I J E S P

International Journal of Educational Studies and Policy

ISSN: 2718-1022

Volume: 2, Issue: 2, November 2021



www.ijesp.net

International Journal of Educational Studies and Policy (IJESP)

Volume:2, Issue:2, November 2021

International Journal of Educational Studies and Policy (IJESP) focuses on teacher education, applied studies, and research methods within the scope of empirical and conceptual studies in the field of educational sciences. It is an international peer-reviewed journal that publishes two issues a year, around May and November, and its publication language is English.

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CONTENTS	
Introduction	i-iii
Articles	Pages
A Descriptive Analysis of Theses on Curriculum Studies in Preschool Education	
Fatma Altın	1-14
Mehmet Altın	
Belongingness and Positivity: The Mediation Role of Problem Fields Among University Students	
Özkan Çıkrıkçı	15-29
Neslihan Çıkrıkçı	
The Role of Teacher Autonomy on Collective Teacher Efficacy	
Seval Koçak	30-50
Selçuk Yusuf Arslan	
Evaluation of the Curriculum on Child Nutrition in the Child Development Program According to Metfessel-Michael Program Evaluation Model	
Hilal Hatice Ülkü	51-72
Ümit Gözel	
Examination of the Mathematical Language Used by Primary School Fourth Grade Students	
Neşe Aydoğan Belen	73-91
Hayriye Gül Kuruyer	
IJESP Volume:2, Issue:2, November 2021	

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Volume: 2, Issue: 2, November 2021

A Descriptive Analysis of Theses on Curriculum Studies in Preschool Education^{*}

Fatma Altın¹ Mehmet Altın²

ABSTRACT

The aim of this study is to descriptively examine the theses on curriculum studies in preschool education. The study was conducted through document analysis, one of qualitative research technique. Collected data from a total of 103 theses were analyzed, and the analyzed data was presented by frequency distributions and percentage values. It was concluded from the research that most of the theses on curriculum studies in preschool education were designed with experimental design. The use of experimental researches in most theses causes the sample sizes not to be very high. So it can be stated that the sample sizes' not being high due to experimental studies is one of the reasons why normality cannot be achieved in the data. Hence, most of the theses used non-parametric tests. On the other hand, it was determined that while curriculum evaluation models are rarely included in the theses, curriculum development models were not used, at all, on curriculum studies in preschool education.

Keywords: Curriculum studies, thesis, preschool education.

Article History: Received 28.03.2021

Accepted 14.09.2021

Cite as: Altın, F. & Altın, M. (2021). A descriptive analysis of theses on curriculum studies in preschool education. *International Journal of Educational Studies and Policy*, 2(2), 1-14.

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*It is presented at the 8th International Congress on Curriculum and Instruction.

1

Introduction

Raising mentally and physically healthy generations who are able to freely express their feelings and thoughts, who are entrepreneurs and researchers, who can maintain self-control and who have cultural values can be achieved by giving the necessary importance to pre-school education (Demirel, 1989). Pre-school education, called early childhood, covers the period from birth to the day when the child attends primary school (Celik and Gündoğdu, 2007). This period is important for the mental, physical, emotional, social development and maturation process of the child (Aral, Kandır and Can Yaşar, 2000; Yılmaz, 2003). The aim of the pre-school curriculum is to ensure the healthy development of children and the acquisition of skills necessary for the future (Hirsh, 2004). Köksal, Balaban Dağal and Duman (2016) explained the purpose of the pre-school curriculum as supporting the development of skills in all areas of development, maximizing these skills, and making up the deficiencies in these areas of development (Kitta and Kapinga, 2015). Preschool curriculum provides educators to reach the general knowledge what to teach children, what educational activities and methods to support children's development, how to create the physical environment, how to get support from families during the education process and how to evaluate children in a more concrete way (Dodge, 1995).

The definition of pre-school education in Turkey is defined by the National Education Basic Law (Abazaoğlu, Yıldırım and Yıldızhan, 2015). National Education Basic Law (2021) stated that objectives and tasks of pre-school education in Turkey are determined in accordance with the general objectives and basic principles of national education.

- To ensure that children develop body, mind and emotion and gain good habits,
- To prepare children for primary education,
- To create a common growing environment for children from unfavorable environments and families,
- To enable children to speak Turkish correctly and well.

The preschool education in Turkey has the lowest enrollment rate in Turkish National Education System. Taner Derman and Başal (2010) stated that enrollment rate in preschool education could not reach a sufficient level neither quantitatively nor qualitatively. Nevertheless, the increase in schooling rates requires studies on quality in education such as the curriculum development and learning theories (Deretarla Gül, 2008). Albrecht and Miller (2004) claims that curriculums which support the development, growth and learning of children at pre-school age are very crucial. In today's conditions, the changing and increasing needs of preschool education and an effective education curriculum in this context (Spodek and Saracho, 2003). Studies on curriculums are of great importance in order to create effective curriculums. Thus, the aim of this study is to descriptively examine the theses on curriculum studies in pre-school education.

Analyzing theses conducted on a field can give information about the depth and prevalence of that topic and reveal the general view of the area studied (Karadağ, 2009). Also, the assessment of literature in a certain field for some periods not only gives information about the trends of the studies, but also cast light on the subsequent research (Erdem, 2011). When literature was reviewed, it was seen that there were several studies on research trends in different fields. Gül and Sözbilir (2015) examined research trends in Biology education by content analysis of national and international journals; Zainuddin and Halili (2016) analyzed articles on flipped classroom learning; Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) examined

subject and research method trends in educational technology field; Krull and Duart (2017) studied on research trends in mobile learning in higher education; Lin, Lin, Potvin and Tsai (2019) analyzed research articles published in science education journals; Jung and Won (2018) conducted systematic and thematic review in robotics education; Bozkurt and the others (2015) explored the current trends in the field of distance education research.

It is important to aim at contributing to the literature with a view to guiding graduate students and their advisors. This study intends to reveal the tendency in the literature regarding curriculum studies in preschool education and on which issues there are deficiencies. Thus, this research will help postgraduate students who will conduct a thesis on curriculum study in preschool education to determine the subject.

Method

Research design

The study was conducted through document analysis, one of qualitative research methods. At document analysis method, researchers focus on documents related to the topics on which they study (Yıldırım and Şimşek, 2004). Hence, the theses published in YÖKTEZ database were analyzed in the research. Curriculum studies in the field of pre-school education are limited to the keywords "pre-school education" and "curriculum" in the YÖKTEZ database. A total of 105 theses were reached; however, three of the theses reached were excluded from the research because they did not fit the scope of the research.

Data collection tool

"Article Classification Form" developed by Sözbilir and Kutu (2008) was revised by two experts in Curriculum and Instruction to be used for the thesis review to collect the data in the theses in question. There are five sections in the form; thesis identification, research design/method, data collection tools, sampling, and data analysis methods.

Data analysis

Collected data were analyzed by both researchers independently using descriptive analysis technique, and a third expert's opinion was sought for inconsistencies between findings. Descriptive analysis is a type of qualitative data analysis that includes summarizing and interpreting data obtained by various data collection techniques according to predetermined themes (Yıldırım and Şimşek, 2004). The analyzed data were also described by giving their frequency distributions (f) and percentage values (%) (Balcı, 2015).

Results

In order to determine the research trends in the field, a total of 102 theses in the "YÖKTEZ" database were subjected to the descriptive analysis. The frequency and percentage values for each analysis are given in the tables.

The completion years of the theses are given in Table 1.

Year	f	%	Year	f	%
2003	1	1.0	2013	4	3.9
2004	1	1.0	2014	9	8.8
2005	1	1.0	2015	13	12.7
2007	1	1.0	2016	9	8.8
2009	4	3.9	2017	10	9.8
2010	2	2.0	2018	13	12.7
2011	1	1.0	2019	16	15.7
2012	4	3.9	2020	13	12.7
Total	102	100			

Table 1. The year the theses were completed

When Table 1 is examined, the number of the theses related to the curriculum studies in pre-school education are increasing over years (2003 [f=1], 2004 [f=1], 2005 [f=1], 2007 [f=1], 2009 [f=4], 2010 [f=2], 2011 [f=1], 2012 [f=4], 2013 [f=4], 2014 [f=9], 2015 [f=13], 2016 [f=9], 2017 [f=10], 2018 [f=13], 2019 [f=16], 2020 [f=13]). It can be interpreted that the increase of the numbers of graduate programs and academicians studying on pre-school education was effective in the increase of the number of the theses.

Table 2 shows the degrees of the graduate programs in which the theses were carried out.

Table 2. Degree of theses

Degree	f	%
Master's degree	58	56.9
Doctorate degree	44	43.1
Total	102	100.0

When Table 2 is examined, it is seen that theses related to program in pre-school education are included in master (f=58) and doctorate (f=48) degrees.

In Table 3, the types of graduate programs in which the said theses are carried out are given.

Category	f	%	Category	f	%
Pre-School Education	37	36.3	Elementary School Teaching	1	1.0
Early Childhood Education	24	23.5	Higher Education Studies	1	1.0
Child Development and Education	11	10.8	Mentally Handicapped	1	1.0
Curriculum and Instruction	10	9.8	Family and Consumer Units	1	1.0
Educational Sciences	3	2.9	Special Education	1	1.0
Music Education	2	2.0	Guidance and Psychological Counseling	1	1.0
Visually Impaired Education	2	2.0	Psychology	1	1.0
Educational Technology	1	1.0	Religious Education	1	1.0
Interdisciplinary Disability Studies	1	1.0	Psychological Services In Education	1	1.0
Measurement and Evaluation	1	1.0	Science Education	1	1.0
Total	102	100			

 Table 3. Graduate programs

When Table 3 is examined, it is seen that theses in preschool education are mostly included in Preschool Education (f=37) and Early Childhood Education (f=24) among 20 different disciplines. The other notable programs in the table are Child Development and Education (f=11) and Curriculum and Instruction (f=10).

Findings about the topics of the theses are given in Table 4.

Table 4. Topics of the theses

Topics of the theses	f	%
Effect of a curriculum on dependent variables	63	61.8
General evaluation of a curriculum	16	15.7
Evaluation of an element of curriculum	14	13.7
Curriculum development	7	6.9
Development and evaluation of a curriculum	2	1.96
Total	102	100.0

When Table 4 is examined, it is seen that the subject of the theses related to studies in preschool education is mostly to examine the effect of a curriculum on dependent variables (f=63). Other topics of the theses are general evaluation of a curriculum (f=16), evaluation of an element of curriculum (f=14), curriculum development (f=7) and evaluation of the developed curriculum (f = 2).

Findings about the models used in the theses are given in Table 5.

Models	f
No model used	99
CIPP	2
ADDIE	1
Total	102

Table 5. Development or evaluation models used in theses

When Table 5 is examined, it is seen that CIPP (Context, Input, Process, Product Evaluation Model), a curriculum evaluation model, is used in two theses, and ADDIE (Analysis, Design, Development, Implementation, and Evaluation Model), an instructional design model, is used in one thesis. Studies on the use of curriculum models are mostly carried out by researchers in the field of Curriculum and Instruction. Therefore, as stated in Table 3, it can be interpreted that the use of models is parallel to the fact that the theses related to curriculum studies in preschool education were performed very little in the Program of Curriculum and Instruction.

Findings about the patterns and methods used in the theses are given in Table 6.

Pattern			Method	f	%
			True experimental	22	21.6
		Experimental	Quasi experimental	28	27.5
			Poor experimental	2	2.0
	Quantitative		Subtotal	52	51.0
			Descriptive survey	19	18.6
		Non-experimental	correlational survey	4	3.9
			Subtotal	23	22.5
	Qualitative Interactive	Interactive	Phenomenology	4	3.9
			Case Study	5	4.9
			Action research	1	1.0
		Subtotal	10	9.8	
			Explanatory	3	2.9
	Mixed		Exploratory	2	2.0
			Triangulation	10	9.8
			Subtotal	15	14.7
			Total	102	100

Table 6. Pattern/method of the theses

When Table 6 is examined, it is found that 52 theses about curriculum studies in preschool education were designed with experimental design, 23 theses were designed with a quantitative non-experimental design, 10 theses were designed with qualitative design and 15

theses were designed with mixed design. When Table 4 is examined, the abundance of studies on the effect of a curriculum on dependent variables comes to the fore; therefore, it can be interpreted that impact studies were mostly carried out with experimental studies.

Findings about the study groups in which the studies were carried out in the theses are given in Table 7.

Study groups	f	%
Kindergarten (48-66)	61	51.69
Teachers	29	24.57
Parents	8	6.77
Kindergarten (36-66)	6	5.08
Undergraduate students	6	5.08
Instructors	3	2.54
Documents	2	1.69
Administers	2	1.69
Graduate students	1	.84
Total	118	100.0

Table 7. Study groups of the theses

When Table 7 is examined, the study groups of the theses consisted of kindergarten students (f=61), preschool teachers (f=29), parents (f=8), kindergarten students (f=6), undergraduate students (f=6), instructors (f=3), documents (f=2), administrators (f=2) and graduate students (f=1). The number of theses whose study groups consisted of kindergarten students before 48 month was too low, whose reason might be the challenges to collect data from the students at that age and to get required permissions from the educational institutions and parents.

The sample sizes of the theses were, also, examined. Histogram chart related to sample sizes is given in Figure 1.





When Figure 1 is examined, it is seen that the average of the sample sizes is 98.1. It is seen that the use of experimental research in most of the theses causes the sample sizes not to be very high.

Findings about data collection tools in theses are given in Table 8.

Data collection tools	f	%
Scale	58	36.02
Attitude/perception/personality/ability tests	32	19.87
Interview	24	14.9
Observation	18	11.18
Questionnaire	14	8.69
Documents	7	4.34
Alternative assessment tools	6	3.72
Achievement test	2	1.24
Total	161	100.0

When Table 8 is examined, scales (f=58), attitude/perception/personality/ability tests (f=32), interviews (f=24), observations (f=18), questionnaires (f=14), documents (f=7), alternative assessment tools (f=6) and achievement tests (f=2) are used.

Findings about the analysis technique types of the data collected in the theses are given in Table 9.

Data	Analysis technique	f	%
	Non-parametric test	52	34.44
	T-test	32	21.19
	ANOVA	23	15.23
	Correlation	9	5.96
Quantitative	ANCOVA	3	1.99
	Regression	1	.66
	MANOVA	1	.66
	Subtotal	121	80.13
	Content analysis	17	11.25
Qualitative	Descriptive analysis	13	8.61
	Subtotal	30	19.86
	Total	151	99.99

Table 9. Data analysis techniques of the theses

When Table 9 is examined, it was found that non-parametric tests in 52 theses, t-test in 32 theses, ANOVA in 23 theses, content analysis in 17 theses, descriptive analysis in 13 theses, correlation analysis in 9 theses, ANCOVA in 3 theses, regression analysis in 1 thesis and MANOVA in 1 thesis were used. When Figure 1 is examined, it can be interpreted that the sample sizes are not high due to experimental studies, which is one of the reasons why normality cannot be achieved in the data.

Discussion, Conclusion and Suggestions

It was concluded from the research that the number of theses on pre-school education is increasing over the years. The reason of the increase is interpreted that the numbers of graduate programs and academicians studying on pre-school education was effective in the increase of the number of the theses. Nevertheless, Abazaoğu, Yıldırım and Yıldızhan (2015) stated that the number of academicians studying on pre-school education was inadequate. Dissimilarly from this conclusion, Altın (2004) thought that there had been an increase in the number of theses related to the field of Curriculum and Instruction in recent years compared to the previous years, it was determined that there was a noticeable decrease.

The theses related to curriculum studies in pre-school education are included at close scores in the master's and doctorate degrees. Also, Bıkmaz, Aksoy, Tatar and Atak-Altınyüzük, (2010) stated that the number of doctoral theses produced in the field of curriculum development had increased exponentially in the examinations made in ten-year periods.

Curriculum studies in preschool education are mostly included in Preschool Education Program and Preschool Teaching Program among 20 different programs.

The study groups of most theses were determined by kindergarten students (48-66 month) whose data were collected mostly by quantitative methods; however, the number of theses whose study groups consisted of kindergarten students before 48 month was too low, whose reason might be the challenges to collect data from the students at that age and to get required permissions from the educational institutions and parents. In educational researches, Göktaş, Hasançebi, Varışoğlu, Akçay, Bayrak, Baran and Sözbilir (2012) determined that study groups mostly consisted of undergraduate students or teachers; and Saracaloğlu and Dursun (2010) suggested that students at primary level and teachers were mostly preferred while Şimşek and the others (2008), Alper and Gülbahar (2009), Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) and Lin, Lin, Potvin and Tsai (2019) concluded that study groups mostly consisted of undergraduate students were mostly studied and that the sample size mostly varied between 31-100 and 100-300. Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) reported that the most common sample size was 31–100.

The subject of the theses related to curriculum studies in preschool education is mostly to examine the effect of a curriculum on any dependent variable. Thus, most of theses on curriculum studies in preschool education were designed with experimental design. Similarly, Karadağ (2009) found that the most preferred model in doctoral theses in the field of Educational Sciences was the experimental research model while Gül and Sözbilir (2015) stated that quantitative research was mostly preferred. Also, Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) stated that the most commonly used research methods were quantitative, qualitative, other (review or meta-analysis), and mixed method, in that order. However, Altın (2004), Arık and Türkmen (2009), Saracaloğlu and Dursun (2010) and Erdem (2011) stated that descriptive methods were widely used in research related to educational research. Also, Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) stated that content analysis was employed most in qualitative studies.

In this study, it was found that the use of experimental research in most theses causes the sample sizes not to be very high. So it can be stated that the sample sizes not being high due to experimental studies is one of the reasons why normality cannot be achieved in the data. Hence, most of the theses use non-parametric tests. In addition, Arık and Türkmen (2009) found that t-test and variance analysis were used at 58% level as data analysis techniques. Göktaş, Hasançebi, Belgeoğlu, Akçay, Bayrak, Baran and Sözbilir (2012) stated that quantitative data analysis techniques were used, Saracaloğlu and Dursun (2010) used descriptive statistical techniques such as central distribution and variability measures in quantitative data analysis, whereas in qualitative data analysis. It was concluded that scales were mostly used as data collection tools in the theses. Saracaloğlu and Dursun (2010) determined that the data was collected mostly by study tools such as questionnaire, achievement test, personal information form, attitude scale, pre-test, and post-test. Göktaş, Hasançebi, Belgeoğlu, Akçay, Bayrak, Baran

and Sözbilir (2012) and Şimşek and the others (2008) suggested that questionnaire/scale was generally applied in the research . Similarly, Alper and Gülbahar (2009) found that scales, success tests and questionnaires were mostly used. Gül and Sözbilir (2015) concluded that achievement tests, questionnaires and attitude scales were commonly used while frequency/percentage tables, central tendency measures, t-tests and ANOVA/ANCOVA analyses were used commonly used as data analysis techniques. Baydaş, Küçük, Yılmaz, Aydemir and Göktaş (2015) reported that researchers tended to use questionnaires, documents, and interviews as data collection tools.

Models were rarely used in theses on curriculum studies in preschool education. Curriculum development models were not used at all. However, curriculum development models are generally very useful for research in explaining how to decide on the desired goals that the learner will reach, with which content and how to reach them, how to evaluate and develop the process (Cinoğlu, 2017). Also, curriculum evaluation models are rarely included in the theses. Regular evaluation of early childhood education programs ensures that the program meets its features such as goals, variables, suitability, whether it meets the conceptual and technically expected results and, in addition, to see the desired and undesirable outcomes. Curriculums are evaluated using scientifically valid methods, guided by logical models, according to their medium and long-term effects on children, communities and families. (NAEYC, 2003). As it is important to design and implement curriculums well, it is also important to evaluate the curriculum with appropriate methods and reflect the evaluation results to the curriculum. Questioning and evaluating the effectiveness of the curriculum is the starting point for curriculum development (Özdaş, Tanışlı, Köse and Kılıç, 2005). Curriculum evaluation models show what quality of evaluation educational institutions will conduct and what processes they should follow (Oliva and Gordon, 2018).

From the conclusions of the study, some suggestions can be made as given below:

- Curriculum evaluation and development models should be applied to accomplish more featured theses.
- The number of the participants in experimental research should be increased so that parametric tests can be realized as normality may be assured.
- Qualitative methods can be taken advantages so that in-depth analysis can be realized.
- The number of curriculum studies on early childhood education of children before 48 months should be increased.

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International Journal of Educational Studies and Policy (IJESP)

Volume: 2, Issue: 2, November 2021

Belongingness and Positivity: The Mediation Role of Problem Fields Among University Students

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ABSTRACT

While university students are fulfilling their developmental tasks, they can both possess academic and professional gains and face some problems. In the current paper, an evaluation based on problem fields of university students was carried out. The main aim of the present study was to explore the mediation roles of problem fields in the association between belongingness and positivity among university students. The study group was composed of 330 university students. The General Belongingness Scale, Problem Fields Scale, and Positivity Scale were used as measures. Pearson product-moment correlation and mediation analysis (Process Macro, Model 4) were applied as well as descriptive analysis to obtain statistical outcomes. Correlational analysis revealed that belongingness and positivity were associated with problems with family structure, problems with body image, problems with social competence, and problems with academic life. Additionally, there was significant association between belongingness and positivity. According to the results of mediation analysis, the indirect effect of belongingness on positivity through problem fields (problems with family structure, problems with body image, problems with social competence, and problems with academic life) was significant. All problem fields partially mediated the association between belongingness and positivity. It was concluded that belongingness and problem fields of university students may have possible contribution to the maintenance of the positivity. Research findings would provide empirical evidence to the positivity literature, particularly, in terms of problem fields among university students.

Keywords: Belongingness, problem fields, positivity, university students

Article History: Received 01.06.2021

Accepted 18.10.2021

Cite as: Çıkrıkçı, Ö. & Çıkrıkçı, N. (2021). Belongingness and positivity: The mediation role of problem fields among university students. *International Journal of Educational Studies and Policy*, *2*(2), 15-29.

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Introduction

Assumptions about what the determinants of psychological well-being were the focus of positive psychology (Seligman and Csikszentmihalyi, 2000). Different propositions were asserted regarding the structures that can explain well-being phenomenon (Caprara et al., 2012). It was known through relevant research on life satisfaction, self-esteem and optimism that these were important variables for explaining well-being (Carver and Scheier, 2002; Diener, Emmons, Larsen, and Griffin, 1985; Rosenberg, 1965). It can be thought that well-being, which can contribute to the cognitions positively, may be related to emotions and behaviours. Developing optimism, strengthening gratitude, and redefining life goals were among positive psychology interventions (Bolier et al., 2013; Huffman et al., 2014; Lyubomirsky and Layous, 2013). Being positive can be accepted as a driving force for individuals to reveal their worldview, mental energies, relationships and potentials (Fredrickson, 2001). The positivity dimension that strengthens the individual in the well-being phenomenon can play a role in determining the factors affecting the empowerment of individuals (Caprara et al., 2012). Positive psychology studies conducted in this focus have a preventive role with the effect of protecting individuals from possible problems (Peterson, 2000).

In recent years, research and field practices in the field of mental health have focused on preventive studies. Individuals exposed to developmental characteristics and similar environmental stimuli can be expected to have similar problem fields. University students identified as the research group in the present study may experience difficulties in many areas due to individual and environmental factors as well as developmental characteristics (Kacur and Atak, 2011). These individuals, who are in the process of preparing for adulthood, need to take on the responsibilities of an independent life when they start university. In addition to being equipped with the competencies of the chosen profession, individuals face a small representation of adult life. With the effect of individual and environmental factors, it may be possible to talk about the existence of problems that have not been encountered before. It can be assumed that the problem fields may vary in relation to the cultural aspects and time period. Studies on the main problem fields that university students may encounter included variables such as economic problems (Bojuwoye, 2002), academic difficulties (Hong and Wengboey, 2002), anxiety (Koç, Avşaroğlu, and Sezer, 2004; Erkan, Özbay, Çankaya and Terzi, 2012).

While examining the developmental characteristics among university students, information about the adolescence period may be used. From a biological perspective, adolescence can be considered as a normal process in growth dynamics (Nixon, 1961). Psychoanalytic advocates considered adolescence as the second oedipal period and emphasized the development of sexual tendencies (Freud, 1953). Developmental theorists, who define adolescence as one of the life-long processes, stated that the critical task in this period is the adolescent's effort to form an identity (Erikson, 1968). Finally, ecological theorists, who draw attention to the harmony between the individual and the environment during adolescence, assessed the relationship of the adolescent with the environment and the importance of future expectations (Pardeck, 1988). In light of the information presented by different theoretical assumptions, areas related to the problem fields of university students can be listed. Although the biological changes experienced were considered normal, examining how this change is perceived by the individual and its effect on their mental structure referred to the problem field in relation with body image.

University life can indeed be a period in which independent life is partially experienced. Determining the problems with family structure among university students, who are trying to create an identity, is crucial for them. The existence of unresolved problems with the family in the

past or the differentiation of expectations can be a problem field that needs a solution for university students. Additionally, it may be possible to state the existence of academic problems in this period when professional development and career-oriented plans mature together. Furthermore, in this period when associations with the environment develop, individuals are expected to establish relationships in different social roles. For university students, their ability to relate to their social environment can be considered as a problem field.

It was very important for individuals to feel valuable in an environment that is appropriate for their own self (Hagerty, Lynch-Sauer, Patusky, Bouwsema, and Collier, 1992). The individuals' perception of themselves as a part of the environment can be explained by the concept of belonging (Levett-Jones, Lathlean, Maguire, and McMillan, 2007). sense of belonging referred to sharing the close environment in a positive and satisfactory association beyond just establishing a social bond (Maslow, 1970). sense of belonging was also related to the effect of the nature of this relationship on the existence of the individual, rather than whether a relationship with others can be established. Belonging represented the individuals' seeing themselves as a part of the environment in social environment. Therefore, the existence of a positive attitude towards support mechanisms can be expressed (Goodenow, 1993). Belonging was a psychological factor that keeps the individuals away from exclusion, enables them to survive and be productive, and was a concept at the centre of human existence and culture (Baumeister and Leary, 1995). The sense of belonging basically had a protective effect on loneliness and social isolation (Ferguson, 2010). Thus, it can be stated that belonging has the potential to protect individuals from factors that may adversely affect psychological health. In processes such as depression, suicide, anxiety, and substance use etc., the sense of belonging can be considered as a protective quality for university students.

After the general presentation of the concepts included in the current research, this section presented the theoretical framework. The Broaden-and-Build Theory was developed as a result of a series of experimental studies reporting that students' perceptions of positivity offer adaptive results as a result of significant social support (Fredrickson, 2003). This theory reveals that positive emotions and orientations expand individuals' focus and thought patterns (Fredrickson, 2001; Kahn and Isen, 1993). It was reported that positive emotion experiences will help students to face anxiety-filled problems and create psychological and social resources that can help them cope with them successfully (Fredrickson, 2003). As stated in the theory, the concept of social resource, which was associated with positivity, could be in relation with the sense of belonging. Combining the Broaden-and-Build theory with a systems approach to understand the dynamics of complex emotions, Fredrickson and Losada (2005) stated that the prosperity of individuals can be represented by positivity. Clarifying the mediation role of problem fields in the association between belongingness and positivity indicates the originality and novelty of the current research. The present study was the initial effort to quantitatively explore the relationships among belongingness, problem fields, and positivity among university students. Additionally, this study was the first to examine an indirect association between belongingness and positivity through problem fields among university students. It was assumed that the current practice would have significant contribution to the relevant literature with regard to the role of belongingness in accounting for the positivity through problem fields among university students. To achieve research aims, the associations among belongingness, problem fields of university students, and positivity were explored by testing the mediation effects of problem fields.

Method

Research Model

This cross-sectional study was conducted based on correlational research design. Correlational research focuses on the associations among two or more variables. It is well known that human behaviors were handled in accordance with several identifications. In identification process, researchers would use the term of variables. Therefore, the further explanations and assessment would be applicable by variables. In correlational design, the predictors of human behaviors and cognitions would be explored by investigating associations among variables (Creswell, 2014).

Study Group

The study group consisted of 330 university students (Mage = 20.02 years, SD = 1.71 years) in Turkey, of which 254 (77%) were females and 76 (23%) were males. Based on grade level, it was determined that 100 students (30.3%) were freshman, 110 students (33.3%) were sophomore, 64 students (19.4%) were junior, and 56 students (17%) were senior.

Measures

The Positivity Scale (PS): The PS was developed by Caprara et al. (2012). PS consisted of 8 items. The PS was a self-report-based 5-point Likert type measure (1 =Strongly disagree,...5 = Strongly agree). Example item: "I look forward to the future with hope and enthusiasm". The adaptation study into Turkish was conducted with Çıkrıkçı, Çiftçi, and Gençdoğan (2015). The PS had a single factor and revealed satisfactory internal consistency coefficients (Cronbach's Alpha = .73). Within the present study, the internal consistency coefficients were found as .80.

Problem Field Scale (PFS): PFS was developed by Çıkrıkçı and Düzgün (2013) to determined problem fields among university students. The PFS consisted of 24 items. The PFS was a self-report-based 7-point Likert type measure (0 = Not reflect me at all, ..., 6 = Completely reflect me at all). Example item: "I think people judge me based on my appearance". The PFS revealed four-factor structure (problems with family structure, problems with body image, problems with social competence, and problems with academic life). The internal consistency coefficient of whole measure was found as to be .70. In present study, the internal consistency coefficients of problems with family structure, problems with social competence, problems with academic life sub-factors were .79, .83, .70, and .78, respectively.

General Belongingness Scale (GBS): GBS was developed by Malone, Pillow and Osman (2012). The GBS consisted of 12 items. The GBS was a self-report-based 5-point Likert type measure (1 = Strongly disagree, ..., 5 = Strongly agree). Example item: "I have close bonds with family and friends". The adaptation study into Turkish was conducted with Çıkrıkçı (2015). The GBS had two sub-factors and revealed satisfactory internal consistency coefficients (Cronbach's Alpha = .86). Within the present study, the internal consistency coefficients were found as .88.

Data Analyses

Several procedures were adopted in data analysis. At first, missing value analysis, outlier analysis, normal distribution, and linear analysis were performed (Field, 2013). Secondly, descriptive statistics were examined based on mean differences for measures. Thirdly, the associations among study variables were assessed via Pearson Product of Moments Correlation Coefficient technique. Finally, the mediation model (Model 4) was tested using Process macro (Hayes, 2018). Age and gender were included in all mediation analysis as covariate variables. The

direct and indirect effect of general belongingness on positivity were analysed based on biascorrected bootstrapping (N = 5000).

Ethical Consideration and Procedure

The current research was conducted in line with the necessary ethical procedures. Mainly, ethical rules of American Educational Research Association (2011) and American Psychological Association (2020) were adopted. Voluntary participation was provided. Data were collected from university students. While collecting data, participants were informed about the research and their rights. No descriptive information (name, surname etc.) was requested from the participants. Privacy, reputation, and participants' rights were taken into consideration. The researchers provided information to the participants that they could withdraw from the study at any stage without giving any reason. The authors analysed the data and reported them depending upon the principle of the transparency. Consequently, the authors attempted to reveal a qualified and responsible publication. Data were collected from pen-and-paper questionnaire. All questionnaires were filled out in classroom settings. Data collection process for each class took approximately 15 minutes.

Results

Sample Characteristics

The descriptive statistics of study variables (belongingness, problems with family structure, problems with body image, problems with social competence, problems with academic life, and positivity) based on gender and grade were presented in Table 1. For belongingness, there was significant difference between female (M = 69.74, SD = 10.33) and male (M = 64.32, SD =11.47) mean scores (t (318) = 3.68, p <.001; 95%CI [2.40, 7.90]). Additionally, it was determined that the mean score of belongingness did not differ based on grade ($F_{(3,308)} = .77, p > .05$). There revealed a significant difference between female (M = 7.53, SD = 6.01) and male (M = 9.97, SD =5.99) mean scores of problems with family structure ($t_{(318)} = -3.07, p < .01; 95\%$ CI [-3.99, -.87]). The mean score of problems with family structure did not differ based on grade ($F_{(3, 308)} = .13, p$ > .05). It was found that there was no significant difference between female (M = 7.61, SD = 6.19) and male (M = 8.62, SD = 6.98) mean scores of problems with body image ($t_{(318)} = 1.20$, p > .05). In addition, the mean score of problems with body image did not differ based on grade ($F_{(3,308)} =$ 2.01, p > .05). As for problems with social competence, significant difference between female (M = 11.26, SD = 6.67) and male (M = 12.26, SD = 7.17) means was not found ($t_{(318)} = 1.11$, p > .05). The mean score of problems with social competence did not differ based on grade ($F_{(3, 308)} = .62$, p > .05). For problems with academic life, there was a significant difference between female (M =17.43, SD = 8.50) and male (M = 20.68, SD = 8.15) mean scores ($t_{(318)} = -2.91$, p < .01; 95% CI [-5.43, -1.05]). Furthermore, the mean score of problems with academic life differed based on grade $(F_{(3,308)} = 13.38, p < .001)$. The fact that the mean score of the sophomore (M = 20.73, SD = 8.78)and junior (M = 20.98, SD = 8.28) students was higher than the mean score of the freshman (M =15.83, SD = 7.35) and senior (M = 13.80, SD = 7.15) students can be considered as the source of the difference. Finally, for positivity, there was a significant difference between female (M = 29.35, SD = 5.01) and male (M = 27.70, SD = 6.08) mean scores ($t_{(318)} = 2.31$, p < .05; 95% CI [.28, 3.01]). It was also found that the mean scores of positivity differed based on grade ($F_{(3, 308)} = 2.78, p < 10^{-10}$.05). The fact that the mean score of the freshman (M = 28.57, SD = 4.73) and sophomore (M =28.00, SD = 5.82) students was lower than the mean score of the senior (M = 30.64, SD = 5.05) can be assessed as the source of the difference.

Gender					_	
	Female $(n = 254)$ Male $(n = 76)$		t	р		
	Mear	n (SD)	Mean	(SD)		
GB	69.47	(10.33)	64.32 (11.47)	3.68	<.001
FS_p	7.53	(6.01)	9.97 (:	5.99)	3.07	<.01
BI_p	7.61	(6.19)	8.62 (6.98)	1.20	>.05
SC_p	11.26	(6.67)	12.26 ((7.17)	1.11	>.05
AL_p	17.43	(8.50)	20.68 ((8.15)	2.91	<.01
POS	29.35	(5.01)	27.70 ((6.08)	2.37	<.05
Grade Level						
	Freshman	Sophomore	Junior	Senior	F	n
	(n = 100)	(n = 110)	(n = 64)	(n = 56)	1	Р
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
GB	67.78 (11.16)	67.38 (11.14)	69.82 (11.20)	68.88 (9.07)	.77	>.05
FS_p	8.19 (6.01)	8.21 (6.35)	7.65 (5.74)	8.02 (6.01)	.13	>.05
BI_p	8.76 (6.80)	7.47 (6.09)	8.35 (6.33)	6.13 (6.12)	2.01	>.05
SC_p	11.48 (6.48)	10.94 (6.62)	12.39 (6.82)	11.64 (7.37)	.62	>.05
AL_p	15.83 (7.35)	20.73 (8.78)	20.98 (8.28)	13.80 (7.15)	13.38	<.001
POS	28.57 (4.73)	29.44 (5.18)	28.00 (5.82)	30.64 (5.05)	2.78	<.05

Table 1. Descriptive statistics for study variables

Note: GB = General Belongingness, FS_p = Problems with family structure, BI_p = Problems with body image, SC_p = Problems with social competence, AL_p = Problems with academic life, POS = Positivity. Confidence intervals generated by means of bias corrected and bootstrapping (N = 5000).

Preliminary Analysis

To assess the associations among belongingness, problem fields (with family structure, body image, social competence, and academic life), and positivity, zero-order correlations were examined (Table 2). According to results of the correlation analysis, belongingness was associated with problems with family structure (r = -.35, p < .01; %95 CI [-.45, -.25]), problems with body image (r = -.32, p < .01; %95 CI [-.42, -.21]), problems with social competence (r = -.45, p < .01; %95 CI [-.53, -.37]), and problems with academic life (r = -.33, p < .01; %95 CI [-.43, -.23]). There was positive significant association between belongingness and positivity (r = .45, p < .01; %95 CI [.35, .54]). Consequently, it was determined that positivity was associated with problems with family structure (r = -.30, p < .01; %95 CI [-.41, -.19]), problems with body image (r = -.39, p < .01; %95 CI [-.48, -.29]), problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with social competence (r = -.42, p < .01; %95 CI [-.51, -.32]), and problems with academic life (r = -.36, p < .01; %95 CI [-.46, -.26]).

Variables	Mean	SD	1	2	3	4	5	6
(1)GB	60.82	10.81	1					
(2)FS_p	8.10	6.08	35**	1				
(3)BI_p	7.85	6.39	32**	.38**	1			
(4)SC_p	11.50	6.79	45**	$.20^{**}$.35**	1		
(5)AL_p	18.19	8.52	33**	.32**	.36**	.29**	1	
(6)POS	28.96	5.31	.45**	30**	39**	42**	36**	1

Table 2. Descriptive statistics for study variables

Note: **p < .01; GB = General Belongingness, FS_p = Problems with family structure, BI_p = Problems with body image, SC_p = Problems with social competence, AL_p = Problems with academic life, POS = Positivity. Confidence intervals generated by means of bias corrected and bootstrapping (N = 5000).

Mediation analysis

In the present study, the mediation role of problem fields of university students in the association between belongingness and positivity was examined. The recommended procedures by Hayes (2018) were applied to perform mediation analysis. Mediation analysis was conducted with the Process Macro (Model 4) application. Due to the fact that problem fields of university students were assessed in four dimensions, four different mediation analysis were tested and reported (Table 3). Age and gender included in all mediation analysis as covariate.

The mediation analysis was started with the examination of the mediation role of problems with family structure in the association between belongingness and positivity. According to the standardized regression coefficients, the direct effect of belongingness on problems with family structure ($\beta = -.34$, p < .001; 95% CI [-.25, -.13], path a1) and positivity ($\beta = .44$, p < .001; 95% CI [.16, .26], path c1) was significant. The total effect of problems with family structure on positivity was significant ($\beta = -.16$, p < .001; 95% CI [-.23, -.05], path b1). When the mediation variable (problems with family structure) was included in the model, the direct effect of belongingness on positivity was decreased ($\beta = .38$, p < .001; 95% CI [.13, .24], path c11). This finding revealed that the association between belongingness and positivity was partially mediated by problems with family structure. The indirect effect of belongingness on positivity through problems with family structure was significant ($\beta = .05$, SE = .02; 95% CI [.02, .10], ab1).

Secondly, the mediation role of problems with body image was explored. Results demonstrated that the total direct effect of belongingness on problems with body image ($\beta = -.33$, p < .001; 95% CI [-.25, -.13], path a2) and positivity ($\beta = .45$, p < .001; 95% CI [.17, .27], path c2) was significant. Problems with body image was associated with positivity ($\beta = -.27$, p < .001; 95% CI [-.31, -.14], path b2). When mediation variable (problems with body image) was included in the model, the direct effect of belongingness on positivity was decreased ($\beta = .36$, p < .001; 95% CI [.12, .22], path c21). According to this finding, problems with body image had a partially mediation role in the association between belongingness and positivity. The indirect effect of belongingness on positivity through problems with body image was significant ($\beta = .09$, SE = .02; 95% CI [.05, .13], ab2).

Mediation analysis continued with the mediation role of problems with social competence. Mediation analysis showed that the direct effect of belongingness on problems with social competence ($\beta = .45$, p < .001; 95% CI [-.35, -.22], path a3) and positivity ($\beta = .45$, p < .001; 95% CI [.17, .27], path c3) was significant. The total effect of problems with social competence on positivity was found to be significant ($\beta = -.26$, p < .001; 95% CI [-.29, -.12], path b3). When mediation variable (problems with social competence) was included in the model, the direct effect of belongingness on positivity was decreased ($\beta = .32$, p < .001; 95% CI [.10, .21], path c31). According to this finding, problems with social competence partially mediated the association between belongingness and positivity. The indirect effect of belongingness on positivity through problems with social competence was significant ($\beta = .12$, SE = .02; 95% CI [.06, .18], ab3).

	Predictors	POS	FS_p	POS
Mediation Model	1 Gender	04	.10*	02
$(GB \rightarrow FS_p \rightarrow POS)$	Age	.03	05	.02
	GB	.44***	34***	.38***
	FS_p			16***
	\mathbb{R}^2	.20	.14	.22
	F	27.32***	17.93***	23.41***
	Predictors	POS	BI_p	POS
Mediation Model	2 Gender	04	.01	04
$(GB \rightarrow BI_p \rightarrow POS)$	Age	.02	.08	.01
	GB	.45***	33***	.36***
	BI_p			27***
	\mathbb{R}^2	.21	.12	.28
	F	29.24***	14.79***	30.93***
	Predictors	POS	SC_p	POS
Mediation Model	3 Gender	04	01	04
$(GB \rightarrow SC_p \rightarrow POS)$	Age	.02	10*	01
	GB	.45***	45***	.32***
	SC_p			26***
	\mathbb{R}^2	.21	.22	.27
	F	29.24***	31.24***	29.56***
	Predictors	POS	AL_p	POS
Mediation Model 4	Gender	05	10	02
$(GB \rightarrow AL_p \rightarrow POS)$	Age	.03	05	.02
	GB	.44***	32***	.36***
	AL_p			23***
	\mathbb{R}^2	.21	.13	.25
	F	23.01***	16.52***	27.25***

Table 3. Standardized coefficients for mediation models

Note: **p < .01; GB = General Belongingness, FS_p = Problems with family structure, BI_p = Problems with body image, SC_p = Problems with social competence, AL_p = Problems with academic life, POS = Positivity. Confidence intervals generated by means of bias corrected and bootstrapping (N = 5000).

Finally, the mediation role of problems with academic life was investigated. The direct effect of belongingness on problems with academic life ($\beta = -.32$, p < .001; 95% CI [-.34, -.17], path a4) and positivity ($\beta = .44$, p < .001; 95% CI [.16, .27], path c4) was significant. Problems with academic life was associated with positivity ($\beta = -.23$, p < .001; 95% CI [-.21, -.08], path b4). When mediation variable (problems with academic life) was included in the model, the direct effect of belongingness on positivity was decreased ($\beta = .36$, p < .001; 95% CI [.12, .23], path c41). According to this finding, problems with social competence had a partially mediation role in the association between belongingness and positivity. The indirect effect of belongingness on positivity through problems with academic life was significant ($\beta = .07$, SE = .02; 95% CI [.03, .11], ab4). The path diagrams for all mediation analysis were presented in Figure 1.



Figure 1. Mediation models from GB to POS through problem fields Discussion, Conclusion and Suggestions

Contrary to the general psychopathological approach, positive psychology focuses on improving the competencies and potentials of individuals (Hefferon and Boniwell, 2014). It was stated that cognitive evaluations towards life can be positive as a result of multifaceted empowerment of individuals who do not have a mental disorder (Seligman and Csikszentmihalyi, 2000). these cognitive assessments are known to have positive effects on positive psychology variables such as well-being, happiness, and life satisfaction (Caprara et al., 2012). Positivity has been among the important constructs that have been discussed in recent years (Barbaranelli, Paciello, Biagioli, Fida, and Tramontano, 2019; Vazquez, 2017; Yıldırım and Güler, 2021), and this study aimed to explore possible predictors of positivity. Researching the mediating role of university students' problem fields in the association between belongingness and positivity added novelty to present study. The present paper was the first study to quantitatively investigate the associations among belongingness, problem fields, and positivity among university students. Additionally, this was the first attempt to explore the mediation role of problem fields in the association between belongingness.

Research findings showed that belongingness was directly related to positivity. In addition, it has been determined that belongingness was indirectly related to positivity through problems with family structure, problems with body image, problems with social competence, and problems with academic life. In other words, the association between belongingness and positivity was partially mediated by problems with family structure, problems with body image, problems with body image, problems with social competence, and problems with academic life. This finding showed that belongingness had an explanatory role on positivity together with the mediation variables (problem areas). Accordingly, an increase in the level of belongingness may lead a decrease in the problems experienced by university students. The reduction in problem fields can also contribute to the

development of positivity. Additionally, it can be stated that this study presented findings that support the Broaden-and-Build Theory (Fredrickson, 2001, 2013).

Before starting the discussion on mediation variable roles, the nature of the association between belongingness and positivity was focused. Human behaviors and motivations can be evaluated in line with social foundations (Cıkrıkçı, 2015). The need to belong was one of the factors that affect all personality processes (DeWall, Deckman, Pond, and Bonser, 2011). At the same time, belongingness had an explanatory role on the individual's cognitive evaluations and behaviors. The fact that the desire to belong to a group can positively affect the behaviors (Newman, Lohman, and Newman, 2007) can be given as an example of the cognitive processes used in the development and maintenance of belongingness. Meeting the need for belongingness regularly, adequately and satisfactorily was considered among the building blocks of physical, emotional, behavioral and spiritual well-being (Maslow, 1970). Cıkrıkcı and Gencdoğan (2020) reported the association of belongingness with life satisfaction, self-esteem and optimism, which were indicators of positive orientations. This finding supported the idea that belongingness can be effective on positive emotions and evaluations. It was suggested that the need to belong, which was also considered as an important need in the self-determination theory, can improve mental health and well-being (Baumeister and Leary 1995). It was known that belongingness can be classified based on different situations and experiences. For example, Arslan and Allen (2021) investigated the structures associated with school belongingness among adolescents in a longitudinal study and presented findings that school belonging can reduce emotional problems and increase psychological well-being. It may be assessed that belongingness can have positive effects on the individual. These positive effects can also contribute to the development of positive emotions. Diener and Lucas (2000) reported that high positive emotions and low negative emotions affect well-being. Similarly, Avey, Wernsing and Mhatre (2011) determined that positive emotions were associated with well-being in their study based on longitudinal design. Belongingness, which was considered as a basic motivator for developing positive relationships with other people (Baumeister and Leary, 1995), can lead an increase in the positivity through the processes it had and presented. In line with the theoretical and empirical findings, it can be stated that the development of general sense of belonging among university students may contribute significantly to positivity.

Another finding revealed in the research was that university students' problems have a mediation role in the association between belongingness and positivity. This finding can be interpreted as the perception of belonging can be evaluated as a factor that paves the way for the reduction of the problems experienced by university students. In other words, by strengthening the general sense of belonging of university students, their negative evaluations about the problems they experience can be reduced. The development of positivity can be shown as a possible positive outcome of this situation. Although university life offered rich new experiences, students sometimes stated that they experience various problems (Ceyhan and Ceyhan, 2011; Feist and Feist, 2006; İnanç, Savaş, Tutkun, Herken, and Savaş, 2004; Perrine and Lisle, 1995). In this study, PFS, which was used to determine the problems of university students sensitive to their developmental periods, focused on four basic problem fields. These problem fields included problems related to family life, body image, social competence and academic life. It was known that the problems experienced by university students can negatively affect their mood (Pedrelli, Nyer, Yeung, Zulauf, and Wilens, 2015; Yorgason, Linville, and Zitzman, 2008). It was considered that belongingness is a key structure in order to reduce the negative effects of the problems experienced. Because belongingness can make the individual strong and can prevent social

exclusion or isolation, which can be one of the possible consequences of the problems experienced (Hagerty et al., 1992). Thus, positive interaction with other people can be achieved and the problem can be solved or its negative impact can be reduced with new social support mechanisms. According to Çıkrıkçı and Gençdoğan (2020), belongingness was an important cognitive evaluation in terms of acceptance and approval of the individual in the environment. Realization of social acceptance can make the individual stronger and make it easier to deal effectively with the problems. According to Osterman (2000), individuals with a high sense of belongingness might evaluate themselves as more autonomous and competent. It was thought that these individuals, who were also developed in terms of intrinsic motivation, can deal with problems actively. An individual with a developed sense of belongingness can see themselves as a part of the social environment, independent of prejudices. It was reported that the psychological health of the individual may improve depending on the associations established with other people (Ernst and Cacioppo, 1999; Townsend and McWhirtter, 2005). It was stated that individuals who can establish social bonds and thus maintain their close relationships adaptively can cope with difficulties more effectively and their well-being and happiness levels may increase as a cumulative result of this process (Baumeister and Leary, 1995). As a result, it can be assumed that belongingness has an important role in coping effectively with the problems of university students. Positive emotions, which can penetrate the individual with the constructive effect, can both combat problems and improve positivity.

This study had some limitations. First of all, since the present study was a cross-sectional, the bi-directional association between the variables was evaluated and it was not possible to make a cause-effect assumptions between the variables. It was recommended that future studies should be designed in an experimental and longitudinal research design in order to determine the causal relationships between variables and to determine their time-based interactions. Secondly, convenience sampling method was used in the present study, and it was recommended to carry out further studies using different sampling methods in order to generalize the findings to the population. Third, the data used in the study were obtained from self-report measures. Conducting studies based on a qualitative research approach may enable a more comprehensive definition of the links between variables. As the fourth limitation, response bias can be expressed. Although participation in the study was voluntary, respondents may not have responded sincerely. Social desirability was another limitation that needs to be addressed. Some respondents may have rated the measures in a way that could be validated by others as inaccurate.

Increasing the well-being of individuals was the focus of mental health studies. This model, which was tested on university students, was recommended to be tested in different samples in future studies. Due to the emphasis, placed on ensuring the well-being of individuals, in the focus of positivity studies, it was recommended to test the positivity model in disadvantaged groups in society. Modelling positivity and determining its relations with different concepts is very important. It was recommended to investigate different psycho-social variables related to belongingness and positivity in future studies. Additionally, it was suggested that the associations identified in the present study should be assessed in the preparation of the contents of the experimental interventions carried out with the aim of improving positivity. It was also recommended to create loyalty development programs in institutions. Finally, it can be suggested to implement functional procedures in universities so that the problems of university students can be dealt with comprehensively, regularly and systematically.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at https://osf.io/p732r/ (doi: 10.17605/OSF.IO/P732R).

International Journal of Educational Studies and Policy (IJESP)

Volume: 2, Issue: 2, November 2021

The Role of Teacher Autonomy on Collective Teacher Efficacy

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ABSTRACT

The aim of the study is to examine the relationship between the perceptions of secondary education teachers about the autonomy levels and the collective teacher efficacy and to determine the role of the domains of teacher autonomy on collective teacher efficacy. This study designed in the relational screening model and was conducted with in-service secondary education teachers working at public schools sharing this is crucial in the province of Ankara in the 2019-2020 academic year. Data were collected using the Teacher Autonomy Scale and the Collective Teacher Efficacy Scale. The research findings showed that among the domains of teacher autonomy had the lowest average. In addition, it has been determined that collective teacher efficacy, it was seen that the highest predictor was professional communication autonomy, followed by professional development autonomy and teaching process autonomy, respectively. It was also determined that curriculum autonomy was not a significant predictor of collective teacher efficacy.

Keywords: Autonomy, teacher autonomy, efficacy, collective teacher efficacy.

Article History: Received 12.06.2021

Accepted 26.10.2021

Cite as: Koçak, S. & Arslan, S. Y. (2021). The role of teacher autonomy on collective teacher efficacy. *International Journal of Educational Studies and Policy*, *2*(2), 30-50.

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Introduction

Schools have a multidimensional position that is responsible for the academic, social, psychological, developments of students. The ability of teachers to carry out this multidimensional structure effectively seems to be considerably related to the concepts of collective power, cooperation, integrity, and synergy that they have established among themselves. As a matter of fact, Bandura (2003, p.851) emphasizes that in social institutions, individuals can achieve many things that they cannot do alone with a collective effort, and that desired outputs can only be achieved through interdependent efforts. Therefore, complex tasks such as ensuring school improvement and increasing the quality of education entail cooperation in order to provide coordination of individual teacher strategies (Schleicher, 2015; OECD, 2009, p.101). For this reason, teachers' integration of their individual competencies towards a common goal can be considered a prerequisite for the development and success of the students at school. This situation brings up the issue of how *collective teacher efficacy* (*CTE*) can be developed in schools.

CTE is a concept developed by Bandura (1997) who moved the concept of self-efficacy forward and it emphasizes the group-level collective ability rather than the individual. In this sense, it represents a teacher's belief in her/his ability to act together with all the teachers in the school. Therefore, it shows how much teachers believe in group-level success rather than their belief in individual success (Berebitsky and Salloum, 2017; Klassen, 2010). According to this point of view, CTE is related to the integration of individual efforts of all teachers, the emergence of a synergistic effect, and the level of teachers' belief in this power.

Teachers' beliefs about CTE are based on the systemic integrity of the group they are in, unlike the sum of their individual competencies (Goddard and Goddard, 2001). With this aspect, the concept focuses on the synergistic effect that the teachers can create on student success as a group, not as an individual (Berebitsky and Salloum, 2017; Ramos, Silva, Pontes, Fernandez and Nina, 2014). In addition, CTE emphasizes the collective power that tries to make a difference by increasing the school success of all students regardless of their social and family status (Parker, Hannah, and Topping, 2006; Schechter and Tschannen-Moran, 2006, p.481). Therefore, the concept indicates that an effective division of labor is very important but not sufficient; therefore, it also points to the importance of cooperation and coordination at school.

As seen, CTE is a concept related to teachers' ability to act in an organized way in increasing school success in social, academic, and all other fields (Goddard, Woolfolk-Hoy, and Hoy, 2004, p.4). It is based on the belief that teacher efforts should be integrated in order to increase student success (Goddard, Hoy, and Woolfolk-Hoy, 2000). As a matter of fact, a fair number of empirical and theoretical studies emphasize that CTE plays an important role in student success and creating effective learning environments (e.g., Abayomi, 2020; Bandura, 1993; Bozkurt, Çoban, Özdemir and Özdemir, 2021; Brinson and Steiner, 2007; Donoho, 2017; Donohoo and Katz, 2017; Eells, 2011; Hoogsteen, 2020; Tschannen-Moran and Barr, 2004). Moreover, it has been discussed as an important variable in ensuring equality among students and minimizing success gaps (Goddard, Skrla, and Salloum, 2017). In the reports prepared by international organizations, the relations between CTE and student success are also considered as an important issue (Elliot and Hollingsworth, 2020; Mulford, 2003; OECD, 2009). For this reason, the high-level positive beliefs of teachers towards CTE are of great importance in terms of student success.

The conducted studies indicate that CTE plays a role in other important school variables as well as student success. For example, studies focusing on the relationship between CTE and

school effectiveness reveal that CTE plays a developing role in school effectiveness (Uğurlu, Beycioğlu, and Abdurrezzak, 2018; Yüner and Özdemir, 2020). However, there are also studies in the literature indicating positive relationships between CTE and teachers' job satisfaction, morale levels, belongingness, and commitment (Buonomo, Fiorilli, and Benevene, 2020; Celik, Gören and Kahraman, 2018; Demir, 2019b; Skaalvik and Skaalvik, 2019; Vatou and Vatou, 2019). As a matter of fact, Donohoo (2017) states that in schools where the collective efficacy is high, teachers make more effort, are more enterprising in trying new teaching methods, and are more sensitive to the needs of disadvantaged students. In this respect, Brinson and Steiner (2007) state that CTE is effective in supporting disadvantaged students, improving parent-teacher relationships, and promoting school commitment. Again, Bellibaş, Karadağ, and Gümüş (2021) have found that there is a positive and significant relationship between CTE and teacher agency. One of the studies that discussed the subject from a different aspect observed that there was a negative relationship between the perception of collective efficacy and the intention to leave the school (Demir, 2019c). These positive effects of CTE on school effectiveness, student success, and positive organizational behavior variables make the work for the development of collective teacher efficacy in schools a fundamental issue in this respect. Verily, Chen and Bliese (2002) emphasize that CTE is important in terms of school development, and therefore it is necessary to investigate which methods and strategies can be used to develop it.

In the literature, certain methods and strategies have been recommended for the development of CTE, and some roles and responsibilities have been expected from school leaders. For example, Sharratt and Planche (2016) argue that for the development of collective efficacy, different views and perspectives should be evaluated, an environment of confidence should be established, the opinions of each teacher in the school should be taken into account, "Assessment-in-Action" should be used to develop the staff, and collaborative school culture should be created. In another study, it was determined that transformational leadership characteristics that support teachers' individual abilities, use cooperation and motivation practices, and foster creative ideas have a positive effect on CTE (Demir, 2019a). In other studies, it has been concluded that cooperation between teachers, supportive leadership practices that provide professional development, in sum, positive and supportive school climate and culture improve CTE (Bozkurt, Çoban, Özdemir and Özdemir, 2021; Cansoy and Parlar, 2018; Kurt, 2012; Skaalvik and Skaalvik, 2019; Özdemir, Demirkol, Erol, and Turhan, 2018). Considering the context of the school is also effective on CTE (Goddard and Skrla; 2006), the school leaders' efforts to create a positive context have gained more importance.

It carries great importance to develop teachers' self-efficacy perceptions for the composition of CTE. Arguably, the individuals' behaviors in the group they are in are affected by their self-efficacy perceptions (Bandura, 1999; Goddard, Hoy, and Hoy, 2004). For this reason, leadership behaviors have a great importance in the development of teachers' professional and personal self-efficacy beliefs within the school. The development of teachers' self-efficacy perceptions seems to depend on their receiving professional support, being empowered and providing them with motivational resources, as well as encouraging them to use initiative. Only in this way can individuals be expected to show voluntary, participatory, and cooperative behaviors at the group level. In other words, teachers' self-efficacy perception can be considered as one of the prerequisites of CTE. Empirical study findings also indicate that self-efficacy plays a positive role in CTE (Dimopoulou, 2014; Gürçay, Yılmaz and Ekici, 2009; Yılmaz and Turanlı, 2017; Zabrina Anyagre, 2017). Additionally, in a report published by OECD (2014), it was determined that teachers who have high self-efficacy show a higher tendency to engage in professional
collaboration. For this reason, it is thought that teacher autonomy, which is closely related to the development of teachers' self-efficacy, is significant. The starting point of this research was to see whether granting teachers autonomy and allowing them to use their own competencies autonomously have a developing effect on CTE. For this reason, the role of teacher autonomy on CTE has been found worthy of investigation.

Teacher autonomy is defined as the independent acting level of teachers in making decisions about educational activities, planning, and implementing them (Öztürk, 2012). In another definition, it is expressed as teachers' perceptions about the level of controlling certain domains of their professional lives (Short, 1992). On the other hand, Huang (2007) defines teacher autonomy as the state of being independent, free, and equipped in controlling the professional processes of teachers. In this context, in general, a worker's autonomy means that s/he can make decisions in accordance with organizational goals, and that s/he has the opportunity to start-continue-empower-end an activity within the scope of his/her job (Zencirci, 2010). However, the point to be noted here is that autonomy is not an area of unlimited freedom, it is an area of freedom given on the basis of organizational goals, laws, scientific, ethical and pedagogical principles (Çolak and Altınkurt, 2017). In light of these principles, teachers can ensure the development of educational activities by using areas of autonomy.

Teacher autonomy is discussed with so many different dimensions that it cannot be explained with a single definition. For example, Short (1992) describes teacher autonomy as the freedom of control about the issues such as determining textbooks, planning instruction, and setting curricula and timing. In this regard, Üzüm and Karslı (2013) discussed teacher autonomy in three basic dimensions in their literature review and examined them under the headings of (i) planning and implementation of instruction, (ii) participation in management processes, and (iii) professional development. Within the scope of this research, the dimensions of the measurement scale developed by Çolak and Altınkurt (2017) were discussed. These dimensions are put forward as (i) Teaching Process Autonomy, (ii) Curriculum Autonomy, (iii) Professional Development Autonomy, and (iv) Professional Communication Autonomy. That said, no matter how it is sized, teacher autonomy has different aspects in-country policies.

In Turkey, certain steps have recently been taken to improve teacher autonomy, as stated in the top policy documents. However, there are still problems detected about this issue (Canbolat, 2020). The Turkish Education System determines teacher activities with a centralized approach and it is the Ministry of National Education that decides which syllabus, materials, and course contents are to be used (Yıldırım, 2003). This situation leads teachers to fulfill the generally determined standard practices. However, as it is stated in the TEDMEM (2015) report, the most important elements of teacher autonomy are closely related to determining the course content, selecting the methods and materials to be used, and participating in school decisions. Therefore, one of the reasons behind teachers' inability to take independent actions as a leader is that they are exposed to curriculum, course material and time limitations (Can, 2009). On the other hand, teacher autonomy is also affected by the leadership behaviors of school administrators (Özdemir and Turan, 2018; Uras, 2000; Yazıcı and Akyol, 2017). In this context, empowering teacher autonomy in Turkey seems to depend on both the development of autonomy policies and supportive school leadership. This is apparently the sole way schools can acquire the benefits of teacher autonomy.

In the literature, some studies exist on the benefits of teacher autonomy for the school. It is stated that teachers who have high-level autonomy can exhibit adaptive behaviors along with

their colleagues and develop knowledge, skills, and behaviors appropriate for their students and the context (Smith, 2003). Moreover, it is stated that the more a student needs flexibility, respect, and freedom, the more a teacher needs them for effective performance. In addition, it is emphasized that autonomy gives the teacher the power to take initiative in order to respond to the different needs of students (Sehrawat, 2014). For this reason, teaching as a "professional career" should have the opportunity to make and implement important decisions as part of its innate being. And teachers should be granted autonomy that can assure student-centered teaching (Güven, 2010; Kılınç, Bozkurt and İlhan, 2018; Özaslan, 2015; Webb, 2002). In this direction, one of the features that distinguish successful education systems from others is "To Recognize Teachers as Independent and Responsible Professionals" (TEDMEM, 2019).

As it is seen, teacher autonomy is of great importance in the effective management of teaching processes (Maviş-Sevi, Yazıcı, and Maviş, 2017) and it ensures gains for teachers and students in various ways. For example, Reeve, Bolt, and Cai (1999) found in their study that autonomous teachers were more effective in creating proper learning environments for students, listening to students' interests and needs, and providing them with some opportunities for independent work. Conversely, it was seen that teachers who were not granted autonomy gave their students standard directives that they had to follow. In a similar vein, Ramos (2006) emphasized in his study that teacher autonomy should be warranted firstly in order to speak of learner autonomy.

Teacher autonomy has positive effects on students as well as whose professional lives. Studies conducted in this context indicate that teacher autonomy plays a significant role in teachers' job satisfaction, professional commitment, and school commitment (Çolak, Altınkurt, and Yılmaz, 2017; Meriç and Erdem, 2020; Wang et al., 2017). Additionally, there are positive and significant relationships between the autonomy of the teaching process and emotional labor and teachers' contribution to the institution (Buyruk and Akbaş, 2021). It is also stated that there is a significantly negative relationship between teacher autonomy and burnout (Javadi, 2014). In brief, teachers, who are granted autonomy, and accordingly, whose job satisfaction, commitment, dedication, emotional labor, and contribution to the institution increase, will also contribute to the collective integrity. In other words, it is possible to say that teachers who have autonomy will be eager to integrate their efforts with other teachers' efforts and act together.

A heading can be useful at this point for the target audience Within the framework of the related problem, the aim of this research is to examine the relationships between in-service secondary school teachers' perceptions of their own, their autonomy levels and collective teacher efficacy. For this purpose, the role of teacher autonomy domains (teaching process autonomy, curriculum autonomy, professional development autonomy, and professional communication autonomy) on collective teacher efficacy was investigated. Within this framework, answers to the following questions were sought:

1- What is the level of teachers' perceptions towards autonomy levels and collective teacher efficacy at school?

2- Is there a significant relationship between teachers' autonomy levels and their perceptions towards collective teacher efficacy?

3- Is the level of teachers' autonomy a significant predictor of collective teacher efficacy at school?

Method

This study, which examines the relationships between teachers' perceptions of their autonomy levels and the collective teacher efficacy, was designed in the relational screening model. In this framework, the role of each autonomy domain on collective teacher efficacy was tested.

Study Group and Processes

This study was conducted with teachers serving in public secondary education institutions in the province of Ankara in the 2018-2019 academic year. While choosing the study group, convenience sampling method was used. In this study, which focused on revealing the relationships between the variables, the study group consisted of 384 teachers. Data about the study group are presented in Table 1.

n	
Gender	Female: 251 (65.4%)
	Male: 133 (34.6%)
Seniority Level	1-14 years: 162 (42.2%) 15 years and up: 222 (57.8%)
Educational Status	With a BA degree: 308 (82.2%) With MA/Doctoral degrees: 76 (19.8%)
School Type	Vocational High School- Religious Vocational High School: 293 (76.3%) Anatolian High School – Science High School: 91 (23.7%)
Total	384

Table 1. Data about the study group

As it is seen in Table 1, 251 (65%) of 384 teachers in the study group were female and 133 (35%) were male. While 162 of these teachers have 1-14-year seniority levels, 222 of them have 15-year or up seniority levels. Considering the educational status of the teachers, 308 of them have a bachelor's degree and 76 of them received post-graduate education. When looking at the schools they serve, it is seen that 76% of them serve in Vocational High Schools and Religious Vocational High Schools, and 24% in Anatolian High Schools and Science High Schools.

In order to implement the scales used within the scope of the research, the necessary legal permissions were obtained from the Ankara Provincial Directorate of National Education. The data were collected face-to-face by the researchers on a voluntary basis. The teachers completed the scales in 10 minutes.

Data Collection Tools

Collective Teacher Efficacy Scale: In the study, the Collective Teacher Efficacy Scale, which was developed by Tschannen-Moran and Barr (2004) and adapted into Turkish by Erdoğan and Dönmez (2015) was used to determine the teachers' views on collective teacher efficacy at schools. The scale is a five-point Likert type. The analyses made in the adaptation stage indicated

that the scale, which consists of 12 items, has a structure with two factors (student discipline and teaching strategies). In other words, the scale was determined to be compatible with its original form. The results for the reliability analyses were calculated as .85 for the *Student Discipline* dimension, .86 for the *Instructional Strategies* dimension, and .88 for the overall scale. The analyses have indicated that the scale is a valid and reliable tool that can be used in Turkish culture (Erdoğan and Dönmez, 2015). Examples of scale items can be given as follows: "How well can teachers in your school ensure that students follow school rules?" and "How capable are the teachers in your school of making sure of deep learning of a subject (as opposed to rote learning or superficial learning)?"

The goodness of fit values obtained as a result of the confirmatory factor analysis (CFA) performed to determine the validity of the scale in this study are as follows: ($\chi 2=120.44$; df=45; $\chi 2/df=2.67$; GFI=0.95; AGFI=0.91; RMSEA=0.06; CFI=0.98; NFI=0.97). In addition, the Cronbach's Alpha coefficients obtained as a result of the reliability analysis were calculated as .78 for the Student Discipline dimension, .79 for the Instructional Strategies dimension, and .89 for the overall scale (Erdoğan and Dönmez, 2015).

Teacher Autonomy Scale: The Teacher Autonomy Scale developed by Çolak and Altınkurt (2017) was used to determine the opinions of teachers about their autonomy levels. The scale was developed in a five-point Likert type. As a result of the exploratory factor analysis, it was determined that the scale consisting of 17 items had a four-dimensional structure i.e., *teaching process autonomy, curriculum autonomy, professional development autonomy, professional communication autonomy.* The rate of variance explained by the four-dimensional structure was found to be 63.84%. The reliability coefficients obtained as a result of the reliability analysis were reported as .77 for the Teaching Process Autonomy, .80 for the Curriculum Autonomy, .75 for the Professional Development Autonomy, .80 for the Professional Communication Autonomy, and .87 for the overall scale (Çolak and Altınkurt, 2017). Some examples can be given about the related scale items as follows; "The school administration does not interfere with my communication with the parents." and "I can attend any scientific meeting related to my field."

Whether the scale is a valid and reliable tool for the study group in this study was found by calculating the CFA and reliability coefficients. According to CFA results, goodness of fit values are ($\chi 2=349.48$; *df*=110; $\chi 2/df=3.17$; *GFI*=0.90; *AGFI*=0.89; *RMSEA*=0.06; *CFI*=0.97; *NFI*=0.95). Besides, Cronbach's Alpha reliability coefficients of the scale were determined to be .83 for Teaching Process Autonomy, .82 for Curriculum Autonomy, .68 for Professional Development Autonomy, .78 for Professional Communication Autonomy, and .91 for the overall scale.

The goodness of fit values and reliability coefficients calculated with the validity and reliability analyses were evaluated for both scales. When the obtained values were analyzed in a holistic fashion according to the ideal values given in the literature (Hooper, Coughlan, and Mullen, 2008; Kline, 2011), the relevant scales proved to be valid and reliable tools that can be used in this study.

Data Analysis

Before starting the analysis, missing data and extreme value analysis were carried out. In this way, 384 data was decided to be included in the analysis. The normality assumptions of the data were tested by examining the kurtosis-skewness coefficients and scatter graphs. As a result

of this analysis, it was seen that the kurtosis-skewness coefficients were in the range of ± 1 and the graphics indicated a normal distribution. Correlation coefficients, tolerance, and Variance Inflation Factor (VIF) values were examined to test whether there was a multicollinearity problem between the dimensions of the independent variable. As a result of the analysis, the tolerance values were found to be higher than 0.1 and the VIF value was lower than 10. On the other hand, the correlation coefficients were in the range of values that would not cause the multicollinearity problem. When all these values are evaluated and compared with the ideal values underpinned in the line of literature (Çokluk, Şekercioğlu, and Büyüköztürk, 2012, p.35-36), it has been decided that there was not a multicollinearity problem between the independent variables.

Descriptive statistics such as arithmetic mean and standard deviation were used to calculate teachers' perceptions of their autonomy levels and their scores on collective teacher efficacy. Interval values were used in the interpretation of descriptive statistics. Multiple correlation levels between variables were calculated using Pearson correlation coefficients. Accordingly, interpretations have been made as follows: if the correlation coefficients are between 0.70-1.00, there is a *high-level* relationship between them; if they are between 0.70-0.30, they have a *moderate-level* relationship, and if they are between 0.30-0.00, they are considered to have a *low-level* relationship (Büyüköztürk, 2007, p.32). Hierarchical regression analysis was used to determine the predictive power of teacher autonomy on collective teacher efficacy. At each stage of the analysis, a sequence was followed from the variable with the highest correlation coefficient with the collective teacher efficacy to the variable with the lowest.

Findings

Based on the first research question of the study, descriptive statistics for teacher autonomy and collective teacher efficacy were calculated. In this context, the mean scores of the variables are presented in Table 2.

Variable	Average	Standard Deviation		
Teacher Autonomy (Total)	3.80	0.50		
Teaching Process Autonomy	3.65	0.55		
Curriculum Autonomy	3.62	0.58		
Professional Development Autonomy	4.05	0.65		
Professional Communication Autonomy	4.16	0.72		
Variable	Average	Standard Deviation		
Collective Teacher Efficacy (Total)	3.93	0.67		
Student Discipline	3.93	0.70		
Instructional Strategies	3.94	0.71		

Table 2. Descriptive statistics about variables and their dimensions

N: 384

As in Table 2, it is seen that the average scores of teacher autonomy in general and those for its dimensions vary between 3.62 and 4.16 out of 5.00. When the dimensions are examined one by one, it is understood that the curriculum autonomy dimension (\overline{X} =3.62) had the lowest average, and the professional communication autonomy dimension (\overline{X} =4.16) had the highest average. The general average score of collective teacher efficacy was also determined to be 3.93 out of 5.00.

For the second research question of the study, the relations between the variables were tested with multiple correlations. The findings obtained in this context are presented in Table 3.

Variable		2	3	4	5	6	7	8
1. Teacher Autonomy (Total)	-							
2. Teaching Process Autonomy	$.78^{*}$	-						
3. Curriculum Autonomy	.76*	.81*	-					
4. Professional Development Autonomy	$.78^{*}$.51*	$.48^{*}$	-				
5. Professional Communication Autonomy	.69*	.38*	.36*	.72*	-			
6. Collective Teacher Efficacy (Total)	.67*	.45*	.44*	.69*	.70 *	-		
7. Student Discipline	.60*	.41*	$.40^{*}$.62*	.63*	.95*	-	
8. Instructional Strategies	.67*	.45*	.43*	.69*	.71*	.95*	.81* *	-

Table 3. Correlation coefficients for the relations between variables

N=*384*, **p* < .001

When the correlation coefficients between the variables in Table 3 are examined, it is seen that there are positively significant relationships between collective teacher efficacy and teacher autonomy. In this context, a moderately significant and positive relationship has been determined between teacher autonomy and collective teacher efficacy $[(r_{TA x CTE} = .67; p < .001)]$. Considering the dimensions of teacher autonomy, the highest relationship with collective teacher efficacy was in professional communication autonomy and there was a positively significant and high-level relationship between these two variables $[(r_{PCA x CTE} = .70; p < .001)]$. It has also been determined that this was followed by the autonomy of professional development $[(r_{PDA x CTE} = .69; p < .001)]$, the autonomy of the teaching process $[(r_{TPA x CTE} = .45; p < .001)]$ and the autonomy of the curriculum $[(r_{CA x CTE} = .44; p < .001)]$, respectively, at the positive and moderate levels.

For the last research problem of the study, hierarchical regression analysis was used to determine whether the dimensions of teacher autonomy predict collective teacher efficacy, alongside confirming the predictive power of each dimension of teacher autonomy on collective teacher efficacy. The findings regarding the hierarchical regression analysis are presented in Table 4.

	Collective Teacher Efficacy							
Predictor Variables	Model 1		Model 2		Model 3		Model 4	
	β	t	β	t	β	t	β	t
<i>Model 1</i> Professional Communication	,709	19,652	,435	8,903	,431	8,941	,431	8,950
Autonomy <i>Model 2</i>								
Professional Development Autonomy Model 3			,378	7,735	,315	6,065	,307	5,914
Teaching Process Autonomy					,127	3,266	,050	,840
<i>Model 4</i> Curriculum Autonomy							,099	1,715
\mathbf{R}^2		503	.570		.582		.585	
R² Difference		503	.067		.012		.003	
F	386	.191*	252.7	46*	176.3	328*	133,	658

Table 4. Hierarchical regression analysis results about the prediction of collective teacher efficacy

N=384, *p < .001

Model 1 in Table 4 shows that teachers' professional communication autonomy explains 50% of the total variance in their collective efficacy. According to Model 2, professional development autonomy significantly predicts collective teacher efficacy, and it alone explains 7% of the variance $(\Delta R^2 = .067, p < 0.001)$. Model 3 indicates that teaching process autonomy explains 1.2% of the change in collective teacher efficacy $(\Delta R^2 = .012, p < 0.001)$. On the other hand, Model 4, indicates that curriculum autonomy is not a significant predictor of collective teacher efficacy. When considered generally, it is seen that professional communication autonomy has the highest predictivity, followed by professional development autonomy and teaching process autonomy. The findings indicate that all domains related to teacher autonomy explain 59% of the variance in collective teacher efficacy.

Discussion

This study determined the relationships between teacher autonomy and collective teacher efficacy and the role of *teaching process autonomy, curriculum autonomy, professional development autonomy* and *professional communication autonomy* dimensions, as to collective teacher efficacy has been identified one by one. For this purpose, the current situation of the related variables and dimensions was firstly revealed with the average scores. According to the findings

of the first research question, the general average scores of teachers' collective teacher efficacy perceptions were also found relatively high. In different studies, teachers' collective efficacy perceptions are found at similar levels (e.g., Demir, 2019a; Demir, 2019b; 2019c; Cansoy and Parlar, 2018; Celik, Gören and Kahraman, 2018; Özdemir, Demirkol, Erol and Turhan, 2018; Yüner and Özdemir, 2020). On the other hand, Yılmaz and Turanlı (2017) pinpointed that the perceptions of collective teacher efficacy in secondary education institutions are moderate. As a matter of fact, in these studies, the average scores of collective teacher efficacy perceptions vary between 3.60 and 4.00 out of 5.00 where specific problems may be experienced. Here some may arise from the leadership behaviors of school administrators, and some from the unique climate and the ethos of the school. Hence, the conducted studies supported that positive leader behaviors and effective leadership styles have a positive effect on CTE (Bozkurt, Çoban, Özdemir and Özdemir, 2021; Cansoy and Parlar, 2018). Similarly, Goddard and Skrla (2006) stated that the contextual and demographic factors of the school play a role in the collective efficacy at schools, that the socio-economic status of the school, the academic success of the students and the disciplinary problems also affect the collective teacher efficacy. Hence, there appears a strong relationship between the development of CTE and the school leaders' displaying empowering and supportive behaviors that can make their teachers effective on students.

According to the results of the present study, although the average scores of the domains of teacher autonomy differ from each other, it has been determined that the general teacher autonomy score is above the medium level (3.80). Studies with similar findings with the current study determined that the views on general teacher autonomy were moderate or slightly above the average level (Çolak, Altınkurt and Yılmaz 2017; Çolak and Altınkurt, 2017; Meriç and Erdem, 2020; Yazıcı and Akyol; Uras, 200). On the other hand, there are also studies indicating that the average of the autonomy perceptions of primary school teachers is high (Buyruk and Akbaş, 2021; Üzüm and Karslı, 2013). This situation may occur due to the fact that primary school teachers have the right to comment on students than secondary school teachers have. The reason why the autonomy perception decreases in secondary education institutions may be the teachers' limited right to speak over the students and the students' starting to individualize because of their developmental period. As a matter of fact, Çolak and Altınkurt (2017) also determined that secondary education teachers' autonomy perceptions were at a lower level compared to pre-school and primary education teachers.

Another reason that decreases the autonomy perceptions of secondary school teachers may be the pressures created by the transition system to the next level institutions. As a matter of fact, a study by Çetin and Ünsal (2018) supports this argument. In this study, the researchers found that central exams which are national and of highstakes nature are gatekeepers thusly they put pressure on teachers, causing them to follow an exam-oriented teaching and became rather monotonous at the end of the day. According to the study conducted by Üzüm and Karslı (2013), teachers think that the professional responsibilities expected from them, and the authority given are not equivalent to each other. This situation keeps teachers off taking initiative and performing autonomous behaviors. However, the cultural, social, political, and economic changes of the current period entail teachers performing various activities in their new territories (Eurydice, 2018). In such a case, the autonomous movement areas of teachers, who are stuck between the limiting effects of central education systems and the expectations of the new world order from teachers, may be negatively affected.

Another finding of this study is that the averages of teacher autonomy domains differ from each other. And the average scores in perceptions of teacher autonomy domains have been

observed to rank from the highest to the lowest as professional communication autonomy, professional development autonomy, teaching process autonomy, and curriculum autonomy. These rankings have differed in other studies. For example, Buyruk and Akbaş (2021) found this ranking from high level to low level as teaching process autonomy, curriculum autonomy, professional communication autonomy, and professional development autonomy. One of the underlying reasons for the difference in rankings is thought to be the difference in the school levels of the teachers in the sample group. This study was conducted with secondary school teachers, and the samples of the other studies reviewed were composed of teachers from all levels at different rates. The common point in other studies is that teaching process autonomy is perceived at the highest level in all studies, and professional development autonomy is perceived at the lowest level. Therefore, these differences in the studies can be explained by the fact that teaching in primary education is at the level of creative activities and that teachers are more independent in terms of the teaching process. As a matter of fact, Colak and Altınkurt (2017) found that primary education teachers' perceptions of teaching process autonomy are higher compared to those of high school teachers. Again, due to the differences between grade levels, professional development autonomy may be perceived at a lower level in primary education teachers than in secondary education teachers. The reason for this can be considered as the fact that primary education teachers spend more time with and for their students as well as the parents and cannot spare time for their professional development. Uslu (2020), in his study, found that primary education teachers maintained their communication with students and their parents outside of school and even had difficulty in establishing a work-life balance. This situation may have posed an obstacle to their professional development autonomy. In secondary education institutions, the fact that teachers are responsible for more individualized and responsible students may have allowed them to allocate time for communication between other teachers and professional development.

One of the important findings of this study is that the lowest autonomy domain for secondary school teachers is curriculum autonomy. This may be due to the centralized structure of the Turkish National Education System and the fact that the curriculum is determined by the center. More clearly, as stated in the Regulation on Secondary Education Institutions of the Ministry of National Education (MoNE), "the curriculum of secondary education institutions is implemented with course schedules approved by the Ministry. According to the types of secondary education institutions, the courses which will be concentrated are detailed in the weekly course schedule and program explanations" (Article 10). In this context, teachers cannot go beyond the center's decisions on issues such as determining learning objectives and textbooks or deciding on the situations in which students will be considered successful or unsuccessful. In other words, teachers follow the detailed plans and programs by the Ministry of National Education and are inspected based on this (Canbolat, 2020). On the other hand, it is stated that even in the centrally managed schools of European countries, teachers actively participate in determining school textbooks and preparing school curricula. It is emphasized that this has a positive effect on teachers' creativity and innovation skills and increases their motivation (Eurydice, 2018). Yahya and Altınkurt (2017), based on the international reports they examined, underlined that in all countries except Turkey and Greece, the textbooks are determined by the teachers and that teachers are not granted autonomy in determining the assessment criteria of the students in Turkey. Moreover, while teachers in Turkey and a few other countries are not granted autonomy in determining the content of the compulsory education program, there are countries that grant autonomy partially or fully to their teachers in this regard. Therefore, the central structure in Turkey can create autonomy problems for teachers in making appropriate decisions for their students at a local level. However, Ingersol (1997, p.24) argues that the people who can make the right decisions about students will

be teachers who know their students best and are personally responsible for their development, and because of this reason, the standard decisions made by the central administration may not work. This unearths the importance of teachers' autonomy respecting the mentioned areas.

The findings examining the relationships between teacher autonomy and collective teacher efficacy revealed that there was a positive and significant relationship between the variables. A hierarchical regression analysis was conducted to examine these relationships further in terms of individual autonomy domains. According to the results of the analysis, it was determined that the highest predictor was professional communication autonomy. In other words, it is observed that the autonomy domain that plays a role at the highest level in the development of the collective teacher perception is communication autonomy. This result supports the fact that communication is a must for collective teacher efficacy. Because collective teacher efficacy fundamentally includes the concepts of cooperation and group-level success (Bandura, 1997; Berebitsky and Salloum, 2017; Goddard and Goddard, 2001; Klassen, 2010). The integration of the efforts of all teachers and the emergence of a synergetic effect is only possible with an environment full of effective, comfortable, sincere, and free communication. In other words, the emergence of collective power seems to depend on the free communication of teachers among themselves and with parents. In this respect, it is quite normal that professional communication autonomy is the autonomy that predicts collective teacher efficacy at the highest level. Besides, Brinson and Steiner (2007), in their study, support this result and emphasize the need to create cooperation and improve relations between teachers and parents in the development of CTE. On the other hand, Ramos (2006) expresses the key words of the teaching profession as growing together, doing projects and new works together, and building collectively. He states that for this aim, cooperation and participation should be developed, and emphasizes the importance of communication, listening, and respect for different opinions. It seems that communication autonomy plays a major role in providing collective efficacy.

The hierarchical regression results indicated that the autonomy domain that plays the second biggest role in the collective teacher perception is the professional development autonomy. Therefore, the freedom of teachers to determine their professional development opportunities and their self-development positively reflects on the school's collective efficacy level. In this respect, Sehrawat (2014) states that professional autonomy is guided by the personal and professional development needs of teachers, and the need for this development of all teachers creates a social interaction area. Thereupon, teachers with professional development autonomy develop their sense of self-efficacy by benefiting from each other, the environment, and other education/development opportunities. On the other hand, the collective efficacy level increases in schools where there are teachers who develop their professional and personal self-efficacy. Studies in the literature also indicate that the perception of self-efficacy is an important antecedent that empowers collective efficacy and that self-efficacy plays an important role in collective teacher efficacy (Bandura, 1999; Dimopoulou, 2014; Goddard, Hoy, and Hoy, 2004; Gürçay, Yılmaz, and Ekici, 2009; Yılmaz and Turanlı, 2017; Zabrina Anyagre, 2017). Therefore, achieving collective competence gets easier in a system where there is professional development autonomy. In this regard, Brinson and Steiner (2007) state that teachers should be empowered in order to develop CTE and emphasize the importance of providing teachers development opportunities that enable their professional development and including them in decision-making mechanisms that will empower them.

The autonomy domain that was revealed to have played the least role on the collective teacher perception is the teaching process autonomy. In a way, teachers see the teaching process

autonomy as a means of providing collective efficacy. The fact that this autonomy domain is less predictive than the others may be due to the natural structure of the teaching profession. In other words, teachers may think that they should already be free in the teaching process and be autonomous in their activities in the classroom. In addition, Yahya and Altınkurt (2017) stated that teachers are partially or completely autonomous in selecting teaching methods and techniques in many countries of the world. In fact, different studies found that teachers mostly feel autonomous in terms of teaching process autonomy and classroom management (Buyruk and Akbaş; 2021; Çolak and Altınkurt, 2017; Çolak, Altınkurt and Yılmaz, 2017; LaCoe, 2006; Yazıcı and Akyol, 2017). For this reason, teaching process autonomy is actually perceived as a hygiene factor, so it may not provide as much motivation on collective teacher efficacy as other domains of autonomy. Therefore, this situation can explain why the teaching process autonomy is the variable predicting the collective teacher efficacy at the lowest level.

The autonomy domain that did not have a statistically significant predictor on collective teacher efficacy was *curriculum autonomy*. This situation can be seen as an indication that teachers accepted the structure of the Turkish National Education System. Because, as stated by Yıldırım (2003), in the Turkish National Education System, the Ministry determines the curriculum, approves the textbooks and educational materials. For this reason, teachers are seen as single implementers of the determined programs and decisions and every teacher who enters the system internalizes that creating the curriculum is the Ministry's duty. Therefore, teachers tend to comply with the standards determined by the Ministry, but they are more reluctant to organize or participate in independent school activities (Can, 2009). Besides, in studies investigating how the concept of teacher autonomy is considered among teachers, using teaching methods and techniques appropriate for individual differences is stated as an autonomy behavior, but subjects such as curriculum creation and content preparation are not mentioned at all (Kılınç, Bozkurt, İlhan, 2018; Özaslan, 2015). This situation may be a proof of the fact that the curriculum preparation by the central government is acknowledged. Therefore, it may lead to the conclusion that it does not play a role in collective teacher efficacy.

Implications and Recommendations

Teacher autonomy is one of the sources of motivation that increases teachers' tendency to act collectively. The freedom of teachers in planning and making decisions about their professional activities, implementing those decisions, and sharing them with other teachers makes them more competent and contributes to the collective integrity at school. The autonomy of inservice secondary education teachers to share their decisions with their colleagues and to communicate with them provides the highest contribution to the collective competence in the school. In addition, professional development autonomy develops the perception of self-efficacy, which is one of the prerequisites of collective teacher efficacy. Teachers who have professional development autonomy improve themselves in every sense. By this means, teachers who feel competent and equipped become willing to contribute to the collective integrity of the school. Similarly, teachers who have teaching process autonomy can achieve student success and contribute to the collective teacher efficacy in the school, as they feel more comfortable in determining the appropriate method and technique for their students. As it is seen, teacher autonomy is a key concept in conducting activities in accordance with the individual differences of the students, the context of the school and the classroom, and the content of the subject taught, as well as in a teacher's discovering the new opportunities to improve herself/himself in the domains s/he needs. As a result of all these, it provides a synergetic competence environment within the school. Accordingly, this study concluded that teacher autonomy is an important source of motivation that plays a role in collective teacher efficacy.

In light of the study results, some suggestions can be made to both practitioners and researchers. It was found in the study that the autonomy domain that plays the biggest role in collective teacher efficacy is professional communication autonomy. In this context, school leaders should make effective communication networks where professional sharing is made, create alternative sharing domains, and activate both face-to-face platforms and technological systems to develop communication. Likewise, leaders should consider the demands of teachers for professional development and education, and support teachers who demand to take part in graduate studies and to be engaged in other developmental spheres. In addition to this, they should conduct supervision processes at the school in a way that raises awareness about professional development of teachers' perceptions about professional self-efficacy and therefore the collective efficacy in their schools. Depending upon the autonomy of the teaching process, they should support teachers' current methods, techniques, and activity plans, and enable those to be shared with other teachers.

This study was conducted with secondary education teachers. It is recommended that the same study should be carried out at other levels and that the role of autonomy domains on collective teacher efficacy should be examined at these levels as well. In addition to this, qualitative studies can also be conducted to reveal what the expectations of teachers are from each autonomy domain. Additionally, conducting qualitative studies about the determination of autonomy domains that will contribute to collective teacher efficacy will also contribute to the field.

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International Journal of Educational Studies and Policy (IJESP)

Volume: 2, Issue: 2, November 2021

Evaluation of the Curriculum on Child Nutrition in the Child Development Program According to Metfessel-Michael Program Evaluation Model

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ABSTRACT

This study aims to evaluate the curriculum of the "Child Nutrition" course, which is one of the mandatory courses of the Associate Degree Child Development Program of a university in the Aegean region, according to the Metfessel-Michael program evaluation model. This course has a curriculum and course information content. Data were collected through stakeholder views, observations and document analysis for the course within the framework of the single case pattern, which is one of the case study types based on the qualitative research approach. Semistructured interview forms, and observation forms were used as data collection tools. The data obtained with the data collection tools were analyzed and evaluated within the framework of descriptive analysis. The participant group of the study consists of 11 students, 2 instructors, and 2 administrators. In the study, the data were handled within the framework of the purpose of students coming to the program, the current status of the program, the content and necessity of the program-course, the suitability of the course to business life, the contribution of the course to the professional development of the students, the business life after graduation, educational status, learning-teaching process, assessment, evaluation, and instructor qualifications. As a result, it has been revealed that the course and course objectives have an important place in the program, there are difficulties in the learning-teaching process, the course and course objectives are mostly tried to be conveyed by direct narration method, and measurement and evaluation are done only with exams.

Keywords: Program evaluation, Metfessel-Michael Program Evaluation Model, child nutrition, vocational school

Article History: Received 08.06.2021

Accepted 25.10.2021

Cite as: Ülkü, H. H. & Gözel, Ü. (2021). Evaluation of the curriculum on child nutrition in the child development program according to Metfessel – Michael Program Evaluation Model. *International Journal of Educational Studies and Policy*, 2(2), 51-72.

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Introduction

Educational programs play a key role for a planned and expected education. From this point of view, education programs include the process of determining the target audience for behavioral change, the learning experiences of the target audience, and the effects of the learning experiences in the target audience, as stated in the process definition of education (Gündoğdu, Çelik, Altın and Şimşek, 2016). Evaluation in education, on the other hand, is to reveal whether the expected behavioral changes reach the targeted results with reference to the criteria in the program design (Yüksel and Sağlam, 2014).

Program evaluation is based on the systematic data gathering nd analysis of a program developed using scientific research processes and is defined as the decision-making process about the accuracy, adequacy, realism, suitability, efficiency, usefulness, effectiveness, success, and practicality of the program (Uşun, 2016). While Green and Stone (1977) express program evaluation as systematically documenting the results or effects of the program, making judgements about the program, and appraising the program; Fitzpatrick, Sanders and Worthen (2012) refer to it as the starting point we will use to decide the value of the program.

When the program evaluation is considered; it is seen that the classification of the programs is made in line with their philosophies, ideologies, evaluation types, system dimensions, designs (target-based, management-oriented, beneficiary-oriented, expert-oriented, negotiation-based, participant-oriented) (Aygören and Er, 2019). In this study, it is a goal-based program evaluation as it is aimed to evaluate the child nutrition curriculum within the frame of the Metfessel-Michael program evaluation model.

This model, which consists of eight stages and main purpose of which is to evaluate school programs, was developed by Metfessel-Michael towards the end of the 1960s. Since Metfessel-Michael created the evaluation process inspired by Tyler's model (Orstein and Hunkins, 1988; Worthen, Sanders and Fitzpatrick, 2004), Tyler's principles are at the core of the model. Metfessel-Michael (1967) explains the six aims of the evaluation, which Tyler also stated:

- Obtaining information about what will be developed in the training program and the functioning of the institution though periodic control,
- Confirming hypotheses about the functions of the educational institution,
- Obtaining guiding basic information for the student's personal efficiency,
- To come up with information that will create psychological relief for students, teachers, and parents,
- To ensure continuity and improvement in public relations,
- To assist students and teachers to gain structured knowledge and redefine their goals.

Metfessel-Michael draws on experiences with school staff (administrators, teachers, students, and staff at the school). It states that in the evaluation process of school programs, revealing the potential benefit will be achieved by using multiple criteria instead of a single model. The following steps should be taken into account for the evaluation.

- Include all stakeholders in program evaluation (student, teacher, parent, administrator, etc.)
- Adapt the purpose and specific objectives to an appropriate model,
- Make specific targets applicable in the program,

- Select or create measurement tools that can measure the effectiveness of the program,
- Periodically observe tests, scales, and other behaviors appropriate to the content,
- Analyze the obtained data with statistical methods,
- Interpret the data using expected performance levels in all measurements,
- Develop forward recommendations for implementation, modification and revision of specific targets (Kuo, Wei, Chen, Wang, Ho and Yang, 2012).

In line with the 8 stages mentioned above, it can be said that the Metfessel-Michael curriculum evaluation model will guide curriculum evaluation experts in the evaluation of school programs (Uşun, 2012). Administrators, teachers, students, parents, and school staff are also effective in the evaluation of the program. As a result, it should be ensured that all individuals involved in education directly or indirectly participate in the evaluation (Demirel, 2007). It should be used in the evaluation phase by taking into account the opinions of all stakeholders about the program. Within the scope of this study, the program of the "Child Nutrition" course, in which nutrition, which has an important role in the growth and development of children, is discussed and the evaluation process will be reported Metfessel-Michael program evaluation model.

The nutritional needs of people are an unchangeable reality. Only variables such as age, employment, health, and disease status can determine nutritional needs. Especially in the growing age, children need more energy and nutrients than adults (Baysal, 2003). If sufficient and balanced nutrition is not provided in childhood, the development of the child slows down, various health problems occur, and this situation greatly affects the future life of the individual (Erkan, Yalvaç, Erginöz, Çokuğraş and Kutlu, 2007). When it comes to early childhood development, this concept includes children's physical, mental and social development and includes all necessary initiatives for nutrition, health, mental development, and social interactions of children (UNICEF, 2001). It is important to provide the necessary nutrients in this period of rapid growth (Black, 2003).

In the Child Nutrition course in the associate degree Child Development Program, which will provide intermediary staff to pre-school education institutions, it is emphasized how an individual should be fed from the mother's womb to an adult. In this context, subjects such as balanced and sufficient nutrition, nutrition in childhood, food hygiene, nutritional deficiencies, and menu preparation are discussed as course content. In this period, when the foundations of healthy lifestyle behavior and personality formation are laid, intertwined with preschool children, it is necessary to know the principles of proper nutrition and to put this information into practice.

Within the scope of the course, in addition to the principles of balanced and adequate nutrition, feeding of infants, nutrition of preschool children, and nutrition of school-age children are also discussed in detail. Considering that proper nutrition is a way of life, it is important to gain a nutritional habit from infancy. One of the most important issues to be emphasized is that preschool children often take their family members and teachers as role models. In this case, the students of the program are expected to complete this course not only to learn but also to give the right direction to their own lives.

Child development practitioners, who aim for the healthy development of children in their professional lives, have to know nutrition principles, food types, age-appropriate eating habits and even prepare a menu for children based on this knowledge. Subjects such as which nutrient and how much should be taken daily in accordance with the age of the child, how to gain nutritional habits, the importance of nutrition, and alternative food types are explained within the scope of the course¹. In addition to these topics, students are also planning learning-enhancing activities such as preparing fun plates after making the menu arrangement for the children.

The nutritional needs of not only healthy children but also sick children are mentioned in the course content. Nutritional information is given in cases where special nutrition is required in relation to nutritional needs and disease status. Approach to children with nutritional problems, eating problems, and diseases that may occur as a result of unhealthy nutrition are also included in the course content. Considering that some diseases are rather related to nutrition, it is obvious that this course will raise awareness about public health and disease prevention. In particular, the biggest cause of childhood obesity is seen as wrong eating habits. This risk can be minimized by giving children appropriate eating habits.

Nutritional disorders are mostly seen when children start school (Çetin and Aydın, 1999). Thus, the nutritional context at school gains importance, and in addition to sufficient and balanced nutrition for teachers and school staff, menu planning is one of the essential issues.

When the objectives of the Child Nutrition course and the Child Development Program are examined; functionality, relationship with the life process and effect on the overall outcomes of the program can be observed. The objectives of the Child Nutrition course are given below:

- Will be able to monitor adequate and balanced nutrition,
- Will be able to apply nutrition efficiency,
- Will be able to apply nutrition activities for children with special conditions,
- Will be able to apply nutrition in accordance with to developmental periods,
- To raise individuals who can plan a menu suitable for nutritional elements¹.

Child Nutrition course is given as a compulsory course in the first semester of the Child Development Program, in the period when the theoretical knowledge of the students is laid and before the pre-school period¹. Today, the employment status, working places, conditions, and job descriptions of child development professionals differ among institutions. Succeeding in such courses in the field preparation stage before starting their professional life is of vital importance in the following years.

The literature on child nutrition is examined regarding nutrition (Özmert, 2005; Topal, Çınar, and Altınkaynak, 2016), child nutrition (Arslan and Beygo, 1974; Bozkurt and Güneyli, 198; Erdim, Ergün and Kuğuoğlu, 2017; Karaağaoğlu, Arslan and Karaağaoğlu, 1988; Koçoğlu, Polat and Özgür, 1990; Samlı, Kara, Ünalan, Samlı, Sarper and Gökalp, 2006; Şahinöz, Bozkurt, Özçırpıcı, Özgür, Şahinöz, Acemoğlu, and Akkafa, 2005; Yetim, Yetim and Devecioğlu, 2015), mother and child nutrition (Arlı, Şanlıer, Küçükkömürler and Yaman, 2006; Karaağaoğlu and Samur, 2013), child nutrition status (Erdem, Özel, Çınar and Işıkhan, 2017; Erkan, Yalvaç, Erginöz, Çokuğraş and Kutlu, 2007; Girli, Özgönenel, Sarı and Ardahan, 2016; Güneyli, 1984; Yalçın, 1974; Hayran, Kayhan and Aksayan, 1990; Özbaş, Uskun, Küçüksoku, Hocaoğlu, Akalın and Özbaş, 2018; Yaşar, Ilıca and Rakıcıoğlu, 1999; İlçin, Toksöz, Mete and Çelik, 1987), children's eating habits (Akal, Birer and Baysal, 1986; Alphan, Keskin and Tatlı, 2002; Demirel, Üner and Kırımi, 2001; Demirezen and Coşansu, 2005; Güneyli, 1988; Haney and Erdogan, 2013; Oguz, 2011; Oguz and Derin, 2013; Öktem, Yavrucuoğlu, Türedi and Tunç, 2005; Sütçü, 2006; Sökülmez and Uyar, 2015; Sümbül, 2009; Tokgöz, Ertem, Çelik, Gökçe, Saka and Hatunoğlu, 1995; Zembat, Kılıç, Ünlüer, Çobanoğlu, Usbaş and Bardak, 2015), nutritional

¹ https://obis.adu.edu.tr/B9DE53FB9964D2BAA0ABECA1D0D2F5

characteristics of children (Garipağaoğlu and Günöz, 1993; Kobak and Pek, 2015), nutrition styles of children (Arslan, 1988), nutritional problems of children (Aksu and Özcan, 1981; Güneyli and Arslan, 1981), children's nutritional behavior (Kanioğluları, 2015), nutrition practices (Garipağaoğlu and Özgüneş, 2008; Uzel, Yücecan, Ekinciler, and Özbayer, 1972), nutrition education (Ataman, 2009; Başkale, 2010; Obalı, 2009; Şanlıer and Güler, 2005; Ünver and Ünüsan, 2005), nutrition rights (Öztürk, 2008), nutrition disorders (Arslan and Köksal, 1974), school health and nutrition programs and nutrition education programs (Sormaz, 2013; Ünver, 2004; Yabancı, 2011), and nutrition education model (Aktaç, 2016). Although there are different studies mentioned above in the field of child nutrition in the literature, a program evaluation study could not be reached with any program evaluation model for the child nutrition course. In this respect, since this research will be an original study for students studying in the child development associate degree program, it is thought that it can provide insight to the with reference to the future program evaluation studies on child nutrition.

Although the number of studies carried out with reference to the Metfessel-Michael Program Evaluation Model has increased recently, it can be said that it is not enough. When we examine the studies of vocational schools that educate technical staff and fullfill the labor force needs of the intermediate market, we did not go beyond a few them and a few articles, and no study was encountered on the evaluation of the Child Nutrition course, which is the subject of this study. Considering the situation of the Child Nutrition course in the educational structure of our country, the importance of the Child Development program in the Child Development Program emerges once again. Especially in pre-school institutions, the regulation of feeding times, the creation of nutrition lists, the fact that nutrition can be healthy, regular, balanced, and nutritious in accordance with feeding hours and nutrition lists, and that it can appeal to different age and developmental characteristics, are indications that this course is one of the most important courses of the Child Development program.

Metfessel-Michael Program Evaluation Model, one of the curriculum evaluation models, was chosen for the evaluation of the program of this course because it is a model that includes all stakeholders in the evaluation, increases the validity and reliability of the study by enabling detailed data gathering through techniques as observation, interview, and document review and it is useful to evaluate all elements of the education program. For this reason, in this researchit is aimed to evaluate the Vocational School, Child Care, and Youth Services Department, Child Development Program Child Nutrition course curriculum of a university located in the Aegean region, in accordance with the Metfessel-Michael program evaluation model.

Method

Research Model

This research was based on a qualitative comprehension. The qualitative research approach aims to gather detailed information about a situation or phenomenon under investigation, as well as to develop a deep understanding and explain the situation within itself (Saban and Ersoy, 2016). In the study, the "case study" design, which is suitable for the nature of the research, was used among the qualitative research designs. The case study design, which is widely used in the qualitative research tradition, is carried out to examine, understand and describe these situations without any intervention to the facts, events or situations, and offers the researcher the opportunity to reveal the effects of the cases, events or situations that they examine for the participants (Saban and Ersoy, 2016).

Since the evaluation of the program will be discussed in the case study, which is the subject of this research, the case was handled as a single case and the "single case design" was used. In order to understand the evaluation process of the program, the "integrated single case pattern" was used because it was studied with more than one unit that was a stakeholder in the program and had experiences and experiences related to the program (Yin, 2003).

Participants

The study was carried out within the scope of the Child Nutrition curriculum in the associate degree Child Development Program of a state university in the Aegean region. The purposive sampling method was used in the selection of the study group. The study was carried out voluntarily with the participation of a total of 15 people, including 2 administrators, 2 instructors teaching the "Child Nutrition" course, and 11 students. There are 3 administrators in total in the school. Two of these administrators agreed to participate in the study. There are 2 instructors teaching the "Child Nutrition" course. Both of them agreed to participate in the study. In determining the student group participating in the study, students were reached from the lower and upper groups by taking the passing grades for this course as criteria. The interviews were continued until the data obtained from the students were sufficient and until the answers were repeated. The data regarding the participants are given in Table 1.

Title	Number of Persons	Gender	Age	Professional Experience Period (Year)
Administrator	1	М	40	15
	1	F	35	10
Instructor	1	F	32	10
	1	F	30	8
Student	15	М	19	-
		М	19	-
		М	20	-
		М	20	-
		М	21	-
		F	18	-
		F	19	-
		F	20	-
		F	20	-
		F	21	-
		F	22	-

Table.1 Data on participants

Materials

Within the scope of this study, qualitative research techniques; interview, observation and document analysis techniques were used. Interview, which is used as a data collection method of different quality and depth, is a form of controlled and purposeful verbal communication between the researcher and the participant who is at the center of the research (Cohen and Manion, 1994). In order to collect the data, a structured form was created in which independent observers could make observations. This form contains 27 items. In the observation form, the Metfessel-Michael program evaluation model, the program elements and the lesson plan (objective, content, educational status, and assessment-evaluation) were included. Semistructured interview forms were prepared and applied in order to get the opinions of the administrators, instructors, and students who are related or thought to be related to the Child Nutrition course. These interview forms are semi-structured forms prepared separately for each group, consisting of 5 items for the administrator, 9 items for the instructor, and 10 items for the student. The questions in the semi-structured interview form cover the education, economic, health, the current status of the course, as well as the content of the program, its necessity and place in the program, its duration, its contribution/effect on their professional development, its suitability for today's business life, the qualification of the instructor and the student, the program elements. There are questions from which in-depth information can be obtained on issues such as suitability. During the preparation of the interview form, question pools were created with the help of field experts and two doctoral students, as well as the relevant literature review. The prepared question pools were evaluated and finalized by 2 field experts, 2 assessment and evaluation experts, and 1 language expert. In addition to the main questions of the interview, explanatory and final questions were included with the assumption that the questions could not be understood or misunderstood. In addition, as document analysis, the program proposal file for the Child Nutrition course, the program information form, the course information form and all the written documents used by the instructors for the course were examined.

Procedure

In the research, data were collected by two independent observers with an observation form, in a total of 6 hours as well as gathering data through semi-structured interview forms prepared for the administrator, instructor, and student. Data were collected from individuals who were within the scope of the study and volunteered to participate in the study (voluntary consent form was signed by each participant) within the sample. It has been declared by the researchers that the data obtained within the frame of the research will only be used within the scope of the research and will not be shared with second or third parties or institutions in any way. The data obtained with the semi-structured interview forms were gathered during the free hours of the administrators, instructors and students and at the time they wanted, and the observation forms were collected during the course hours.

In order to ensure the relaxation of the participants, the interviews started with conversations outside the research topic, continued with warm-up questions, questions that were not understood or thought to be unexplained were discussed again with explanatory and probe questions, and the duration of the interview was tried to be extended as much as possible so as not to bore the participants. Before starting the interviews, permission was obtained from each participant for the audio recording of the interviews, and the data were gathered through voice recording and note-taking method.

Analysis of Data

The data obtained through the observations of the independent observers and the opinions of the administrators, instructors and students for the Child Nutrition course were analyzed using descriptive analysis technique. As Yıldırım and Şimşek (2016) stated, direct quotations from the data of the participants were frequently included since the data were tried to be transferred to the other party effectively in the descriptive analysis technique used. The aim here is to present the obtained data to the readers in an organized and interpreted way. Within the frame of the study, the purpose of students coming to the program, the current status of the program, the content and necessity of the program-course, the suitability of the course with business life, the contribution of the course to the professional development of the students, post-graduation business life, educational status, learning-teaching process, testing situations-measurement, evaluation, and teaching staff competencies themes were created before starting the study. Within the scope of the themes, interview questions, and observation forms were created and open coding was done with the line-by-line reading technique from the obtained data; and first of all, codes, categories, and themes were determined. The codings were performed by two researchers after coding twice in different periods. The agreement coefficient between encoders was calculated as .88 (Miles and Huberman, 1994). Codes that could not be agreed between the coders were not included in the research, and the data that were agreed between the coders were included in the research.

Ethics Committee Approval

This research was carried out in accordance with the decision of Aydın Adnan Menderes University Educational Research Ethics Committee dated 05.06.2020 and numbered 84982664-100.

Validity and Reliability

Regarding the validity and reliability of the research; the data gatherind period of the study took approximately 26 days. Researcher 1 interviewed the instructors and institution administrators, while researcher 2 interviewed the participants who took the "Child Nutrition" course in the program. The data collection process was prolonged as the interviews took place at the time the participants wanted. The data collected by observation were carried out by an independent researcher. In addition, the syllabus and curriculum of the course were analyzed by researcher 1 and researcher 2. Thus, researchers; In accordance with the spirit of qualitative research, he spent time in the field, interviewed directly with the participants and, when necessary, lived and tried to understand the experiences of the participants during the course and between lectures during the 26-day period, and used the perspective and experience gained from the data obtained in the field and observations in the analysis of the data. In this context, the researchers had the opportunity to stay in the field as long as possible, making it a natural part of the research and investigating the research in-depth.

Interview questions and observation form items were prepared by taking the opinions of subject experts, assessment-evaluation experts, and language experts; and data collection diversity was provided within the scope of the research. The data obtained from the interviews were collected by voice recording and note-taking method, and the agreement coefficient between the coders was checked by coding the data by different coders.

Results

The research findings were designed in accordance with the 8 stages of the Metfessel-Michael Program Evaluation Model. These stages were planned in line with each dimension of the Child Nutrition lesson and the resulting findings were expressed in the form of comments and exemplary quotes.

Purpose of students coming to the program

As a result of the interviews with the students, it is seen that the purpose of coming to the program is different for most of the students. Some of them preferred this program because their score was not enough for another program, some willingly, some because they were interested in children, some because they thought it was a job they could do in the future, and some because it was a continuation of their high school programs. Some student opinions supporting these issues are as follows:

"Normally, I didn't want this department, but I wanted to be a primary school teacher, but I chose this department because I didn't score well and it was the closest department to child development." (S-3)

"The reason I chose this program is because I believe that I will love to do this job. (S-5)

"Actually, I wanted to be a preschool teacher, but I chose this program because I couldn't get into the preschool teacher program and because I love children and also because I thought it would be useful to children." (S-8)

Current status of the program

When we look at the statements of 2 administrators and 2 lecturers participating in the research, it could be summarized that the situation of the Child Development Program in the economic, health, economic and current structure of our country; It has been stated that the Child Development Program has increased the need for nurseries and kindergartens due to the increasing population and women's participation in business life. In addition, the fact that the students who have completed the Child Development Program can benefit from the Pre-School Teaching, Child Development (Undergraduate), Special Education and Social Service undergraduate programs through the Vertical Transfer Exam, forming their first steps towards becoming public personnel and academic personnel in their future lives are other reasons for choosing the program.

It is thought that graduation has positive effects on the business world due to reasons such as participation in the workforce and working life, employment opportunities, contribution to the economic and economic structure, and cost advantage. It is also stated that almost all of the graduates are preferred as intermediate staff, technical staff, and assistant staff in private kindergartens. Despite all these positive situations, it has been stated that although the place, importance and preferability of the graduates of the program in today's business world can be considered good, in our country, the idea of "more work with less salary" pushes the graduates of the program to different preferences (opening their own school, completing a bachelor's degree).

Examining, comparing, and analyzing the course information form and the program information form and looking at the results: when the relationship between the learning outcomes of the lesson and the program is evaluated, it is understood that the effect of the lesson

learning outcomes on the program has a substantial effect. Some of the views put forward on this issue are as follows:

"Graduates are needed in the field. With the increasing population, the fact that women are in the working life and the children are directed to kindergartens, in economic terms, private institutions act with the idea of "less salary more work" and supervision should be provided in this sense." (L-1)

"Child development, occupancy, and employment are also very good, the quotas are full, the fact that they are in business life increases the need for the program and I think that it will not lose its importance in the future in parallel with the need." (A-1)

Even if an individual studying or graduating from a child development program does not have any contribution to the business world, the practical and applied education they learn here with the thought of a possible parent candidate in the future, at least in the program that will be useful to them in real life, such as child education, child psychology, child nutrition, development, and learning. It also shows the importance of the program that the courses and concepts will guide the graduates in real life. An example view on this issue is as follows:

"I think of it as a babysitting. I believe it should be mandatory, even mothers should receive training on the program. It should be given to expectant mothers about child education, psychology, and discipline rules. Even if she doesn't graduate from the program, she can take care of her own child." (A-2)

Content and necessity of the program/lesson

All of the lecturers who expressed their opinions on the sufficiency and necessity of the program said that the content of the program is in a very good condition, that it is a lesson system based on maximum performance in a 2-year education, that the program and its content are constantly updated by following the new developments, that the latest publications, studies, and researches related to the field are followed. It states that the content of the program was arranged by using the program so that the content of the program is full. The following is an example quote that supports this view:

"The program content is very full. In fact, it needs to be spread over 4 years and needs to be assimilated. The content is up-to-date and we are constantly trying to follow and update the publications." (L-2)

The administrators who expressed their opinions on the necessity of the lesson stated that since the children spend almost 8 hours a day in kindergartens and schools, they not only eat right, balanced and healthy in the schools they attend but also that the right eating habits can be acquired by a proficient and experienced staff and that the graduates as staff working in these schools are the children's age and age. They expressed their opinion that the lesson is necessary for them to organize nutrition and feeding time in accordance with their development. An example quote that supports this view is as follows:

"Your children spend all their days in school. Most of the feeding hours are spent there, so a healthy and balanced diet is important for health. Students whose child nutrition lesson is important should graduate competently." (A-1)

The instructors, who expressed a positive opinion about the necessity and adequacy of the course in general, aim to reorganize the course not only in the form of child nutrition but also in the form of child and mother nutrition stated that they should. In addition, according to the

results of the observations, it was determined that the objectives were attainable, suitable for students' needs, oriented towards student behaviors and partially consistent with each other; it was concluded that the content was organized according to the teaching principles and was suitable for previous subjects and learnings. A sample excerpt from the views supporting these issues is as follows:

"Children's nutrition lesson aims to give students the habit of eating and how nutrition should be. In this respect, the first term should be given and it should be compulsory." (L-2)

All of the students who expressed their opinions on the necessity and adequacy of the lesson expressed a positive opinion. For children to eat healthily, grow up healthy and remain healthy individuals; what are the useful and harmful foods from pregnancy to the end of school age, how a healthy nutrition menu should be and how it is prepared, how many hours and how the child should be fed, what kind of menu is prepared for different age groups, etc. The fact that the subjects which are handled in course shows that the course is necessary and sufficient for the students and that the course has an important place in the program. The sample views they gave to the question of whether the course has an important place in the program and supporting these issues are as follows:

"This lesson has an important place in the program. We need to know how to implement a healthy program when we start our profession. We can say that it is an indispensable lesson for the program." (S-2)

Suitability of the lesson with business life

One of the managers had a positive view on the suitability of the lesson with business life while one of them had a negative view. The manager who expressed a positive opinion stated that proper nutrition has an important place in the childhood, that is, in the growth period, by citing knowing how to prepare a sample menu and also knowing the physical and physical development of the students. The administrator, who expressed a negative opinion on this subject, states that the nutrition menus can be prepared by nutritionists, dietitians, even school principals or health professionals or guides working in the institution and states that the course is necessary but not very suitable for business life for program graduates. In the observations made, it was seen that the content was decent for living conditions. Positive and negative managerial views supporting this view are presented below respectively:

Preparing a sample menu and providing a balanced diet also means knowing the mental, physical and physical development of children. Therefore, children need to be fed correctly, balanced and regularly, especially during the periods when growth is fastest after birth. I think the course is appropriate for today's business world as our students who will do this that is to provide these opportunities and conditions is our output." (A-1)

"Considering that our graduates are generally employed as auxiliary personnel in kindergartens and schools, I think that the lesson hours, feeding times, and nutrition menus in these institutions can even be made by more specialized hands (manager, specialist, dietitian ...). For this reason, I can think that the course is necessary, but it is not possible to say that it is very suitable for business life." (A-2)

Instructors state that the lesson is suitable for business life. While one of the instructors (S-1) stated that he was only suitable for business life because the students could prepare a nutrition menu suitable for all criteria. The other (S-2) stated that the lesson was even more than

business life because the lesson included not only childhood but also adolescence. It also emphasizes how a healthy diet should be. However, information and practices are provided outside the pre-school period also means that it will be a burden for a staff who will work in the preschool period and may not be of use to them. An example excerpt supports these views is as follows:

"The content is compatible with business life. The menu planning knowledge given to the students in class is something they will use in their work. It is important in that sense." (S-1)

"There is a little bit more to business life, too. When we say child nutrition, we deal with the needs of the individual, how nutrition should be in all periods from birth to adolescence. But considering that most students will work in the preschool period, the content may not match." (S-2)

While all of the students state that the lesson is suitable for business life, only one of the students states that the lesson content is not sufficient even though the course is suitable for business life. The students, who stated that their job is to take care of children and the health of children is the most important thing when taking care of them, attributed the basic condition for children to be healthy primarily to a healthy diet. Considering that this course is taught to them within the scope of this lesson, they state that the course is very suitable for business life. A sample excerpt from student opinions supporting these views is as follows:

"We take care of children, and the most significant thing when taking care of them is their health, so this lesson is one of our most essential lessons. It is up to us to keep them healthy. If we prepare a healthy diet, if we provide a balanced, regular and clean diet, taking into account all the development of children, we will raise healthy individuals. We learn this information within the scope of the course. For this reason, I think this course is very suitable for business life." (S-5)

Contribution of the course to the professional development of students

Instructors state that every student is a parent as well as a prospective teacher, so the lesson is as important for students' personal development as their professional development and voluntarily performs. The sample quoted opinion supporting these views is as follows:

"I care about them since each of them will be a teacher and then a parent. In their professional development, it is very important to be able to raise individuals who eat nutrition, child nutrition, and most importantly, to be able to eat healthy." (L-1)

Views of the students also support the views of the instructors. All of the students who participated in the interview should attend this lesson for their professional development and personal development, so that they will be intertwined with children in their professional life, they will be individuals who carry out healthy nutrition, they can prepare a healthy nutrition program and become an experienced and conscious teacher in this regard and prepare a balanced and healthy nutrition program in business life state that their contribution is positive and undeniably important. They also state that when they become prospective parents in the future, they will be able to adapt this information to their own lives. The sample opinion supporting these issues is as follows:

"Since we will all be in kindergartens and intertwined with children in the future, we learn how to feed children more healthily in our professional life, so it contributes to us." (S-5)

Business life after graduation

As a result of the interviews with the students, in their business life after graduation; By completing a bachelor's degree, they see themselves as a child development or kindergarten teacher, as an academician, by opening their own schools, and as an ideal teacher. Examples of student opinions supporting these issues are as follows:

"First of all, I want to finish school and complete my undergraduate degree. My goal is to be an academician, but I think I will have difficulties in this regard, so I want to be a kindergarten teacher. Even if I do not work in the government, I will continue my profession in private companies." (S-9)

"I want to finish my school first. Afterward, I want to study an undergraduate program related to my field, if not, I want to study from open education and become a civil servant. I want to work in private institutions or open my own school if I have the opportunity." (S-10)

"I aim to develop myself more and open my own school. As a final step, I would like to add graduate and academic studies." (S-11)

Educational situations, learning-teaching process

In order to increase the effectiveness of the lesson, the instructors first used the lecture method in the lesson, then planned the nutrition plan, the nutrition menu (breakfast plate, fruit plate) together, and tried to learn by doing, learning on the spot, and teaching what they learned in a way that they could apply in real life. They also stated that as an activity, they prepare and present special nutrition menus in accordance with the development of children (with regard to different age groups). Pursuant to the results of the observation, the practices in the learning-teaching process are partially compatible with the contemporary teaching principles, students' prior knowledge is checked at the entrance to the lesson, the introduction to the lesson (curiosity, drawing attention, informing the target), the transition to the lesson and the teaching of the lesson (hint, reinforcement, feedback, correction) was applied effectively, and the method and technique were partially chosen appropriately. An example opinion supporting these points is as follows:

"It is important to keep the student active in order to increase the learning effectiveness, so I open a discussion after each topic. We share in the form of questions and answers. In addition, we prepare special nutrition menus for the child every semester and offer them at the end of the semester (main and snacks)." (L-2)

Almost all of the students expressed contradictory opinions with the instructors regarding the learning-teaching situations and the effectiveness of this process. While only one of the students is content with the functioning of the learning process, the others state that the instructors should teach by diversifying techniques and methods. This course should be practiced in nursery and kindergartens, the nutrition programs of nursery and kindergartens should be examined and analyzed, observation should be made at meal times of kindergarten students, meals should be eaten in the same environment with the children, students should prepare a sample plate and present it as homework, as well as another meal in the classroom as a presentation. The instructors should present the lesson not only through lectures but also by diversifying the method and technique and making presentations, slides, videos, etc. They also stated that they should teach by using the materials. Examples of opinions on this subject are as follows:

"You can go to kindergarten and examine the nutrition programs there. For example, we could watch students over a breakfast. We could see what foods they like to eat." (S-3)

"We should not just read through the book, we should make use of all the details about the nutrition lesson, be it slides or videos..." (S-6)

"We could go to the kindergarten and prepare a plate there and observe. We could see the children's reactions." (S-11)

Test situations-measurement and evaluation

Instructors state that they do the measurement and evaluation process in a similar way. They state that they evaluate a semester with midterm (40%) and final (60%) exams at the time and date determined by the university, and they make their criteria through open-ended questions and multiple-choice tests while making the assessment. In addition to these, (S-2) who finds the measurement-evaluation processes insufficient, states that he wants homework at the end of the term. In the observations made, it was seen that the targets were achieved and the measurement-evaluation activities reflected the process. An opinion on this issue is as follows:

"Students have midterm and final grades. But I prefer to make the exams more classical and multiple choice. However, with the thought that this evaluation is insufficient, I also have sample menu plates prepared at the end of the term or fun plates in regard to the age group." (S-2)

Students expressed different opinions about the measurement-evaluation process. Some of them stated that the exams are simple and that they should be made more difficult and the duration of the exam should be increased, some of them stated that only the exam time should be increased, some of them stated that the duration is insufficient but the content validity is very good, and some of them are content with everything done. However, in general, the students state that they are satisfied with the evaluation criteria and evaluation conditions, even if they express different opinions. Examples of opinions supporting these issues are as follows:

"I think it's appropriate. Instructors took into account important information and asked them." (S-1)

" "Exam time is short, but we took the exam from what we learned, I think it's useful." (S-7)

"The exams should be made a little more difficult. Exam time should be increased." (S-10)

Instructor qualifications

While one of the administrators who participated in the interview stated that he found the instructor sufficient on the grounds that he could show an exemplary nutrition menu, the other administrator had to know the proficiency of the students in order to know the adequacy of the instructor. He stated that he had no idea. Some of the views that support these points are as follows:

"I think the instructors are sufficient. It can show a sample menu." (A-1)

"In order for me to know the competence of the instructors, I need to know the competence of the students. It is necessary to measure the achievements of the student, to look at their goals, to see how much can be transferred across. I have no idea." (A-2)

While one of the lecturers who participated in the interview stated that he did not consider himself fully competent, but aimed to improve himself in order to be better in the coming years, the other lecturer stated that he considered himself sufficient, but still acted with the motto of how can I be better in my profession:

"Maybe I can be better. I believe it will be even better in the coming years. I will try to bring in activities that develop myself and improve the lesson (if I have the lesson)" (L-1)

"I see it as enough, but I am always researching how I can convey it better. Because I want students to have a perception that they are willing to learn and how I can do better, not just out of fear of passing the course as a lesson." (L-2)

Students participating in the interview; He found the instructors sufficient because he taught the lesson with his knowledge from the book and his daily life, gave presentations, taught in a conversational style, gave examples from the instructors' own lives, and conveyed all the necessary information. Two students who do not agree with these views state that they do not have sufficient equipment and still feel deficiencies in themselves that the lesson is in the air of an elective lesson and that the instructors do not feel proficient. Examples of citations that support these views are as follows:

"Good information was given, but I do not think it is enough. The information did not fit well in my head. I still feel lacking. It was like an elective, less succinct." (S-9)

"As the lecturer teaches from the book and her knowledge of daily life, it becomes more permanent." (S-11)

Discussion, Conclusion and Suggestions

In this study, in accordance with the basic stages of the Metfessel-Michael Program Evaluation Model, the "Child Nutrition" curriculum was evaluated using observation, interview and document review techniques and in line with the opinions of the program stakeholders. Since the learning outcomes of the course are thought to have a high effect among the learning outcomes of the program, it was obtained as a result of the examination of the course information forms that the course has a high level of relationship with the program. Therefore, it can be said that the course is a course with significant outputs that affect the program achievements to a high degree (which constitutes almost 20% of the program goals).

As a result of the interviews with the students, the reason for choosing this program is that most of the students have a different purpose and the reasons for choosing this program are that their score is not enough for another program, they prefer the program willingly, they have an interest in children, they think that it is a profession they can do in the future, and the reasons for choosing this program are the factors for continuation of their high school programs. Considering the current structure of the program in line with the opinions of the participants, the need for kindergartens has increased due to the increasing population and women's participation in business life, and therefore the need for qualified and intermediary staff to work here will increase, it is thought that individuals who graduate from the program will be needed for a long time. Considering the participation of graduates in the workforce and working life, employment opportunities, and the fact that graduates of the program can generally be employed as intermediate staff and auxiliary personnel, we encounter the discourse of extremely low wages in today's Turkey. Therefore, it has been determined that students tend to be public employees, academician or open their own schools while they are still studying in the program. In addition, the fact that the students who come to the program can benefit from the Preschool Teaching, Child Development (Undergraduate), Special Education, and Social Work undergraduate programs through the Vertical Transfer Exam constitutes the program's attractive point.

It has been determined that all of the administrators, instructors, and students expressed positive opinions about the necessity and content of the course. In the same way, the contribution of the lesson to the professional development of the students was welcomed by the instructors and students, but based on the fact that there are better-equipped individuals in kindergartens and nurseries in business life, the emphasis that all work and operations related to child nutrition can be performed by more technical and well-equipped hands is also very realistic with the business life of the course. Although it is not compatible, it has been concluded that graduates have an extremely important place in terms of personal accumulation and personal development.

Considering the achievements related to the Child Nutrition lesson, it is seen that there are problems related to the teaching-learning process and that the problems experienced create problems in reaching the goals. When the learning-teaching process was evaluated from this point of view, it was emphasized by the students that the activities should be enriched by restructuring the learning-teaching process in order to achieve goals and improve learning. The findings obtained from the regular in-class observations and interviews made by the researchers, which are included in the 8 basic stages of the Metfessel–Michael curriculum evaluation model, confirm the analysis.

While one of the lecturers interviewed did not feel sufficient in this regard, the other stated that he felt sufficient, and almost all of the students criticized the current situation negatively. It is emphasized that the education-teaching process is mostly based on lecture, discussion, and question-answer methods-techniques, but the learning should be more permanent and the individual differences of those in the classroom should be taken into account. At the same time, the process should be based on modern education understanding within the scope of the concept of andragogy. In this case, it is thought that enriching the learning-teaching process with visuals, videos, and slides in order to restructure and organize the process, on-site observation and examination with trips to nurseries and kindergartens, and practical assignments can motivate students towards the lesson and increase the effectiveness of the process.

With respect to the results of the observations made and the interviews with the students and instructors, it was seen that the instructors tried to explain the lesson through expression rather than using different methods and techniques, and tried to enrich the activity, lesson and process partly with discussion and question-answers. This situation is not a situation that encourages learning, but can be seen as a deficiency that limits the quality, permanence and effectiveness of learning. Similarly, as stated in Yakar and Saracaloğlu's (2013) study conducted within the scope of the Metfessel-Michael evaluation model, new and different activities are needed; content, learning-teaching process, and evaluation dimensions are similar to the finding that there are similar problems. It is similar to the findings of program evaluation studies conducted at different school levels. Similarly, the same findings were reached in the study conducted by Gündoğdu et al. (2017) within the scope of Metfessel-Michael program evaluation, Human Resources Management Program, Human Relations course. All these findings show that it is necessary for the programs to be developed in the light of contemporary principles and for the instructors to be trained in this direction.

During the measurement and evaluation phase of the lesson, it is measured with two exams, as midterm and final application, as stated in the lesson information form and stated by the instructors, and it has been determined that the instructors use multiple-choice tests and openended questions as measurement tools in these exams. It would be appropriate to say that an evaluation process in which the process is dominated and the result is evaluated, rather than result-oriented, as the students want in the interviews, will be effective on the motivation of the students and instructors.

As a result, it is seen that the course and its objectives have an important place in the program, the content of the lesson is not limited to a single source, there are problems in the learning-teaching process, the lesson is tried to be conveyed mostly through lectures, and the assessment and evaluation are done only with exams. Considering this situation, the two educational situations in which the greatest difficulty is experienced are the learning-teaching process and measurement and evaluation. For this reason, the following recommendations can be made. These:

Regarding the teaching-learning process,

In the teaching-learning process, the general difficulties experienced in almost all higher education institutions were encountered and it was observed that most of the lessons were taught as presentations, and processes such as demonstration, application, demonstration and show were almost not implemented except for practical lessons. Two situations are considered as the reason that either the lesson content is too intense or the instructors do not have sufficient knowledge and equipment on strategy, method, and technique. Therefore, the instructor can simplify the lesson content. In addition, the instructor can be encouraged to improve himself or participate in in-service training.

Regarding Measurement-Evaluation,

Assessment and evaluation should be consistent with the objectives of the course, exam periods should be planned in regard to the content of the exam. Considering that classical measurement and evaluation criteria are applied in general from primary school to higher education in Turkey and this alone is not sufficient, it is known that classical measurement and evaluation is result-oriented. However, it is important to evaluate both the duration and the result in the constructivist education system. For this reason, alternative measurement and evaluation methods should be included the process.

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International Journal of Educational Studies and Policy (IJESP)

Volume: 2, Issue: 2, November 2021

Examination of the Mathematical Language Used by Primary School Fourth Grade Students*

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ABSTRACT

The purpose of this study is to examine the mathematical language of fourth-grade students. A nested multiple case design was used in the study. The study participants are 150 fourth-grade students (86 girls and 64 boys) attending three different primary schools in the same school district in Altinordu district of Ordu in 2016–2017 school year. The data were collected using the Mathematical Language Use Inventory. Both qualitative and quantitative analyses were used to evaluate the data at hand. Based on the quantitative analysis, the students were divided into the following three groups: low, medium, and high-level students. These groups were used as the sub-themes in the analysis of the qualitative data. Descriptive analysis was used to evaluate the qualitative data. Evaluations and comparisons were made on the status of the low, medium, and high-level students in terms of the use of mathematical language. The findings of the evaluations and comparisons on the low, medium, and high-level students revealed that the use of mathematical language varied from student to student.

Keywords: Mathematical language, problem solving, problem posing

Article History: Received 02.07.2021

Accepted 29.10.2021

Cite as: Belen N. A. & Kuruyer, H. G. (2021). Examination of the mathematical language used by primary school fourth grade students. *International Journal of Educational Studies and Policy*, 2(2), 73-91.

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*This paper was originally submitted to the Ordu University for the Master's Degree in Primary School Education and supervised by Hayriye Gül Kuruyer.

Introduction

The main goal of mathematics teaching is not to transmit information to students but to equip the student with communication, association, reasoning, and problem-solving skills that will enable them to access information (National Council of Teacher of Mathematic [NCTM], 1989). Generally, while teaching mathematics in schools, teachers use a set of relations, rules, and symbols without basing mathematical knowledge on a reason. Therefore, students can only solve problems similar to the ones they have learned (Brown and Walter, 1983; Leikin et al., 2013; Olkun and Toluk, 2014). Individuals who learn mathematics as a set of rules fail to overcome the problems they encounter in real life because they cannot learn to think mathematically. Therefore, a focus on mathematics at school (Anghileri, 2005). Thinking and communication are interrelated processes. Explaining the use of mathematical language in this process can be accepted as a starting point in learning mathematics (Ferrari, 2004). Understanding the nuances of a child's mathematical language is necessary to understand the mathematical difficulties that the child experience (Warren, 2006).

In mathematics classes, students communicate mathematically by speaking, writing, and explaining their mathematical ideas. They learn to communicate through mathematical language by exploring their ideas in verbal activities in the classroom. There is no better way to express an idea or convey it to others (Van de Walle et al., 2014). Using mathematical language in discussions based on verbal expressions exchanged between among students and between a student and a teacher is a part of effective teaching. As a result of these discussions, a shared meaning is constructed about the discussed idea. In other words, the primary purpose of mathematics activities is to construct meaning (Olkun and Toluk, 2014). Mathematical language is used to construct and enhance meaning related to basic arithmetic content and define, compare and develop mathematical ideas (Warren, 2006). Individuals construct their knowledge by thinking effectively and deeply. They also construct understanding by using their existing ideas and knowledge (Van de Walle et al., 2014). To understand how students learn and understand and use their internal representations, structured math activities are a good starting point (Lesser and Tchoshanov, 2005).

The language of mathematics is a living language that enables concepts to be perceived, has a unique syntax, and gives birth to new concepts when necessary (Karaçay, 2011). Mathematical language is a part of daily life, and its meaning can change depending on the contex. For example, zero can mean absence, a bad result in an exam, or a number in a phone number. Teaching mathematical language is important as it increases students' motivation and moves students beyond the rules (Schoenfeld, 2016). Children learn how to use the mathematical language more effectively when conveying the results of their mathematical thoughts about the solution to a problem, verbally or in writing (Olkun and Toluk, 2014). Teaching mathematics as a language is often a subject that is given little attention and emphasis in the classroom. However, for students to become a true mathematical literate, it is necessary to bring real-life situations into the classroom and make them a part of the learning environment (Adams, 2003). The basic element of accomplishing mathematical thinking by acquiring concepts and information about mathematics is using mathematics field language correctly (Lansdell, 1999, as cited in Toptas, 2015). With the correct use of the field language, students can understand abstract concepts more easily, reach new concepts and information in mathematics, and apply their mathematical knowledge and skills to different disciplines. These skills form the basic components of mathematics learning (Yeşildere, 2007).

Revealing and analyzing the mathematical language that children use allow creating insights about how children understand mathematics, how they learn it and the situations in which they have difficulty in learning (Pirie and Schwarzenberger, 1988). The way students represent mathematical concepts is affected by their beliefs, concepts, misconceptions, and individual differences (Duval, 2006). Students need to learn how to use mathematical language to communicate with each other and with their teachers. Transferring students' clear and consistent arguments and written and oral presentations that reflect their mathematical styles to the learning environment effectively develop students' mathematical language skills (Schoenfeld, 2016).

It is seen that most of the studies in mathematical language in Turkey examined secondary school students and only one study examined preschool students only (Dur, 2010; Çakmak, 2013; Taşkın, 2013; Yüzerler, 2013; Ünal, 2013; Akarsu, 2013; Kula-Yeşil, 2015; Yıldız, 2016). To the best of our knowledge, no study in mathematical language examined primary school students in Turkey. In this sense, this study aims to make important contributions to the literature. Mathematics is a way of thinking, which everyone uses to solve every-day problems (Yıkmış, 2012). It should be aimed that young children have a complete understanding of the mathematical concepts and principles forming the basis of mathematics as they learn from their teachers from the moment, they start their education life (Haylock and Cockburn, 2014). Therefore, this study aims to help teachers understand how students make sense of mathematical thoughts and information that form the basis of what they teach. Using an approach to support the development of problem-solving behaviors in basic education, especially in the first years, helps students both increase their success in problem solving, better understand the principles and subjects of mathematics, develop positive attitudes toward mathematics, and increase their self-confidence (Baykul, 2016, p. 83).

For this reason, it is important to examine the mathematical language that primary school students use while solving and posing problems. In this sense, the primary purpose of this study is to examine the mathematical language used by primary school fourth-grade students. Within this context, the sub-purposes of the study are as follows:

- 1. Examination of the mathematical language used by the fourth-grade students in the problem-solving process.
- 2. Examination of the mathematical language used by the fourth-grade students in the problem-posing process.
- 3. Examination of how the use of mathematical language in the problem-solving and posing processes of primary school fourth-grade students differs by the scores they get from the rubric.

It would be possible to say that the scope of this study is limited to the problem-solving and problem-posing processes, fourth- grade students, and the learning area of numbers.

Method

A nested multiple case study method, one of the qualitative research approaches, was used to examine the mathematical language used by students while solving and posing problems. This method is used to examine the mathematical language used by fourth-grade students while solving and posing problems and its characteristics. Also, it was aimed to identify the mathematical language they used within the context of in-class learning and experiences in the learning area of numbers. In this study, the nested multiple case study method was preferred as it would allow investigating how primary school fourth-grade students used mathematical language while solving and posing problems, whether the mathematical language used by them while solving and posing problems varied depending on the score they got from the rubric and the source of variation, if there was any. This method allowed making detailed implications about the mathematical language that is the study subject and examining more than one case associated with the mathematical language.

Participants

The study used a purposive sampling method because of the necessity of selecting cases that contain rich information for the depth of the study. In this regard, to determine the study participants, the data were collected through the interviews conducted with the school principals and primary teachers during the previous visits. Thus, three different schools in the same school district were selected. In these three schools, it was aimed to understand the use of mathematical language in the problem-solving and posing processes of primary school fourth-grade students within the context of in-class learning and experiences in the learning area of numbers. The reason for selecting fourth-grade students is that this grade level is the last grade of primary school. The study participants are 150 fourth-grade students (86 girls and 64 boys; their mean age is 9.5, SD=.57) attending three different primary schools in the same school district in the Altinordu district of Ordu. Initially, there occurred a concern that data saturation would not be reached in the study as activities such as thinking aloud and writing in detail could not be used in the mathematics lessons of primary school students, especially when using problem-solving skills and that the students had limited experiences. Thus it was decided to work with a large number of participants. As a result, a total of 190 students participated in the study. The papers of 40 students were excluded from the study as their papers were not readable or as they did not complete the tasks in the inventory. Instead of using the real names of the students, codes were assigned to each student such as Student 1 and Student 150. Before the application, the students were informed about the study, and their consent was obtained, and the students who did not want to participate in the study were excluded from the study.

Data Collection Tool and Rubric

The study data were collected using the "Mathematical Language Use Inventory." A rubric was used to evaluate the data at hand.

Mathematical Language Use Inventory

The literature was examined to decide whether there is a need for an inventory to determine the use of mathematical language in the problem-solving and posing processes. As there was no measurement tool to determine the mathematical language used by students in the problem-solving and posing processes, an inventory was developed. The purpose of this inventory is to determine the mathematical language that students use when dealing with problems. In line with this purpose, first, the relevant literature was reviewed to establish the inventory's conceptual bases and determine the structural features it should have (Baykul, 2016; Gonzales, 1998; Mayer and Hegart, 1996; Polya, 2004). To reveal students' use of mathematical language while solving and posing problems, four operations skills, problem-solving and posing skills in the primary school fourth-grade curriculum were taken as a basis. While preparing a mathematical language use inventory covering four operations (addition-subtraction-multiplication-division), problems to measure the use of mathematical language while solving and posing problems within limits specified in the fourth-grade Mathematics Curriculum (Ministry of National Education [MoNE, 2015]); the problems used in the problem-solving achievement test developed by Özsoy and Kuruyer (2012), TIMSS (2011) questions and primary school mathematics fourth-grade teacher's guide book (Karakuyu & Şenyurt, 2016) were drawn on. After the inventory was created, the draft was sent to three experts having a doctorate in Primary Education and having experience in mathematics teaching and one expert having a doctorate in Measurement and Evaluation in Education to obtain their opinion about the draft. The inventory was finalized the experts' feedbacks provided. The Lawshe method was used for the content validity index (CVI).

The content validity index was calculated as .92. A pilot study was conducted to determine whether the tasks in the inventory reveal the mathematical language in the problem-solving and problem-posing processes and evaluate the data collection process and the problems in the inventory. There were 10 problems and eight subtasks for each problem prepared in accordance with the problem-solving stages of Polya (2004) in the inventory prepared for the pilot study. These tasks are as follows; (a) Explain what is given and asked for in the problem, (b) Which mathematical operation(s) will you use to solve the problem?, (c) Explain why you chose the mathematical operation(s) to use, (d) Solve the problem, (e) Can you solve the problem by drawing a picture or figure? If so, how? (f) Write a problem similar to the one you have solved, (h) What is/are the mathematical operation(s) that should be used to solve the problem you have written? (i) What is the clue to solve the problem you have written? Please explain briefly.

The pilot study was conducted with 50 students who were excluded from the study group in two course hours. As a result of the pilot study, three problems in the inventory were removed and the inventory was finalized, making it ready for the main application. In the final form of the inventory, there were seven problems in total and subtasks to determine the use of mathematical language for these problems. In addition, the mathematical language skills that the problems in the inventory aim to reveal are as follows: (1) being able to translate verbal language into symbolic and visual language (problems 1, 2, 3, 4), (2) being able to translate visual language into a verbal and symbolic language (problems 5, 6), (3) being able to translate symbolic language into a verbal language (problem 7).

The Rubric

To determine the mathematical language used by the students during problem solving and posing processes, a rubric were developed by the researchers to evaluate the tasks presented to the students through the inventory. To develop the rubric, first, the literature was reviewed (Altun, 2005; Altun, 2015; Baykul, 2014; Çalıkoğlu-Bali, 2002; Olkun and Toluk, 2014; Van de Walle et al., 2014). While developing the rubric, the skills required to use of the mathematical language suitable for the current study were taken into account. These skills can be listed as follows: translating verbal language into symbolic language, translating symbolic language into verbal language, translating visual language into verbal language, and translating visual language into symbolic language. In the measurement of the performance indicators in the rubric, of the

following grading levels were used: expressing correctly and thoroughly = 2 points, expressing incompletely = 1 point, and expressing wrongly or expressing nothing = 0 point. After developing the rubric, the opinions of six experts having a doctorate in Primary Education were sought to ensure content validity. The Lawshe method was used for the content validity index. The CVI value was found to be .94. The criteria of the rubric aim to determine the level at which students use the mathematical language. The rubric is composed of seven performance indicators about problem-solving or posing processes. For each performance indicator, the students using mathematical language thoroughly and correctly were given 2 points, using mathematical language incompletely or insufficiently were given 1 point, while 0 point was given to whom could not use mathematical language and the scores obtained from the Mathematical Language Use Inventory were summed. The total mathematical language use score of each student was obtained. For the reliability of the rubric, all the data obtained from the Mathematical Language Use Inventory were evaluated by the researchers and three other field experts, and the correlation coefficient between the results of the five researchers was calculated to be .98. The lowest score to be taken from the mathematical language use inventory is 0, while the highest is 74.

Application of the Data Collection Tool

Before starting the application process, permissions were obtained from the Ordu Provincial Directorate of National Education and the principals of the schools where the application would be made were contacted to inform the study. Then, the fourth-grade teachers in whose classes the data would be collected were contacted to determine the most convenient time for the application of the Mathematical Language Use Inventory to their students. The inventory was then administered to the students during the course hours determined by their teachers. While talking to the teachers before the application, information was obtained about the mathematics knowledge level of the students and the way they use to teach mathematics lessons verbally. Before the application, the primary researcher who would conduct the application spent some time with the participants for them not to be negatively affected by the presence of the 2016–2017 school year. Before starting the main application, a pilot study was conducted and a sample application was performed by the primary researcher. The main application was carried out with the participation of fourth-grade students within 24 course hours.

Data Analysis

In the first stage of the study, it is aimed to evaluate the data quantitatively and qualitatively. The quantitative data obtained by evaluating mathematical language use inventories completed by the students through the rubric were transferred to the IBM SPSS 22 program. Kolmogorov- Smirnov test was used to determine whether the total scores of the participants showed a normal distribution. As the total scores obtained from the Mathematical Language Use Inventory were normally distributed (N= 150, p= .200), the range of 0 - (mean-standard deviation) was defined as the low (or subgroup), the range of (mean-standard deviation) - (mean+standard deviation) was defined as the medium and the range of (mean+standard deviation) < and the subsequent was defined as the high group. Thus, the range of (0-15.81) was specified as the low group, the range of (15.81-36.47) was specified as the medium group, and the range of 36.47< ... was specified as the high group. The students were grouped as low-level students (N= 25), medium-level students (103), and high-level students (N= 22) according to the scores they obtained from the Mathematical Language Use Inventory. These groupings were determined as sub-themes. The qualitative data obtained from the Mathematical Language Use Inventory were

evaluated through a descriptive analysis method. The data obtained through this method were summarized and interpreted according to the previously determined themes. The main purpose of the descriptive analysis is to present the findings to the reader in an organized and interpreted manner (Yıldırım and Şimşek, 2008, p. 224). In the analysis of the data, the following stages were followed: (a) determining the themes and sub-themes (b) transcribing the data (c) organizing the data according to the themes (e) analyzing and interpreting the data. The themes and sub-themes determined within the context of the study are presented in Table 1.

Table 1. Themes and sub-themes

THEFTER			The status of the low-level students
	Being able to use verbal language in the process of understanding the problem		The status of the medium-level students
			The status of the high-level students
			The status of the low-level students
	Being able to use verbal language in the process of determining the operation		The status of the medium-level students
			The status of the high-level students
			The status of the low-level students
	Being able to use verbal language while performing the operations selected	Sub-themes	The status of the medium-level students
			The status of the high-level students
	Being able to use symbolic language in the process of solving the problem		The status of the low-level students
			The status of the medium-level students
			The status of the high-level students
			The status of the low-level students
	Being able to use visual language in the process of solving the problem		The status of the medium-level students
			The status of the high-level students
	Being able to translate symbolic and/or visual language into a verbal language in the process of		The status of the low-level students
			The status of the medium-level students
	posing the problem		The status of the high-level students
	Being able to use verbal language in the process of comprehending the problem		The status of the low-level students
			The status of the medium-level students
			The status of the high-level students

In Mathematical Language Use Inventory, the sub-theme of being able to use verbal language in understanding the problem was prepared to explain students' skill of using verbal

language in the process of understanding the problem. The student, who can use verbal language to understand the problem, can clearly express what is given and asked for in the problem and can explain the problem in his/her own words. To explain how the evaluation is made according to Sub-Theme 1, the analysis of the answers given by Student 135 (low-level student), Student 124 (medium-level student) and Student 132 (high-level student) to the question "What is given and asked for" in the problem 1 are given as examples. The answer given by Student 135 is "A mountaineer climbs 1315 meters, then takes a break and climbs back up. How many meters are left for the mountaineer to reach the summit?"; the answer given by Student 124 is "He climbs 1315 meters, climbs 915 meters more, the remaining distance is 530 meters. How many meters is the mountain?" and the answer given by Student 132 is "A mountaineer takes a break after climbing 1315 meters and climbs another 915 meters after the break and the remaining distance is 530 meters. The height of the mountain." In the answers, it is seen that Student 135 expressed the given information incompletely. Student 124 could not explain what was given in his/her own words. Student 135 and Student 124 could not use verbal language adequately in the process of understanding the problem. The performance of Student 132 was interpreted as follows: "He/she was able to use verbal language in the process of understanding the problem by expressing clearly what was given and what was asked for." The data obtained from the Mathematical Language Use Inventory allowed obtaining in-depth information for the determination of the mathematical language use of the primary school fourth-grade students while solving and posing problems. The researchers and three independent experts examined the themes, sub-themes, and findings identified during the data analysis process. The internal validity of the study was attempted to be ensured by reporting the obtained data in detail, direct quotations, and explaining the findings objectively based on these quotations. The external validity of the study was attempted to be ensured by explaining the research process and what was performed in this process in detail. To establish the reliability of the study, all data were reviewed by three field experts. Using the reliability formula proposed by Miles and Huberman (1994), the *p*-value was found as .94.

Findings

Being Able to Use Verbal Language in the Process of Understanding the Problem – the Status of the Low, Medium, and High-Level Students

The findings of the study revealed that the low-level students had difficulty expressing the problem in their own words. It was observed that they confused concepts such as height and size (Students 62, 63), only expressed what was given or only what was asked for (Students 84, 87, 95,150), and incompletely expressed what was given (Students 60, 68, 96). According to the findings, it was observed that the students who did not understand the problem could not clearly express what was given and what was asked for using verbal language. The mistakes made by the medium-level students at this stage include using numerical data only (Students 35, 106, 144) and incomplete or incorrect data (Students 32, 112, 122) while expressing what was given and writing the same problem sentence while expressing what was given and what was asked for (Students 69, 75). The medium-level students were observed to express what was given and asked for by summarizing and using verbal language to understand the problem (Students 77, 98, 123). The high-level students were able to articulate clearly what was given and asked for in the problem (Students 2, 15, 18, 19, 43, 81, 82, 129). Findings revealed that they could successfully use verbal language in the process of understanding the problem. Examples illustrating this situation are presented below.

Size of the mountain. (Low-level – Student 63, Problem 1)

A mountaineer climbs 1315 meters, climbs 915 meters after the break, the remaining distance is 530 meters to reach the summit. What is the height of the mountain? (Middle-level – Student 75, Problem 1)

The mountaineer climbs 1315 meters, takes a break, then climbs 915 meters. The remaining distance is 530 meters to reach the summit. Find how many meters the mountain is. (High-level – Student 82, Problem 1)

Being Able to Use Verbal Language in the Process of Determining the Operation – the Status of the Low, Medium, and High-Level Students

In the process of determining the operation, the low-level students were observed to commit mistakes, such as selecting the wrong operation for the solution of the problem (Students 21, 62, 95, 102), selecting unnecessary operations in the solution to the problem (Students 59, 83), using incomplete operations for the solution of the problem (Students 101, 135), confusing mathematical operations with the numerical values in the problem (Student 14). Based on the mistakes made by these students, it was concluded that they were not successful in using verbal language in the process of determining the operation. The medium-level students who could express what was given and what was asked for in the problem also correctly expressed the operations to solve the problem (Students 96, 144, 146). Some students who determined the correct operations for the problem's solution wrote by confusing the order of the operations (Students 21, 61). The students who could not express what was given and asked for in the problem failed to determine the operation (Students 3, 76). Some students wrote multiplication or division operations without focusing on the main idea in the problem sentence, as the term "times" was used in the problem. Some students chose random operations among the numerical data given in the problem (Student 83, 145). Some medium-level students identified the correct operation for a part of the problem (Students 38, 110). The high-level students expressed the operations to be followed in solving problems in order and complete. They were successful in using verbal language in the process of determining the operation. They successfully used verbal language in determining the operation (Students 22, 50, 64, 73, 125, 118, 128, 132). Some examples illustrating such situations are presented below:

Division, multiplication (Low-level – Student 101, Problem 2), *Subtraction, division, multiplication* (Medium-level – Student 61, Problem 2)

Division, multiplication, subtraction (High-level – Student 128, Problem 2)

The correct order in the solution to Problem 2^1 is as follows: Division, multiplication, subtraction.

Being Able to Use Verbal Language While Performing the Operation Selected – the Status of the Low, Medium, and High-Level Students

While justifying the operation, the low-level students wrote down what was asked for in the problem (Students 21, 60, 100) or used expressions such as *the result was found like that* (Students 63, 100). There were also students expressing which operations to apply (Student 60, 65). They could not accurately justify every operation they used in the solution (Students 66, 90, 105). It was determined that the low-level students could not use verbal language correctly while justifying the operations they selected. It was observed that the low-level students could not express the main idea that would lead to a solution to the problem, or they expressed it incorrectly.

¹ Problem 2. A tanker is completely filled with oil and there are 105 liters of oil in this tanker. How many liters of oil are left when 5/2 of this oil is used?

While justifying the operations chosen by the medium-level students, they were observed to frequently use expressions such as "*the result was found like that*," "*to solve the problem*" (Students 11, 13). Again, several students reported that they chose those operations to find what was asked for. Still, it was seen that they did not specify why they would apply the operations they chose to which numerical data are given in the problem (Students 16, 36, 40, 139). No medium-level students who explained why they chose which operations step by step were found. The high-level students stated that if there was the term "times" in the problem, they would multiply, if they were asked for the remainder, they would subtract, and when the total was asked for, they would add. It was observed that they used expressions such as "I would divide and multiply" while performing operations (Students 1, 107, 117, 129). They partially used verbal language while justifying the operations they had chosen (Students 22, 132). Some students incompletely expressed the main idea that would lead to a solution to the problem. Some examples illustrating such situations are presented below:

In order to solve the problem (Low-level – Student 63, Problem 3)

As it was asked how much money he/she spent (Medium-level – Student 139, Problem 3)

Since it says 6 meters, 19 TL for each meter, we multiply it and add the result with 280 TL because it says how much it costs (High level – Student 22, Problem 3)

Being Able to Use Symbolic Language in the Process of Solving the Problem – The Status of the Low, Medium, and High-Level Students

As the low-level students were unable to determine the correct option for the solution, they were observed to experience difficulties in using the symbolic language of mathematics in the process of solving the problem (Students 68, 83, 99). It was observed that these students tried to solve the problems randomly using the numerical data given in the problem and the four operations (Students 65, 86, 87, 95). It was observed that they could not reach the correct result. The students who could not use the symbolic language correctly in solving the problem were observed to be unsuccessful in summarizing the problem with their own words, determining the operation for the solution of the problem, and justifying the operation they chose. The findings reveal that the medium-level students could not reach the correct result because they made operational errors while using a symbolic language to solve the problem (Students 88, 120). While solving the problem, it was observed that they left the task uncompleted without reaching what was asked for (Students 27, 98). It was seen that they performed wrong operations and correct operations in solving the problem (Students 10, 116). Although students (Students 23, 29, 55) were unable to express the main idea that would lead to a solution to the problem and were engaged in the wrong solution, it was observed that the medium-level students could also use symbolic language while solving problems (Students 108, 121). According to the findings, the high-level students determined a complete plan for the solution and implemented the plan they determined without making any mistakes. They successfully used symbolic language to solve the problem (Students 15, 18, 43, 64, 82, 125, 129). Some examples illustrating such situations are presented below:

264×5 =1320 (Low-level – Student 47, Problem 4) 264:6=44 44×2=88 264-88=176 (Medium-level – Student 10, Problem 4) k+5k=6k, 264:6=44, 44×5=220 large number (High-level – Student 125, Problem 4) The correct solution to Problem 4^2 : 1 time + 5 times = 6 times (expression of the sum of the smaller number and the larger number), 264:6=44 (smaller number), $44\times5=220$ (larger number), or 1 time + 5 times = 6 times (expression of the sum of the smaller number and the larger number), 264:6=44 (smaller number), 264:6=44 (smaller number), 264:6=44 (smaller number), 264-44=220 (larger number).

Being Able to Use Visual Language in the Process of Solving the Problem – The Status of the Low, Medium and High-Level Students

The low-level students could not draw a shape or diagram suitable for events and relationships in solving the problem (Students 14, 21, 47, 60, 87, 101, 149, 150). These students were observed to draw pictures evoking the concepts in the problem but that were not solution oriented. Therefore, it would be safe to say that they were unable to use the visual language of mathematics to solve the problem. Among the middle-level students, the students who drew the figure or diagram incompletely or incorrectly or made the necessary markings incompletely or incorrectly constituted the majority (Students 25, 28). Some pictures and drawings do not fit the visual language of mathematics and are not solution oriented (Students 5, 6, 136). Students could not show the data appropriately in the figures they drew (Students 73, 113). Thus, it can be said that these students could not comprehend the visual language of mathematics because they used symbols instead of shapes or diagrams (Students 6, 25, 17, 28, 71, 131, 136, 140). The high-level students were mostly able to solve the problem by drawing shapes and diagrams suitable for the events and relationships in the problem. It was observed that the high-level students could not express the sizes of the figures showing the same unit equally in their drawings (Students 12, 132). In addition, there are deficiencies in the markings on the figures or diagrams suitable for the events and relations in the problem (Students 3, 22). It was observed that the high-level students were relatively more successful in using visual language to solve the problem than the low and mediumlevel students (Students 39, 82, 117, 125, 133). Examples illustrating these situations are presented below (Figure 1).



Figure 1. Sample Drawings for Problem1³: Drawing 1. Low-Level – Student 150, Drawing 2. Medium-Level – Student 136, Drawing 3. High-Level -Student 39

² Problem 4. The sum of two different numbers is 264. If the larger number is five times the smaller number, what is the larger number?

³ Problem 1. A mountaineer takes a break after climbing 1315 m. After the break, he climbs another 915 m. If the mountaineer has 530 meters left to reach the summit, what is the height of the mountain?

Being Able to Translate Symbolic and/or Visual Language into Verbal Language in the Process of Posing the Problem and Being Able to Pose a Problem Similar to the Problem Already Solved – The Status of the Low, Medium and High-Level Students

As the low-level students were unable to interpret the visual shape correctly, the problems they posed according to the shape given in the task (Students 47, 60, 86, 87, 95, 101, 135, 149) were wrong. Therefore, the problems they posed were either incomplete or incorrect in terms of meaning and numerical data. It was observed that the low-level students could not pose an original problem. Some of the medium-level students did not change the data and conditions of the problem but posed the problem changing its subject (Students 12, 20) only, some of them posed a similar problem by changing the data and the subject without changing the conditions (Students 7, 25, 88), and some of them posed a similar problem simply by changing the data (Students 33, 124). Only one student was able to pose a problem by changing the data, subject, and conditions (Student 140). In the problems that the high-level students posed, it was observed that they posed similar verbal problems to the problems they had already solved (Students 1, 2, 15, 22). Some examples illustrating such situations are presented below:

An apple weighs 50 grams, when 2 more apples are added, they weigh 150 grams, how much would it weigh, if you put 6 more apples next to these apples? (Low-level – Student 87, Problem 5)

I have 4 friends with me, and I have 36 hazelnuts, how many hazelnuts does each of my friend will have? (Student 86, Problem 1)

A scale weighs 3 apples as 220 grams. How many grams is an apple? (Medium-level – Student 31,

Problem 5)

What is the most preferred color? (Medium-level – Student 17, Problem 6)

Three apples weigh 220 grams. The weight of the first apple is 75 grams, the weight of the second apple is 25 grams more than the first apple. How many grams is the third apple? (High-level – Student 125, Problem 5)

Favorite colors in a classroom are red, green, blue, and yellow. As 4 students are choosing the color red, 2 students choosing the color green, 6 students choosing the color blue and 7 students choosing the color yellow, so how many students are there in the classroom? (High-level – Student 126, Problem 6)

Being Able to Use Verbal Language in the Process of Comprehending the Problem – The Status of the Low, Medium and High-Level Students

The low-level students had difficulties posing problems by transforming the visual, verbal, and symbolic language of mathematics to each other. They wrote problem sentences, including incomplete, incorrect, contradictory, and inadequate statements in terms of meaning. Therefore, they could not express the main idea to be used in solving the problems they wrote (Students 65, 95, 101). Although the medium-level students themselves posed the problems, they could not accurately and thoroughly express the main idea that they expressed in the problem and used to solve the problem (Students 71, 127, 130, 137, 142). Students expressed what was given or asked for as the main idea to be used in the solution. Some students expressed the main idea to solve the problem incompletely or incorrectly (Students 54, 131). Therefore, medium-level students were

inadequate in using verbal language to comprehend the problem. However, although there were students (Students 12, 127) who could not interpret visual shapes and tables correctly, it was observed that there were students who were successful in translating visual language into a verbal language (Students 71, 109). It was observed that some students expressed the main idea to be used in the solutions to the problems posed by the high-level students correctly, while some students expressed it incompletely (Students 71, 128). This shows that the high-level students were able to partially use verbal language to comprehend the problem (Students 22, 81). These students were successful in posing problems by translating visual language into verbal language and symbolic language into a verbal language (Students 39, 43, 73, 82, 107, 117, 118, 125, 126, 132). Some examples illustrating such situations are presented below:

We shared 336 bagels equally among 28 people. 8 people each ate 1 bagel of one of these 28 people, so how many bagels of this person were left?- What is the clue to be used in the solution to the problem you have written? Explain it briefly. People (Low-level – Student 65)

He/she formed the following question: 336 feeds will be equally divided among 28 cows. What is left if we subtract 8 from this? What is the clue to be used in the solution to the problem you have written? Explain it briefly. *Divide and subtract (Medium-level – Student 78)*

What is 8 minus one 28 of 336 marbles? What is the clue to be used in the solution to the problem you have written? *One 28 of 336 means division and minus 8 means subtraction (High-level – Student 22).*

Results and Discussion

In mathematics teaching, it is possible to say that the approach involving the direct presentation of the information by the teacher and then students' working on four operations skills and similar skills are not effective in students' learning and keeping mathematical concepts in mind (Van de Walle et al., 2014). Observing the student in the problem-solving process allows us to recognize and understand the student's thinking structure (Polya, 2004). In the problem-solving process, emphasis should be placed on the solution rather than the answer to the problem. It should be emphasized how the student solves the problem, what information in the problem contributes to this solution, how he/she represents the problem (table, figure, concrete object, etc.), how the chosen strategy and the way of representation facilitate the solution. Ways of solving a problem should not be given to students directly; rather a suitable environment should be provided for students to create their own solutions. In addition, students should be given the opportunity to pose unique problems similar to and different from the problems they have solved before. Primary school level has critical importance in teaching and developing problem-solving skills. However, it can be argued that this does not make students internalize mathematical skills because in primary school, first, basic concepts of mathematics, operation skills, and problem-solving skills that require operation skills are taught. However, more emphasis is put on mathematical operations skills rather than teaching children mathematical thinking skills by using the language of mathematics in schools.

Thus, teachers and students are more interested in the results of operations rather than constructing meaning, reasoning, and problem solving by thinking in a mathematical language. In this sense, the mathematical language used by primary school fourth-grade students in solving and posing problems was examined in the current study. Based on the findings, it was observed that the low-level students were not be successful in using verbal language by not correctly expressing what was given and what was asked for in the process of understanding the problem. It was observed that the medium-level students were mostly successful in using verbal language by correctly summarizing what was given and asked for in understanding the problem. The high-level students were able to use verbal language successfully to understand the problem by clearly

expressing what was given in the problem and what was asked for. To solve a problem, a connection should be established between what is given and what is asked for by using the concepts of mathematics, reasoning, and operations. Students who cannot establish this connection are unable to successful in problem solving (Baykul, 2016; English et al., 2008; Polya, 2004). The results of the study are also in line with the findings of the previous studies. It was observed that students who were unable to express what was given and asked for in the problem using verbal language were successful in solving the problem, while students who were unable to summarize the problem in their own sentences using verbal language were unsuccessful at this stage.

It was observed that the low-level students were not successful in using verbal language to determine the operation. Although middle-level students confused the order of the operations to be followed in solving the problem or expressed them incompletely, it was observed that the majority of the middle-level students were successful in using verbal language in the process of determining the operation. The high-level students were observed to be successful in using verbal language by expressing the operations to be used in the solution to the problem in order and completely during determining the operation. At the stage of understanding the problem, what is given and what is asked for in the problem is clearly determined, and an answer is sought for the relations between what is given and what is asked for (Altun, 2015; Gonzales, 1998). Students who succeed at this stage can express the operations to be followed in solving the problem in order and complete. The results obtained in this study confirm this conviction for high-level students.

It was observed that the low-level students could not express the main idea that would lead to the problem's solution, or they expressed it incorrect. No student explained step by step why he/she chose which operation among the middle-level students. It was observed that there were students who were unable to express the main idea that would lead to the solution of the problem or expressed it incomplete or incorrect. It was observed that the high-level students could partially benefit from verbal language while justifying the operations they chose and that some students incompletely expressed the main idea that would lead to the solution of the problem. Problems used to develop students' problem-solving skills in mathematics education are mostly in verbal form. For students to solve these verbal problems, they should understand the text of the problem and the numerical relations described in the problem and are able to establish relationships between them.

For this reason, verbal problems allow interactions between reasoning, mathematical development, and mathematical language formation (Aydoğdu and Olkun, 2004; Mason, 2003; Zazkis, 2000). The findings of the study are in line with the findings of previous studies. It was observed that students who were able to express the main idea verbally that would lead to a solution in the problem-solving process could use mathematical language more effectively. Knowing at what stage students make mistakes in the problem-solving process helps us understand where students have difficulties. In terms of mathematics education, it is important to define and evaluate students' skills in the problem-solving process (Baki et al., 2002).

The low-level students were mostly not successful in using the symbolic language of mathematics in the problem-solving process because they were unable to determine the right plan for the solution. It was observed that the medium-level students were mostly successful in using symbolic language in the problem-solving process. However, it was seen that while using symbolic language in the problem-solving process, they made operational mistakes and left the problem solving incomplete. The findings of the study revealed that the high-level students determined a complete plan for the solution and implemented the plan they determined without making

mistakes. They were successful in using symbolic language in the problem-solving process. By controlling symbolic operations, it should be evaluated whether the students who make mistakes make them due to lack of procedural knowledge or lack of conceptual knowledge. Every answer given by students in problem solving and posing processes should be checked, regardless of whether their answers were correct or not, and students should be talked about their thinking processes. The correct and appropriate use of symbolic language is important in the acquisition of problem-solving skills. All these arguments are supported by the findings of this study because students who are unable to fully understand the expressions and concepts given in the problem and cannot establish the equations related to the problem have difficulty in solving problems (Mayer, 1982; Mayer and Hegart, 1996; Polya, 2004).

It was observed that the low-level students generally produced pictures or drawings that were not solution oriented. Therefore, it would be safe to say that they were not successful using the visual language of mathematics in the problem-solving process. Among the middle-level students, the students who drew the figure or diagram incompletely or incorrectly or made the necessary markings incompletely or incorrectly constituted the majority of the students. The high-level students were observed to be successful in using visual language in the problem-solving process. Drawing a suitable figure or diagram for a problem is a high-level indicator of the understanding of that problem (Altun, 2015; Baykul, 2016). This is supported by the results obtained in this study because the students who comprehended the problem were more successful at this stage.

It was observed that the low-level students were unable to pose original problems similar to the problem they solved. It was observed that while the low-level students posed problems by translating visual and symbolic language into verbal language, they posed problems that were problematic or erroneous in terms of meaning. The middle-level students had successful examples of posing problems similar to the problem they solved and posing problems by translating visual and symbolic language into verbal language. The high-level students were highly successful in posing problems similar to the problem they had solved and in posing problems by translating visual and symbolic language into verbal language. High-level students were good at translating verbal, visual, and symbolic forms of mathematical language into each other.

It was observed that the low-level students were unable to express the main idea to solve the problems they posed. It is possible to say that the medium-level students were inadequate in using verbal language to comprehend the problem. It was observed that the high-level students partially verbally expressed the main idea to solve the problems they posed. To solve a problem, it is not enough that students chose the right operations. What is needed to find a solution to a problem is to comprehend and express the main idea. This is possible using the verbal language of mathematics (Schleppegrell, 2007; Schoenfeld, 2016; Schunk, 2011). These findings support the literature because students who comprehend the main idea of the problem use verbal language more successfully.

The Mathematical Language Use Inventory and rubric can be used by teachers to focus on students' experiences of using mathematical language, identify the difficulties students experience in using mathematical language, and prepare learning environments to overcome these difficulties. In addition, it is thought that examining the use of mathematical language with larger study groups of different characteristics at the primary school level will be important in terms of revealing their current state. In this study, the mathematical language used by the fourth-grade students (mean age 9.5, SD= .57) to solve and pose problems was examined. It should be noted that the scope of this

study is limited to the problem-solving and problem-posing processes and to fourth-grade students. Thus, further studies might examine different mathematical processes and the use of mathematical language at different grade levels (different age groups). Also, this study is limited to the learning area of numbers. It would be important to focus on different learning areas in future studies. Mathematical Language Use Inventory was used as the data collection tool of the study. The data were evaluated with a rubric developed by the researchers. To examine the use of mathematical language, further studies may focus on methods such as observation and interview. Further studies can also examine the opinions, and experiences of teachers and students. In addition, studies that will be designed quantitatively and qualitatively or in which these two designs will be used together can also be conducted to determine the mathematical language use of primary school students.

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Volume: 2 Issue: 2/ November 2021