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## Investigation of pre-service teachers' perceptions about concept of measurement and assessment through metaphor analysis

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### Abstract

The aim of this study is to investigate the perceptions of the pre-service elementary and preschool teachers concerning the concept of measurement and assessment through metaphor analysis. For this study, pre-service elementary and preschool teachers were interviewed. Qualitative research technique was used to obtain, analyze and interpret data. Metaphors were used in data acquisition. The findings of the study indicate that the pre-service elementary and preschool teachers have a negative perception of measurement and assessment.

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*Keywords:* Pre-service preschool teacher; pre-service elementary teacher; measurement and assessment; metaphor.

### 1. Introduction

The most fundamental objective of measurement and assessment, which is an integral and complementary element of the education process, is to increase the quality of education by ensuring the relatively effective continuation of the process. When planned with this objective in mind, measurement and assessment activities can be expected to support and enhance the students' learning process by revealing to what extent the acquired knowledge is utilized in novel situations. Measurement and assessment activities help teachers with regards to numerous aspects of the teaching and training process. The most important among these aspects are the evaluations of teaching and program effectiveness, the identification and appropriate placement of students within the education process, and the determination of deficiencies in and difficulties relating to learning by way of measuring the level of learning (Stark, 1998). Whether measurement and assessment succeeds in attaining these objectives relating especially to the students, teachers and teaching activities, largely depends on how well-equipped the teachers are about measurement and assessment. The studies conducted on this subject indicate that the knowledge and skills that the teachers possess concerning measurement and assessment have an impact on their classroom activities and their self-perception of adequacy (Mertler, 2009; Karaca, 2004; Çakan, 2004; MoNE, ERDHO, 2006).

The extent of the knowledge and skills concerning measurement and assessment that teachers possess and how much they are utilized, are closely correlated with the quality of the pre-service training teachers receive. According to Plake (1993), the measurement and assessment related deficiencies that teachers suffer are rooted in the deficiencies of the training they received before their service (cited Mertler, 2009). On the other hand, according to Berberoğlu (2006), education and training activities contain perceptual characteristics such as attitudes and interests

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just as they contain the students' knowledge and skills concerning the subject matter. In this regard, it is estimated that the training pre-service teachers receive can also influence their attitudes and perceptions towards measurement and assessment. In a study conducted by Struyven, Dochy and Janssen (2005) to examine how pre-service teachers perceive measurement and assessment, it was discovered that how these pre-service teachers perceive measurement and assessment indeed have an influence on their learning and work efforts. Examining the perceptions of the pre-service teachers towards measurement and assessment helps us clearly identify their thoughts, perspectives and attitudes concerning measurement and assessment. The most powerful instruments for clearly identifying the perceptions of the pre-service teachers regarding the concept of measurement and assessment are the metaphors these teachers develop about this concept. Metaphors are the instruments used for explaining an abstract concept by establishing connections between the abstract concept and various concrete and observable concepts (Saban, 2004). Metaphors help convey the intended meaning with fewer words and a stronger emphasis. In this respect, it is inevitable that individuals resort to metaphors when describing their thoughts, feelings and life experiences (Girmen, 2007). The aim of this study is to investigate the perceptions of the pre-service elementary and preschool teachers concerning the concept of measurement and assessment through metaphor analysis.

## 2. Method

### 2.1. Research Model

The study has a descriptive character since it aims to depict the phenomenon it focuses on as it actually is. Qualitative research method was used in the study.

### 2.2. Study Sample

The study was conducted with 200 participants, who are studying in a large public university and have taken a course in measurement and assessment in their third and fourth grade.

### 2.3. Data Acquisition and Analysis

An interview form was prepared to discover the perceptions that the participating pre-service teachers have about measurement and assessment. In the interview form, the participating students were asked to complete the sentence "*Measurement and assessment is like ... because ..*". The perceptions that the participating pre-service teachers have about measurement and assessment were examined using the method of metaphor analysis. As a process, metaphor oriented data acquisition studies are not really different from the open-ended individual or focus group interviews. When the typical "metaphor oriented" qualitative data acquisition process is used by itself, it is possible to obtain very rich metaphors from the participants just by asking one or a few open-ended questions (Yıldırım and Şimşek, 2006). Within this scope, the process of the analysis and interpretation of the metaphors pre-service teachers develop about measurement and assessment consists of the following four stages: (1) the identification of the metaphors, (2) the classification of the metaphors, (3) the development of categories and (4) validity and reliability assurance.

### 2.4. Findings and Interpretation

It was found that the participating pre-service elementary and preschool teachers have developed 96 metaphors about the concept of "measurement and assessment" and 8 of these were left out of the analysis. The metaphors developed by the pre-service teachers were divided into ten categories. These categories concerning the developed metaphors are "complicated", "essential", "control mechanism", "complementary", "subjective", "bottom-line-oriented", "richness/depth", "fear", "unnecessary" and "holism". A category of metaphors the participating pre-service teachers developed about "measurement and assessment" is "complicated". Participants developed metaphors indicating complexity and expressing the fact that the scope of measurement and assessment encompasses numerous different subjects, which are inherently difficult and taxing to comprehend. The frequency distribution of the metaphors belonging to this category the pre-service teachers developed is shown in Table 1.

Table 1. The frequency distribution of the pre-service teachers' metaphors, which fall under the “complicated” category

	A computer	A maze	A badly tangled rope	Badly tangled hair	A foreign language	An octopus	Novels by Tolstoy	A woman	Traffic	Chess	A bottomless well	Human relations	Marriage
CLA	-	2	3	2	1	1	-	2	2	1	1	2	1
PSC	1	3	2	2	2	2	1	4	2	-	-	-	-

When Table 1 is examined, it can be seen that a total of 13 metaphors were developed about the concept of measurement and assessment. Whereas the pre-service elementary teachers most frequently developed “a badly tangled rope” among those belonging to the “complicated” category, the pre-service preschool teachers most frequently developed the metaphor of “a woman.” The following statement by a pre-service preschool teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like a maze because it is a puzzle where there are many inter-connected paths and it is not easy to find the exit. We may have to think hard and try many paths in order to find the exit.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “essential”. Participants developed metaphors belonging to this category because they thought that measurement and assessment is an indispensable part of the process of teaching. The frequency distribution of the metaphors the pre-service teachers developed is provided in Table 2.

Table 2. The frequency distribution of the pre-service teachers' metaphors, which fall under the “essential” category

	Sun	Food	Water	Money	Time	Air	Blood	Life	Ozone Layer	Light
CLA	-	1	1	2	1	1	1	1	1	1
PSC	1	1	2	1	1	-	-	-	-	1

When Table 2 is examined, it can be seen that a total of 10 metaphors were developed about the concept of measurement and assessment. Whereas the pre-service elementary teachers most frequently developed “money” among those belonging to the “essential” category, the pre-service preschool teachers most frequently developed the metaphor “water.” The following statement by a pre-service elementary teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like water. Measurement and assessment, which possesses great significance with respect to the identification of the needs encountered in the education process, is essential, just as water is essential for life.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “control mechanism”. Participants developed metaphors belonging to this category because they thought that measurement and assessment plays an important role in supervising the education process in order to detect the deficiencies, in making decisions about the effectiveness of the process, structuring of the teaching process and directing the students in accordance with their interests and talents. The frequency distribution of the metaphors belonging to the “control mechanism” category the pre-service teachers developed is provided in Table 3.

Table 3. The frequency distribution of the pre-service teachers' metaphors, which fall under the “control mechanism” category

	A traffic police	A pilot	A teacher	Check-up machines	A president	A quality control unit	An accountant	A lie detector	A judge	A physician	A clock	A mirror
CLA	-	-	-	1	-	3	2	2	-	2	2	2
PSC	1	1	1	1	1	2	-	-	-	1	-	1

According to Table 3, a total of 12 metaphors were developed about the concept of measurement and assessment. Both the pre-service elementary and preschool teachers most frequently developed the metaphor of “a quality assurance unit” among those belonging to the “control mechanism” category. The following statement by a pre-service elementary teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like the quality control units in factories. Just as a quality control unit in a factory inspects the quality of the products and determines the measures to be taken, measurement and assurance too makes corrections possible by detecting the deficiencies in education.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “complementary”. Participants developed metaphors belonging to this category by stating that measurement and assessment is an integral part of the teaching and training process. The frequency distribution of the metaphors belonging to the “complementary” category the pre-service teachers developed is provided in Table 4.

Table 4. The frequency distribution of the pre-service teachers' metaphors, which fall under the “complementary” category

	Dessert	Accessory	Make-up	Salt	Roof
CLA	1	-	-	1	1
PSC	1	1	1	-	-

When Table 4 is examined, it can be seen that the pre-service elementary teachers and the pre-service preschool teachers each developed an equal number of metaphors about the concept of measurement and assessment. The following statement by a pre-service preschool teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like make-up. Make-up complements one's beauty. In the same manner, measurement and assessment complements education.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “subjective”. Participants developed metaphors belonging to this category because subjective judgments may play a role in measurement and assessment. The frequency distribution of the metaphors belonging to the “subjective” category the pre-service teachers developed is provided in Table 5.

Table 5. The frequency distribution of the pre-service teachers' metaphors, which fall under the “Subjective” category

	A team fan	A sports-match commentary	A work of art	A human being	Beauty	Life	A chameleon	A painting
PSC	1	2	1	1	1	1	1	1

According to Table 5, only 9 preschool teachers developed metaphors belonging this category. The following statement by a pre-service preschool teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like a sports-match commentary. The same match can be commentated differently by different commentators. In a similar manner, a teacher can grade an exam differently at different times.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “numerical values/data”. Those pre-service teachers, who think that measurement and assessment process only yield numerical data, developed metaphors belonging to the “numerical data” category. The frequency distribution of the developed metaphor is provided in Table 6.

Table 6. The frequency distribution of the pre-service teachers' metaphors, which fall under the “numerical values/data” category

	A ruler	A balance	A yard-stick	A thermometer	A calculator	An abacus	A scale	A money counting machine	An exam	A bill	A final match	A clock	The score of a match
CLA	2	8	1	2	1	-	4	-	1	-	1	1	3
PSC	3	6	2	3	2	2	3	1	-	2	1	-	-

When Table 6 is examined, it can be seen that a total of 13 metaphors were developed about the concept of measurement and assessment. Both the pre-service elementary teachers and the pre-service preschool teachers most frequently developed the metaphor of “a balance” among those belonging to the “numerical value” category. The following statement by a pre-service elementary teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like a balance. It gives us a concrete numerical result about the thing we want to measure.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “richness/depth”. Pre-service teachers developed metaphors belonging to the “richness/depth” category by stating that measurement and assessment is conducted by different methods and for different objectives. The frequency distribution of the metaphors belonging to the “richness/depth” category the pre-service teachers developed is provided in Table 7.

Table 7. The frequency distribution of the pre-service teachers' metaphors, which fall under the “richness/depth” category

	A chest	An ocean	A forest	A farm	A rainbow	A treasure	An alphabet	Pandora's box	Turkish meals	An oyster	Shopping
CLA	-	1	-	-	-	2	1	1	1	1	1
PSC	1	2	1	1	1	1	1	-	-	-	1

According to Table 7, a total of 11 metaphors were developed about the concept of measurement and assessment in this category by the pre-service elementary teachers and the pre-service preschool teachers. Whereas the pre-service elementary teachers most frequently developed the metaphor of “a treasure”, the pre-service preschool teachers most frequently developed the metaphor of “an ocean”. The following statement by a pre-service preschool teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like an ocean. A great variety of living creatures live in an ocean and their numbers are greater than we can imagine. There are similarly numerous methods and techniques available for conducting measurement and assessment.”*

Another category of metaphors the participating pre-service teachers developed about “measurement and assessment” is “fear”. It is observed that pre-service teachers developed metaphors belonging to the “fear” category by taking into account the undesirable outcomes one may encounter as a result of the measurement and assessment process. The frequency distribution of the developed metaphors is given in Table 8.

Table 8. The frequency distribution of the pre-service teachers' metaphors, which fall under the “fear” category

	A tiger	A bee	A mouse	Darkness	A snake	A Dinosaur	A dog	A boomerang	Death
CLA	1	1	1	2	1	1	-	1	1
PSC	-	1	-	1	1	-	1	-	-

According to Table 8, the pre-service elementary teachers developed a greater number of metaphors belonging to this category in comparison to the preschool teachers. The following statement by a pre-service elementary teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like darkness. Darkness is scary. When in darkness, you can't know what you will encounter. Similarly, you can encounter a bad outcome at the end of the measurement and assessment process. Even thinking about such an outcome frightens me.”*

Another category metaphors the participating pre-service teachers developed about “measurement and assessment” is “unnecessary”. Participants developed metaphors belonging to this category because they thought that measurement and assessment did not play an important role in the education process. The frequency distribution of the metaphors belonging to the “unnecessary” category the pre-service teachers developed is provided in Table 9.

Table 9. The frequency distribution of the pre-service teachers' metaphors, which fall under the “unnecessary” category

	A garlic peeler	A cicada	An ornamental item	TV	Homework
CLA	1	1	1	1	1
PSC	-	-	2	1	-

When Table 9 is examined, it can be seen that the pre-service elementary teachers developed a greater number of metaphors. The following statement by a pre-service elementary teacher is an example of the metaphors belonging to this category:

*“Measurement and assessment is like a cicada. I find measurement and assessment to be a tiresome headache more than anything else. Just like a cicada squeaking all the time and giving me a headache, measurement and assessment is nothing but a frivolous headache.”*

Yet another category of metaphors is “holism”. Pre-service teachers developed metaphors belonging to this category by stating that measurement and assessment is constituted by a number of inter-related stages which

together form a meaningful whole. In this whole, the problems encountered in one of the stages negatively affect the other stages. The frequency distribution of the metaphors the pre-service teachers developed is provided in Table 10.

Table 10. The frequency distribution of the pre-service teachers' metaphors, which fall under the "holism" category

	A jig-saw puzzle	An orchestra	A puzzle	A pattern	A domino piece	A picture	An experiment	Maslow's Hierarchy of Needs	Jenga
CLA	2	-	3	1	-	2	1	1	1
PSC	2	1	1	-	1	5	-	-	-

When Table 10 is examined, it can be seen that a total of 9 metaphors belonging to this category were developed. Whereas the pre-service elementary teachers most frequently developed the metaphor of "a puzzle", the pre-service preschool teachers most frequently developed the metaphor of "a picture". Regarding this category, the following statement by a pre-service elementary teacher constitutes a good example:

*"Measurement and assessment is like a jig-saw puzzle, because you can achieve your objective by putting together different pieces. Every particular behavior of the child constitutes an individual piece of the puzzle and when you put them together, you get to a meaningful conclusion about the child."*

#### 4. Conclusion and Recommendations

As the study results indicate, when the categories, which were produced on the basis of the responses the participant pre-service teachers gave, are examined, it can be seen that half of these categories express positive perceptions (essential, control mechanism, complementary, richness/depth and holism) and the other half express negative perceptions (complicated, subjective, numerical value, fear and unnecessary). The pre-service elementary teachers developed a total of 67 metaphors distributed across 9 categories. When we examine this distribution, we see that 56 participants developed metaphors expressing negativity whereas 46 participants developed metaphors associated with positive perceptions. The pre-service preschool teachers on the other hand, developed a total of 65 metaphors distributed across 10 categories. When we examine this distribution, we see that 60 participants developed negative metaphors whereas 38 participants developed metaphors associated with positive perceptions. These figures indicate that both the pre-service elementary teachers and the pre-service preschool teachers have negative perceptions about measurement and assessment.

The fact that the pre-service teachers perceive measurement and assessment most frequently as a concept about "numerical data" and least frequently as a "complementary" concept indicates that the process of measurement and assessment is perceived as if it merely yields numerical data and its evaluative dimension is largely neglected. When we think of the categories concerning the concept of measurement and assessment as a whole, we see that the pre-service elementary teachers most frequently developed the metaphors of "a balance" and "a scale" whereas the pre-service preschool teachers most frequently developed the metaphors of "a balance" and "a picture". This could be due to the fact that the quantitative subjects dominate measurement and assessment courses at universities. The fact that a small number of teachers perceive measurement and assessment as a complementary concept makes one think that they failed to realize that this concept plays a crucial role in education process. This could be due to the fact that many university courses do not offer a sufficiently thorough treatment of the subject of measurement and assessment. According to the findings obtained during this study, it is recommendable to ensure that in university courses measurement and assessment is treated as a whole, its applications are given due emphasis, measurement and assessment activities are used as a complementary element in other courses, and professors drive home the message about the significance of this process. In addition to these, it is possible to recommend that research should be conducted on the causes of the negative perceptions towards the measurement and assessment courses, that the present study should be repeated with service teachers and that the relationship between the perceptions and actions of the teachers should be examined.

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