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## Teachers' Professional Development Needs: A Q Method Analysis

Emin Tamer Yenen and Mustafa Kemal Yöntem  
Nevsehir Haci Bektas Veli University, Nevsehir, Turkey

### Abstract

This study aims to determine the professional development needs of teachers working in different subject domains. In this context, the sample of this study was 35 teachers working in state schools in Cappadocia provinces of Turkey. Q method analysis which includes qualitative and quantitative processes is used in this study. The professional development needs of the teachers is discussed under four main themes; instructional development, scientific field development, personal development, and organizational development and 14 sub-dimensions related to these themes. The data collection instrument of the study consisted of a total of 36 Q items regarding the professional development needs of teachers. The findings of the study show that the most needed professional development areas of the teachers were special education, scientific research methods, and participation in the projects and related professional activities. It was determined that some of the participants needed professional development in the areas of instructional technologies, material development, student participation, assessment and evaluation, and teamwork skills.

*Key words:* professional development, professional development areas of teachers, common professional development needs, Q method analysis.

### Introduction

Teaching is a profession that requires a constant development according to the conditions brought by the current age. Development in the skills and knowledge within different fields, learning characteristics of the new generation, and technology and information network. Such a network is developed by the new teaching strategies designed in accordance with these characteristics of new generation teachers to renewal of expertise. Developments in many areas of life push teachers to become better equipped, which makes the teaching profession increasingly complex and difficult. Furthermore, because professional skills are important in teaching activities, the students expect more from teachers (Cumming, 2011). As can be seen, professional development of the teachers is more important than ever before (Evans, 2019; Guskey, 2002; Zein, 2017; Pipere, 2019).

Professional development is not only a process that contributes to the personal development of teachers but also an important factor in improving the quality of education

in schools (Dunn, Hattie, & Bowles, 2019). Therefore, policy-makers in education make considerable investment in professional development of teachers. However, to be effective, professional development studies should be based on the current instructional practices and actual needs of teachers, which is also supported by the literature (Kabilan & Veratharaju, 2013). It has been indicated in the literature that professional development activities may change the teaching practices of teachers, and can positively affect achievement and learning of the students (Borko, 2004; Darling-Hammond, 2000; Garet et al., 2001). To be effective and to carry out the best teaching practices means that teachers and school administrators need to improve their knowledge and skills constantly (Mizell, 2010). In order that the students learn to a maximum extent, teachers need to be open to learning themselves. Learning experiences of teachers are generally influenced by their previous experiences of learning at school, university, digital learning, and informal learning. For sustainability of lifelong learning, teachers logically need to create a combination of innovation and what they have learned earlier (Mirçe, Cakula, & Tzivian, 2019; Iliško, 2016; Salite, 2008; Heasley et al., 2020).

A teacher may think that she/he has received adequate training in the pre-service training process, but the pre-service training may not always help the teacher to cope with the challenges faced within the real teaching scenario (Mizell, 2008). Teachers need to model knowledge in upgraded sustainable development in order to cope with the educational problems, which must be constantly updated as they face students in the classroom. Sustainable development of teaching-learning process is currently considered a key factor in the development of the education system (Khumalo, 2019; Hersly et al., 2020). For this reason, to ensure a sustainable high standard in education and to maintain a high-quality teacher workforce, education systems around the world apply in-service training programs to the teachers each year. As part of these in-service training programs, teachers are expected to develop effective learning environment, integrate students with special learning needs into mainstream classroom, use information and communication technologies more effectively, get involved in the planning of assessment and evaluation process, and do more to include families in educational activities (OECD, 2009). However, research results from both developed and developing countries have shown that workshops, conferences and seminars within the annual professional development programs are not always effective and successful for all the teachers (Villegas-Reimers, 2003). The failure of these training programs can be attributed to the imprecise assessment and preparation process of the administrators, inactive participation of teachers in career development plans, and sometimes political and financial issues (Hien, 2009).

In Turkish context, professional development activities are carried out by Ministry of National Education (MoNE) at the beginning and end of each academic year in accordance with the plan determined by the Ministry of National Education as a 15-day seminar series administered in schools under the control of school principals. In addition to that, a total of seven active in-service training institutions organize various in-service training programs during the year (Elçiçek, 2016). Moreover, each province in Turkey organizes in-service training programs at the local level. However, as in many countries, professional development programs organized in Turkey were discovered to be imperfect. The studies conducted on the efficiency of professional development programs showed that the training programs organized at the beginning and end of each academic year are inadequate and inefficient and that they do not even respond to teacher needs. Moreover, studies showed that the training programs are not implemented properly (Bümen,

Ateş, Çakar, Ural, & Acar, 2012; Elçiçek, 2016; Kaya & Kartallıoğlu, 2010; Uştu, Taş, & Sever, 2016). In addition, it was indicated in the report of International Teaching and Learning (TALIS) 2010 that Turkey was staffed by many young teachers; however, their professional development needs could not be determined exactly, and professional development activities in which the teachers participated were not effective (Büyükoztürk, 2010).

### Literature Review

As a tool to train qualified teachers, the professional development of teachers is accepted as an important variable in the determination of school policies, in the regulation of teaching settings and in student learning (Borko, 2004). The research conducted on the professional development of the teachers revealed that professional development activities increase the commitment of the teachers to the processes of motivation and teaching-learning (Hunzicker, 2010; Makrevičs & Iliško, 2019). In accordance with that it was also indicated that professional development positively affects professional cooperation and job satisfaction of the teachers and increases the possibility of staying in teaching (Martson, 2010; Özer & Beycioğlu, 2010; Akçay-Kızılkaya & Özdemir 2012). Furthermore, it was also proposed that professional development activities increase teacher qualification and the quality of the teaching practices (Desimone, Porter, Garet, Yoon, & Birman, 2002; İlğan, 2013; Murphy & Calway, 2008). But the literature on professional development showed that professional development activities are conducted on limited time with very limited knowledge and skills. That the organizers do not take into consideration the real needs of teachers were stated to be the main reason of this situation (Darling-Hammond, 2010; Zein, 2017; Salite et al., 2019). Sometimes, some teachers are reluctant to participate in programs and take responsibility for their professional development (Daniel & Peercy, 2014). Such a situation indicates that there are some positive and negative factors affecting the decisions of teachers about participating in the professional development activities. Drage (2010) listed the positive factors of teachers' participation in the professional development activities as the desire to become a more effective teacher, the desire for lifelong learning, the influence of colleagues and the work environment, the reward promotion, and the support of administrators and the close environment (family, friends) On the other hand, Yamagata-Lynch and Haudenschild (2009) listed the negative factors effecting teachers' participation in professional development activities as lack of time, financial difficulties, and professional development activities that the teacher did not need.

Various studies have been carried out to develop professional development models based on scientific and technological developments in the historical process aimed at meeting the professional development needs of teachers (Sparks & Loucks-Horsley, 1989; Loucks-Horsley & Stiegelbauer, 1991; Fretz et al., 1993; Lawler & King 2000) However, the traditional professional development model is generally applied in the field of teacher training (Ravhuhali, Mashau, Kutame, & Mutshaeni, 2015). Seminars, workshops and short-term training activities are at the heart of the traditional professional development models. However, these types of professional development organizations have been criticized for being too short, not seen as effective for teachers, and that only a few of the teachers do not achieve much more than gathering a few new strategies (Jovanova-Mitkovska, 2010; Smith & Gillespie, 2007).

When the professional development models in the literature are analyzed, it can be seen that there are different classifications related to the dimensions of professional development. Based on these classifications found in the literature, the dimensions of professional development of teachers can be classified in four main themes as instructional development, scientific field development, personal development, and organizational development (Borko, 2004; Garet et al., 2001; Goodwin & Kosnik, 2013; Grant & Keim, 2002; Kabakçı, 2005; Moeini, 2003).

Within the scope of this research, the professional development needs of the teachers are held within these four dimensions:

- a) *Instructional development dimension*: This dimension includes the topic related to teaching practices such as determination of teaching objectives, selection and use of appropriate teaching materials, application and evaluation of teaching programs, recognition and application of teaching methods and techniques, classroom management, assessment-evaluation, and special education (Borko, 2004; Moeini, 2003; Zein, 2017).
- b) *Scientific-field development dimension*: This dimension generally includes activities aimed at developing teachers' research identities. Taking part in national and international projects, following publications and innovations in the field, learning and applying research techniques are among the subjects of scientific field development (Grant ve Keim, 2002; Kabakçı, 2005).
- c) *Personal development dimension*: This dimension contains personal activities both inside and outside the school. Personal development dimension aims at supporting the development of teachers and increasing their effectiveness. Planning work life, anger control, coping with stress, improving verbal and nonverbal communication skills are included in the personal development dimension (Garet et al., 2001; Grant and Keim, 2002; Kabakçı, 2005).
- d) *Organizational development dimension*: The dimension of organizational development includes the responsibility of teachers to see themselves as a part of the institution they work in, to have knowledge about the functioning of the institution, and to take part in improvement activities (Goodwin & Kosnik 2013). This development dimension, which contains management skills and activities related to institutional culture (Kabakçı, 2005), includes activities related to teamwork, institutional functioning and adaptation, and activities for common reasoning and problem solving (Grant and Keim, 2002).

Looking at the studies in the related literature, it is clear that professional development should not be perceived only as the training programs conducted by the teachers such as workshops, seminars, observations and performance trainings. It is emphasized in the studies that teachers' professional development activities should be organized through effective, meaningful and sustainable programs aimed at meeting the needs of teachers who participate in these programs (Garet et al., 2001; Goodwin & Kosnik, 2013). Teachers of the future need to be directed to new teaching methods, techniques and approaches. In professional development programs, teachers therefore will improve their teaching practices, deepen their pedagogical knowledge, and increase their domain-specific and personal development (Kabakçı, 2005; Zein, 2017). Similarly, Guskey (2002) emphasized the necessity to consider the differences among teachers, administrators and students, to increase the effectiveness of professional development programs. The

researcher also emphasized the necessity of planning, implementing and evaluating professional development programs to meet the needs of teachers in the schools where they work. It can be clearly understood from the related literature that teachers' professional development needs can have priority in the professional development programs.

Rapidly changing family structures, which affect student learning, scientific and technological advances, and changing cultural values shape teachers' self-efficacy and thus their professional development needs (Mizell, 2008). It can be accepted then that teachers' professional development needs will be considered as a natural and powerful tool to determine the qualifications of teachers in the teaching process. The basic problem of the current study highlights this fact. Consequently, this study aims to determine current professional development needs of teachers. In the current study, while forming the research questions about teachers' professional needs, aforementioned dimensions of professional development such as instructional, scientific-field, personal and organizational development were used. In this context, the following research questions are formulated.

- What are the professional development needs of teachers?
- Do teachers have a common idea about professional development?
- Which dimensions of professional development stand out in the professional development of the teachers?

The finding of this study will shed light on how to determine teachers' professional needs and will also contribute to the related literature, because determining teachers' professional development needs is one of the most important elements in the education planning and curriculum development of a nation (Kabilan & Veratharaju, 2013). In addition, the findings of the current study will lead to professional development programmers and policy makers who are developing an effective professional development series of programs for teachers.

## Method

This study has determined teachers' professional development needs by using Q methodology. Q method analysis is a research method that allows the measurement of approach, attitudes and perception of the participants (Brown, 1996). Q method analysis uses the strength of both qualitative and quantitative methods (Brown, 1996). In the data analysis process of this method, different statistical analyses are used to find out the common points in the responses of the participants. In this method, a correlation coefficient is calculated based on the participants' answers. The most commonly used method of calculating a correlation coefficient is the "R" statistics (Webler, Danielson, & Tuler, 2009). The strength of Q methodology is that it can determine whether perception, attitude and beliefs of participants can be associated under a broader theme, and it reveals the common ideas of the participants because it can sort these ideas in order of priorities (Brown, 1996). The Q method analysis is an important method to investigate the idea patterns in the sample participants and it enables a comparison between the groups (Webler, Danielson, & Tuler, 2009).

The framework revealed by the Q method is in a sense similar to the scale development process. The basic component analysis process of Q methodology is similar to that of exploratory factor analysis (EFA), with a few fundamental differences. The principal component analysis of explanatory factor analysis determines relevant items in the scale

development process. On the other hand, the principal component analysis in Q method will group the relevant ideas. Consequently, the relevant items grouped together in explanatory factor analysis refers to the groups of people with similar ideas in Q method analysis.

## Participants

In this context, the sample of this study was 35 teachers, including 24 males and 11 females, working in state schools of ministry of National Education in Cappadocia provinces (Aksaray, Nevşehir) of Turkey. All the participants of the study were subject domain teachers. In addition, equal distribution of subject matters was taken into consideration in the selection of the participants. In this context, the data of the current study were collected from primary school, mathematics, science, Turkish, English and social studies teachers. The experience of the teachers ranged from 3 to 25 years ( $X=12.75$ ,  $Sd.=7.06$ ).

## Q Method Data Collection and Analysis

Within the scope of this study, 36 items based on the instructional development, scientific field development, personal development, and organizational development dimensions of professional development were prepared in item form. The items were submitted to the experts who have PhD degrees in education management, curriculum development and instruction, special education, assessment and evaluation. With the guidance of the experts, some minor changes have been applied to the items. The item form was applied to the participants individually. Data of this study were collected between November, 2018 and February, 2019. It took an average of 25 minutes to complete each item form. The item form is as shown in Table 1 and Q matrix is as in Table 2.

Table 1  
Q Items

Instructional development	Instructional technologies and material design	I need knowledge about designing and using instructional materials. (34)
		I don't have any problems in preparing and using teaching materials. (16)
		I need knowledge about using technology for teaching purposes. (19)
		I follow the innovations in information and communication technologies and apply them in my lessons. (24)
	Teaching strategies	I think I need training about different teaching methods and techniques. (5)
		I can easily use various teaching strategies in my lessons. (26)
		I do not feel qualified enough to make my students think critically and creatively. (1)
		I can easily improve my students thinking abilities. (14)
		I feel the need to develop myself in preparing appropriate learning environments. (2)
		I am successful in teaching environment and classroom preparation activities. (22)

*See next page for continuation of table*

Continuation of Table 1

Instructional development	Lesson planning	I feel the need to improve myself in preparing lesson plans in accordance with the curriculum. (18)
		I do not have any problems in preparing lesson plans in accordance with learning outcomes in the curriculum. (3)
	Classroom management	I need training to cope with undesired behaviours in the classroom. (33)
		I do not have difficulty in preventing student interventions that negatively affect the lesson. (4)
		I need to learn how to build a classroom management system that is appropriate for different student groups. (20)
	Student participation	The differences in the proficiency levels of the students do not affect my classroom management skills. (10)
		I would like to learn different teaching methods to motivate students and to encourage them participate in classroom activities. (35)
	Assessment and evaluation	I can always motivate my students and encourage them participate in the classroom activities.
		I need to be familiar with the use and development of appropriate and different measurement instruments for evaluating learning outcomes. (21)
	Special education	I have enough knowledge about assessment and evaluation. (8)
I need knowledge about how to provide appropriate learning environments for students with special needs (such as hyperactive, specific learning difficulties, gifted). (27)		
Scientific field development	Scientific research methods	I do not have difficulty in teaching gifted children or children with learning disability. (15)
		I want to learn the research methods and statistical research techniques related to my scientific field. (36)
	Participation in projects and professional training programs	I have enough knowledge about scientific research methods. (9)
		I need knowledge on how to take part in national and international projects and activities related to my scientific field. (23)
		I know how to take part in projects and activities related to my field or to benefit from research funds. (13)
Personal development	Planning	I would like to take support about career planning and time management. (28)
		I am good at career planning and time management. (17)
	Anger management	I need to improve my anger management skills. (29)
		I do not have any problems in controlling my anger (25)
Effective communication skills	I think I need to have knowledge about verbal and nonverbal communication skills. (11)	
	I think I have effective communication skills (30)	
Organizational development	Organizational structure	I think I need to have knowledge about verbal and nonverbal communication skills. (11)
		I need information about organizational structure and operations (12)
	Team work	I have enough information about school culture and school work. (31)
I feel the need to improve myself about teamwork activities for the school's needs. (7)		
		I consider myself adequate about the team work in the institution. (32)

As shown in Table 2, the normal distribution schema between the edges of -5 and +5 was used in the Q matrix.

Table 2  
Q Matrix

I do not agree					Neutral	I agree				
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

### Results

While determining professional development needs of the teachers, it was firstly examined whether there is a common ground between the teachers. For this purpose, basic component analysis and varimax rotations were conducted through “PQMethod 2.35” software. The distribution of the scores is shown in Table 3. The participants are numbered as P1 (Participant 1) in the table.

Table 3  
Table of Factor Load

Participant/ Factor	1	2	3	Participant/ Factor	1	2	3
P1	0.7469X	0.1262	-0.2102	P13	0.7401X	0.1905	0.2235
P2	0.5903X	0.5130	0.0731	P14	0.8330X	-0.0143	-0.2105
P3	0.6477X	0.0294	-0.0681	P15	0.4692X	0.2907	0.0386
P4	0.0192	0.8136X	-0.0256	P16	0.4413X	0.1834	-0.0635
P5	0.4789X	0.1863	0.1766	P17	0.6833X	-0.3762	-0.0045
P6	0.7481X	0.0137	-0.0204	P18	0.1481	0.6093X	0.2941
P7	-0.4222X	0.0216	0.0681	P19	0.1123	0.3016	0.6752X
P8	0.6742X	-0.1662	0.1019	P20	0.2719	-0.0066	0.6813X
P9	0.2268	0.6249X	-0.2916	P21	0.7145X	-0.1437	-0.2013
P10	0.1073	0.2119	-0.5339X	P22	-0.1570	0.4514X	0.0984
P11	-0.1536	0.3501	0.4188X	P23	0.8351X	-0.1797	-0.1094
P12	0.5911X	0.3687	0.2006	P24	0.7834X	-0.2094	0.1018

See next page for continuation of table



Continuation of Table 3

P25	<b>0.6917X</b>	-0.0315	-0.1105	P31	<b>0.4057X</b>	0.2986	0.1090
P26	<b>0.8058X</b>	-0.3023	-0.0924	P32	0.0081	<b>0.4980X</b>	-0.3749
P27	<b>0.5072X</b>	-0.0081	0.4945	P33	-0.2229	<b>0.5465X</b>	0.4758
P28	<b>-0.4344X</b>	-0.2277	-0.1364	P34	-0.2179	0.1253	<b>0.6244X</b>
P29	<b>0.8505X</b>	0.1199	0.1587	P35	-0.0376	<b>0.8061X</b>	0.1451
P30	<b>0.5003X</b>	0.1449	0.3262				

Factor loads of 35 participants are as shown in the table above. Basic component analysis and varimax rotation analysis showed that 35 participants could be grouped under three factors. In order to show clearly which participant is included in which factor, “X” symbol is used and the numbers are written in bold. There are 23 participants in the first factor (column), 7 participants in the second one and 5 participants in the third factor. 23 out of 35 participants (%65.71) are grouped under a dimension, which may indicate that the participants have a general characteristic. From this point of view, it can be proposed that teachers’ opinions on their professional development needs are similar. It is necessary to examine the common grounds in which this similarity meets and which sentences are more important. Table 4 shows the items, Z values of the items and the rank of Z scores of the items in each group (in the factor). The items were sorted according to the degree of proximity of the 23 participants grouped under factor 1.

Table 4  
Z Values of the Items and the Order of Importance of the Items

Factor Item	Factor 1		Factor 2		Factor 3	
	Z	Rank*	Z	Rank*	Z	Rank*
6	1,683	1	-0,343	24	1,025	6
30	1,641	2	1,424	4	-0,473	26
22	1,563	3	-0,048	19	0,625	13
14	1,477	4	0,178	16	-0,243	20
26	1,441	5	-0,903	30	0,900	8
3	1,164	6	0,394	12	-0,383	23
25	1,127	7	1,451	3	-0,370	22
24	1,052	8	-0,340	23	-1,120	31
8	0,889	9	-0,094	20	-0,879	29
17	0,864	10	0,311	14	-0,399	24
16	0,802	11	-0,821	28	-1,122	32
31	0,628	12	0,233	15	-0,401	25
4	0,580	13	-0,453	26	0,900	9
9	0,422	14	-0,869	29	-0,183	19
32	0,353	15	-0,137	21	-0,342	21
13	0,246	16	-1,736	34	-0,001	17
10	-0,159	17	-1,927	36	-2,343	36
15	-0,187	18	-1,737	35	-1,566	35
36	-0,225	19	0,687	10	1,424	3
27	-0,314	20	1,729	2	1,497	2
35	-0,318	21	1,203	6	2,069	1

See next page for continuation of table

Continuation of Table 4

23	-0,513	22	2,013	1	-1,002	30
19	-0,561	23	0,757	9	1,379	4
7	-0,698	24	0,074	17	0,989	7
21	-0,791	25	0,848	8	0,148	15
12	-0,932	26	0,343	13	-0,815	28
34	-0,955	27	0,964	7	0,815	10
28	-0,972	28	-1,426	33	-0,179	18
2	-1,027	29	-0,293	22	0,121	16
5	-1,036	30	0,496	11	0,780	12
20	-1,053	31	1,207	5	-0,554	27
18	-1,066	32	-1,030	31	0,200	14
33	-1,111	33	0,036	18	-1,280	34
29	-1,231	34	-1,119	32	1,124	5
11	-1,234	35	-0,376	25	0,811	11
1	-1,547	36	-0,694	27	-1,151	33

The most positively approached item by 23 participants in Factor 1 is “I can always motivate my students and encourage them to participate in the classroom activities.” and the most negatively approached item is “I do not feel qualified enough to make my students think effectively”. While 18 items included in this study were related to professional competence, 18 items stated that they had inadequate professional development. When the preferences of the participants grouped under the first factor were examined, it is seen that the participants preferred the items that indicate that they have professional competence. Table 5 shows the average Z scores calculated for each variable in the factors. The formula of average Z scores is as follows:

$$Z_{mean} = (Z \text{ value of the positive item about the dimension} - Z \text{ value of the negative item about the dimension})/2$$

Table 5  
Mean of Z Values

		Factor 1 (n=23)	Factor 2 (n=7)	Factor 3 (n=5)	Weighted mean	$\bar{x}$
Instructional development	Instructional technologies and material design	1.69	-0.72	-1.11	0.78	0.43
	Teaching strategies	1.35	-0.05	0.26	0.88	
	Lesson planning	1.12	0.71	-0.29	0.81	
	Classroom management	0.65	-0.91	0.10	0.25	
	Student participation	1.00	-0.77	-0.52	0.42	
	Assessment and evaluation	0.84	-0.47	-0.51	0.37	
	Special education	0.13	-1.733	-1.53	-0.47	
Scientific field development	Scientific research methods	0.32	-0.79	-0.80	-0.06	-0.11
	Participation in projects and professional training programs	0.38	-1.87	0.50	-0.05	

See next page for continuation of table

*Continuation of Table 5*

Personal development	Life Planning	0.92	0.87	-0.11	0.74		
	Anger management	1.18	1.29	-0.75	0.90		0.88
	Communication skills	1.44	0.90	-0.64	1.00		
Organizational development	Organizational structure	0.78	-0.06	0.21	0.52	0.38	
	Team work	0.53	-0.11	-0.66	0.23		

When the Z scores of all 35 participants are examined, it was found that the most positive self-evaluation dimensions are; personal development ( $X_z=0.88$ ), instructional development ( $X_z=0.43$ ) and organizational development ( $X_z=0.38$ ). However, scientific field development has a negative effect ( $X_z=-0.11$ ). When the sub-dimensions are examined, it was found that effective communication skills ( $Z_{\text{mean}}=1.00$ ), anger control ( $Z_{\text{mean}}=0.90$ ), teaching strategies ( $Z_{\text{mean}}=0.88$ ), lesson planning ( $Z_{\text{mean}}=1.00$ ), instructional technologies and material design ( $Z_{\text{mean}}=0.78$ ) and life planning ( $Z_{\text{mean}}=0.74$ ) have the highest Z scores. However, the mean scores of 36 participants in the sub-dimensions such as special education ( $Z_{\text{mean}}=-0.47$ ), scientific research methods ( $Z_{\text{mean}}=-0.06$ ) participation in projects and professional activities ( $Z_{\text{mean}}=-0.05$ ) is found to be negative.

When the findings are considered on the basis of the factors, it was found that the 23 participants in the first factor evaluated themselves as positive in all dimensions and sub-dimensions. The sub-dimensions that the 23 participants considered themselves most adequate were in the dimensions of instructional development and personal development, respectively. The participants in the factor one stated to be the least competent in the scientific research methods ( $Z=0.32$ ), participation in projects and professional activities ( $Z=0.38$ ), special education ( $Z=0.13$ ) sub-dimensions.

7 participants in the second factor found themselves inadequate in all areas of professional development except for personal development dimension and course planning sub-dimension. Participants in the second factor considered themselves as the most inadequate in the areas of participation in projects and professional activities ( $Z=-1.87$ ), special education ( $Z=-1.733$ ), classroom management ( $Z=-0.91$ ), scientific research methods ( $Z=-0.79$ ), student participation ( $Z=-0.77$ ), teamwork ( $Z=-0.11$ ), institutional structure ( $Z=-0.06$ ) and instructional strategies ( $Z=-0.05$ ) respectively. 5 participants in the third factor considered themselves partially sufficient in the sub-dimensions of participation in projects and professional activities ( $Z=0.50$ ), instructional strategies ( $Z=0.26$ ), institutional structure ( $Z=0.21$ ) and classroom management ( $Z=0.10$ ). They perceive themselves as inadequate in all the other sub-dimensions.

## Discussion

This research, based firmly on Q methodology, aimed to find out the most important professional development needs of the teachers. This study also aimed to determine how teachers perceive their professional development needs, and whether they have a common view on their professional development needs. The participants of the study were 35 teachers with different fields from four different provinces of Turkey. The data

were collected through 36 Q items. In this context, the results of the study are limited to the data collected from 35 participants by Q method.

When the findings obtained from the opinions of the teachers regarding their professional development needs are evaluated in general, it can be concluded that the teachers generally perceive their professional development as sufficient. According to the findings of this study, it was found that teachers felt most efficient in terms of personal development dimension of the professional development. When the Z scores were examined, it was found that the mean scores of instructional development and organizational development were close to each other. However, the mean scores of personal development was found to be low in half compared to that of instructional development and organizational development. The professional development dimension that teachers needed the most was found to be scientific field development, including the sub-dimensions of scientific research methods and participation in projects and professional activities. When the findings regarding sub-dimensions of professional development were examined, it was found that the sub-dimensions of personal development such as effective communication skills, anger control and life planning, and the sub-dimensions of instructional development such as lesson planning, teaching strategies, instructional technologies and material design have the highest Z scores. According to these results, the vast majority of teachers need less professional development for personal development, lesson planning, teaching strategies, instructional technologies and material design compared to other dimensions of personal development. The results showed that special education, scientific research methods and participation in project and professional activities had negative mean scores, which indicated that the participants needed professional development training programs especially in these sub-dimensions of professional development.

The findings of this study corroborated with the findings of previous studies. Gökmenoğlu et al. (2016) stated that teachers needed in-service training on guidance and special education, and the researchers also stated that teachers regularly needed in-service training especially for working with students with learning disabilities, as well as students who are in need of psychological support and who are at the risk of dropping out. In the same study, communication and social skills was stated to be needed rarely by the teachers, which was similar to the findings of this study. A comprehensive survey conducted by OECD (2009) with participants from 23 different countries showed that special education of students with special needs was the personal development dimension that was needed the most by the teachers. This result may be an indication that teachers are not ready to follow a strategy for the education of children with special needs or gifted children.

Children with special needs are children whose physical characteristics and/or learning abilities are significantly different from the others. It is necessary for teachers who will play an active role in education should be able to recognize these children and prepare educational environment for their needs (Akay & Gurgur, 2018; İlgar, 2017). However, current knowledge, strategy and teaching approaches in educational programs aim to meet the needs of all students in general, and this causes teachers to face difficulties in working effectively and providing quality education to the students in need of special education (Lewis, Wheeler, & Carter, 2017). Because, pre-service training for special education in Turkey is limited to a single theoretical course given only in the final year, it may cause teachers to need professional development in this issue.

Similar findings regarding the professional development needs such as participation in projects and professional activities and scientific research methods are also found in the studies of MoNE (2008, Ministry of National Education) and Kabakçı (2005). In the study conducted by MoNE (2008) to determine the in-service training needs of primary school teachers, it was found that 39% of teachers have a high percentage and 39.8% have partial need for professional development. In the study of Kabakçı (2005), it was found that 45.7% of the participants were in need of professional development about participation in national and international projects. As a result, it can be observed that personal development needs of the teachers centered upon the process of getting information on scientific research methods, (which can be used frequently in the field of education) such as action research and case, and participation in national and international projects and professional activities. The reason for such a result may be attributed to rather limited number of in-service and professional training programs related to these areas.

Finally, it was found that the participants in the second (n=7) and third factor (n=5) have professional development areas where they considered themselves to be weak, and are different from the participants in the first factor (n=23). In addition to the professional development areas needed by the entire research group, participants in both factors (second and third factor) were identified as the need for professional development in the areas of instructional technology and material design, student participation, assessment and teamwork. Similarly, Dalton and Boyd (1992) found the most common professional development needs of the teachers is to know the various approaches in order to measure student knowledge; to know students' different learning styles in order to meet their learning needs; to know the techniques of cooperative learning and team work; to increase student participation; and to know the class management techniques. In a similar vein, Drage (2010) revealed the most important professional development needs of the teachers as developing, improving and expanding the use of technology for instruction; developing critical thinking and problem solving skills of the students; and developing the skills of working as a member of a team inside and outside the classroom.

Gökmenoğlu, Clark, and Kiraz (2016) determined that in the context of classroom management, there is a need for training programs in schools to prevent peer bullying and the researchers also found that there is a need for training programs to provide opportunities for individual differences in education. According to the findings of Copland, Garton, and Burns (2014) and Zein (2017), teachers need professional development related to classroom management, and teacher training programs should include classroom management skills. Kabilan and Veratharaju (2013) stated that the professional development needs of the teachers are not independent from the needs of the school and professional development needs of the teachers are part of the school culture. The researchers also stated that professional development training needs to be carried out collaboratively with colleagues as teamwork, which in turn, accelerates the change and development of the school. In this respect, it is important to consider teachers' desire to improve themselves in teamwork activities for the needs of the school.

### Conclusions

The biggest problem in determining the characteristics of successful professional development programs is to try to find a single correct answer. Even though some general principles can be reached through research, the uniqueness of institutional or individual situations is always a critical factor in determining the characteristics of successful professional development programs. Activities led by teachers might be needed in one context and organizational structure may be needed in another one. In other words, instead of one correct answer or one right way, there is a collection of answers depending on the context. The aim should be to find out the most suitable blend and to be aware that this blend may also change over time (Guskey 2007; Bümen et al., 2012). This study aimed to compose a collection of answers regarding professional development needs of teachers by using the richness of differences.

According to the results of this research, special education, scientific research methods and project preparation techniques should be given priority in in-service training activities. There is also a need for training programs on instructional technologies and material design, student participation, assessment and teamwork. Further studies may concentrate on more specific personal development needs of teachers related to the sub-dimensions of personal development. In-depth findings can be obtained in further studies by conducting qualitative research in relation to teachers' relevant professional development needs. In addition, this study has some limitations in terms of sample size. Further studies may need to have more participants. The participants of this study were teachers from different subject domains. Further studies may address the professional development needs of teachers specific to their relevant subject.

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Correspondence relating this article should be addressed to Emin Tamer Yenen, Nevşehir Hacı Bektaş Veli University, Nevşehir, Turkey. Email: tamer-yenen@hotmail.com