Turkish Elementary School Teacher Candidates' Technology Metaphors[1]

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Abstract

This research applied metaphor analysis to investigate elementary school student teachers' conceptions of technology. The sample included 160 student teachers who were studying at first, second, and third grades of an Elementary Teacher Education Program in 2010-2011 academic years. A questionnaire form was prepared in order to elicit information about the perception of teacher candidates for the concept of technology. In the first section of the form, they were asked to provide personal information, while they were asked to complete the sentence "Technology is like … , because … " in the second section of the form. Metaphors created by the candidates were analyzed and classified under eight categories. Participants produced 154 distinct mental images clustered into nine conceptual categories that characterize technology as required, constantly changing, developing, providing benefit, leading to addiction, useful and harmful, progressing so fast and making life easier. Overall, the results suggest that student teachers' conception of technology is restricted and mostly focuses on artifact and technical dimensions. Unfortunately, none of them created a metaphor including learning or teaching technologies.

Key Words: metaphor, student teachers, teacher development, technology education.

Introduction

In the 21th century technology has progressed faster than it did in any other era. This, of course, affected learning and teaching process as well as it affected other fields of society life. Because of this immense growth of technology, there is, now, a search for quest that make use of technology in

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[1] This paper was presented in the 10th Elementary Teacher Education Symposium, which had been organized between 3-5 May, 2011 by Cumhuriyet University in Turkey.

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instructional environments. As new media have been integrated in learning environments and teachers have started to instruct their students using these media, students have started to interact with technology. Turkish Ministry of National Education (2006) had listed performance indicators below that teachers should possess in proficiency field of Information and Communication Technologies (ICT) of General Proficiencies of Teaching Occupation.

Turkish Teachers;

- have legal and ethical responsibilities related to ICT and can transfer these responsibilities to their students.
- are technology-literate.
- follow the updates in ICT.
- benefit from ICT in order to support their professional development and increase their efficiency.
- benefit from ICT (online magazines, software, e-mail, etc.) in order to share information.
- create appropriate learning environments by using ICT for students who have different experiences, characteristics, and abilities.
- state how they will use ICT in their course flow.
- make use of computer and other technologies in developing instructional materials.
- reach sources in digital environments (databases, online resources, etc.) and evaluates these sources in terms of accuracy and appropriateness.
- are models for making effective use of technological sources and teaches how to use these sources.
- consider that students may need to be instructed differently and uses technology that supports student centered strategies.
- analysis data using ICT.
- share the analysis results with parents, school administrators and other educators using ICT.

From the point of these performance indicators, it is a requirement to investigate attitudes of teachers and also teacher candidates towards technology and the meanings they attribute to technology periodically. Literature related to educational sciences states that teachers and teacher candidates don't possess sufficient knowledge and competence about using teaching technologies in their classrooms. Indeed, recent surveys suggest that technology has not been effectively used for facilitating meaningful learning in the schools yet (Ertmer & Ottenbreit–Leftwich, 2010). For that reason, they encounter many problems in using instructional technology and developing instructional materials when they become practicing teachers. In some studies, it is stated that although they are able to attain easily, teachers tend not to use technology in their classrooms (Çağıltay, Çakıroğlu, Çağıltay & Çakıroğlu, 2001). Teachers' attitudes towards technology, their perspectives and perceptions about them are of great importance in benefiting from the opportunities provided by technology (Çelik & Kahyaoğlu, 2007).

There is a close relationship between individual's perceptions of technology and usage of it (Cüre & Özdener, 2008). Thus, students' and teachers' interaction with technology establishes a ground to research their attitudes towards technology, their perceptions, their opinions and the meanings they attributed to technology. In the literature, there are some studies about this field (Cüre & Özdener, 2008; Umay, 2004; Seferoğlu, Akbıyık & Bulut, 2008; Yavuz & Coşkun, 2008). It is very important to have positive perceptions relating to technology for teacher candidates who attend Faculty of Education (Christensen, 2002; Çelik & Kahyaoğlu, 2007; Marcinkiewicz, 1993–1994; Hew & Brush, 2007; Lai, Pratt &Trewem, 2001).

A well-known way of researching how human being perceives technology and what meanings they attribute to it is metaphor that is accepted as one of the strongest intellectual media in determining the perceptions of the concept of technology. Metaphor is considered as a strong intellectual medium that can be employed to understand and explain a highly abstract, complex and theoretical phenomenon (Saban, Koçbeker & Saban, 2006). Metaphor is a transfer of meaning between two objects of which share perceptional similarity. Metaphors allow human being to compare abstract or

complex phenomena with concrete or experienced one and in this way they provide an opportunity to develop an understanding of unknown phenomena. It is stated that metaphor is not only a figure of speech used to decorate the daily language and its importance in human life mean much more than this (Saban, Koçbeker & Saban, 2006; Semerci, 2007).

In a study conducted by Semerci (2007) to investigate individuals' perceptions of some certain concepts, the researcher explored the metaphors of teachers for program development. In the study, it is stated that using metaphors can be appropriate in the subjects difficult to comprehend, and these metaphors can be live or lifeless, abstract or concrete, positive or negative. Another important conclusion of the study is that metaphors can be used as means of collecting information and inquiry; they can allow understanding and summarizing more easily.

In the literature, there are also a number of studies examining the metaphors used by pre-service teachers to define their perceptions about teacher (Aydın & Pehlivan, 2010; Pektaş & Kıldan, 2009), language teacher (Nikitina & Furuoka, 2008; Oxford et al, 1998), science and technology teacher (Afacan, 2011), teacher-profession (Ocak & Gündüz, 2006), teaching (Bullough & Stokes, 1994), student (Aydın & Pehlivan, 2010; Saban, 2009), gifted student (Eraslan-Çapan, 2010), school (Balcı, 1999; Saban, 2008), curriculum (Özdemir, 2012), technology (Karadeniz, 2012; Gök & Erdoğan, 2010) and social network (Gürol & Donmuş, 2010).

Review of the Metaphor Studies in the Turkish Literature

There are many studies in which teacher candidates' views of technology were studied by means of metaphors. For example, Gök and Erdogan (2010) studied with classroom teacher candidates. In this study they found out that student teachers developed 285 metaphors related to technology. They reached a conclusion that teacher candidates perceived technology as at most "developing", at least "facilitating the quality of life". In that research, teacher candidates' perceptions related to technology concept were classified into nine categories as "needed", "continuously changing", "developing", "harmful", "useful", "addictive", "both useful and harmful", "rapidly developing", and "facilitating the quality of life".

In Karadeniz's (2012) study, he investigated the perceptions of school administrators, ICT coordinators and teachers regarding the concept of "technology". He found out that the participants indicated 60 valid metaphors which were grouped into five categories as technology as a "changing and developing entity", technology as a "facilitator", technology as a "needed entity", technology as a "useful and harmful" entity and technology as a "diffusional entity".

In another study, Çoklar and Bağcı (2010) examined the teacher candidates' roles in using educational technologies. 131 teacher candidates from different teacher training programs participated in the study. The metaphors which were developed by the teacher candidates were classified into six categories as "important", "useful", "guide, user, producer", "designer", "student" and "attitude". In that research it was also found that there was a difference between the metaphors developed by teacher candidates in terms of their departments.

In a last study done by Kurt and Özer (2013), they studied the perceptions of the students of Teacher Training Certificate Program concerning technology through metaphors. The study group of the research consists of 164 teacher candidates attending Teacher Training Certificate Program of the Educational Sciences Department in the Faculty of Education. Findings of the study showed that the participants indicated 120 valid metaphors which were grouped into seven categories as technology "facilitating the quality of life", "useful technology", "harmful technology", "both useful and harmful technology", "developing technology", "know-how technology" and "necessary technology". In the research the metaphors developed by the candidates did not differ according to gender and according to their departments.

It is clear from the mentioned literature that student teachers' metaphors about technology are usually restricted by digital technologies used in daily life, like for someone not attending technology courses in an educational faculty. However, student teachers are waited to have performance indicators about ICT explained above. On the other hand, student teachers who have performance indicators about ICT may construct technology metaphors within education and/or teaching technologies. In this context, it is a requirement to investigate teacher candidates towards technology and the meanings

they attribute to technology periodically. It is a useful way to research on this topic by metaphor analysis. Reached results via this instrument are of great importance in estimating how teacher candidates consider technology and also how they will use technology during instructional activities. Besides, one of the preconditions of gaining the proficiencies determined by the Ministry of National Education and explained above is possessing positive attitudes towards technology and also consider it as expected. It is also possible to define clearly what schemas teacher candidates place technology in their minds and to change possible negative perceptions. Therefore, it has an importance to investigate the perceptions of technology of teacher candidates.

This study aimed to investigate teacher candidates' perceptions of technology studying at an Elementary Teacher Education Program in Turkey through metaphor analysis.

Method

This study is a descriptive research intended to define the metaphors of elementary school student teachers for technology. The data is gathered using qualitative research methods. The sample included 160 student teachers who were studying at first, second, and third grades of Teacher Education Program of Faculty of Education at Recep Tayyip Erdogan University in 2010-2011 academic years. 38.1% (61 students) of the sample studied at first grade of the program, 32.5% (52 students) studied at second grade of the program, and 29.4% (47 students) studied at the third grade of the program when the study conducted. 30.6% of the sample (49 students) is male while 69.4% of the sample (111 students) is female.

The analysis and interpretation process of the metaphors created by the teacher candidates in the sample consisted of 5 steps as the process was used by Gök and Erdoğan (2010) and as follows: 1) defining the metaphors 2) classifying the metaphors 3) developing categories 4) ensuring validity and reliability 5) transferring the data to SPSS software for quantitative analysis. In this study the metaphor categories are created individually by the researchers and then compared with each other for the reliability of the analysis process.

Results

Teacher candidates in the sample created a total of 120 metaphors for the concept of technology. These metaphors are classified under eight categories. These categories are "required", "constantly changing", "developing", "providing benefit", "leading to addiction", "both useful and harmful", "progressing so fast" and "making life easier". The metaphors analyzed under each category and the distributions of these metaphors are tabulated below.

The Metaphors Classified Under Required Category

The metaphors created by teacher candidates and are classified under "required" category are given in Table 1.

Table 1.
The Frequencies and Percentages of the Metaphors under "Required" Category

Metaphor	f	%
Sun	5	9,6
Air	4	7,7
Soil	4	7,7
Breath	3	5,8
Family	2	3,8
Life	2	3,8
Love	2	3,8
Meal	2	3,8

Money	2	3,8
Agriculture tool	1	1,9
Bread	1	1,9
Clear air	1	1,9
Close friend	1	1,9
Electricity	1	1,9
Energy	1	1,9
Friend	1	1,9
Hand	1	1,9
Heart	1	1,9
Home	1	1,9
Human Brain	1	1,9
Information	1	1,9
Light	1	1,9
Oxygen	1	1,9
Salt	1	1,9
Sleep	1	1,9
Soul	1	1,9
Source of food	1	1,9
Sport	1	1,9
Spouse	1	1,9
Sugar	1	1,9
Teacher	1	1,9
Torch	1	1,9
Tree	1	1,9
Total	50	100,0

It can be seen from the Table 1 that, teacher candidates created a total of 50 metaphors in the "required" category of which 33 metaphors are different. They created "sun", "air", and "soil" metaphors the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like the sun. Because we always need it to survive. As the sun is something that never going to be exhausted and something that we always need, technology is something that never going to be exhausted too and always a need of us."

The Metaphors Classified Under Constantly Changing Category

The metaphors created by teacher candidates and are classified under "constantly changing" category is given in Table 2.

Table 2.
The Frequencies and Percentages of the Metaphors under "Constantly Changing" Category

Metaphor	f	%
Earth	2	18,2
Cell	1	9,1
Clock	1	9,1
Cloth	1	9,1
Fashion	1	9,1
Puzzle	1	9,1
River	1	9,1
Stream	1	9,1
Tree	1	9,1
Total	10	100,0

Teacher candidates created a total of 10 metaphors in the "constantly changing" category of which 9 metaphors are different. Teacher candidates created "earth" metaphor the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like the Earth. Because as the Earth changes constantly, technology, too, always changes and evolves."

The Metaphors Classified Under Developing Category

The metaphors created by teacher candidates and are classified under "developing" category are given in Table 3.

Table 3.
The Frequencies and Percentages of the Metaphors under "Developing" Category

Metaphor	f	%
Human	4	16,7
Newborn baby	4	16,7
Child	2	8,3
Book	1	4,2
Bead bracelet	1	4,2
Brain	1	4,2
Forest	1	4,2
Fruit	1	4,2
Growing	1	4,2
Impasse	1	4,2
Light	1	4,2
Sapling	1	4,2
Seed	1	4,2
Soil	1	4,2
Space	1	4,2
Student	1	4,2
Total	23	100,0

Teacher candidates created a total of 23 metaphors in the "developing" category of which 16 metaphors are different. Teacher candidates created "human" and "newborn baby" metaphors the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like a newborn baby. Because newborn baby grows and evolves as time passes. Technology, too, evolves and adds something new to itself."

The Metaphors Classified Under Providing Benefit Category

The metaphors created by teacher candidates and are classified under "providing benefit" category are given in Table 4.

Table 4.
The Frequencies and Percentages of the Metaphors under "Providing Benefit" Category

Metaphor	f	%
Light	4	12,9
Medicine	2	6,5
Sun	2	6,5
Tree	2	6,5
Friend	2	6,5
A piece of our lives	1	3,2

Book	1	3,2
Cow	1	3,2
Crossword	1	3,2
Family	1	3,2
Information	1	3,2
Instruction Manual	1	3,2
Knife	1	3,2
Library	1	3,2
Life	1	3,2
Octopus	1	3,2
Robot	1	3,2
Rumor-monger	1	3,2
Sleep	1	3,2
Spice	1	3,2
The moon	1	3,2
Walnut	1	3,2
Total	29	100,0

Teacher candidates created a total of 29 metaphors in the "providing benefit" category of which 23 metaphors are different. Teacher candidates created "light" metaphor the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like the light. Because it illuminates human life."

The Metaphors Classified Under Leading to Addiction Category

The metaphors created by teacher candidates and are classified under "leading to addiction" category are given in Table 5.

Table 5.
The Frequencies and Percentages of the Metaphors under "Leading to Addiction" Category

Metaphor	**f**	**%**
Cigarette	1	20,0
Drug	1	20,0
Heart	1	20,0
Love	1	20,0
Time	1	20,0
Total	5	100,0

Teacher candidates created a total of 5 different metaphors in the "leading to addiction" category. Teacher candidates created "cigarette", "drug", "heart", "love" and "time" metaphors for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like drug. Because when we start to use it, it may look nice initially but then it causes addiction. Our relations with people break, and we start to lose our relationships. But no matter what happens we can't quit it."

The Metaphors Classified Under both Useful and Harmful Category

The metaphors created by teacher candidates and are classified under "both useful and harmful" category are given in Table 6.

Table 6.
The Frequencies and Percentages of the Metaphors under "both Useful and Harmful" Category

Metaphor	f	%
Medicine	2	12,5
Air	1	6,3
Bacteria	1	6,3
Cactus	1	6,3
Fat	1	6,3
Fire	1	6,3
Food	1	6,3
Knife	1	6,3
Love	1	6,3
Neural system	1	6,3
Ocean	1	6,3
Pencil	1	6,3
Rain	1	6,3
Soil	1	6,3
Stream	1	6,3
Total	16	100,0

Teacher candidates created a total of 16 metaphors in the "both useful and harmful" category of which 15 metaphors are different. Teacher candidates created "medicine" metaphor the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like medicine. Because if we use it appropriately at the right time it may be useful; but if we use it wrong, it may not be fatal but can cause harmful consequences."

The Metaphors Classified Under Progressing So Fast Category

The metaphors created by teacher candidates and are classified under "progressing so fast" category are given in Table 7.

Table 7.
The Frequencies and Percentages of the Metaphors under "Progressing So Fast" Category

Metaphor	f	%
Time	3	25
Avalanche	1	8,3
Car	1	8,3
Clock	1	8,3
Crossword	1	8,3
Life	1	8,3
Road	1	8,3
Tree points	1	8,3
Vortex	1	8,3
Wave	1	8,3
Total	12	100,0

Teacher candidates created a total of 12 metaphors in the "progressing so fast" category of which 10 metaphors are different. Teacher candidates created "time" metaphor the most for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like time. Because as time progresses without stopping, technology, too, progresses without stopping."

The Metaphors Classified Under Making Life Easier Category

The metaphors created by teacher candidates and are classified under "making life easier" category are given in Table 8.

Table 8.
The Frequencies and Percentages of the Metaphors under "Making Life Easier" Category

Metaphor	f	%
Air	1	11,1
Car	1	11,1
Computer	1	11,1
Cook	1	11,1
Detergent	1	11,1
Fifth finger	1	11,1
Glasses	1	11,1
Ladder	1	11,1
Power	1	11,1
Total	9	100,0

Teacher candidates created a total of 9 different metaphors in the "making life easier" category. Teacher candidates created "air", "car", "computer", "cook", "detergent", "fifth finger", "glasses", "ladder", and "power" metaphors for the concept of technology in this category. A sample metaphor and its explanation are given below:

"Technology is like detergent. Because as detergent cleans difficult dirt easily, technology, similarly, makes difficult works easier."

The Comparison of the Technology Metaphors in terms of Grade

The distribution of the metaphors of the teacher candidates for the concept of technology in terms of grade is given in Table 10.

Table 9.
The Distribution of the Metaphors for the Concept of Technology in terms of Grade

Metaphor Categories	1. Grade f (%)	2. Grade f (%)	3. Grade f (%)	Total f (%)
Required	21 (40,4)	21 (40,4)	8 (19,2)	50 (100,0)
Constantly changing	5 (45,5)	4 (36,4)	1 (18,2)	10 (100,0)
Developing	7 (29,2)	3 (16,7)	13 (54,2)	23 (100,0)
Providing benefit	16 (51,6)	10 (32,3)	3 (16,1)	29 (100,0)
Leading to addiction	5 (100,0)	0 (,0)	0 (,0)	5 (100,0)
Both useful and harmful	5 (31,3)	7 (43,8)	4 (25,0)	16 (100,0)
Progressing so fast	1 (8,3)	4 (33,3)	7 (58,3)	12 (100,0)
Making life easier	1 (11,1)	2 (22,2)	6 (66,7)	9 (100,0)
Total	61 (38,1)	52 (32,5)	47 (29,4)	154 (100,0)

Table 9 shows that there are differences between the metaphors of the teacher candidates for the concept of technology in terms of grade. As the grade increases, there is a decrease in the number of the metaphors created by the teacher candidates. The reason of this situation is that the students in the first grade are more than the students in the second and the students in the third grades. And, similarly, the students in the second grade are more than the students in the third grade. However, although there are fewer students in the third grade, when it is compared in terms of categories, the students in the third grade have more metaphors in "developing", "progressing so fast", and "making life easier" categories than the other students in the first and second grades.

Implications and Conclusions

The categories obtained from this study are similar to the categories created by Kurt and Özer (2013) and also Gök and Erdogan (2010). The technology metaphors adopted by the elementary teacher candidates in the sample investigated under eight categories: These categories are "required", "constantly changing", "developing", "providing benefit", "leading to addiction", "both useful and harmful", "progressing so fast" and "making life easier". The sample studied perceives technology as "required" and "providing benefit" the most; however, they perceive technology as "leading to addiction" the least. The situation can be interpreted that the perceptions of teacher candidates of technology different from each other, and they are mainly positive (Yavuz & Coşkun, 2008). This result is desirable fact.

Based on the data, the results suggest that student teachers' conception of technology is restricted and mostly focuses on artifact and technical dimensions. None of them constructed a metaphor reflecting to their technology literate student teachers. Especially, we waited them to construct metaphors in which teaching technologies used in different disciplines, because they had a course named "instructional technologies and material design" for the second year of the pre service teacher education program. This course includes; instructional technology; properties of different instructional technology, place and using of instructional technology in teaching process, the determination of technological needs of school or classrooms, making of suitable technology plan and its practice, material development via instructional technology, the development of teaching tools (work sheets, activity design, overhead transparent, slides, visual aids (VCD, DVD, computer based tools), examination of educational software, evaluation of teaching tool with different quality, internet and distance learning, principle of visual design, the investigation of activities of teaching materials, the using of teaching materials in Turkey and on the World. However, as the grade increases there are more metaphors in just the "progressing so fast" and "making life easier" categories, nothing more. These results are quite similar to Koç's (2013) study. In order to solve this problem, educators should engage in a reflective and critical position for the integration of technologies into educational settings.

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