ANALYSIS OF INTERNET METAPHORS: CASE FOR INFORMATION TECHNOLOGY STUDENTS

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ABSTRACT

The purpose of this study is to determine the Internet-related metaphors used by Information Technology students and examine these metaphors in terms of their class, gender, daily internet use, internet use experiences and internet use proficiencies. This exploratory research seeks to answer four specific questions in line with determining the internet metaphors of IT students. A questionnaire developed by the researchers was used for data collection. The questionnaire included a total of 13 items, 10 of which are multiple choice and three of which are open-ended. Based on the findings obtained in the study, the Information Technology students were found to use their own internet metaphors besides the widespread internet metaphors. It was concluded that the students produced metaphors emphasizing the sharing of and access to information for the internet and that among widespread internet metaphors, they used the network metaphor most and among the metaphor families, they used the "open space" metaphor family most. This finding revealed that sharing of and access to information and networks was most important factors for the students' use and perception of the internet. In addition, it was also revealed that there was a significant difference between the frequencies of the information technology students' use of the metaphor families with respect to the class. Based on the results of metaphor analysis, required recommendations were presented related to inform students about the scope and features of the internet in their courses.

Keywords: *Internet; Metaphor; Internet Metaphors; Internet Metaphor Families; Information Technology Students*

1. INTRODUCTION

The internet has a place in the center of information technology (IT) applications served for the society today. Social constructions and groups of almost all types have started to operate via the internet. A similar situation is also seen in the field of education. Educational information sources reach the target populations via the internet, and the number of these applications is increasing each day. Thus, the internet has become an indispensible tool for educational services today. But for to change education by internet it is not enough to be a good idea, proper metaphors, examples and comparisons must be discussed [1].

Parallel to the increasing number of its users, the internet, which allows worldwide circulation of information, now has a more complex structure. To Asaolu, [2] the Internet is a vast and complex network of networks that connects computers around the world; it is changing social, political, and economic structures. For this complexity and versatility, as they do in similar situations, people benefit from metaphors to emphasize their thoughts about the nature and potential of this complex structure [3]. The reason is that metaphors can contribute to success and satisfaction in understanding the system by uploading the first comparison related to the system to the working memory as well as the comparisons that would take long time to make via reasoning [4]. To Ritchie, [5] if a word or phrase has a more basic contemporary meaning that can be clearly distinguished from and understood in comparison with the meaning in context, the word or phrase is identified as metaphorical.

Today, a number of metaphors that feature different aspects of the internet are used. Taniguchi, [6] mentions four basic internet metaphors which reflect the view point about computer technologies

and which create different images in the mind: looking up information on the Web, Global Village, Information Superhighway, and surfing on the Net. These metaphors commonly used for the internet are so widespread, familiar and integrated within the mind that it is quite difficult to avoid using these metaphors. In addition, internet metaphors have been classified by different authors under different metaphor families. These metaphors are, in fact, part of the collective experience of Internet users.

The individual's perceptions regarding the internet and the purpose and way of using the internet for better teaching-learning are quite important in using the internet for educational purposes. Individuals' perceptions of a certain subject could be understood and concretized via the metaphors they created regarding the subject. In other words, in order to understand a complex thing, another one yet well-known could be used to explain it. Therefore, metaphors created regarding the internet could give insights to how the structure of the internet is understood. The reason is that metaphors not only give explanatory information but also provide important clues regarding the design manner of the creator of the metaphor and regarding the creator's way of shaping the cognitive structures [7].

The metaphors created and used by IT students for the internet can give information about their perceptions of the internet and about their way of making sense of the internet. According to Ross, [8] the way of describing a thing determines the way of perceiving that thing, and the way of perceiving a thing influences the way of using that thing. Therefore, it is believed that the internet-related metaphors used by IT students who are expected to use the internet intensely for educational purposes as required by their jobs are of great significance. In this way, the internet-related perceptions of IT students and thus their way of using the internet will be better understood.

This study has two core stakeholders: educators who use internet in education and e-learner students. Educators can benefit from this study in understanding the perception of students on internet and their way of use the internet. Educator as first core stakeholders of this study will be able to benefit from the results of this study for determine and ensure the success of correction of student's misconceptions on the internet structure. Thus, the e-learners as second stakeholders of this study will have a chance to see their perception and misuse of internet and create more realistic and comprehensive point of view related to internet.

In literature related to the internet metaphors, there are different classifications. Depending on these classifications, the different classifications have been made for internet metaphors as follows: space (cyber space, galaxy, robots etc.), highway (map, trip, road, avenue, highway etc.), water (ocean, surfing, pool, tank, flow etc.), border (discovery, hunting etc.), politics (municipality, village etc.), bazaar (trade, customer, supermarket etc.), liveliness (spider, worm, virus, organism etc.) and game/entertainment (video game, film etc.) [9]-[10]-[11]-[6]. However, as can be seen in Table 1, four basic internet metaphor families could be mentioned as an example for a more simple and comprehensive classification covering all these metaphors and metaphor families.

Table 1. Metaphor families and samples commonly used for the internet

Metaphor Family	Metaphor Samples
A CLOSED SPACE	(library, city, supermarket etc.)
AN OPEN SPACE	(ocean, highway, network etc.)
A LIVE THING	(spider, worm, organism etc.)
A INANIME THING	(machine, food, game, tool etc)

There are a limited number of analytical studies on internet metaphors in general and on Web metaphors specifically [12]. In addition, there are various other studies most of which focus on the general use of the internet. In one study, Palmquist, [10] tried to determine more useful internet metaphors that make the hyper-linked structure and goal of the internet or Web components more familiar and comprehensible for users. The study was conducted by examining 100 published articles from three different databases. In this study, the internet metaphors were gathered under eight metaphor families such as Travel/Explore, Fire or Water, Commerce/ Politics, Animals, Anthropomorphic, Communication, Tools or Machines or Process and others. Based on the information obtained from the databases and the articles examined, the metaphor family of travel/explore (%15) was found as the most commonly used metaphor family.

In a descriptive study carried out by Johnston, [3] the researcher discussed internet-related metaphors and metaphor families established based on the results obtained from different studies. As a result, the researcher pointed out that internet metaphors

were used as physical space, physical speed, destruction, and salvation and that analyses related to internet metaphors should be conducted by studying target populations on regional basis. In their study Kramarae and Kramer, [9] mentioned the importance of metaphors in determining the future of the Internet and expressed common Internet metaphors as follows: superhighway, city, ecosystem and web, with its connotations of bonds to others, connectedness.

Though limited when compared to the international literature, there are studies on internet metaphors in Turkey as well. In one of these studies, Durmuş, Bağcı and Ağca, [13] studied the internet-related metaphors of elementary school students and examined whether these metaphors differed with respect to their classes. The results of the study revealed that a majority of the elementary school students (89,1%) considered the internet as a source of information; that 5,5% of the students believed the internet to be used for communication; and that the rest of the students (5,5%) considered the internet as a communication tool.

A number of metaphors and metaphor families established based on the research in related literature demonstrate that the internet itself has become a platform for communication and information-sharing [17]. However, the internet metaphors used by IT students directly interested in using the internet for educational purposes were not sufficiently compared with studies that examined commonly-used internet metaphors according to demographic features. Regarding this point, Johnston, [3] emphasized that use of metaphors should be examined according to the demographic features.

The purpose of the present study is to determine the internet-related metaphors used by the students attending the Department of Computer and Instructional Technologies at the Education Faculty of Anadolu University in the academic year of 2009-2010 and to examine these metaphors with respect to various variables. In line with this purpose, the following questions were directed in the study:

(1) What are the metaphors and metaphor families created by IT students for the internet?

(2) How frequently do IT students use the common internet metaphor families?

(3) Does the frequency of IT students' use of the common internet metaphor families differ with respect to their class, gender, the frequency of their average daily internet use, their internet use experiences (year) and their internet use proficiencies?

(4) Which common internet metaphors do IT students use?

2. METHOD

This exploratory research seeks to answer four specific questions in line with determining the internet metaphors of IT students. Study was designed with the relational and singular survey models. Relational survey models aim at determining the degree or existence of change between two or more variables, while the purpose of singular survey models is to analyze the type or amount of each variable [14]. In the present study, the internet metaphors of IT students, their approaches to metaphor families and the common internet metaphors they used were analyzed according to the singular survey model; and the changes regarding these variables with respect to the demographic backgrounds of the students were analyzed according to the relational survey model.

2.1. Participants

The participants of the present descriptive study, which aimed at determining the internet metaphors used by IT students, were 112 2nd, 3rd and 4th grade students attending the Department of Computer and Instructional Technologies at the Education Faculty of Anadolu University in the academic year of 2009-2010. In the study, the reason for not collecting data from the 1st grade students was the thought that they would not be able to produce metaphors appropriate to the qualities of Information Technology students – who constitute the scope of the present study – as they were new in using the internet in education. The demographic backgrounds of the 112 IT students participating in the present study can be seen in Table 2 below.

Table 2. Demographic Backgrounds of the Participants

Variables	f	%
Gender		
Female	48	42,9
Male	64	57,1
Grade		
2nd Grade	50	44,6
3rd Grade	15	13,4
4th Grade	47	42,0
Frequency of Average Daily internet Use		
2 Hours	16	14,3
Between 2-4 Hours	43	38,4
Between 4-6 Hours	43	38,4
Between 6-8 Hours	43	38,4
8 Hours or More	11	9,8
Internet use experience (year)		
2 Years	4	3,6
2-4 Years	11	9,8
4-6 Years	39	34,8
6-8 Years	30	26,8
8 Years or Longer	28	25,0
Internet use proficiencies		
Beginner	2	1,8
Intermediate	24	21,4
Advanced	44	39,3
High-Advanced	42	37,5

As can be seen in Table 1, 42,9% of the participants were female, and 57,1% of them were male. When the frequency of their daily average internet use is taken into consideration, it was seen that 66,1% of the IT students used the internet for 2-6 hours a day at average. In addition, parallel to the fact that 85% of the internet use experiences of the students were 4 years or longer, it was striking that 76,8% of their internet use proficiencies was advanced or high-advanced. This shows that the IT students used the internet intensively.

2.2. Data Collection

In the study, a questionnaire including four parts and 13 items developed by the researchers was used as a data collection tool. In the questionnaire, the commonly-used internet metaphors of IT students as well as the internet metaphors they themselves created were investigated. In the first part of the questionnaire, there five items related to the students' class, gender, frequency of their average daily internet use, their internet use experience (year) and their internet use proficiencies. In the second part, there were two items investigating what the internet metaphors created by the students were and which features of the internet caused the students to use these metaphors. The third part included four items examining which metaphor family was more appropriate to the internet. In the fourth part, there were two items investigating which commonly-used internet metaphors the students used for the internet and what their overall related views were. For the content validity and the overall appearance of the questionnaire, three field experts in instructional technologies were asked for their views. In line with these views, the questionnaire was finalized. Also, for clarity the survey items an IT student was interviewed. First, the questionnaire was given to student for review and was asked to respond. Then student were asked for his views about the survey questions. Thus, well-understood questions fixed and breakdowns of the survey have been fixed.

2.3. Data Analysis

The data collected via the questionnaire applied within the scope of the study helped answer the research questions directed in the study. Regarding the first research question, the content-based descriptive analysis of the qualitative data was conducted to determine the internet metaphors created by the students. An inductive approach was applied to group the metaphors created by the participants under the metaphor families. In this respect, first, the research data transcribed were tabulated in a way to facilitate coding. Following this, temporary themes were created from these tables independently by the researchers. The inconsistencies among the themes created by the two researchers were avoided by expending, narrowing or renaming the themes. Finally, in order to increase the reliability of the research, the themes with the consistency percentage of 85% or above were used. One of the common methods used to establish consistency between independent observers is calculating the consistency percentage [15]. In order to determine the differences between

students' perceptions and structure of internet common internet metaphors and students' own internet metaphors compared in the study.

For the analysis of the questionnaire data regarding the common internet metaphors used by IT students, descriptive statistics including percentages (%) and frequencies (f) was applied. For the change in internet metaphors used by IT students with respect to their class, One Way ANOVA was applied; with respect to gender, two independent samples t-test; the change with respect to their average daily internet use, their internet use experiences (year) and internet use proficiencies, One Way ANOVA was applied. Before running these parametric tests, Kolmogorow Smirnow and Levene test was applied for the equality variances and normal distribution of these parametric tests. For the analysis of the data, the software of SPSS 17.0 was used.

3. FINDINGS

According to the data obtained from the questionnaire, the findings of the study were gathered under four sub-titles. Under each heading are the findings obtained to find answers to one research question. The qualitative and quantitative data collected while finding answers to the research questions were evaluated on relational and totalitarian basis.

3.1. The metaphors created by IT students

In order to determine the students' own internet metaphors, two open-ended questions were directed in the second part of the questionnaire: "The internet is (a/an) …. The reason is that the internet has the following features: ...." The responses given to these questions revealed that 81,4% of the IT students created their own internet metaphors besides other commonly-used internet metaphors.

Regarding the students' own internet metaphors, the content-based descriptive analysis of the qualitative data was conducted. An inductive approach was applied and research data transcribed were tabulated in a way to facilitate coding. Temporary themes were created from these tables independently by the two researchers. The themes with the consistency percentage above 85% were used.

Four metaphor families were obtained from the metaphors and related explanations revealed via the questionnaire regarding IT students' own internet metaphors. Therefore, 60 different metaphors created by IT students were examined under four

themes. The frequencies and percentages of the themes obtained are presented in Table 3 below.

Table 3. Demographic Backgrounds of the Participants

Themes	*f*	**%**
Accessing and sharing information (Information pool, information center, information sharing center etc.)	57	62.63
Human life (Life style, needs, virtual life, obligation, second live, friends etc.)	23	25.27
Communication (communication tool, communication and information tool, bridges between people, social sharing tool etc.)	19	20.87
Pollution (data garbage, scrapyard, knotty problem, etc.)	12	13.18

As can be seen in Table 3, 57 IT students who created their own internet metaphors created metaphors that emphasized accessing and sharing information. Some of the most frequently emphasized metaphors were information pool, information world and information store. Here, it was striking that the students created metaphors – which pointed out the role of the internet regarding accessing and sharing information - such as "the internet is an information pool" and "the internet is an information sea" that belonged to the water-related metaphor family expressing especially the open space. Regarding this point, two participants reported their views as follows:

"The internet is an information pool because the internet is a storage of any kind of information that you need or do not need." (K-80)

"The internet is an ocean because it is a source of unlimited information." (K-111)

In addition, it was seen that 42 IT students who created their own internet metaphors while explaining why they created these metaphors emphasized the information traffic and its size on the internet. The reason could be the fact that as required by their field, IT students used the internet more for producing, accessing and sharing information.

Besides accessing and sharing information, IT students created metaphors under the themes of "human life", "communication" and "pollution". Regarding these three themes, some of the participants stated their views as follows:

"The internet is the second life because on the internet, we become a character who can do things that he or she cannot do in real life." (K-76)

"The internet is a bridge between people because you can easily talk to and see people from other parts of the world." (K-24)

"The internet is garbage of data because it is full of necessary or unnecessary information." (K-24)

Although the IT students created internet-related metaphors at most under the theme of accessing and sharing information, they also created metaphors emphasizing the effects of the internet on human life, its potential of communication and the pollution occurring in this environment. Furthermore, as can be obviously seen in the comments of IT students regarding internet pollution, unnecessary information caused internet pollution.

3.2. Frequencies for Metaphor Families

The frequencies of IT students' use of common internet metaphor families were investigated with four seven-point Likert-type items. Each item was designed as one internet metaphor family: open space, closed space, live and an inanimate thing. Although the frequencies of IT students' use of metaphor families did not reveal big differences, as can be seen in Figure 1, the open-space metaphor family was supported most (31%).

Figure 1. Internet metaphor families
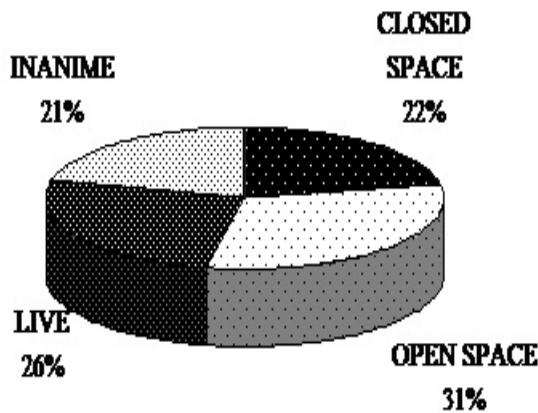
As can be seen in Figure 1, the IT students' views about metaphor families revealed that "open space" metaphor family was followed by the metaphor families of "a live thing" with a rate of 26%, "closed space" with a rate of 26% and "an inanimate thing" with rate of 26%. This finding was parallel to the findings obtained regarding the first research question. Descriptive statistics regarding

the degree of IT students' agreement with the common internet metaphor families is presented in Table 4 below.

Table 4. Descriptive statistics regarding common internet metaphor families

Metaphor Family	N	$\overline{X}$	Sd
CLOSED	112	3,8036	1,93516
OPEN	112	5,4554	1,60455
LIVE	112	4,5357	1,82045
INANIME	112	3,5982	1,86702

It was seen that the metaphors created by the students belonged to the metaphor family of "accessing and sharing information" with such a high rate of 62.63%. This metaphor family, which was mostly supported with an information pool and information ocean, was an open space metaphor family. As can be seen, metaphors are closely related to participants' areas of expertise as conceptualization of the Internet is related to the context [16]. In addition, it was observed that the students created metaphors related to human life with a rate of 25.27%. Moreover, this metaphor family belonged to the metaphor family of a live thing. Therefore, with a rate of 87.9%, it could be stated that the internet metaphors created by the IT students were consistent with the common internet metaphors they used. Here it could be stated that the IT students regarded the internet as an open space with a complex and relational structure.

3.3. Use of Metaphor Families With Respect to Students' Demographic Background

The results of the Kolmogorow-Smirnow Normality test conducted to determine whether the frequencies of IT students' use of common internet metaphor families had a normal distribution or not are presented in Table 5 below.

Table 5. Kolmogorov-Smirnov Normality Test Results

	N	$\overline{X}$	Sd	Kolmogorov-Smirnov Z	p
Metaphor Families	112	4,34	,826	1,024	,245

According to the Kolmogorov-Smirnov test results, the scores related to the IT students' use of metaphor families had a normal distribution $[D_{(112)}=1.024, p=.245>0.05]$. This finding revealed that the parametric tests regarding the scores of IT

students' use of internet metaphor families provided the normal distribution condition. The results of the Levene F test conducted for the equality variance, which was the second condition of the parametric tests of t-test and One Way ANOVA, are presented together with the results of One Way ANOVA and t-test. The results of independent samples t-test for the degrees of IT students' agreement with internet metaphor families with respect to their gender are presented in Table 6 below.

Table 6. Independent t-test results

	Groups	N	$\bar{X}$	Sd	T	p
CLOSED	Female	48	3,81	1,829	,042	,223
	Male	64	3,79	2,025		
OPEN	Female	48	6,06	1,227	3,65	,071
	Male	64	5,00	1,708		
LIVE	Female	48	4,85	1,821	1,61	,789
	Male	64	4,29	1,796		
INANIME	Female	48	3,41	1,998	-,89	,211
	Male	64	3,73	1,766		

As can be seen in Table 6, first, it was seen in Levene F test that the variances were equal for all the groups (p>.05). Thus, it was possible to state that the t-test result was significant. However, when Table 6 was examined, it was seen as a result of the two independent samples t-test that there was no significant difference between the degrees of IT students' agreement with internet metaphor families with respect to their gender.

For the changes in the degrees of IT students' agreement with internet metaphor families with respect to their class, frequencies of their average daily internet use, their internet use experiences (year) and their internet use proficiencies, One Way ANOVA was applied. As a result of the analysis conducted, a significant difference was found for the metaphor family of "an inanimate thing" only with respect to class. The One Way ANOVA results for the metaphor family of "an inanimate thing" in terms of class are presented in Table 7 below.

Table 7. One Way ANOVA results

Metaphor Family		df	F	p
CLOSED	Between Groups	2	2,237	,112
	Within Groups	109		
	Total	111		
OPEN	Between Groups	2	1,817	,167
	Within Groups	109		
	Total	111		
LIVE	Between Groups	2	,207	,813
	Within Groups	109		
	Total	111		
INANIME	Between Groups	2	4,797	,010
	Within Groups	109		
	Total	111		

As can be seen in Table 7, a significant difference was found between the degrees of IT students' agreement with the metaphor family of "an inanimate thing" with respect to their classes ($F_{(3,109)}$=4.797, p=.01<.05). For the purpose of determining which groups caused this difference, Posthock test was run. The Tukey HSD test results are presented in Table 8 below.

Table 8. Posthock test, Tukey HSD test results

Dependent Variable	(I) Class	(J) Class	MD (I-J)	SE	p
INANIME	2nd Grade	3rd Grade	1,61 (*)	,531	,008
		4th Grade	,15	,366	,905
	3rd Grade	2nd Grade	-1,61 (*)	,531	,008
		4th Grade	-1,45 (*)	,535	,021
	4th Grade	2nd Grade	-,15	,3669	,905
		3rd Grade	1,45 (*)	,535	,021

* The mean difference is significant at the .05 level.

As can be seen in Table 8, regarding the degrees of IT students' agreement with the metaphor families of "an inanimate thing", there was a significant difference between the 2nd and 3rd grades at the level of p=.008 and between the 3rd and 4th grades at the level of p=.02. Based on this result, the IT students from the 3rd grades were those who considered the internet least as "an inanimate thing". In other words, the IT students in the 2nd and 4th grades considered the internet as "a

live thing" with a significant difference when compared to those in the 3rd grades. This differences may be because of 3rd grade students have less samples than 2nd and 4th grades.

3.4. Common Internet Metaphors Used By IT Students

In order to determine the internet metaphors used by IT students, first, the researchers determined which common internet metaphors the students used and how frequently they used these metaphors. The common internet metaphors used by IT students and the frequency of their agreement with these metaphors are presented in Figure 2 below.
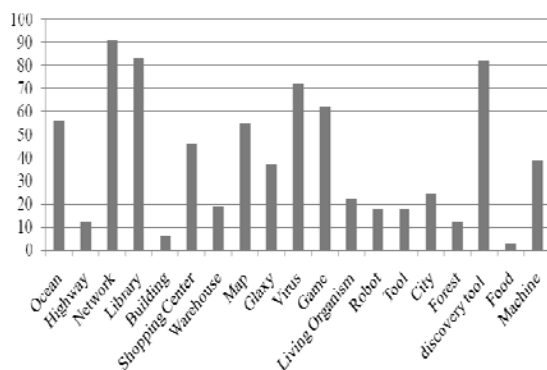

Figure 2. Frequency of common internet metaphors used by IT students

According to the data obtained in the study, it was seen that among the common internet metaphors, the IT students used most network (91), discovery tool (83), library (82), virus (72) and game (62). Based on this result, for the internet, the IT students used a metaphor that belonged to the metaphor family of "open space" with a high rate of 83,04%. This finding was parallel to the finding that IT students used most the metaphor family of "open space" that belonged to their common internet metaphors and "accessing and sharing information" stressed with metaphors created by the IT students for the internet.

4. DISCUSSION AND CONCLUSION

This study conducted to determine the internet-related metaphors used by IT students and to examine these metaphors with respect to various variables was carried out with IT students from Anadolu University in the Spring Term of 2009-2010 academic year. The study was designed with the relational and singular survey model. 10 open-ended and 3 multiple-choice questions were directed to determine the internet metaphors created by the students and the reasons why they used these metaphors; to determine the students' agreement with the common internet metaphors; to examine whether the metaphors used by the students changed with respect to their class, gender, the frequency of their average daily internet use, their internet use experiences (year) and their internet use proficiencies; and to investigate the common internet metaphors they used. The present study revealed several important findings one of which was also supported by previous related studies.

First, when the internet metaphors created by the IT students were examined, it was seen that they used metaphors pointing out "accessing and sharing information" such as information pool and information world. Parallel to this, it was also seen that the IT students used the metaphor family of "open space" most among the common internet metaphor families. In addition, the frequencies of the students' use of common internet metaphor families were examined with respect to their classes, gender, frequencies of their average daily internet use, their internet use experiences (year) and their internet use proficiencies, but no significant difference was found. It was seen that IT students used the Network metaphor most with a rate of 83% among the common internet metaphors.

When the common internet metaphors used by IT students were examined, it was seen that the Network metaphor used most belonged to the open space metaphor family and was used to emphasize the power of the internet to access and share information; that the discovery tool belonged to the border metaphor family and was used to emphasize that the internet was a space open to discovering new and up-to-date information. Therefore, it could be stated that the common internet metaphors used by the IT students were close to the internet metaphors created by the IT students and that they focused especially on the feature of the internet such as accessing and sharing information.

In this study, it was seen that for the internet, the IT students produced metaphors gathered under the heading of accessing and sharing information; that they supported the "open space" metaphor family most among the common internet metaphor families; and that they used the network metaphor most among the common internet metaphors. These results obtained in the study were parallel to finding of a study carried out by Palmquist, [10] who suggested the metaphor family of navigation/discovery and to the finding of another study conducted by Durmuş, Bağcı and Ağca, [13] who reported that most elementary school students

(89%) considered the internet as a source of information.

Considering the limitations and the findings of the study, it could be stated that the IT students regarded the internet as an open space with a complex and relational structure on the basis of accessing and sharing information. This finding demonstrated that the conceptions of the IT students regarding the internet were appropriate to the general structure of the internet. However, the responses of the IT students to the common internet metaphor families revealed that 26% of the students considered the internet as a live thing. It was also thought that although a majority of the students made healthy conceptions regarding the internet, some of the students made misconceptions. Therefore, the students could be informed about the scope and features of the internet in courses including such subjects as internet-based education and the internet in education; in this way, the students' cognitive perceptions of the internet and their cognitive images could be enhanced. Furthermore, it was seen that 13% of the IT students who created their own internet metaphors emphasized the filthy and complex structure of the internet. This finding revealed that information pollution on the internet was an important factor for the students' use and perception of the internet. As required by the professions of IT students, it is important to equip students with the necessary information and skills in order for them to use the internet efficiently and to pioneer in this point. For this purpose, with the efforts of those who give courses in teacher-training programs, courses that would help students use the internet efficiently and perceive the internet accurately could be given in these educational programs.

This study is limited to the IT students attending Anadolu University in the Spring Term of 2009-2010 academic year and a questionnaire including four parts and 13 items developed by the researchers. In future studies to be carried out on this subject, the internet metaphors used by IT students attending other universities could be examined in detail with respect to various independent variables such as their class, gender, the duration of their average daily internet use, their internet use experiences and their internet use proficiency; in addition, such future studies could support and enhance the findings of the present study. Moreover, studies which employed qualitative research methods such as observation and interview could be designed to investigate the reasons for the IT students' internet-related

perceptions of open space and of accessing and sharing information. Finally, this research can be continuously developed by a future phenomenology research project. In this long term and covered project students' cognitive perceptions of the internet and their cognitive images can be investigated by help of educational psychologists.

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