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*Research Article*

# Scaling of Ideal Teachers Characteristics with Pairwise Comparison Judgments According to Pre-service Teachers Opinions

**Metin Yasar**

Educational Measurement and Evaluation, Pamukkale University, Denizli, Turkey

**Abstract:** In this study, scaling the characteristics that should be found in an ideal teacher according to the pre-service teachers by using the pairwise comparison method was aimed. Thirteen characteristics that an ideal teacher should have were given to 211 pre-service teachers in the working group, and these 13 properties were first asked to be considered as a whole, and then each property was asked to be compared to another property, one by one, to prefer one property to another. The research data were obtained from 211 pre-service teachers in fall semester of the 2015-2016 academic year. The data were scaled according to the pairwise comparison method. According to the findings obtained, when the characteristics were aligned from the most important characteristic that an ideal teacher should have according to the pre-service teachers to the most unimportant one, it was determined that; he/she should have an intellectual personality (U10) should have a sense of humor (U7), should be open to being criticized (U2), should be motivating (U1), should have a smiling expression (U5), should have a good usage of diction (U8), should be trustworthy (U3), should be creative (U6), should be a researcher (U9), should use teaching techniques well (U10), should give importance to the students (U4), should have good communication skills (U9), should keep the distance with the students (U12).

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Pairwise Comparison,
Teacher Characteristics

## 1. INTRODUCTION

Nowadays it seems that the education system is in a student centered concept rather than a teacher centered one. Student centered education does not make a teacher insignificant, on the contrary it gives the teacher a more significant role. The most significant role of a teacher in education system is to assist the cognitive, affective and psychomotor development of students. An ideal teacher is a guide who takes care of all the students in class and enables required behavioral changes in the students by encouraging them to participate in class. The increase in the expectations of societies in education and by means of that in teachers switched the role of teachers in education system (Şahin, 2001), moreover the personality characteristics became more important. Along with the characteristics which a teacher is required to have such as being friendly, enthusiastic, in favor of change and progress, humanist, thinker and a person

Corresponding Author E-mail: myasar@pau.edu.tr

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who expresses their own opinions (Brophy & Alleman, 1991), a teacher is also expected to be a person who communicates with students effectively (Bilen, 1995), a teacher who enables students to participate in the teaching – learning process effectively therefore helps them obtain behavioral change as a qualified teacher in the field, a teacher who utilizes convenient methods and instruments in order to meet educational needs (Şahin, 2001; Woolfolk, 1998), who listens to the problems of their students, who understands their students truly and tries to find solutions to their problems and a teacher who treats them as a friend (Ergün, Duman, Y. Kıncal & Arıbaş,1999).

When the studies which define the characteristics of a teacher are investigated, these characteristics come forward: Creativity, emotional adaptation, performing positive approaches towards students, positive attitudes towards teaching, socially good relationships, using the mother tongue efficiently, being sensitive, being able to develop empathy, avoiding judgements and participating in the social occasions of the society where they live (Confery, 1990; Good & Grouws, 1979; Rosenshine & Stevens, 1986; Ryan, 1960).

Since the target audience of teachers is students, they are required to have such characteristics as: enabling students to discover their potential and by developing their potential guiding them to their self-actualization, providing them the knowledge and the skills that would help them solve the real-world problems, establishing health relationships in order to prepare them for life, making the students trust, being gracious to them, being creative, caring about the students, being motivating, being open to criticism, being humoristic, having a good diction, having high communication skills, being sophisticated, utilizing teaching methods efficiently, being open and respectful to individual differences and being an enquirer. Unfortunately, claiming that all these characteristics are present in the teachers at a desired level is hardly possible. It is sometimes necessary to know the differences between the perceived and actual sizes of teacher qualifications mentioned above. The main purpose of the scale obtained from the difference or the correlation between perceived and actual size of the desired qualifications or any other variable is to put forward the methods of transition from empirical relationships based on observations to formal relationships based on rules (Anıl & Güler, 2006; Kan, 2008; Kart & Gelbal, 2014; Turgut & Baykul, 1992). Anıl and Güler (2006) perceived scaling in measuring process as a significant factor of the transition from the observations which shows qualitative distinction to the scales which show quantitative distinction. On the contrary, Stevens (1966) perceived scaling as marking objects with numbers based on a certain rule, testing hypothesis, determining whether a status or a concept is unidimensional or multidimensional and it was expressed that the most known reason of him to use scaling is grading (as cited in Anıl & Güler, 2006).

The approaches used in scaling are classified into two groups. The first of them is the approaches based on judge decisions and the second one is the approaches based on the reactions of test subjects. The classification of scaling approaches is given on Figure 1.

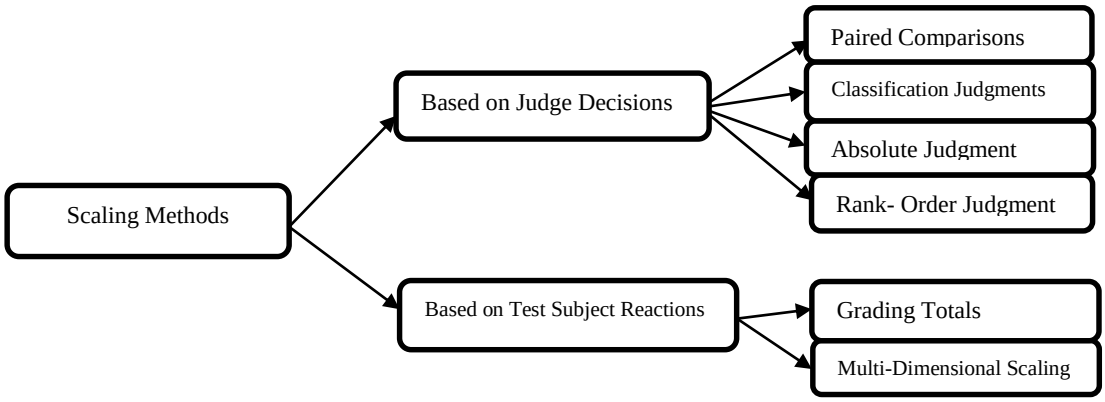


**Figure 1.** Main Approaches used in scaling (Arık & Kutlu, 2013).

The scaling approach based on judge decisions is to scale present stimulants at a determined level according to the judgments of observers and experts and in experimental methods, N number observers are demanded to determine stimulus levels of each of K number stimulants according to a certain method (Anıl & Güler, 2006; Turgut & Baykul, 1992; Yaşar, 2016). The size of the stimulants which are given to the observers is asked to be determined by comparing them to other stimulants. Therefore, the mean value of the judgments of observers gives the scale value of the stimulant.

In the approaches based on test subject reactions, it is not defined as stimulant centered but answerer centered approach. According to this approach, each answerer is placed somewhere on the scale according to the answers (reactions) that they give for the items (Crocker & Algina, 1986; as cited in Arık & Kutlu, 2013). Despite the rareness, it is obvious that the number of studies made on this subject is increasing. When the studies which were made considered, paired comparison method was used in order to scale the characteristics that a qualified teacher was required to have (Anıl & Güler, 2006), in order to scale the importance levels of professional teaching knowledge lessons (Nartgün, 2006), and to determine what characteristics the students who applied for a master's degree were required to have according to instructors (Güler & Anıl, 2009).

Attitude scale on addictive drugs was used in order to find out whether the scaling methods based on classification and sorting judgments gave similar results (Kan, 2008). The studies which were made also contained the scaling study on reliability and validity of field choice inventory of the senior students in the faculty of education (Öğretmen, 2008), overall impression, grading key, and the study of psychometric characteristics of three different evaluation methods based on the data collected from the compositions which were graded by Thurstone paired comparison method (Ömür, 2009), the scaling of the factors which were thought to be effective in placement test success with rank-order law (Bal, 2011).

Apart from these studies above, the studies which were also investigated are listed below: which characteristic competence of preservice teachers is more significant in the competence codes of teaching which were determined by Ministry of Education (Özer & Acar, 2011), the study to determine the consistency among scaling values obtained by scaling based on classification judgments and scaling based on test subject reactions (Öztürk, Özdemir & Gelbal, 2011), ranking judgment based scaling the characteristics which are thought to affect the academic success (Yaşar, 2016), ranking judgment based scaling of the mate selection criteria of university students (Bozgeyikli & Toprak, 2013), the investigation of the empathetic approach of elementary school administrators towards the professional problems of teachers with paired comparisons method (Ekinci, Bindak & Yıldırım, 2012), comparing the consistency

of the scale values obtained from scaling approaches based on paired comparisons judgments and ranking judgments (Albayrak & Gelbal, 2012), a paired comparison scaling study on the duties of education inspector in Turkey (Bülbül & Acar, 2012), scaling the characteristics which affect the success of elementary school students with completely ordered paired comparisons (Kara & Gelbal, 2013), judge decision based scaling of the assessment and evaluation competence of teachers (Arık & Kutlu, 2013), comparison of the evaluations which were made by grading key, overall impression and paired comparison methods (Ömür & Erkuş, 2013), comparison of two scaling methods: Paired Comparison and Ranking judgments (Acar Güvendir & Özer Özkan, 2013), the factors that affect the attitudes of students towards maths lesson according to teacher opinions (Arıcı, 2013), determining the scientific research self-efficacy perceptions of preservice teachers with paired comparison scaling method (Kart & Gelbal, 2014), determining the assessment and evaluation methods and instruments primarily used by elementary school teachers with paired comparison scaling method (Altun & Gelbal, 2014), determining the social activity choices of preservice teachers with paired comparison scaling method (Polat & Göksel, 2014), scaling the professional teaching knowledge lessons which senior students of faculty of education took with ranking judgment law (Yalçın & Avşar, 2014), the study in which it was detected whether the scale values of the purpose of internet use of preservice teachers obtained based on paired comparison and ranking method (Albayrak Sarı & Gelbal, 2015), the study to determine the measuring instruments (Gülşah Şahin, Boztunç, Öztürk & Taşdelen Teker, 2015). When research studies done abroad based on paired comparison method are considered, these studies listed below used paired comparison scaling method (as cited in Nartgün, 2006): the values of people on forests (Neuman, 1993), the value tendencies of Europeans (Francis et al., 2001), the perceptions of students on different nations (Zevinet al., 1998), the priority of social problems on natural resources (USDA Natural Resources Conservation Service, 1997), the perception of psychiatric patients on society's perspectives on mental illnesses (Freidle et al., 2003), the determination of the crispness levels of different brand crisps (Courcoux et al., 2005).

In this study, *the characteristics that an ideal teacher is required to have* were determined by using the scaling from the "*Law of Comparative Judgement IV Case Full Data Matrix".*

## 2. METHOD

Since in this study, the findings obtained from the study group do not generalize to the population, this study is not only a quantitative study but also a basic research study.

### 2.1. Study Group

This study consists of 211 preservice teachers who were getting education at the faculty of education of Pamukkale University, Denizli, Turkey in 2015-2016 academic year. The range of the preservice teachers according to certain variables is given on Table 1.

**Table 1.** Range of the preservice teachers of the study group according to certain variables.

| Variable | | f | % |
|---|---|---|---|
| Gender | Female | 175 | 82.9 |
| | Male | 36 | 17.1 |
| Department | 1 Primary School Teaching | 71 | 33.6 |
| | 2 Preschool Education | 83 | 39.3 |
| | 3 Psychological Counseling and Guidance | 57 | 27.0 |
| Program Type | 1 Daytime Education | 121 | 57.3 |
| | 2 Evening Education | 90 | 42.7 |
| Grade Level | 2nd Grade | 99 | 46.9 |
| | 3rd Grade | 82 | 38.9 |
| | 4th Grade | 30 | 14.2 |

The preservice teachers of the study group is consisted of 175 (82.9%) female and 36 (17.1%) male students. 121 (57.3%) of them are daytime education students and 90(42.7%) of them are evening education students. 99 (46.9%) of them are second grade, 82 (38.9%) of them are third grade and 30 (14.2%) of them are fourth grade students. 71 (33.6%) of them are from the department of primary school teaching, 83 (39.3%) of them are from the department of preschool education and 57 (27.1%) of them are from the department of psychological counseling and guidance.

### 2.2. Data Collection Tool

In order to constitute a data collection tool, firstly the preservice teachers were asked to make a list of *"the characteristics that an ideal teacher is required to have"*. According to the answers of the preservice teachers, these characteristics were determined as: *(U1) should be motivating, (U2) should be open to criticism, (U3) should be reassuring, (U4) should care about students, (U5) should be cheerful, (U6) should be creative, (U7) should be humoristic, (U8) should have a decent diction, (U9) should have good communication skills, (U10) should be sophisticated, (U11) should utilize teaching methods efficiently, (U12) should be open and respective to differences, (U13) should be a researcher*. Statements on these characteristics were applied to 211 preservice teachers of the research group and the data which were used in the study were collected.

### 2.3. Data Analysis

Each preservice teacher who participated in the study was asked to prefer a characteristic to another one via paired comparison of *the characteristics that an ideal teacher is required to have*. Since there were 13 statements in the data collection tool, (13x(13-1))/2=78 paired comparisons were made in total. The frequency values of each characteristic were determined according to this process. Frequency matrix was constituted according to the frequency values. After the frequency matrix created, the values in each cell of the frequency matrix were divided into the number of the people and (P) values were obtained and therefore ratio matrix was created. Later on, the Unit Normal Deviance Matrix was created by obtaining (Z) values which were equaled to ratio matrix (P) values with the use of Microsoft Excel. The mean of columns in the unit normal deviance matrix was calculated and the scale values were achieved. The starting point of axis (zero point) was moved to the smallest scale value to determine the locations of the scale values on numerical axis (Anıl & Güler, 2006; Ekici, Bindak & Yıldırım, 2012; Turgut & Baykul, 1992).

### 2.4. Determination of the internal consistency of scale values

The internal consistency of scaling was examined in order to check whether the individuals of the group study behaved carefully on the statements of paired comparisons which they made for the stimulants. In order to determine the internal consistency of scale values, the concordance level of the observed $p_{jk}$ rates with the $p'_{jk}$ rates which are obtained from scale values (expected from the scaling) is considered (Turgut & Baykul, 1992). In order to examine the internal consistency, the concordance between theoretical ratios and observed ratios is investigated by creating a Z' unit normal deviation matrix and theoretical ratio matrix obtained from this matrix according to the scale values obtained from the data. In order to test the concordance level, formula (1.1) was used.

$$ME = \frac{\Sigma \left| P_{jk} - P'_{jk} \right|}{K\,(K-1)} \qquad (1.1)$$

ME: The mean value of the difference between theoretical ratios and observed ratios (mean error)

$P_{jk}$: The ratio obtained from observed frequencies
$P'_{jk}$: Theoretical ratio
K: The number of the stimulants

A small mean value obtained from the formula above indicates that the scale values obtained according to the paired comparisons that the observers made are reliable whereas a high error value indicates that the judgments of the observers are not reliable.

In order to determine the reliability which means the internal consistency of achieved scale values via the paired comparisons that 211 preservice teachers made in the study group of this study *"the characteristics that an ideal teacher is required to have",* these processes listed below were applied respectively.

**1st Step:** A theoretical $Z'$ unit normal deviation matrix is created as it is showed in Table 2 by using scale values. In order to determine the elements of Z' matrix, $Z'_{jk} = S'_j - S'_k$ formula is used.

**Table 2.** Theoretical Unit Normal Deviation Matrix $Z'$ ($Z_{jk}=S_j-S_k$)

| | | U1 | U2 | U3 | U4 | U5 | U6 | U7 | U8 | U9 | U10 | U11 | U12 | U13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0,228 | 0,202 | 0,556 | 0,942 | 0,359 | 0,58 | 0,06 | 0,422 | 0,964 | 0,000 | 0,935 | 1,048 | 0,917 |
| U1 | 0,228 | 0,000 | | | | | | | | | | | | |
| U2 | 0,202 | 0,026 | 0,000 | | | | | | | | | | | |
| U3 | 0,556 | -0,328 | -0,354 | 0,000 | | | | | | | | | | |
| U4 | 0,942 | -0,714 | -0,740 | -0,386 | 0,000 | | | | | | | | | |
| U5 | 0,359 | -0,131 | -0,157 | 0,197 | 0,583 | 0,000 | | | | | | | | |
| U6 | 0,580 | -0,352 | -0,378 | -0,024 | 0,362 | -0,220 | 0,000 | | | | | | | |
| U7 | 0,060 | 0,168 | 0,142 | 0,496 | 0,882 | 0,299 | 0,520 | 0,000 | | | | | | |
| U8 | 0,422 | -0,194 | -0,220 | 0,134 | 0,52 | -0,060 | 0,158 | -0,362 | 0,000 | | | | | |
| U9 | 0,964 | -0,736 | -0,762 | -0,408 | -0,022 | -0,610 | -0,384 | -0,904 | -0,542 | 0,000 | | | | |
| U10 | 0,000 | 0,228 | 0,202 | 0,556 | 0,942 | 0,359 | 0,580 | 0,060 | 0,422 | 0,964 | 0,000 | | | |
| U11 | 0,935 | -0,707 | -0,733 | -0,379 | 0,007 | -0,580 | -0,355 | -0,875 | -0,513 | 0,029 | -0,940 | 0,000 | | |
| U12 | 1,048 | -0,820 | -0,846 | -0,492 | -0,106 | -0,690 | -0,468 | -0,988 | -0,626 | -0,084 | -1,050 | -0,113 | 0,000 | |
| U13 | 0,917 | -0,689 | -0,715 | -0,361 | 0,025 | -0,560 | -0,337 | -0,857 | -0,495 | 0,047 | -0,920 | 0,018 | 0,131 | 0,000 |

**2nd Step:** $\boldsymbol{P'}$ matrix is created by finding $P'_{jk}$ rates equaled to $Z'_{jk}$ values of $Z'$ matrix from one unit normal distribution table. The matrix is given in Table 3.

**Table 3.** Theoretical Ratios Matrix ($\boldsymbol{P'}$)

| | | U1 | U2 | U3 | U4 | U5 | U6 | U7 | U8 | U9 | U10 | U11 | U12 | U13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0,228 | 0,202 | 0,556 | 0,942 | 0,359 | 0,58 | 0,06 | 0,422 | 0,964 | 0,000 | 0,935 | 1,048 | 0,917 |
| U1 | 0,228 | 0,000 | | | | | | | | | | | | |
| U2 | 0,202 | 0,512 | 0,000 | | | | | | | | | | | |
| U3 | 0,556 | 0,371 | 0,366 | 0,000 | | | | | | | | | | |
| U4 | 0,942 | 0,239 | 0,229 | 0,348 | 0,000 | | | | | | | | | |
| U5 | 0,359 | 0,448 | 0,436 | 0,579 | 0,719 | 0,000 | | | | | | | | |
| U6 | 0,580 | 0,363 | 0,352 | 0,492 | 0,641 | 0,413 | 0,000 | | | | | | | |
| U7 | 0,060 | 0,568 | 0,556 | 0,689 | 0,810 | 0,618 | 0,698 | 0,000 | | | | | | |
| U8 | 0,422 | 0,425 | 0,413 | 0,552 | 0,699 | 0,477 | 0,563 | 0,351 | 0,000 | | | | | |
| U9 | 0,964 | 0,230 | 0,222 | 0,341 | 0,492 | 0,271 | 0,352 | 0,184 | 0,294 | 0,000 | | | | |
| U10 | 0,000 | 0,591 | 0,579 | 0,712 | 0,826 | 0,641 | 0,719 | 0,523 | 0,662 | 0,832 | 0,000 | | | |
| U11 | 0,935 | 0,239 | 0,233 | 0,352 | 0,501 | 0,281 | 0,359 | 0,189 | 0,305 | 0,512 | 0,174 | 0,000 | | |
| U12 | 1,048 | 0,206 | 0,198 | 0,312 | 0,457 | 0,244 | 0,319 | 0,161 | 0,264 | 0,468 | 0,147 | 0,456 | 0,000 | |
| U13 | 0,917 | 0,245 | 0,236 | 0,359 | 0,512 | 0,288 | 0,367 | 0,195 | 0,309 | 0,519 | 0,179 | 0,508 | 0,551 | 0,000 |

Error matrix $p\left(p_{jk}-p'_{jk}\right)$ is created by the absolute value of the differences between observed ratios and theoretical ratios. The Error matrix is given in Table 4.

**Table 4.** Error Matrix

| | | U1 | U2 | U3 | U4 | U5 | U6 | U7 | U8 | U9 | U10 | U11 | U12 | U13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0,228 | 0,202 | 0,556 | 0,942 | 0,359 | 0,58 | 0,06 | 0,422 | 0,964 | 0,000 | 0,935 | 1,048 | 0,917 |
| U1 | 0,228 | 0,000 | | | | | | | | | | | | |
| U2 | 0,202 | 0,005 | 0,000 | | | | | | | | | | | |
| U3 | 0,556 | 0,085 | 0,018 | 0,000 | | | | | | | | | | |
| U4 | 0,942 | 0,084 | 0,089 | 0,063 | 0,000 | | | | | | | | | |
| U5 | 0,359 | 0,056 | 0,004 | 0,038 | 0,023 | 0,000 | | | | | | | | |
| U6 | 0,580 | 0,022 | 0,033 | 0,021 | 0,093 | 0,021 | 0,000 | | | | | | | |
| U7 | 0,060 | 0,016 | 0,004 | 0,029 | 0,051 | 0,007 | 0,006 | 0,000 | | | | | | |
| U8 | 0,422 | 0,015 | 0,025 | 0,062 | 0,086 | 0,056 | 0,033 | 0,04 | 0,000 | | | | | |
| U9 | 0,964 | 0,023 | 0,028 | 0,041 | 0,077 | 0,014 | 0,091 | 0,017 | 0,030 | 0,000 | | | | |
| U10 | 0,000 | 0,070 | 0,048 | 0,074 | 0,083 | 0,017 | 0,073 | 0,04 | 0,014 | 0,038 | 0,000 | | | |
| U11 | 0,935 | 0,030 | 0,069 | 0,019 | 0,045 | 0,035 | 0,035 | 0,080 | 0,061 | 0,083 | 0,047 | 0,000 | | |
| U12 | 1,048 | 0,016 | 0,034 | 0,009 | 0,030 | 0,005 | 0,026 | 0,009 | 0,065 | 0,152 | 0,000 | 0,007 | 0,000 | |
| U13 | 0,917 | 0,047 | 0,052 | 0,045 | 0,004 | 0,051 | 0,298 | 0,056 | 0,053 | 0,131 | 0,042 | 0,039 | 0,017 | 0,000 |
| | Total | 0,469 | 0,404 | 0,401 | 0,492 | 0,206 | 0,562 | 0,242 | 0,223 | 0,404 | 0,089 | 0,046 | 0,017 | 0,000 |

Mean error is found by finding the total of the column totals of error matrix given in Table 4 and dividing it into K.(K-1) number. For this study the mean error ratio was calculated as:

$$ME = \frac{\Sigma\left|P_{jk} - P'_{jk}\right|}{K\,(K-1)} = \frac{3.555}{13\,(13-1)} = 0{,}022$$

This value may be accepted as a considerably small value. The case that mean error ratio value is considerably small shows that scale values have internal consistency.

## 3. FINDINGS

In this part of the study, paired comparisons and interpretations of *the characteristics that an ideal teacher is required to have* were given according to the gender, program type and grades of preservice teachers. Here, how many times the characteristic in the line was chosen compared to the character in the column; i. line and j. column element ($U_{ij}$), by the preservice teachers. According to this, it was seen that) =104 for U1 U2 characteristics. This means that the number of preservice teachers who preferred U1 to U2 is 104 out of 211. Likewise, the number of preservice teachers who preferred U2 characteristic to U1 is [(U2, U1) = n - (U1, U2)] = 211-104 = 107.

**Table 5.** The Raw Scores Matrix of the Preservice teachers [F]

| | **STIMULANTS ($U_j$)** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $U_i$ | U1 | U2 | U3 | U4 | U5 | U6 | U7 | U8 | U9 | U10 | U11 | U12 | U13 |
| U1 | | 104 | 153 | 182 | 129 | 132 | 87 | 126 | 171 | 70 | 158 | 168 | 153 |
| U2 | 107 | | 133 | 185 | 119 | 132 | 92 | 120 | 174 | 77 | 151 | 166 | 154 |
| U3 | 58 | 78 | | 153 | 96 | 103 | 68 | 106 | 150 | 42 | 135 | 61 | 128 |
| U4 | 29 | 26 | 58 | | 51 | 93 | 46 | 78 | 124 | 50 | 114 | 121 | 102 |
| U5 | 82 | 92 | 115 | 160 | | 121 | 78 | 123 | 160 | 77 | 147 | 164 | 143 |
| U6 | 79 | 79 | 108 | 118 | 90 | | 62 | 98 | 159 | 71 | 144 | 152 | 138 |
| U7 | 124 | 119 | 143 | 165 | 133 | 149 | | 146 | 173 | 108 | 160 | 179 | 162 |
| U8 | 85 | 91 | 105 | 133 | 88 | 113 | 65 | | 146 | 71 | 163 | 172 | 160 |
| U9 | 40 | 37 | 61 | 87 | 51 | 52 | 38 | 65 | | 39 | 120 | 145 | 129 |
| U10 | 141 | 134 | 169 | 161 | 134 | 140 | 103 | 140 | 172 | | 168 | 184 | 168 |
| U11 | 53 | 60 | 76 | 97 | 64 | 67 | 51 | 48 | 91 | 43 | | 114 | 112 |
| U12 | 43 | 45 | 61 | 90 | 47 | 59 | 32 | 39 | 66 | 27 | 97 | | 90 |
| U13 | 58 | 57 | 83 | 109 | 68 | 138 | 49 | 51 | 82 | 43 | 99 | 121 | |
| **total** | 899 | 922 | 1265 | 1640 | 1070 | 1299 | 771 | 1140 | 1668 | 718 | 1656 | 1747 | 1639 |

Ratio (P) matrix was created by dividing the values of judgements located in the each cell of Frequency (F) matrix into the number of the judges (N=211). The ratios (P) matrix is given in Table 6. Since the ratio values of ratio matrix are symmetrical to main diagonal, the sum of the ratios is equal to 1.

**Table 6.** Ratio Matrix (P)

| | STIMULANTS ($U_j$) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $U_i$ | **U1** | **U2** | **U3** | **U4** | **U5** | **U6** | **U7** | **U8** | **U9** | **U10** | **U11** | **U12** | **U13** |
| **U1** | | 0,492 | 0,725 | 0,862 | 0,611 | 0,625 | 0,412 | 0,597 | 0,810 | 0,331 | 0,748 | 0,796 | 0,725 |
| **U2** | 0,507 | | 0,630 | 0,876 | 0,563 | 0,625 | 0,436 | 0,568 | 0,824 | 0,364 | 0,715 | 0,786 | 0,729 |
| **U3** | 0,274 | 0,369 | | 0,725 | 0,454 | 0,488 | 0,322 | 0,502 | 0,710 | 0,199 | 0,639 | 0,289 | 0,606 |
| **U4** | 0,137 | 0,123 | 0,274 | | 0,241 | 0,440 | 0,218 | 0,369 | 0,587 | 0,236 | 0,540 | 0,573 | 0,483 |
| **U5** | 0,388 | 0,436 | 0,545 | 0,758 | | 0,573 | 0,369 | 0,582 | 0,758 | 0,364 | 0,696 | 0,777 | 0,677 |
| **U6** | 0,374 | 0,374 | 0,511 | 0,559 | 0,426 | | 0,293 | 0,464 | 0,753 | 0,336 | 0,682 | 0,720 | 0,654 |
| **U7** | 0,587 | 0,563 | 0,677 | 0,781 | 0,630 | 0,706 | | 0,691 | 0,819 | 0,511 | 0,758 | 0,848 | 0,767 |
| **U8** | 0,402 | 0,431 | 0,497 | 0,630 | 0,417 | 0,535 | 0,308 | | 0,691 | 0,336 | 0,772 | 0,815 | 0,758 |
| **U9** | 0,189 | 0,175 | 0,289 | 0,412 | 0,241 | 0,246 | 0,180 | 0,308 | | 0,184 | 0,568 | 0,687 | 0,611 |
| **U10** | 0,668 | 0,635 | 0,800 | 0,763 | 0,635 | 0,663 | 0,488 | 0,663 | 0,815 | | 0,796 | 0,872 | 0,796 |
| **U11** | 0,251 | 0,284 | 0,360 | 0,459 | 0,303 | 0,317 | 0,241 | 0,227 | 0,431 | 0,203 | | 0,540 | 0,530 |
| **U12** | 0,203 | 0,213 | 0,289 | 0,426 | 0,222 | 0,279 | 0,151 | 0,184 | 0,312 | 0,127 | 0,459 | | 0,426 |
| **U13** | 0,274 | 0,270 | 0,393 | 0,516 | 0,322 | 0,654 | 0,232 | 0,241 | 0,388 | 0,203 | 0,469 | 0,573 | |
| total | 4,261 | 4,370 | 5,995 | 7,773 | 5,071 | 6,156 | 3,654 | 5,403 | 7,905 | 3,403 | 7,848 | 8,280 | 7,768 |

(Z) standard values equaled to the cell values (P) of ratios matrix was found and unit normal deviation matrix in Table 7 was obtained. In the unit normal deviation matrix (Z), the elements are opposite signed according to main diagonal but their values are absolute. The column values of the stimulants in the unit normal deviation matrix (Z) were summed up. The column sums in the matrix were divided into the numbers of elements in the column and the scale values of the stimulants were calculated. The scale values are given in Table.7.

**Table 7.** Unit Normal Deviation Matrix (Z Matrix)

| | STIMULANTS (Uj) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $U_i$ | **U1** | **U2** | **U3** | **U4** | **U5** | **U6** | **U7** | **U8** | **U9** | **U10** | **U11** | **U12** | **U13** |
| **U1** | | -0,018 | 0,598 | 1,092 | 0,283 | 0,320 | -0,222 | 0,246 | 0,879 | -0,435 | 0,671 | 0,828 | 0,598 |
| **U2** | 0,018 | | 0,333 | 1,159 | 0,161 | 0,320 | -0,161 | 0,173 | 0,933 | -0,345 | 0,570 | 0,795 | 0,612 |
| **U3** | -0,598 | -0,333 | | 0,598 | -0,113 | -0,030 | -0,461 | 0,006 | 0,556 | -0,845 | 0,358 | -0,556 | 0,271 |
| **U4** | -1,092 | -1,159 | -0,598 | | -0,701 | -0,149 | -0,779 | -0,333 | 0,222 | -0,716 | 0,101 | 0,185 | -0,042 |
| **U5** | -0,283 | -0,161 | 0,113 | 0,701 | | 0,185 | -0,333 | 0,209 | 0,701 | -0,345 | 0,515 | 0,763 | 0,461 |
| **U6** | -0,320 | -0,320 | 0,030 | 0,149 | -0,185 | | -0,542 | -0,089 | 0,686 | -0,422 | 0,475 | 0,584 | 0,396 |
| **U7** | 0,222 | 0,161 | 0,461 | 0,779 | 0,333 | 0,542 | | 0,501 | 0,915 | 0,030 | 0,701 | 1,029 | 0,732 |
| **U8** | -0,246 | -0,173 | -0,006 | 0,333 | -0,209 | 0,089 | -0,501 | | 0,501 | -0,422 | 0,747 | 0,897 | 0,701 |
| **U9** | -0,879 | -0,933 | -0,556 | -0,222 | -0,701 | -0,686 | -0,915 | -0,501 | | -0,897 | 0,173 | 0,488 | 0,283 |
| **U10** | 0,435 | 0,345 | 0,845 | 0,716 | 0,345 | 0,422 | -0,030 | 0,422 | 0,897 | | 0,828 | 1,136 | 0,828 |
| **U11** | -0,671 | -0,570 | -0,358 | -0,101 | -0,515 | -0,475 | -0,701 | -0,747 | -0,173 | -0,828 | | 0,101 | 0,077 |
| **U12** | -0,828 | -0,795 | -0,556 | -0,185 | -0,763 | -0,584 | -1,029 | -0,897 | -0,488 | -1,136 | -0,101 | | -0,185 |
| **U13** | -0,598 | -0,612 | -0,271 | 0,042 | -0,461 | 0,396 | -0,732 | -0,701 | -0,283 | -0,828 | -0,077 | 0,185 | |
| $\sum Z$ | -4,225 | -4,568 | 0,035 | 5,060 | -2,527 | 0,352 | -6,406 | -1,710 | 5,346 | -7,191 | 4,960 | 6,436 | 4,733 |
| $\bar{Z}$ | -0,325 | -0,351 | 0,003 | 0,389 | -0,194 | 0,027 | -0,493 | -0,132 | 0,411 | -0,553 | 0,382 | 0,495 | 0,364 |
| $S_C$ | 0,228 | 0,202 | 0,556 | 0,942 | 0,359 | 0,580 | 0,060 | 0,422 | 0,964 | 0,000 | 0,935 | 1,048 | 0,917 |

13 characteristics that an ideal teacher is required to have according to preservice teachers, the scale values obtained by the law of paired comparisons and the stimulant rank values of the characteristics are displayed in Table 8.

The significance order of the characteristics that an ideal teacher is required to have were determined considering the gender, the program type (daytime education- evening education)

and the grades of the preservice teachers. The findings obtained according to these characteristics are displayed in Table 8.

When the findings in Table 8 are considered in general, the most important characteristic was stated as *(U10) should be sophisticated*, and the others were ranked respectively as *(U7) should be humoristic, (U2) should be open to criticism, (U1) should be motivating, (U5) should be cheerful, (U8) should have a decent dictation, (U3) should be reassuring, (U6) should be creative, (U13) should be a researcher, (U11) should utilize teaching methods efficiently, (U4) should care about students, (U9) should have good communication skills, (U12) should keep distance from students.*

On the other hand, when the gender of the preservice teachers is considered, *the characteristics that an ideal teacher is required to have* are ordered as: the most significant characteristic according to both male and female preservice teachers is *a teacher should be sophisticated*, the second significant characteristic according to male preservice teachers is *a teacher should be humoristic* whereas this characteristic is the third significant according to female preservice teachers. While the most significant characteristic according to male preservice teachers is *a teacher should be open to criticism*, according to female preservice teachers this characteristic is the second significant characteristic. The fourth significant characteristic according to both male and female preservice teachers is *a teacher should be motivating.* Similarly, according to both male and female preservice teachers the least significant characteristic is *a teacher should keep distance from students.*

When the school type (daytime and evening education) is considered, the most significant characteristic that an ideal teacher is required to have is *a teacher should be humoristic* according to the preservice teachers of daytime education, whereas according to the evening education preservice teachers this characteristic is the second significant one. The most significant characteristic according to the evening education preservice teachers is *a teacher should be sophisticated*, however, this characteristic is the second significant characteristic according to the daytime education preservice teachers. Furthermore, the characteristic of *a teacher should keep distance from students* is the least significant one according to both daytime and evening education preservice teachers.

When the grades of the preservice teachers are considered, the paired comparison results based on the significance ranks of the characteristics that an ideal teacher is required to have are stated as: the characteristic of *a teacher should be sophisticated* is the most significant characteristic according to the second and third grade preservice teachers, but according to the fourth grade preservice teachers this characteristic is the fourth significant one. On the other hand, the most significant characteristic according to the fourth grade preservice teachers is *a teacher should be open to criticism*, while this characteristic is the third significant characteristic according to the second graders and the fourth significant characteristic according to the third graders. According to the preservice teachers of all grades, the characteristic *a teacher should keep distance from students* is the least significant one.

*(U4) a teacher should care about students* characteristic, which is indeed supposed to be among the most significant characteristics, is the eleventh according to the second grade preservice teachers and the tenth according to the third and the fourth grade preservice teachers. Similarly, *(U11) a teacher should utilize the teaching methods efficiently* characteristic which can be seen as a significant characteristic in the professional development of a teacher, is the tenth according to the second grade preservice teachers, the eleventh according to the third grade preservice teachers and the eighth according to the fourth grade preservice teachers. Likewise, all three grades of preservice teachers stated that the least significant characteristic in the scale is *(U12) a teacher should keep distance from students.*

**Table 8.** The scale values and stimulant ranks of "the characteristics that an ideal teacher is required to have" according to the general, gender, school type and grades of preservice teachers.

| The characteristics that an ideal teacher is required to have according to preservice teachers | | Preservice Teachers (General) | | Gender | | | | School Type | | | | Grade | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Male Preservice Teachers | | Female Preservice Teachers | | Daytime Education | | Evening Education | | 2nd Grade | | 3rd Grade | | 4th Grade | |
| | | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks | **Scale Values** | Stimulant Ranks |
| **U1** | Should be motivating | 0,228 | **4** | 0,247 | **4** | 0,164 | **3** | 0,102 | **3** | 0,337 | **4** | 0,325 | **4** | 0,155 | **3** | 0,026 | **2** |
| **U2** | Should be open to criticism | 0,202 | **3** | 0,180 | **2** | 0,203 | **4** | 0,217 | **4** | 0,209 | **3** | 0,259 | **3** | 0,324 | **4** | 0,000 | **1** |
| **U3** | Should be reassuring | 0,556 | **7** | 0,702 | **9** | 0,513 | **8** | 0,447 | **7** | 0,756 | **8** | 0,662 | **8** | 0,569 | **7** | 0,456 | **9** |
| **U4** | Should care about students | 0,942 | **11** | 0,915 | **12** | 0,949 | **9** | 0,845 | **10** | 1,114 | **11** | 1,041 | **11** | 1,055 | **10** | 0,624 | **10** |
| **U5** | Should be cheerful | 0,359 | **5** | 0,482 | **7** | 0,330 | **5** | 0,247 | **5** | 0,573 | **6** | 0,489 | **5** | 0,340 | **5** | 0,238 | **6** |
| **U6** | Should be creative | 0,580 | **8** | 0,481 | **6** | 0,382 | **6** | 0,488 | **8** | 0,591 | **7** | 0,612 | **7** | 0,591 | **8** | 0,293 | **7** |
| **U7** | Should be humoristic | 0,060 | **2** | 0,202 | **3** | 0,027 | **2** | 0,000 | **1** | 0,188 | **2** | 0,146 | **2** | 0,034 | **2** | 0,103 | **3** |
| **U8** | Should have a decent dictation | 0,422 | **6** | 0,473 | **5** | 0,411 | **7** | 0,365 | **6** | 0,520 | **5** | 0,502 | **6** | 0,496 | **6** | 0,194 | **5** |
| **U9** | Should have good communication skills | 0,964 | **12** | 0,903 | **11** | 0,981 | **11** | 0,935 | **12** | 1,047 | **10** | 1,054 | **12** | 1,017 | **9** | 0,801 | **12** |
| **U10** | Should be sophisticated | 0,000 | **1** | 0,000 | **1** | 0,000 | **1** | 0,036 | **2** | 0,000 | **1** | 0,000 | **1** | 0,000 | **1** | 0,165 | **4** |
| **U11** | Should utilize the teaching methods efficiently | 0,935 | **10** | 0,684 | **8** | 0,989 | **12** | 0,851 | **11** | 1,090 | **9** | 0,990 | **10** | 1,204 | **11** | 0,397 | **8** |
| **U12** | Should keep distance from students | 1,048 | **13** | 1,014 | **13** | 1,156 | **13** | 1,041 | **13** | 1,292 | **13** | 1,177 | **13** | 1,323 | **13** | 0,846 | **13** |
| **U13** | Should be a researcher | 0,917 | **9** | 0,732 | **10** | 0,950 | **10** | 0,782 | **9** | 1,138 | **12** | 0,801 | **9** | 1,283 | **12** | 0,715 | **11** |

The characteristics that an ideal teacher is required to have according to preservice teachers were scaled by using paired comparisons method according to the gender, school type and grades of preservice teachers. Spearman's rho correlation method was utilized in order to determine whether there was a meaningful correlation between the results of paired comparisons which were made according to the mentioned characteristics of the preservice teachers. The results obtained are displayed in Table 9.

**Table 9**. Spearman's rho correlation coefficients of the significance levels of the characteristics that an ideal teacher is required to have according to the gender, program type (daytime education and evening education) and grades of the preservice teachers

| | | | MPT | FPT | DE | EE | SG | TG | FG | GPT |
|---|---|---|---|---|---|---|---|---|---|---|
| Spearman' rho | MPT | Correlation Coefficient | 1,000 | | | | | | | |
| | | Sig. (2-tailed) | . | | | | | | | |
| | | N | 13 | | | | | | | |
| | FPT | Correlation Coefficient | ,890** | 1,000 | | | | | | |
| | | Sig. (2-tailed) | ,000 | . | | | | | | |
| | | N | 13 | 13 | | | | | | |
| | DE | Correlation Coefficient | ,896** | ,967** | 1,000 | | | | | |
| | | Sig. (2-tailed) | ,000 | ,000 | . | | | | | |
| | | N | 13 | 13 | 13 | | | | | |
| | EE | Correlation Coefficient | ,967** | ,929** | ,929** | 1,000 | | | | |
| | | Sig. (2-tailed) | ,000 | ,000 | ,000 | . | | | | |
| | | N | 13 | 13 | 13 | 13 | | | | |
| | SG | Correlation Coefficient | ,956** | ,962** | ,978** | ,956** | 1,000 | | | |
| | | Sig. (2-tailed) | ,000 | ,000 | ,000 | ,000 | . | | | |
| | | N | 13 | 13 | 13 | 13 | 13 | | | |
| | TG | Correlation Coefficient | ,890** | ,956** | ,945** | ,967** | ,934** | 1,000 | | |
| | | Sig. (2-tailed) | ,000 | ,000 | ,000 | ,000 | ,000 | . | | |
| | | N | 13 | 13 | 13 | 13 | 13 | 13 | | |
| | FG | Correlation Coefficient | ,940** | ,874** | ,896** | ,929** | ,918** | ,874** | 1,000 | |
| | | Sig. (2-tailed) | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | . | |
| | | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | |
| | GPT | Correlation Coefficient | ,940** | ,951** | ,984** | ,951** | ,995** | ,940** | ,907** | 1,000 |
| | | Sig. (2-tailed) | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | . |
| | | N | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |

** P<0,01

MPT: Male Preservice Teacher; FPT: Female Preservice Teacher; DE: Daytime Education; EE: Evening Education; SG: Second Grade; TG: Third Grade; FG: Fourth Grade; GPT: General Preservice Teachers

When Table 9 is investigated, the minimal value of correlation coefficients for N*(N-1)/2 paired comparisons made according to the gender, program type (daytime and evening education) and grades of the preservice teachers who participated in the study group is between FG and FPT ($r$ = 0.874) and between FG and TG ($r$ = 0.874) while the maximum correlation coefficient is between GPT and SG ($r$ = 0.995).

In addition, the Spearman's rho correlation coefficients of the paired comparisons in Table 9 indicate a positively high level correlation and also it is clear that the correlation coefficients of paired comparison results are statistically significant at the 0.01 level.

## 4. DISCUSSION, RESULTS AND SUGGESTIONS

In this study, the perceptions of preservice teachers who were students at faculty of education on the characteristics that an ideal teacher is required to have and the characteristics which were assumed to be related were scaled via full data matrix with the use of the law of paired comparatives V case. The study was carried out on the data collected from 211 preservice teachers who were 2nd, 3rd and 4th grade students at Pamukkale University, Denizli, Turkey, faculty of education, department of primary school teaching (n=71; 33.6%),

department of preschool education (n=83; 39.3%), department of psychological counseling and guidance (n=57; 27.0%). The preservice teachers were asked to prefer one characteristic to another by making paired comparisons of 13 characteristics that an ideal teacher is required to have. After making paired comparisons, the frequency of each characteristic was determined. Frequency matrix was created with these frequencies. Then, the value of each cell in the frequency matrix was divided into the number of the participants in the study group (n=211) therefore ratios (***P***) matrix was created. Unit deviation matrix (Z) equaled to each (P) value of the ratios matrix was also created. In order to determine whether the paired comparison judgments of preservice teachers that they made for the stimulants given, internal consistency of scaling was examined. For this, the concordance level of observed $\boldsymbol{P_{jk}}$ ratios with $\boldsymbol{P'_{jk}}$ values obtained from the scale values (expected from the scale values) is examined (Turgut & Baykul, 1992). In order to examine the internal consistency, the concordance between observed ratios and theoretical ratios is checked by obtaining a Z' unit normal deviation matrix created from the scale values which were obtained by the data and a theoretical matrix out of this matrix.

Calculated mean error value can be accepted as a quite small value. A considerably small mean error value (ME=0.022<0.05) indicates that the scale values have internal consistency. The first question of the study was how the characteristics that an ideal teacher is required to have according to preservice teachers were ranked from the most significant characteristic to the least significant one. Therefore, the preservice teachers were asked to compare each characteristic to the others as pairs using the law of paired comparisons. According to the findings obtained, among 13 characteristics that an ideal teacher is required to have, *(U10) a teacher should be sophisticated* was stated as the most significant characteristic. On the other hand, the least significant characteristic was stated as *(U12) a teacher should keep distance from students*.

The second question of the study is whether the significance rank of the characteristics that an ideal teacher is required to have vary or not considering the gender of preservice teachers. The finding that was reached when the gender of preservice teachers was considered stated that the most significant characteristic for both male and female teachers was *(U10) a teacher should be sophisticated.* For male preservice teachers the characteristic of *(U2) a teache*r *should be open to criticism* was the second significant characteristic while the characteristic of *(U7) a teacher should be humoristic* was the second significant characteristic for female preservice teachers. According to both male and female preservice teachers, the characteristic of *(U12) a teacher should keep distance from students* was stated as the least significant characteristic among 13 characteristics that an ideal teacher is required to have.

The third question of the study is whether the significance rank of the characteristics that an ideal teacher is required to have vary or not according to the program type of preservice teachers. According to the preservice teachers of daytime education, the most significant characteristic that an ideal teacher is required to have was *(U7) a teacher should be humoristic*, whereas this characteristic was the second according to the preservice teachers of evening education. The most significant characteristic according to the preservice teachers of evening education was *(U10) a teacher should be sophisticated*, while this characteristic was stated as the second according to the preservice teachers of daytime education.

The fourth question of the study is whether the significance rank of the characteristics that an ideal teacher is required to have vary or not according to the grade of preservice teachers. When the grade of preservice teachers was considered, according to the second and the third grade preservice teachers, the most significant characteristic was *(U10) a teacher should be sophisticated*, while according to the fourth grade preservice teachers this characteristic was stated as the fourth significant characteristic. On the other hand, according to the fourth grade preservice teachers, the most significant characteristic was stated as *(U2) a*

*teacher should be open to criticism*, while this characteristic was stated as the third significant characteristic according to the second grade preservice teachers and the fourth significant characteristic according to the third grade preservice teachers. According to all grades of preservice teachers the least significant characteristic was determined as *(U12) a teacher should be open and respective to differences.*

A paired comparison scaling study on teacher qualifications was carried out by Anıl and Güler (2006). Apart from this research, no other study handling teacher qualifications has been observed. Anıl and Güler (2006) examined eight qualifications as teacher characteristics in their study. In their study, the most significant qualification was stated as *working with passion,* it was followed respectively by the qualifications as *having the skill of imparting knowledge, having good communication skills, being open to technological developments, having the content knowledge, being democratic, being open to criticism* and the least significant qualification was stated as *being humoristic.*

It is clear that the characteristics of this study are stated as the same with the *being humoristic, communication skills, being open to criticism* qualifications of the study of Anıl and Güler (2006) and yet the other variables are stated as different.

While *communication skills* was determined as the third most significant characteristics in the study of Anıl and Güler (2006), in this study it was ranked as the twelfth. In Anıl and Güler's (2006) study, the characteristic of *being open to criticism* was ranked as the seventh in terms of significance whereas in this study, this characteristic was ranked as the third. In the study of Anıl and Güler (2006), the characteristic of *being humoristic* was ranked as the last in terms of significance among eight characteristics, while in this study it was ranked as the second among thirteen characteristics. It is clear that in the study of Anıl and Güler (2006), the mutual characteristics are not in the same significance order.

In the study of Anıl and Güler (2006) there were eight qualifications of teachers within the research but in this study there were 13 characteristics. While Anıl and Güler (2006) studied by considering the judgments of university students in general terms, in this study apart from the general judgments of preservice teachers who participated in the study, the variables of their gender, grades and program types (daytime education and evening education) were taken into consideration.

It is easy to see the known fact that there are few studies about scaling when the literature review is done. Therefore, the need for more studies on this field emerges spontaneously. It is thought that the researchers who are willing to study on this field can work on the subjects such as the effectiveness of teaching.

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