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Information and Communications Technology Metaphors

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ABSTRACT

Determination of the perceptions of the prospective teachers for the ICT terms have a remarkable potential to provide input for technology integration plans and ICT trainings. Within this context, the purpose of this study is to discover the metaphors constructed by prospective teachers for the ICT terms. Data were gathered from 180 prospective teachers through survey. 977 valid metaphors constructed by the participants were grouped into conceptual categories for the six ICT terms. The most common conceptual categories are "developing and changing" for the technology, "making life easy" for computers and search engines, "limitless and endless" for the Internet, "means of communication" for social networks, and "addictive items" for video games.

Keywords: metaphors, ICT, teacher education, prospective teachers

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INTRODUCTION

The use of technology has recently become more common than ever before. Along with the use of technological devices, this has also brought about the frequent use of words related with technology in our daily lives and in education. Developments in Information and Communications Technology have opened a great avenue for educators to improve teaching and learning. Technology is currently perceived in education as a mean of enhancing teaching and learning. In order to embed technology efficiently in educational processes, it is necessary for teacher educators to know how technology and terms related to the technology are perceived by prospective teachers. When teacher candidates have sufficient instruction during their education they have positive ideas for instruction using technology and they believe that it is effective (Morrison and Jeffs, 2005).

A significant quality of technology is that it eliminates limits in education, transferring learning processes outside the class enabling learning during the entire day and life. This also supports life-long learning which has become quite popular recently due to the fact that learning must not be limited within education offered at school, it should continue during entire life because new knowledge is generated very rapidly. In order to make use of technology in teaching to support limitless learning, and to grant learners with life-long learning skills, it is required for teacher educators to know how students perceive forms of technology such as social networks, search engines and video games. It has been indicated that prospective teachers' behavioral approaches perceptions of the technologies that they are going to make use of in their classrooms have a strong influence on their future perceptions and eagerness to use technology in their teaching environments (Teo and Lee 2010).

Studies investigating metaphors used for the computer and for the technology can be found on the literature (Gecer, 2013; Gurol & Donmus, 2010; Kobak & Taskin, 2012; Koc, 2013). However there is no single study investigating the metaphors for the terms used in Information Communications Technology which are frequently used by the stakeholders of the education adventure. Prospective teachers play the key role in the integration and use of the ICT in schools. Determination of the perceptions of the prospective teachers for ICT terms have a remarkable potential to provide input for technology integration plans and ICT trainings. Within this context, the purpose of this study is to discover the metaphors constructed by prospective teachers for the ICT terms. This study aims to seek answers for the following research questions:

1. Which metaphors do prospective teachers use to portray the terms for technology, computers, the internet, search engines, social networks and video games?
2. How frequently are the metaphors used by prospective teachers to portray the terms for technology, computers, the internet, search engines, social networks and video games?
3. How do prospective teachers justify metaphors for the ICT terms that they constructed?

Table 1. Distribution of the participants according to their gender and programs

		Undergraduate Program					
		Early Childhood Ed.		Special Ed.		Total	
		f	%	f	%	f	%
Gender	Male	12	11,8	31	39,2	43	23,8
	Female	89	88,1	48	60,7	137	76,1
Total		**101**	**100**	**79**	**100**	**180**	**100**

METHODOLOGY

Design of the Study

The qualitative survey (Jansen, 2010), recently emerging type of qualitative research, was used in the study. There were two open-ended questions at the survey. The first open-ended question was targeting to gather the metaphors constructed by the prospective teachers for the six ICT terms. The second open-ended question was asking respondents to justify the metaphors for the ICT terms that they constructed. The content analysis was used to analyze the qualitative data.

Participants

The participants of the study are 180 freshmen prospective teachers studying at the Education Faculty of a State university located at the Black Sea region. Prospective teachers studying at the Early Child Education and the Special Education departments in 2013-2014 academic year were selected among volunteers. The distribution of the participants according to their departments and genders are provided in **Table 1**.

Data collection Instrument

Participants were asked to complete six questions at the survey to form metaphors. Each survey question was constructed asking participants to write the metaphor for the ICT term and the reason for choosing that metaphor.

Data Analysis

Participants answered a total number of 1080 questions for the six ICT terms. The first stage of the data analysis includes exclusion and coding. Preliminary analysis of the data revealed that some participants did not use metaphors at the answers. Therefore, these answers were eliminated and not used at the analysis. Similarly, some participants did not provide explanation for the metaphors at the survey, so their answers were not considered at the analysis either. After the elimination of the unacceptable answers, the total number of metaphors left for analysis was 977.

In the next stage, the content analysis process was initiated. Metaphors were alphabetically listed and a sample explanatory sentence describing the metaphor best was selected for each metaphor. After that, the metaphors formed by the participants were analyzed in terms of their common features related with the keywords. Conceptual categories were formed for each keyword associating each metaphor with a certain theme.

Results

Findings for the first research question

The conceptual categories formed after the elimination of irrelevant or lacking data for each keyword are provided in **Table 2**.

Findings for the second research question

The frequencies and percentages of the conceptual categories formed after the elimination of irrelevant or lacking data for each keyword are provided in **Table 3**.

Findings for the third research question

The most common means by which prospective teachers justify the metaphors they constructed for the ICT terms are provided in **Table 4**.

CONCLUSION AND RECOMMENDATIONS

The purpose of this study is to discover the metaphors constructed by prospective teachers for the ICT terms. Results revealed that the most common conceptual category are developing and changing for the technology, making life easy for the computers and search engines, limitless and endless for the Internet, means of communication for the social networks, and addictive items for the video games. These findings reflect the perceptions of prospective teachers on ICT terms.

It has been emphasized in several studies that technology implementation requires profound changes in the role of teachers and their epistemological views (Koc, 2013). Learning the perception of the prospective teachers for the ICT terms is important to take protective actions to change the undesirable perceptions of the prospective teachers for the ICT which is widely used in schools. In Koç (2013)'s study, it has been emphasized that student teachers' conception of technology is restricted, focusing mostly on artifact and technical dimensions. In order to avoid this restriction, the curriculum must have a broader approach towards technology. Future research should concentrate on investigating the match and mismatches between intended use of the ICT tools and the perception of the prospective teachers.

Table 2. Categories formed for the keywords

Keywords	Conceptual Categories	Metaphor Names
Technology	Developing and changing	flower, plant, tree, human, child, river, baby, chameleon, living thing, earth, city, life, body, infinity, day, progress, horse, life, capitalism, black hole, writing, hairdresser, monkey, seasons, water, numbers, historic identity, outer space, pyramid, rain
	Limitless, endless	Earth, sky, outer space, tree, living thing, circle, avalanche, abyss, line in geometry, dreaming, numbers
	Making life easy	mother, robot, Hercules, popeye, spiderman, a hero performing magic, scientist, donkey, Earth, girl
	Necessities	water, tree, bread, sun, life, light, organs, market, inspector gadget, Zeus
	Beneficial items	library, forest , sun, Alaaddin's lamp, magic window, magic world, donkey, cow, lost property room, saver
	Tools	gear, vacuum cleaner, F5 key, pencil, box, hourglass, mixer, kitchen tools, toy
	Both beneficial and harmful	humans, nuclear energy, weapon, dinosaur, sun, sea, life
	Rapidly progressing	cheetah, rocket, dream, time, surfing
	Small animals	bird, louse, butterfly, virus
	Food	walnut, water, fried egg with meat
	Harmful items	bomb, sandwich with jam, cat
	Vehicles	car, train
	Hardworking animals	bee
	Big animals	lion
	Addictive items	Nutella
Computers	Making life easy	library, intelligence, colt, robot, heartless person, octopus, mother, archive, myself, empty land, house, suitcase, sun, dough, intelligent person, human, the Jetsons, women, kangaroo, ant, turtle, all-inclusive thing, wise man, kitchen, teacher, rucksack, superman
	Organs	brain, veins of brain, veins, heart, nervous system, body
	Limitless, endless	Earth, universe, box, jigsaw puzzle, a lady's bag, living things kingdom, factory, safe, Matruska doll, item, encyclopedia, vacuum cleaner, road
	Tools	box, refrigerator, flight recorder, notebook, cupboard, memory stick, women's memory, cauldron, book, bookshelf, jewelry box, television
	Necessities	darling, spiced chips, building base, living thing, washing machine, limbs, house, book, chicken, girl, life, meal
	Beneficial items	human, close friend, cow, turtle, encyclopedia, fun box, vacuum cleaner, book
	Both beneficial and harmful	corn, human, knife, television, robot
	Fast animals	horse, cheetah, atom ant
	Harmful items	terrorist, monster, poisoned apple, vacuum
	Addictive items	chocolate, honey, virus, cigarette
	Big animals	lion, dog, Cyclops
	Developing and changing	chameleon, Sultan Mehmet the Conqueror, Metehan
	Vehicles	car, truck
	Hardworking animals	ant
	Means of communication	telephone
	Small animals	puppy
The Internet	Limitless, endless	library, ocean, universe, infinity, earth, sea, octopus, encyclopedia, humans, spider , toolbox, grocer, knowledge accumulation, wise man, room full of information, city, cloud, abyss, elephant, life, light speed, book, bookshelf, greengrocer's, teacher, pyramid, magician, magic box, magic broom, historic item, land, space, Josph Morgan, Mustafa Topaloğlu, Spiderman
	Making life easy	book, library, Alaaddin's magic lamp, Superman, phone, encyclopedia, animal, 911 service, mother, father, car, friend, wise man, Gargamel, newspaper, sister Güzin, wise engine, St. Hizir, servant, rooms, dictionary, communication network, speaking, Nasreddin Hodja, Spiderman, Robin Hood, plane, vehicles
	Necessities	water, food, life, breathing, salt, hunger, couch, most-liked item, chocolate, house, stuffed mutton balls, ladle, mother, funfair
	Both beneficial and harmful	elephant and rabbit, horse, knife, bear, monster, Pandora's box, circle, vacuum cleaner, high heel shoe, virus, meal, beneficial substance in alcohol
	Organs	brain, veins, nerve cells
	Addictive items	car, makeup, cigarette, air and water, drugs
	Harmful items	illness, monster, virus, dump site
	Slow animals	turtle
	Fast animals	horse, ant
	Developing and changing	Che Guevera, Historic identity
	Means of communication	bird, carrier pigeon
	Beneficial items	fun club
	Food	chocolate

Table 2. Categories formed for the keywords (continued)

Keywords	Conceptual Categories	Metaphor Names
Search Engines	Making life easy	library, encyclopedia, teacher, Superman, vehicle, assistant, book, magnifying glass , Esra Erol, servant, woman, dog, girl, hero, family, smart devices, key, mother, father, parents, mirror, genius mind, easiness, electronic goods, factory workers, map genie, human mind, jet, introduction part, greengrocer, price tag, tongs, angel, stairs, fruit pieces, Nasreddin Hodja's donkey, cooker, compass, clock, exhibition, Sherlock Holmes, dictionary, pilot, flying carpet, old wise man
	Limitless, endless	wise man, library, encyclopedia, woman, earth, archive, shopping center, sea, lady's bag , herbalist, researcher, bucket, wise sister, boutique, dustbin, mountains, matchmaking program, Saint Çelebi, Saint, philosopher, lake, life, book, Müge Anlı, Nasreddin Hodja, school, forest, Spiderman's web, Pepe, Father Smurf, chips with taso, space, old man
	Beneficial items	hero of a fairy tale, Tom and Jerry, friend, teacher, milkman, cow, light, antibiotics, bridge, information
	Hardworking animals	ant, bee
	Harmful items	spoilt child, alcohol seller
	Both beneficial and harmful	spy, friend
	Vehicles	ship, vehicle
	Addictive items	alcoholic drink
	Fast animals	cheetah
	Small animals	bird
	Tools	jigsaw puzzle
	Necessities	tree
Social Networks	Means of Communication	letter, café, pigeon, telephone, gossip, friends' gathering, easter, gold day, friends circle, nightingale, rail line, wedding, diary, communication, communication skill, communication device, wire, identity, book, bird, school, holiday resort, party, window, public transport vehicle, train station
	Addictive items	octopus , spider web, cigarette, drug, prison, swamp, alcohol, lion, independence, Burak Özçivit, ripped stocking, whirlpool, pit, creature, sedative
	Necessities	family, neighbours, friend, alcohol addict, mother, friend circle, gossip, man, matchmaking program, heart, bird, model, happiness, favourite toy, water
	Making life easy	octopus, humans, newspaper boy, journalist, fish, meeting point, café, flat, pigeon, extended family, small child, hero, spider, popular friend, fan group
	Beneficial items	toy, café, game, leisure center, diary, air, spider web, funfair, university
	Harmful items	parrot, notebook of preschool children, big animal, monster, gossipy women, turtle, koala, labyrinth, cigarette, endless road, chicken hen
	Limitless, endless	octopus, spider web, funfair, lace, zoo
	Both beneficial and harmful	candy, dishonest person, herd, shopping mall, slippery bridge
Video Games	Developing and changing	postman, virus
	Food	dinner, apple
	Organs	vein
	Small animals	spider
	Addictive items	drugs, cigarette, chocolate, alcohol, heroine, coffee, lion, darling , fire, addiction, addictive substances, myself, illness, beer, chocolate, crossword, Burak Özçivit, monster, chips, seed, playing house, well, book, cocaine, pasta, nicotine, chewing gum, sugar, collar, Teen Wolf, television, meal
	Beneficial items	funfair, friends, toy, dreams, life, game boy, playing on the street, an item, Alice in Wonderland, myself, Bugs Bunny, lifeguard, Çalıkuşu, chocolate, playground, game, leisure center, Fenerbahçe, football, excitement, coffee, hero, book of tales, listening to music, game room, game, deadly illness, psychologist, clock
	Harmful items	sleep, monster, television, knitting, appendix, empty plate, useless dream, empty room, Fenerbahçe, faux pas, unnecessary task, working in vain, dream world, thief, empty flat, cola, puppet, sly friend, dry tissue, painting nails, cigarette, indispensability, tuberculosis, snake, devices stealing time, passing time, time machine, poison
	Both beneficial and harmful	dream, bacteria, chocolate, cat, funfair, appetizer, useless item, clock, television, passion, dungeon
	Limitless, endless	funfair, fishnet, earth, leisure center, gloves, animals, small organisms
	Developing and changing	Tom and Jerry, virus, graveyard
	Fast animals	squirrel
	Making life easy	friend
	Necessities	meal

Table 3. Frequencies and Percentages of Categories formed for the keywords

Keywords	Conceptual Categories	Metaphor Frequency	Metaphor Percentage
Technology	Developing and changing	56	36,3
	Limitless, endless	18	11,6
	Making life easy	15	9,7
	Necessities	14	9,0
	Beneficial items	11	7,14
	Tools	9	5,8
	Both beneficial and harmful	7	4,5
	Rapidly progressing	7	4,5
	Small animals	5	3,2
	Food	3	1,9
	Harmful items	3	1,9
	Vehicles	2	1,3
	Hardworking animals	2	1,3
	Big animals	1	0,6
	Addictive items	1	0,6
	Total:	**154**	**100%**
Computers	Making life easy	36	23,5
	Organs	29	18,9
	Limitless, endless	19	12,4
	Tools	14	9,1
	Necessities	13	8,5
	Beneficial items	11	7,19
	Both beneficial and harmful	5	3,2
	Fast animals	5	3,2
	Harmful items	4	2,6
	Addictive items	4	2,6
	Big animals	3	1,9
	Developing and changing	3	1,9
	Vehicles	3	1,9
	Hardworking animals	2	1,3
	Means of communication	1	0,6
	Small animals	1	0,6
	Total:	**153**	**100%**
The Internet	Limitless, endless	69	39,8
	Making life easy	38	21,9
	Necessities	25	14,4
	Both beneficial and harmful	13	7,5
	Organs	8	4,62
	Addictive items	5	2,8
	Harmful items	4	2,3
	Slow animals	3	1,7
	Fast animals	2	1,1
	Developing and changing	2	1,1
	Means of communication	2	1,1
	Beneficial items	1	0,5
	Food	1	0,5
	Total:	**173**	**100%**

Table 3. Frequencies and Percentages of Categories formed for the keywords (continued)

Keywords	Conceptual Categories	Metaphor Frequency	Metaphor Percentage
Search Engines	Making life easy	86	50,8
	Limitless, endless	57	33,7
	Beneficial items	10	5,9
	Hardworking animals	5	2,9
	Harmful items	2	1,1
	Both beneficial and harmful	2	1,1
	Vehicles	2	1,1
	Addictive items	1	0,5
	Fast animals	1	0,5
	Small animals	1	0,5
	Tools	1	0,5
	Necessities	1	0,5
	Total:	**169**	**100%**
Social Networks	Means of Communication	54	33,3
	Addictive items	21	12,9
	Necessities	19	11,7
	Making life easy	18	11,1
	Beneficial items	15	9,2
	Harmful items	12	7,4
	Limitless, endless	10	6,1
	Both beneficial and harmful	5	3,0
	Developing and changing	2	1,2
	Food	2	1,2
	Organs	2	1,2
	Small animals	2	1,2
	Total:	**162**	**100%**
Video Games	Addictive items	62	37,3
	Beneficial items	44	26,5
	Harmful items	33	19,8
	Both beneficial and harmful	12	7,2
	Limitless, endless	9	5,4
	Developing and changing	3	1,8
	Fast animals	1	0,6
	Making life easy	1	0,6
	Necessities	1	0,6
	Total:	**166**	**100%**

Table 4. Participants' Justifications for the most common metaphors

Keywords	Most Common Category	Justification	Justification Frequency	Justification Percentage
Technology	Developing and Changing	because it evolves continuously	38	67,8
		because it changes continuously	12	21,4
		because it renews itself	4	7,1
		because it develops itself	2	3,5
		Total:	**56**	**100%**
Computers	Making life easy	because they store information efficiently	10	27,7
		because they help us	9	25,0
		because they are multifunctional	9	25,0
		because they do everything fast	2	5,5
		because they shape you	1	2,7
		because they solve problems easily	1	2,7
		because they answer questions	1	2,7
		because they are more superior than humans	1	2,7
		because they keep everything in memory	1	2,7
		because they teach us	1	2,7
		Total:	**36**	**100%**
The Internet	Limitless, endless	because it has all we need	27	39,1
		because it contains lots of information	18	26,0
		because it has no restriction or boundary	8	11,5
		because it is quick and comprehensive	4	5,8
		because it is like a web	3	4,3
		because it is very large	3	4,3
		because it helps our learning process	1	1,4
		because it answers questions	1	1,4
		because it is everywhere	1	1,4
		because it looks endless but actually it is not	1	1,4
		because it is like a city	1	1,4
		because it is mysterious	1	1,4
		Total:	**69**	**100%**
Search Engines	Making life easy	because we can find all we are looking for	29	33,7
		because they help us	12	13,9
		because they answer our questions	8	9,3
		because they meet our needs	8	9,3
		because they know everything	5	5,8
		because they provide access to knowledge	5	5,8
		because they take you to everywhere	4	4,6
		because they lead to the target	3	3,4
		because they offer choices	2	2,3
		because they make access to knowledge easier	2	2,3
		because they enhance learning	2	2,3
		because they select useful knowledge	1	1,1
		because they maintain communication	1	1,1
		because they are smart	1	1,1
		because they provide results if you use them well	1	1,1
		because they are different from human mind	1	1,1
		because they are companions	1	1,1
		Total:	**86**	**100%**

Table 4. Participants' Justifications for the most common metaphors (continued)

Keywords	Most Common Category	Justification	Justification Frequency	Justification Percentage
Social Networks	Means of Communication	because they put us in communication with other people	25	46,3
		because they make communication easier	5	9,2
		because they help communication	5	9,2
		because they enable us to share things with people	5	9,2
		because they enable us to meet new people	4	7,4
		because they bring friends living far away closer	2	3,7
		because they provide us with personal information	2	3,7
		because they provide unlimited communication	2	3,7
		because they provide opportunities to exchange information	2	3,7
		because they provide a new environment	1	1,8
		because they enhance curiousity	1	1,8
		Total:	**54**	**100%**
Video Games	Addictive Items	because they cause addiction	34	54,8
		because they occupy you deeply	12	19,3
		because you want to eat more	4	6,4
		because you want to play more	3	4,8
		because they cause loss of time and money	3	4,8
		because you can't give up although they are harmful	2	3,2
		because they make you happy	1	1,6
		because they are like an epidemic	1	1,6
		because they never fully satisfy you	1	1,6
		because they are harmful	1	1,6
		Total:	**62**	**100%**

REFERENCES

Gecer, A. (2013). Determination of the computer self-efficacy perception of students and metaphors related to "computer ownership" *TOJET: The Turkish Online Journal of Educational Technology, 12*(3), 51-71.

Gurol, M., & Donmus, V. (2010). Metaphors created by prospective teachers related to the concept of "Social Network". *Procedia Social and Behavioural Sciences, 9*(2010), 1489-1496. https://doi.org/10.1016/j.sbspro.2010.12.354

Jansen, H. (2010). The Logic of Qualitative Survey Research and its Position in the Field of Social Research Methods. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 11*(2). Art. 11. https://doi.org/10.17169/fqs-11.2.1450

Kobak, M., & Taskin, N. R. (2012). Prospective Teachers' Perceptions of Technology in Three Diffferent Ways. *Procedia Social and Behavioural Sciences, 46*(2012), 3629-3636. https://doi.org/10.1016/j.sbspro.2012.06.118

Koc, M. (2013). Student teachers' concepts of technology: A metaphor analysis. *Computers & Education, 68*(2013), 1-8. https://doi.org/10.1016/j.compedu.2013.04.024

Morrison, W. F., & Jeffs, T. L. (2005). Outcomes of preservice teacher's technology use. *Assistive Technology Outcomes and Benefits, 2*(1), 71-78.

Saban, A., Kocbeker, B. N., & Saban, A. (2006). Prospective Teachers' Conceptions of Teaching and Learning Revealed Through Metaphor Analysis. *Learning and Instruction, 17*(2006), 123e139. https://doi.org/10.1016/j.learninstruc.2007.01.003

Teo, T., & Lee, C. B. (2010). Explaining the intention to use technology among student teachers: An application of the theory of planned behavior. *Campus-Wide Information Systems, 27*(2), 60-67. https://doi.org/10.1108/10650741011033035

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