Opinions of Teachers on Using Internet Searching Strategies: An Elementary School Case in Turkey

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Abstract

The purpose of the current study is to determine opinions of teachers on using internet searching strategies in an elementary school. The study conductad through qualitative method was designed on survey research model. Participants were consisted of 21 teachers at an elementary school in Eskişehir in Turkey. Questionnaires consisting of open-ended questions were used to collect data in the spring semester of 2008, which were analyzed through inductive coding technique. Findings reveal that elementary school teachers primarily use Google for searching on the internet. It is revealed that internet search strategies applied by teachers differ between the inception and the development processes of the search. In addition, teachers have several problems like irrelevant information, accessing insufficient information, accessing websites with virus threats while searching. A need for in-service training regarding the ways of accessing and retrieving information from İnternet was stated along with creative suggestions in accordance with the content and structure of the instructional process assumed.

Keywords: *Internet literacy; Internet using; Internet searching strategies; elementary school teachers.*

Introduction

Internet has been an indispensable tool of the teaching-learning process for both teachers and students as it provides users with great opportunities to access information and communicate. Teachers use İnternet for a large variety of purposes including materials development, planning lessons, accessing instructional resources and communicating with colleagues (Akkoyunlu, 2002b; Andersson, 2006; Brehm, 1999). In addition, teachers guide students to benefit from İnternet resources in order to do their assignments and projects.

As internet has become an important resource for the teaching-learning process, the importance of internet using skills for both teachers and learners increases along with the emphasis on information technology literacy skills such as accessing, retrieving, evaluating and applying information. Previous studies reveal that teachers and learners have problems in terms of accessing and using information

available on the internet, and lack sufficient skills for information processing (Kuiper, Volman & Terwel, 2008; Madden, Ford, Miller & Levy 2006; Scott & O'Sullivan, 2005; Walton & Archer, 2004; Bilal, 2001; Sorapure, Inglesby, & Yatchisin 1998). This prevents teachers and learners from benefiting from the internet effectively and integrating internet facilities into instructional endeavors. The amount of guidance offered by teachers and parents regarding the use of information and communication technologies carries particular importance as Madden et al. (2006) maintains that the amount of guidance both from teachers and from parents seems to be one of the important factors determining the child's ability to apply successful information search strategies.

Internet literacy or web literacy is among the contemporary and important information literacy constructs. Internet literacy involves a set of several skills regarding the meaningful use of the Web such as the evaluation, use, and production of web information. Similar definitions for the term can be found in the literature. It can simply be defined as the access and evaluation of web-based materials, as well as the production and distribution of web pages (Kuiper et al. 2008; Mackey & Ho 2005). Internet literacy involves a variety of skill categories including searching, reading and evaluating. Internet searching skills, for instance, include the ability to define appropriate key words and locate relevant information (Kuiper et al. 2008). In other words, İnternet searching skills involve information, skills and strategies necessary to conduct effective information search along with methods and tools to access, retrieve, evaluate and use information. In order for teachers to guide students in terms of accessing a variety of information resources, and selecting and using the most reliable of these resources, they need a working knowledge of internet searching, reading and evaluating skills in addition to proficiency in terms of the methods and tools to access, evaluate, and use information.

Search Process on the Internet and Strategies for Searching

Gordon and Pathak (1999) maintain that there are four methods for locating information on the Web. First, a user may go directly to a Web page by knowing its exact location. Second, the hypertext links located at a Web page involve built-in associations to other pages that the author of the document considers to provide additional or related information. Third, the narrowcast services can give the users specific pages to meet their particular user profile. Finally, search engines can be used to state the kind of information users hope to find and then provide a large variety of information resources, which are likely to be related to that information. As clearly summarized in the official website of Louisiana State University Libraries, search engines, for instance, have a large variety of uses and types including general search engines retrieving web pages on all different topics regardless of the quality of the content; academic search engines retrieving high quality information relevant to scholars; meta search engines searching several other search engines along with top results from each; subject-specific search engines retrieving web pages in a certain field; special search tools to search for images, videos, people and news; and deep Web search engines retrieving web pages that aren't searchable by general search engines. In order to use the information resources of the Web, above search engines and information location methods can be used with a combination of effective searching strategies to access, evaluate and use quality information. Internet searching strategies can be defined as the organization of search keywords and symbols in order to conduct effective search on the Web, and extend and narrow search results accordingly (Brehm, 1999). Among frequently used searching strategies some of which are cited in Akkoyunlu (2002a, pp. 53-56) and Brehm (1999) are Boolean search commands (and, or, near, none, not), search engine math commands (+, -, " ", etc.), power searching commands (intitle:, site:, url:, link:, *, ?, etc.), and search assistance features (related search, clustering, stemming, etc.).

Most users do apply keyword search which is easy to conduct. However, it has been observed that only keyword search is not effective in some instances as users could end up surfing from one site to another or abandon the search in frustration (Scott & O'Sullivan 2005). In this respect, as also suggested by Scott and O'Sullivan (2005) students and teachers need to master further information literacy skills including understanding the nature of information, being aware of the structure of the İnternet, and navigating the hypertext environment of the İnternet effectively.

Kuiper et al. (2008) realized a multiple case study design with four 5th grade teachers who carried out a program, which consisted of eight weekly sessions to teach students Web searching, reading and evaluating skills. The purpose was to investigate the contextual factors that influence the realization of the program and the learning gains in the participants in terms of content knowledge and Web skills. Videotaped and written lesson observations, interviews with students and teachers, teacher diaries, student questionnaires and student assignments were the data sources. Findings revealed that contextual factors that influenced the program were related to conditions as teachers' investment of time and effort, and school's way of organizing computer work. In addition, students' knowledge and skills improved in terms of both content knowledge and Web skills. Nevertheless, most students did not act upon their knowledge of Web searching, reading and evaluating skills, and showed unexpected or inconsistent behaviors.

In order to evaluate and describe the internet search strategies of adolescent learners, Guinee, Eagleton and Hall (2003) conducted a study with 161 middle and high school students. Data were collected through students' descriptions of the search process, observations of student searching behaviors, and audit trail lists of search strings used by students. Approaches adopted by students to locate information were listed as dot-com formula, shopping mall, and search engine all of which were used by students regardless of the computer experience. Methods for constructing search strings were listed as seven items which were single term (64.5 %), topic + focus (66.7 %), multiple terms (19.4 %), phrase (51.6 %), question (29 %), combination (6.5 %), and repeated concept (29 %). Finally, four techniques for recovering from unsuccessful search attempts were demonstrated, which were switching topics, visiting additional web sites, trying new keywords, and changing search engines. It is maintained that in the absence of sufficient and continuous instruction and support, students fall back on their previous stage of Web searching habits such as asking for help, resorting to print resources, or persevering with search results from ineffective search queries. Thus, it is suggested that students should be trained in a way that they become more metacognitive about their searching to differentiate between successful and unsuccessful search.

Williams and Coles (2007) examined the use of research information by the UK school teachers addressing their information literacy levels with an emphasis on strategies and confidence in their abilities to find, evaluate and use research information (i.e. the published output of a planned research). Participants included 312 teachers and 78 head teachers from nursery, primary and secondary schools in Scotland, England and Wales. Even though participants were positively motivated towards the use of research evidence, their actual use of information from research was relatively limited. Lack of time and lack of ready access to resources were considered as barriers to the use of research information. Insufficiency of research information use was observed as a limiting factor in terms of the professional development of teachers. Findings of the more research motivated sample revealed that teachers were less confident in finding and using research information than general information. Confidence in finding research information was slightly higher than confidence in using research information. It was also revealed that participants had a range of concerns regarding the lack of skills and knowledge necessary to search and evaluate information effectively.

Most studies on information literacy skills focus on students from different levels ranging from elementary schools to higher education, adults, web experts and professionals in other fields. Similar studies should be conducted to see teachers' internet searching strategies and methods along with variables affecting their internet literacy. In Turkey, an experimental study conducted by Akkoyunlu and Kurbanoglu (2002) provided teachers with training within the framework of information literacy involving the use of information resources, evaluation and information search on the internet. The effectiveness of the training was evaluated, which revealed that the training increased teachers' levels of using search engines, using Boolean search commands, and evaluating web sites.

Purpose and Research Questions

The current study tries to determine teachers' situation of internet search strategies who work at an elementary school in a Turkish city. Their perceptions about issues they encounter while using these strategies are also investigated. In order to address these purposes, the following research questions are asked:

1. What types of web sites are used by elementary school teachers while searching on the internet?
2. Which strategies are adopted by elementary school teachers while searching on the internet?
3. What are the problems encountered by elementary school teachers while searching on the internet?
4. What are the perceptions of elementary school teachers about their educational needs regarding internet searching strategies?

Methodology

The current study was designed on survey research model as a qualitative method. survey researches includes cross-sectionaland longitudinal studies using questionnaires or structured interviews for data collection, with the intent of generalizing from a sample to a population (Creswell, 2003). Participants of the study consisted of 21 teachers at an elementary school in a Turkish city. The sample consisted of eight classroom teachers, two science teachers, two religion teachers, two English teachers, two mathematics teachers, a computer science teacher, an instructional design and technology teacher, a music teacher, a Turkish teacher and a pre-school teacher. The mean of their seniority was 11. Only three of them had an experience less than a year while three teachers had a seniority of 26 years.

Questionnaires consisting of open-ended questions were used to collect data in the spring semester of 2008. Open-ended questions help researchers to obtain information to support theories and notions arising from the literature (Creswell 2005). Open-ended questions were deliberately used as the current study aimed to obtain information regarding teachers' use of Internet searching strategies mentioned in the literature, and to evaluate further comments that are not expected. In order to control for the content validity of the questions included in the questionnaire, expertise of five field experts and three qualitative research experts was resorted to. Based on their comments, questions were further revised and piloted with 16 elementary school teachers at another school to check the intelligibility of the items. Based on the comments of the pilot group, the final form of the questionnaire was decided on, which involved seven questions. After the written permission of the administration of the sample school, and oral permission of volunteer teachers were ready, the questionnaires were administered to 21 teachers. In order to collect richer data in terms of validity, participants filled in the forms before the researchers and asked whenever they did not understand a specific item. After the data collection was over, a researcher transferred the data to computer

environment. Another researcher controlled the data in the computer environment to sustain that the data was entered correctly.

The data were analyzed through inductive coding technique suggested by Strauss and Corbin (1990). Initial data were transferred to the computer, each question was reviewed sentence by sentence to get the general sense of the data, and statement patterns that occurred in the data were listed. Then, these patterns were coded in accordance with the research questions. Next, patterns were organized within main themes and themes, which were generated in accordance with the structure of the data and related literature (Cresswell 2005). The list of main themes and themes that grew after this analysis was reviewed by an independent field expert and a qualitative research expert, and a consensus on the template between the researchers was built. More specifically, to examine reliability, the formula suggested by Miles and Huberman (1994) was applied (i.e. reliability = number of agreements / total number of agreements + disagreements). The findings revealed better than 88 % inter-coder reliability suggesting that coding procedure was reliable. Finally, the data were described and interpreted which were given in order of importance and supported with direct quotations where necessary.

Findings and Interpretation

Findings revealed after the data analysis are provided as main themes and themes along with sample statements for the opinions with high frequencies. Findings are combined under four main headings involving;

- Web tools used by teachers during internet searching,
- Internet searching strategies adopted by teachers,
- problems encountered by teachers during internet searching, and
- teachers' educational needs regarding internet searching strategies.

Web tools used by teachers during Internet searching

Websites and web tools mentioned by teachers, which were used during internet searching, were examined one by one, and the tools were classified under eight themes, namely search engines, file sharing directories, teaching websites, official websites of state institutions, websites of private institutions, subject-specific search engines, forums and other sites. Specified frequency of Websites and web tools mentioned by teachers are given below in Table 1.

Table 1. Websites and Web Tools Mentioned by Teachers

Websites and web tools	***Frequency (f)***
search engines	27
file sharing directories	13
teaching websites	12
official websites of state institutions	12
websites of private institutions	10
subject-specific search engines	4
forums	2
other sites	4

Among the search engines, the most preferred one was Google (18). Teachers used file sharing directories (www.etkinlikpaylas.com, www.egitimhane.com, etc.) to share and download lesson plans, sample activities, and instructional materials. They applied to several unprofessional teaching websites in order to access resources about their fields (e.g. www.memocal.com,

www.ilkokumayazma.com.tr.tc). They also used official websites of the state institutions among which the official website of the National Ministry of Education was the most popular (i.e. www.meb.gov.tr). Websites of private institutions were also preferred by teachers to conduct research. These websites included news and comments regarding teachers and similar civil servants in Turkey (www.memurlar.com, www.wikipedia.org). In order to access subject-specific information, www.yahoo.com is the most preferred. In addition, teachers made use of forum websites to interact with their colleagues, and resorted to specific websites to search about their personal interests (www.bebek.com, etc.).

Internet searching strategies adopted by teachers

Internet searching strategies adopted by teachers were grouped into two themes. The first theme involved strategies used at the beginning of the searching process and the second theme included those used according to the results of the first search. Strategies used at the beginning of the searching process were keyword search, searching through a subject-specific website, and using search operators and commands to facilitate search. So that, elementary school teachers' internet search strategies at the begining of searching process can be illustrated as shown below in Figure 1.

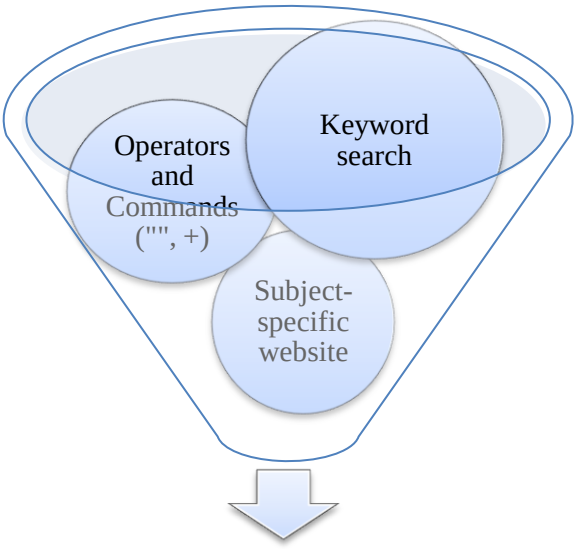

Figure 1. Elementary School Teachers' Popular Search Strategies

Two of the teachers maintaining that they conducted keyword search stated that they selected the keywords in accordance with the main idea of the subject. In addition, they maintained that they tried not to choose a very broad or very specific term to search for. Sample statements demonstrating such searching behaviors are provided below:

> *"…I list the keywords to search for according to the main idea of the subject. I write the first main subject to the search field…."*
>
> *"…I determine the keyword. The keyword must not be either too broad or too specific…."*

Five of the teachers maintained that they conduct the search through a subject-specific website, that is, they directly visit the website of that specific field if available, as exemplified below:

> *"…When I enter the mathematics websites, I find the information I want to see and enter…."*

"…I just write the address of the website and there comes the page I want …."

Three of the teachers stated that they used specific search commands to facilitate their searching such as quotation marks (" ") and plus sign (+). For instance, a teacher states "*I write the relevant word in quotation marks. I use it if necessary….*" Another teacher used the following expressions: *"I write the keyword to the search field, use operators like + and can conduct search through several keywords…."*

Findings on internet searching strategies, which were used according to the results of the first search, revealed that teachers increased the number of keywords (9), used a different search engine (4), and resorted to advanced search options (3). They used these strategies whenever they come up with very few pages or too many pages deviating from the purpose of their specific search. Increasing the number of keywords was the most favorite strategy adopted according to the results of the first search. They selected additional keywords appropriate to the subject, subject-specific terminology and synonyms of the first keyword. Direct quotations illustrating such strategies are provided below:

"…I conduct the search through using different words relevant to the subject. Or I conduct advanced search. For instance, rather than artists I say Pablo Picasso. I use affection rather than love…."

"…Whenever I cannot reach the information relevant to my subject, I search for important notions or keywords I determine according to the title and relevant subtitles of the subject…"

Teachers resorted to other search engines whenever they could not find what they wanted at the first search. A teacher stated *"…I use more search engines…."* In addition, teachers used the advanced search options of a specific search website, and applied to specifications such as determining the file type before searching. A teacher stated "*…I make use of the advanced search options of the search engine…. "*

These findings suggest that elementary school teachers resorted to different strategies at the inception of the search and after the results of the first search. At the inception, teachers conducted keyword search, subject-specific website search and searching through commands. Interestingly, teachers only resorted to quotation marks and the plus sign while they did not mention any instances of using other search operators such as Boolean search commands (and, or, near, none, not), search engine math commands (+, -, " ", etc.), and powerfull searching commands (intitle:, site:, url:, link:, *, ?, etc.). In order to extend or narrow down the results of the first search, teachers resorted to additional keywords, new search engines and advanced search features. In brief, it can be suggested that the most popular search strategy applied by teachers was the keyword search.

Problems encountered by teachers during Internet searching

Based on the coding of the data regarding the problems encountered by teachers during internet searching, six themes were observed which were accessing irrelevant information, accessing insufficient information, accessing websites with virus threats, lack of Turkish resources on the Web, difficulty of accessing scientific resources, and accessing websites requiring membership. Specified frequencies of problems encountered by teachers are given below in Table 2.

Table 2. Problems Encountered by Teachers

Websites and Web tools	**Frequency (f)**
irrelevant information	9
accessing insufficient information	4
accessing websites with virus threats	3
lack of Turkish resources on the Web	2
difficulty of accessing scientific resources	2
accessing websites requiring membership	2

Example quotations are provided below:

> *"…When I enter the keyword, many pages come up regardless of whether they are relevant or irrelevant. This extends the search time and becomes boring. Sometimes, I give up searching."*
>
> *"When we cannot specify the subject clearly, too much information comes up. Thousands of pages… It is hard to decide which of this information is necessary and which of it is not, because there is no time. We suffice with checking the first one or two sites…."*
>
> *"I see many unnecessary and impracticable resources. I find limited or wrong information on some subjects. I cannot access scientific research resources…."*

One of the teachers stated "*I absolutely find the page relevant to subject*" suggesting that he had no problems in terms of internet searching while another one stated "*If I cannot reach, I just give up*" suggesting that he gets frustrated whenever he cannot find the desired information. A teacher having problems in terms of internet searching solved her problems by resorting to a computer expert: "*There is everything on the page, necessary and unnecessary, so I cannot find what I want all the time. My husband is a mentor computer teacher. He helps me when I'm stuck.*"

Accessing insufficient and unnecessary information was the most prominent problem experienced by elementary school teachers while searching on the Web. It can be suggested that this primarily stems from being unaware of relevant internet searching strategies. In addition, teachers had problems in accessing correct information about some subjects suggesting that the amount of vague, insufficient, and wrong information on the Web is too much, while considerable amount of scientific and correct information requires membership or authorization to access.

Teachers' educational needs regarding Internet searching strategies

Of participating elementary school teachers, 19 (91 %) stated that they needed training on Internet searching skills and strategies. Two themes emerged through the comments of the participants, one addressing the content of the training and the other addressing the nature of the training. The contents of the training demanded by teachers were using search engines (5), conducting advanced search (2) and basic internet using skills (2). A teacher focusing on the importance of learning about search engines says:

> *"…I'd love to learn how to use the search engines, because I use them ineffectively. What is the difference between Google and Firefox. Which one leads to better search results? I'd love to learn these …."*

The themes regarding the structure of the training demanded by teachers were applications (3), interaction (2), longitudinal training (2), visuals supports (1) and relevance to teachers' current computer use levels (1). Example expressions illustrating participants' expectations from the nature of

the training are "*…It should be in a way that I could use in real life, with applications, with continuous interaction…*", "*…longitudinal, effective and not given just for the sake of giving training…*", "*I expect it to be appropriate to our groups' computer use levels….*"

Almost all participants mentioned a need for specific training in order to improve their internet searching skills and strategies. In addition, as the levels of participants regarding the use of internet searching strategies were quite different, the contents of the training demanded by teachers varied considerably. Finally, teachers asked for a longitudinal training appropriate to teachers' levels, which should be supported through applications, continuous interaction, and visual materials.

Conclusion and Suggestion

Internet searching strategies used by elementary school teachers varied considerably. However, it can be suggested that the most preferred search strategy was to resort to search engines. Google seemed to be the most popular search engine used by teachers, which is in line with the previous literature, particularly the Madden et al. study (2006) which revealed that all participants were familiar with Google whether or not they knew what a search engine was. Teachers also resorted to subject-specific websites to search for certain information such as file sharing directories, teaching websites, official websites of state institutions, websites of private institutions, subject-specific search engines, forums and other sites.

Internet searching strategies adopted by teachers at the beginning of the searching process and strategies adopted according to the results of the first search varied as well. Strategies used at the beginning of the searching process were keyword search, searching through a subject-specific website, and using search commands to facilitate search. On the other hand, at the end of the search project they resorted to narrowing down or extending the search such as using additional keywords, trying different search engines and resorting to advanced search features. This finding is partially in line with the findings of Guinee et al. (2003) study which revealed that students demonstrated keyword search for locating information on the internet; visited additional web sites, tried new keywords and changed search engines for recovering from unsuccessful search attempts. That is, strategies adopted by elementary school teachers' and students are quite similar. Finally, teachers only applied to quotation marks and the plus sign whereas they did not use other search options and commands such as Boolean search, search engine math commands and power searching commands. In this context it is possible to summarize teachers' internet search strategy process as shown below in Figure 2.

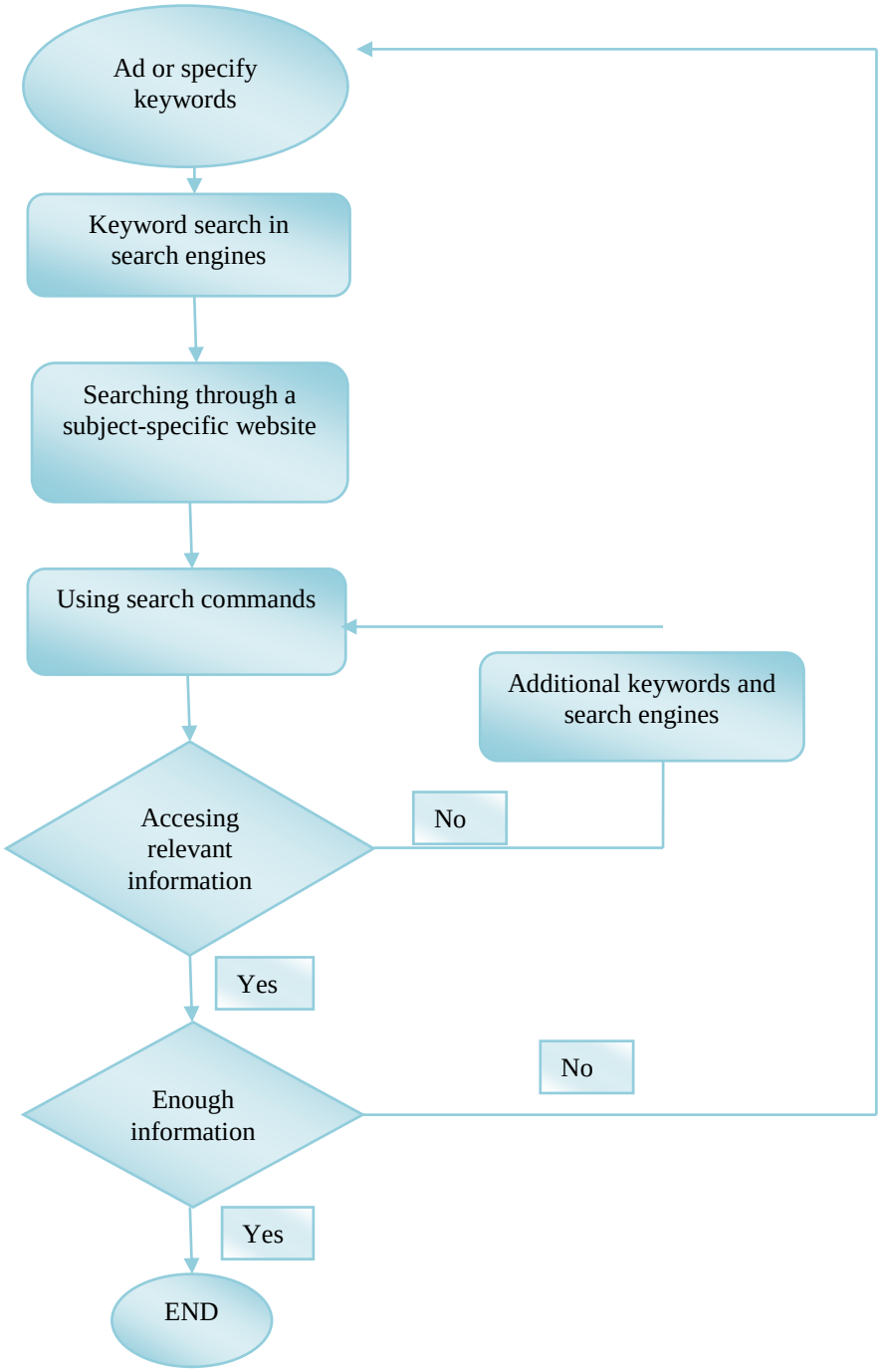

Figure 2. Flow Diagram of Elementary School Teachers' Internet Search Strategy Process

As seen in Figure 2 elementary school teachers start internet search process by add or specify keywords and search these keywords in search engines. From the results of search engine find subject-specific websites and seach through them. In this step teachers use search comments (especially "" and + comments) to extend the results until accesing relevant information. If not, they try additional keywords and search engines. If retrieved information meets needed information teachers end searching process. But, if this information is not enough, they tearn to the first step of searching process and add or specify new keywords.

Among the most prominent problems encountered during internet searching process were accessing irrelevant and insufficient information, accessing websites with virus threats, lack of Turkish resources on the Web, difficulty of accessing scientific resources, and accessing websites requiring membership. This finding is partially in line with the Williams and Coles (2007) study, which suggested that school teachers consider the most prominent barriers to the use of research information as the lack of time and ready access to resources. It might be suggested that some of these problems stem from the deficiency of effective internet searching strategies. The lack of such strategies lengthens the time of accessing information or totally prevents teachers from accessing necessary information on the Web.

Almost all participant teachers thought that they needed training on internet searching skills and strategies. In addition, participants suggested some criteria to prepare the contents and strategies during such training. Since the computer using levels of teachers varied, their comments on the content and the structure of the training varied as well. For instance, using search engines, conducting advanced search and basic internet using skills were the contents suggested by participants. Thus, it can be suggested that teachers could be given training on how to cope with internet and make use of this resource effectively. Teachers also commented on the structure of the training they demanded, and asked for longitudinal training appropriate for their current levels -a training, which is improved with applications, interactive activities, and visual supports. Such training might eliminate above mentioned prominent barriers to internet searching skills and help teachers to conduct more effective searches on the Web.

The current study poses some limitations as well. Even though the study was conducted in a qualitative approach in order to collect data describing the situation in depth, additional data collection tools need to be administered to enrich the data sources and to increase the reliability. In this respect, it is colorable to claim that the study could be enriched through observations, interviews and document analysis.

Considering the scope of the research findings it has optained that primary school teachers have educational requirements about internet search strategies and techniques obtained. This requirement is specifically stated by 91% of teachers participated in the research. But course or courses including educational internet search content in 2010 In-Service Training Plan of In-service Training Department of the Ministry of National Education (Turkey) are not considered enough.
Therefore, It is thought that in-service education activities carried out by Ministry of National Education should contain "Educational Search in Internet" content that may take 4-6 lessons.

Apart from in-service training it is thought that in pre-service teacher candidates' skills and competencies about Educational use of Internet should be supported by related courses and / or contents. Not only in departments related to Information Technology but also in all departments train teachers such activities and applications should be carry out. To do these, first of all the requirements and opportunities should be identified and appropriate solutions must be produced for these issue.

In further researches with wider participants, Internet search skills and problems of elementary school teachers may be investigated by the aid of quantitative designs. In addition, an action research to find the ways the develop elementary school teachers' internet searching strategies is a good option to diagnose potential problems, identify actions and alternative actions to eliminate these problems, and improve teachers' internet searching effectiveness.

Note: This paper is extended version of the study whose abstract has been published in the proceedings of the 8th International Educational Technology Conference.

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