

Self-Efficacy Levels of Teachers in Information and Computer Literacy

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Abstract: Discovering more about teachers' information and computer self-efficacy beliefs would provide us with clues about whether they find activities necessitating IL important for their personal and professional lives and whether they are able to design environments conducive to the acquisition of these skills by students. Obtaining such data is particularly relevant and timely for Turkey as the Turkish education system is currently attempting to bring to life a new curriculum based on activities necessitating IL such as project based learning and performance tasks. In this context the purpose of this study is to determine teachers' IL and CL self-efficacy beliefs. The study was carried out among 68 teachers chosen randomly from 3 public and 2 private primary schools. The study is descriptive and based on both quantitative and qualitative data. The quantitative data was collected through an Information Literacy Self-Efficacy Scale and a Computer Literacy Self-Efficacy Scale. The qualitative data was collected through interview questions prepared by the researcher. Data obtained from information and computer literacy self-efficacy was analyzed by using descriptive statistics (% , frequency). Kruskal-Wallis H Test was implemented to examine the differences between the teachers' self-efficacy beliefs for IL and CL. The results reveals that most teachers' self-efficacy for information literacy and computer literacy are at the high. The meaningful differences exists between teachers with different CL self-efficacy levels with regard to their IL self-efficacy levels and the meaningful difference are between the first and third and the second and third stages. Results may be a sign that teachers have experience of using IL skills. The findings obtained from the interviews with participants may be regarded as corroborating evidence for this assumption. The teachers said in these interviews that they assign research tasks every week. They believed that students gained the skills of reaching information, literature review, referencing. Showing through their responses that they observe the necessities of IL processes in their own research. Findings implicate that IL and CL need to be treated together both in studies focusing on these two skills and in the process of teaching them to students. Teachers find the process of research difficult but enjoyable; and blame the difficulty partially on a lack of IL skills. Therefore, studies centering on the identification and satisfaction of these lacks would be beneficial.

Key words: Information literacy • computer literacy • literacy skills • self-efficacy

INTRODUCTION

The technological tools of the Information Age such as computers, the Internet and telecommunications systems have brought us a huge volume of information accompanied by certain issues such as what information is available, when to use it and how to find out about it. People today face an explosion of information resources together with the challenge of using them effectively and responsibly. The National Forum on Information Literacy [1] has emphasized this by stating, "Information is expanding at an unprecedented rate and enormously rapid strides are being made in technology for storing, organizing and accessing the ever-growing tidal wave of

information". What might a person do when faced with so many possibilities in information? Which information is reliable and which is not? With this gargantuan amount of information and therefore misinformation, everyone-whether they be in the education system or not-must have information skills, or in other words "information literacy skills".

What is information literacy (IL) and computer literacy (CL)?: IL can be defined in several different ways. According to the ALA [2], the information literate person is, "able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information". Similarly, NCREL North Central

Regional Educational Laboratory [3] defines information literacy as “the ability to evaluate information across a range of media; recognize when information is needed; locate, synthesize and use information effectively; and accomplish these functions using technology, communication networks and electronic resources.” NFIL [1] defines it as “the ability to know when there is a need for information, to be able to identify, locate, evaluate and effectively use that information for the issue or problem at hand.” As can be seen, IL is much more than merely accessing and using technology [4].

Computer literacy, on the other hand, refers to the degree to which individuals are familiar with computer operating systems and applications. Tsai [5] defines it as “the basic knowledge, skills and attitudes needed by all citizens to be able to deal with computer technology in their daily life” (p. 69). As computers have become critical tools for learning, problem solving, communicating and retrieving information, it would not be an exaggeration to claim that computer-related knowledge, know-how, familiarity, capabilities and abilities [6] have become a part of and even a prerequisite for IL in our day [7]. IL is related to both information technology and CL. As IL focuses on content and communication, it encompasses authoring, information finding and organization, research and information analysis, assessment and evaluation.

Consequently, CL and IL skills are among the key skills required for success in knowledge-based societies. Teachers who prepare their students for the Information Age should make effective use of both information and technology. That is why the teacher education reform calls for modifications in teacher education and asks for performance expectations to include computer and information literacy concerns. Consequently, there have been many attempts and debates to integrate CL and IL requirements into the programs of teacher education schools worldwide [2, 8-10].

As education systems become remolded by technological innovations, teachers in these institutions are faced with the need to gain knowledge and skills to survive in this renewed environment [11]. Lack of such knowledge and skills is known to adversely affect the applicability of technological practice [12]. Therefore, current teachers in many institutions worldwide are introduced to such technological knowledge and skills through in-service training. Another significant factor which affects the applicability of a practice is efficacy belief. Teacher beliefs of self-efficacy affect what they do and what they manage [11].

What is Self-Efficacy?: Efficacy beliefs operate as a key factor in a generative system of human competence. Hence, different people with similar skills or the same person under different circumstances may perform poorly, adequately or extraordinarily, depending on fluctuations in their beliefs of personal efficacy. Perceived self-efficacy is not a measure of the skills one has but a belief about what one can do under different sets of conditions with whatever skills one possesses [13]. Interpreting a performance as a success increases self-efficacy beliefs while interpreting it as a failure decreases it. It is primarily formed by the interpretation of the results of one’s own actions, in other words, one’s own experiences [14-17].

Self-efficacy has been a popular topic attracting the attention of many researchers from the education discipline. Studies have been conducted in the context of teacher efficacy [18-20] and teachers’ computer or internet self-efficacy [21-23]. These studies showed that teachers with higher self-efficacy are more likely to be effective in their classrooms by exhibiting enthusiasm for teaching, being open to students’ ideas, using innovative instrumental methods that reflect their instruction and motivating students to learn [24, 25]. Although there seems to be a large body of literature related to self-efficacy and teacher-efficacy, those mentioning self-efficacy in the context of IL are few in number [26-30].

With the Information Age, the major principles of design for teaching and learning environments have changed dramatically. Therefore, possessing IL skills, as well as developing high self-efficacy, has become crucial skills in our day. Self-efficacy is a fundamental determinant in coping with and adapting to the system and it particularly affects what teachers do and what they manage, as stated by Bandura [11]. Efficacy beliefs largely determine how much effort individuals will spend on an activity, how long they will persevere and how flexible they will become in the face of difficult situations.

Discovering more about teachers’ information and computer self-efficacy beliefs would provide us with clues about whether they find activities necessitating IL important for their personal and professional lives and whether they are able to design environments conducive to the acquisition of these skills by students. Obtaining such data is particularly relevant and timely for Turkey as the Turkish education system is currently attempting to bring to life a new curriculum based on activities necessitating IL such as project based learning and performance tasks. In this context the present study thus seeks answers to the following questions.

Problem

**What is the level of teachers' IL and CL self-efficacy?
How able are teachers to plan activities necessitating the use of IL skills and manage them?:**

- What is the level/strength of teachers' self-efficacy for IL?
- What is the level/strength of teachers' self-efficacy for CL?
- Do the IL self-efficacy beliefs of teachers with different levels of CL self-efficacy differ meaningfully?
- How able are teachers to plan activities necessitating the use of IL skills and manage them?

METHODS

The purpose of this study is to determine teachers' IL and CL self-efficacy beliefs. The study considers self-efficacy belief to include both information and computer self-efficacy beliefs as CL skills are a prerequisite and part of IL [7, 2, 31].

The study is descriptive and based on both quantitative and qualitative data. The former was collected through structured scales and the latter through interviews.

Participants: The study was carried out among 68 teachers chosen randomly from 3 public and 2 private primary schools.

In all K-12 levels of Turkish Educational System, education curricula have been revised. All of the new curricula that have been put to use between 1st to 5th grades as of 2005-2006 educational year and those that will be gradually spread into other levels, envision an education system which is based upon cognitive and constructive principles, as well as a student-centered approach [32]. As a requirement of such curricula, teachers have been instructed to use activities such as project-based learning or performance tasks as part of their classroom instruction. These methods and activities require IL skills.

Therefore, all participants were teachers from primary school level (1st to 8th grade) who must incorporate activities necessitating IL skills into their teaching.

Research Instruments: The quantitative data required for this study was collected through an Information Literacy Self-Efficacy Scale and a Computer Literacy Self-Efficacy Scale. The qualitative data was collected through interview questions prepared by the researcher.

Information Literacy Self-Efficacy Scale: The scale for IL self-efficacy was a 28-item and 7-point Likert scale developed by Kurbanoglu *et al.* [33] to define participants' self-efficacy level for IL. The participants were asked to rate each item on a scale ranging from 1 to 7. The maximum score which could be received from the Information Literacy Self-Efficacy Scale was 196. The scores obtained were deemed as follows: "1-65: Low", "66-130: Medium" and "131-196: High". The alpha reliability coefficient of the scale was calculated to be 0.92.

Computer Literacy Self-Efficacy Scale: The 32-item and 7-point Likert type self-efficacy scale for CL was developed by Akkoyunlu & Kurbanoglu [30] to define participants' self-efficacy level for CL. Participants were asked to rate each item on a scale ranging from 1 to 7. The maximum score which could be received from the Computer Literacy Self-Efficacy Scale was 224. The scores obtained were deemed as follows: "1-74: Low", "75-149: Medium" and "150-224: High". The alpha reliability coefficient of the scale was calculated to be 0.73.

Interview Questions

- How frequently do you assign your students tasks requiring IL such as research, data gathering and evaluation?
- What attainments do your students gain through these activities?
- How do you guide your students towards/during these activities?
- Which resources do you mostly encourage your students to use? Why?
- What do you do to improve your students' IL skills?
- What process do you follow in your own research studies?
- What do you think about the necessity of being a good computer and Internet user for IL?
- What resources do you prefer in your studies?
- Do you think the research process is easy?
- Do you think the research process is enjoyable?

Data Analysis: Several statistical procedures were run on data which was collected through the instruments. To begin with, data obtained from information and computer literacy self-efficacy was analyzed by using descriptive statistics (% , frequency). Secondly, Kruskal-Wallis H Test was implemented to examine the differences between the teachers' self-efficacy beliefs for IL and CL. Finally, Mann-Whitney U test was implemented for the comparisons in analysis of variance.

Table 1: Teachers' Mean Scores of Self-Efficacy for Information Literacy

IL Self-Efficacy Level	n	%	\bar{x}	sd
Low	1	1.47	27.000	-
Medium	15	22.06	104.400	21.659
High	52	76.47	160.115	18.019
Total	68	100.00	145.868	33.145

Table 2: Teachers' Mean Scores of Self-Efficacy for Computer Literacy

Computer Literacy Self-efficacy Level	n	%	\bar{x}	sd
Low	7	10.29	44.1429	22.54942
Medium	30	44.12	107.1333	24.88142
High	31	45.59	187.2581	20.08809
Total	68	100.00	137.1765	54.43439

Table 3: Kruskal-Wallis H Test Results about the Differences between CL Self-Efficacy Belief Levels with Respect to IL Self-Efficacy Beliefs

CL Self-Efficacy		Low n=7	Medium n=30	High n=31
IL Self-Efficacy	Mean Rank	16.500	24.43	48.31
	Chi-Square	28.702		
	Asymp. Sign	0.000		

Table 4: Mann Whitney U Test Results about the Stages where the Difference Occurs

	Low (1) n= 7	Medium (2) n=30	High (3) n=31			
Low (1)		77.500	10.000*	Levels	N	Mean Rank
Medium (2)			135.500*	1	7	5.43
High (3)				3	31	22.68
				2	30	20.02
				3	31	41.63

FINDINGS

What is the level/strength of teachers' self-efficacy for IL?:

Table 1 shows that the general mean score of teachers' self-efficacy for IL was 144.96 which indicates the high level. As mentioned above, the scores obtained were deemed as follows: "1-65: Low", "66-130: Medium" and "131-196: High".

The overview of the results reveals the following: the rate of "low" was 1.47%, "medium" was 22.06% and "high" was 76.47%. As can be seen, most teachers' self-efficacy was at the high level.

What is the level/strength of teachers' self-efficacy for computer CL?:

Teachers' self-efficacy mean scores for computer literacy are presented in Table 2. According to the results, the general mean score of teachers' self-efficacy for CL was 124.37, which indicates the *medium* level. As mentioned above, the scores are categorized as follows: "1-74: Low", "75-149: Medium" and "150-224: High".

The evaluation of the distribution of teachers' self-efficacy for computer literacy level showed that most of

the teachers are at the high level (45.59 %), followed by the medium level by 44.12% of teachers.

Do the IL self-efficacy beliefs of teachers with different levels of CL self-efficacy differ meaningfully?: Kruskal-Wallis H Test was conducted to answer this question and the results are given in Table 3.

The table shows that a meaningful difference exists between teachers with different CL self-efficacy levels with regard to their IL self-efficacy levels. Mann-Whitney U test was conducted for paired comparisons to see the levels where the difference occurred. The results can be seen in Table 4.

The table shows that the meaningful difference exists between the first and third and the second and third stages. This leads to the inference that as CL self-efficacy belief becomes stronger, so does the IL belief.

These results imply that teachers have strong IL and CL self-efficacy beliefs and that the system has improved in this regard. This increases the possibility of the activities suggested by the curriculum to be materialized. In line with this assumption, a group of 10

participant teachers were given interviews so as to identify their opinions about using and managing activities requiring IL skills.

How able are teachers to plan activities necessitating the use of IL skills and manage them?: Two groups of interview questions were prepared to this end. The first group of questions is related to the activities that teachers carry out with their students and the second group is related to teachers' own studies. The questions and answers were grouped as follows:

About student work:

1. How frequently do you assign your students tasks requiring IL such as research, data gathering and evaluation?: We assign such tasks once a week. They also need to use these skills to do their projects and performance tasks.

2. What attainments do your students gain through these activities?: They learn how to reach information. They also learn critical and creative thinking skills; literature review, referencing skills. Other skills gained include classifying research studies, obtaining detailed information.

3. How do you guide your students towards/during these activities?: We limit the topics. We discuss the aim, benefits and stages of the study. We guide them to the right resources. One teacher pointed out that guidance was not necessary as the students already had these skills.

4. Which resources do you mostly encourage your students to use?: Almost all teachers responded to this question by mentioning encyclopedias, books and journals; only two teachers added to this list computers and the Internet. One teacher said that instead of guiding students towards certain resources, s/he informed them that not all resources are equally reliable.

5. Why these resources?: Teachers said that they found encyclopedias, books and journals more reliable. Those who mentioned computers and the Internet said that they found print resources reliable but also thought that the Internet had the advantage of being up-to-date and practical.

6. What do you do to improve your students' IL skills?: We carry out small-scale research in the classroom. Using

classroom research, we discuss the use of information and the skills of self-expression. We teach library skills.

About teachers' own work:

1. What process do you follow in your own research studies?: I identify a problem and start the process. I gather data. I test and eliminate the data for suitability with the aim, validity and reliability. I try to reach the best resources.

2. What do you think about the necessity of being a good computer and Internet user for IL?: One teacher responded negatively to this question. Others said it was necessary to be a good computer and Internet user as this would allow them to easily reach a diverse body of information in a limited time.

3. What resources do you prefer in your studies?: Teachers said they themselves use the resources they suggest to their students, such as encyclopedias, books and journals. Differently from the students, all teachers said they were using the Internet. They said that they find print resources reliable and the Internet up-to-date and practical.

4. Do you think the research process is easy?: Half of the teachers said that the research process was a difficult process requiring a lot of time, energy and resources. Other teachers said it was an easy process as they possess the necessary skills.

5. Do you think the research process is enjoyable?: All teachers responded positively to this question and said that it gave them joy to reach a solution and to learn new things.

The responses show that the teachers adequately use and manage activities requiring IL skills.

RESULTS AND DISCUSSION

The present study aimed to determine teachers' information and computer literacy self-efficacy beliefs. Additionally, their information and computer self-efficacy beliefs and processes of planning and managing activities requiring IL skills were studied.

Results show that most teachers' self-efficacy for IL and CL are at a high level. This may be a sign that teachers have successful experiences of using IL skills. As has been mentioned before, perceiving a performance

as a success increases self-efficacy beliefs whereas perceiving it as a failure lowers it. It is primarily formed by the interpretation of the results of one's own actions, in other words one's own experiences [14-17].

The findings obtained from the interviews with participants may be regarded as corroborating evidence for this assumption. The teachers said in these interviews that they assign research tasks every week and they also assign projects and performance tasks occasionally. They believed that students gained the skills of reaching information, literature review, referencing, classifying. Showing through their responses that the teachers observe the necessities of IL processes in their own research. They referred to these processes as difficult but enjoyable.

These results may be interpreted to mean that teachers will continue to encourage students to use and improve their IL skills and plan increasingly more effective new environments and activities. As stated by Bandura, self-efficacy is a major determinant of coping with and adapting to a given system [11]. Efficacy beliefs determine the effort one will invest in an activity, their levels of perseverance and their potential for resilience in the face of difficulties.

Another result of the study has been that the IL self-efficacy beliefs of teachers with strong CL self-efficacy are significantly higher than those with moderate and low CL self-efficacy. This seems to corroborate Cole and Kelsey [7] view that CL is a prerequisite for IL. The interviews also show that teachers see the Internet as a practical and up-to-date source of information but not equally reliable. This may cause reservations in teachers about using computers or the Internet or guiding their students to do so, even though they may have a high level of self-efficacy.

CONCLUSIONS AND RECOMMENDATIONS

As has been mentioned above, the study has shown that most teachers' self-efficacy for IL and CL are at a high level and that the IL self-efficacy beliefs of teachers with strong CL self-efficacy are significantly higher than those with moderate and low CL self-efficacy. This finding implicates that IL and CL need to be treated together both in studies focusing on these two skills and in the process of teaching them to students.

Teachers find the process of research difficult but enjoyable; and blame the difficulty partially on a lack of IL skills. Therefore, studies centering on the identification and satisfaction of these lacks would be beneficial.

Although it is not statistically possible to generalize the findings of this specific study, data obtained from the participants give us important clues about teachers' self-efficacy levels. Based on our findings, it may be concluded that information literacy instruction should be programmed in relation with computer literacy instruction and measures should be taken to include computer and information literacy concerns in teacher education programs.

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