of research is presented in Table 4.

Table 4: Independent t-test results on the usability of chess game as a tool for developing skills according to pre-service teachers' gender

Gender	N	Mean	S.D.	S.E.	t	p
Female	91	35,70	9,42	0,98	-0,691	0,47
Male	50	36,92	11,00	1,55		

When Table 5 is examined, it is seen that there isn't a significant difference at the level of the female teachers' scores ($\overline{X}$=35,70) and male teachers' scores ($\overline{X}$=36,92) regarding the usability of playing chess as a tool for developing skills according to their gender.

When this difference was analyzed with the t test at the significance level of 0.05, the p value was found as 0.47 [p = 0.47, p>0.05]. This result shows that the difference between the arithmetic means of both groups is not significant. In other words, there is no significant difference in the views of pre-service teachers regarding the usability of chess as a tool for gaining skills according to their gender.

3.4 Comparison of Pre-Service Teachers' Perception of Chess as A Means of Gaining Common Skills According to Studying Department Variable

Under this title, comparison of teacher candidates' perceptions of playing chess develops educational acquisitions of students which show a significant difference according to their studying department".

The descriptive statistics of the total scores obtained from data are given in Table 5, and the two-factor ANOVA results are given in Table 6.

Table 5: Descriptive statistics on the scores of preservice teachers regarding the perception of chess as a for developing common skills

Department	N	Mean	S. D	S.E
Science	44	35,09	9,63	1,45
Classroom	50	36,16	10,22	1,44
Social science	47	37,08	10,17	1,48

In Table 6, it is seen that there is no difference between pre-service teachers' opinions regarding the usability of playing chess as a tool for gaining the common skills of the curricula according to their studying department. To elaborate Table 6, data analyzed with one-way ANOVA test. The results are presented in Table 7 to determine whether these data create a significant difference between the groups.

Table 6: ANOVA results of pre-service teachers' scores regarding the perception of chess as a tool for developing common skills

	Sum of Squares	SD	Mean Square	F	p
Between Groups	90,424	2	45,212	0,45	0,63
Within Groups	13878,016	138	100,565		
Total	13968,440	140			

* According to Levene statistical results (0,991), the variances of the groups were homogeneous.

When Table 7 is examined, it is seen that the average scores given by the pre-service teachers regarding the usability of playing chess as a tool for gaining skills according to their departments. When the difference between the results was evaluated, there was no statistically significant difference at the 0.05 level of significance ($F(2,138) = 0.63$, $p > 0.05$). In other words, there is no significant difference in the opinions of pre-service teachers regarding the usability of chess as a tool for gaining skills according to their studying departments.

4. Discussion and Conclusion

In this study, it is aimed to research whether playing chess as a means of developing basic skills and key competencies of renewed curriculum according to pre-service teachers who took up chess courses. The main finding of the study is that the perception of chess as a means of gaining common skills in the curriculum shows a significant difference according to the chess competencies of the pre-service teachers. This finding is in line with the results of the study (Çallıca, Erol, Sezgin, & Kavcar, 2001; Güven, Öztuna, & Gürdal, 2002) showing that teachers' proficiency in programs affects the success of the course, and It is in parallel with the opinion of Mart (2013a; 2013b) and Semerci & Yanpar-Yelken, (2010) who argue that the success of a teaching program is only possible with the will and harmony of teachers.

Chess is an individual game with complex rules, in which the player displays his creative thoughts with a personal presentation (Gliga & Flesner, 2014). Common skills such as critical thinking, problem solving, creativity, reasoning, concentration, planning strategies, decision making, and their ability to solve mathematical problems, use time wisely and entrepreneurship as stated in the MEB (2013) can be achieved by playing chess (Krogius, 1972; Storey, 2000; Kulaç & Daban, 2012; Trinchero, 2013). The findings of the study were examined, it is consistent with the results researches (Krogius, 1972; Storey, 2000; Kulaç & Daban, 2012; Trinchero, 2013) which playing chess as a means of developing basic skills and key competencies as stated in highlighted in the renewed curriculum (MEB 2013) according to pre-service teachers' chess competencies.

Researchers (Ayvacı, 2010; Semerci & Yanpar-Yelken, 2010; Mart, 2011; Çallıca, Erol, Sezgin, & Kavcar, 2001; Mart, 2017; Güven, Öztuna, & Gürdal, 2002) indicate that, there is a need for teachers who will make an effort to help students acquire cognitive skills and use these skills in life practices, regardless of their branch of teaching. Being a subject matter expert is different from knowing the philosophy of the teaching programs. For this reason, it is important for preservice teachers to take and attend skills training courses during their undergraduate education. No matter how important the structure and functions of the curricula are, responsibility and role of the teacher are the most important things in skill training (Semerci & Yanpar-Yelken, 2010). That's why, teachers need to know the philosophy of the teaching approach they apply, as well as their subject matter knowledge and pedagogical knowledge (Ayvacı, 2010). Because, there are studies stating that teachers who are experts in their fields but do not apply the philosophy of the teaching programs put into practice cause their students to fail in the courses (Çallıca, Erol, Sezgin, & Kavcar, 2001; Güven, Öztuna, & Gürdal, 2002).

The effective acquisition and permanence of predetermined learning experiences in education programs is based on the teachers who allow students to be responsible citizens, as well as being supportive and contributing. If the teacher is disruptive instead of supportive, all resources are wasted and cause undesirable developments (Ertürk, 1986). This will be especially effective when the structure of the programs is almost completely different and the role of the teacher changes. Because innovations that are not well understood and adopted by the teacher will have a low chance of success in practice. The success of education programs depends on the knowledge, skills and competence of the teachers in practice. Teachers must believe in the importance of the program, know and accept the underlying philosophy and reasons (Semerci & Yanpar-Yelken, 2010)

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