Prospective Teachers' Digital Empowerment and
Their Information Literacy Self-Efficacy

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Abstract

Problem Statement: Being digitally competent will influence the future of both individuals and societies. While it is an indispensable necessity for information societies in terms of individuals, it means the closure of digital divide for the societies. Digital empowerment impacts the competitive power of individuals in the business market, as well as their status and earning power. The sector of digital technology services will create employment for young people, increase production, export and "social belonging," and in this way, solutions can be found to solve important developmental problems. Educational institutions have a great responsibility in enabling individuals to acquire digital empowerment, i.e., acquisition of information literacy skills. One of the purposes of an education is to train individuals in accordance with the needs of the society. For that reason, at the present day educational systems are responsible for turning out individuals who have the attributes appropriate for the information age and who can meet the expectations of the information society.

Purpose of Study: The purpose of the study is to determine the prospective teachers' digital empowerment and their information literacy self-efficacy.

*Methods: D*escriptive survey research was designed to search prospective teachers' digital empowerment and their self-efficacy beliefs about information literacy. Digital empowerment scale and information literacy self-efficacy scale were conducted to 169 fourth grade prospective teachers at the elementary level.

Findings and Results: According to findings, it was seen that the prospective teachers' overall mean of self-efficacy beliefs about information literacy score was at the moderate level; however, prospective

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teachers presented higher self-efficacy beliefs for certain categories such as *defining the need for information, locating & accessing the resources, initiating the search strategy* and *communicating information*. Results also showed that prospective teachers' overall mean of digital empowerment score was *high*, which is quite satisfactory. Their digital empowerment scores related to categories for awareness, motivation and technical access were also high, but empowerment level was medium. The issue of high level of access to digital technologies found in this study is quite gladsome. Besides, further analysis was carried out to study the relationship between prospective teachers' self-efficacy beliefs about IL and their digital empowerment and found a moderate but significant positive relationship between prospective teachers' self-efficacy beliefs about IL and their digital empowerment.

Conclusion and Recommendations: Result showed that prospective teachers' self-efficacy beliefs on the *interpreting, synthesizing & using the information* and *evaluating the product and process* and their digital empowerment on the empowerment are not fully satisfactory. Based on our findings, it is recommended to develop and maintain information literacy and digital empowerment programs for prospective teachers. Which are vital for lifelong learning. Besides, government's policies should give big importance to diffusion of information literacy and digital empowerment in schools and in the society.

Keywords: digital empowerment, digital literacy, information literacy, self efficacy

Individuals, societies and workplaces are impacted by economic, social and technological developments. Changing work environments, faster and larger information flow, developing digital technologies and technology-based communications have converged in what is called a digital revolution. The changes in the economy, politics, culture and social living have uncovered the necessity for change in the existing social structure. Government policies give priority to how every individual in the society can get acquainted with new technologies and know how to use them effectively in the world turning into a more and more digital situation every passing day. Within the scope of these changes and discussions shaping these changes, being a "digital participant" is to enable digital technologies to be used in our daily life consciously. Digital technologies offer new social activities and new opportunities for individuals to take part in education and the workplace. However, new technologies must not be accepted passively, but must be questioned. It is of great importance for individuals to be educated as digital participants and to have the capacity to interpret the world around them actively in today's world where digital technologies are an indispensable part of our daily lives. Today, opportunities for accessing and learning technological skills vary according to geographical areas and socioeconomic conditions. These differences create an imbalance not only societal, but also regional; these variations in access and use of digital technologies lead to new economic and social divisions. Inequity experienced in

accessing digital technologies is expressed as the "digital divide." The digital divide is an obstacle to development and it needs to be eradicated. Nowadays, the concept of digital divide is replaced by usage divide (Uçkan, 2009). In other words, what gains importance is not the use of technology, but the way technology is used. Though the concept of usage divide is related to the concept of digital divide, it refers to a more comprehensive and profound difference. Dijk (2003) notes four factors (lack of digital experience, insufficient computer or network connection, lack of skill and insufficient possibility of the use) contributing to the usage divide. The need for individuals and institutions to acquire digital empowerment in conjunction with rapid change in digital technologies and the information explosion has come to the fore (Norris, 2001). To fully benefit from the power of digital technology, it is necessary to be digitally competent as well as comfortable. New technologies have made it compulsory for individuals to participate in the information society, acquiring new skills in order to express theirselves and take advantage of various opportunities. The concept of digital empowerment gains importance in the sense of both having digital skills and using them to their full potential.

Digital Empowerment

In this study, "empowerment" is used to express the concept of an individual's competence in both awareness of what is important and their ability to conduct those operations: to have control over their lives and environments. While empowerment is defined as the development of the information, skills and abilities that are necessary for individuals to control their own learning activities (Harvey, 2004), digital empowerment refers to the ability of an individual to use digital technologies effectively in order to develop life skills and strengthen his or her capacity within the information society (Makinen, 2006). However, use of digital technologies must not be conducted only in the dimensions of access and use. Individuals must understand why and how digital technologies are needed and how these technologies develop, in order to be digitally competent. Dijk (2003) and Makinen (2006) mention the four elements (awareness, motivation, technical access and empowerment) that enable individuals to achieve digital empowerment.

Increasing awareness is a process relating to the development of the individual in many fields. In the process of becoming aware, the individual must feel the experience relating to his feelings, wishes, dreams and behaviors occurring within him (Adams & Bond, 2000). When awareness is realized, new cognitive schemes take shape in the mind of the individual. Increasing the level of awareness about ideas and feelings that produce certain behaviors can be achieved through various methods. Raising the level of awareness refers to the enrichment of an individual's response to the situations he or she experiences; in other words, it refers to discovering different ways to negotiate his or her relations and life. As for the awareness within the scope of digital empowerment, it signifies understanding potential opportunities created by the use of new technologies such as the Internet. If people lack knowledge or do not understand

the choices that are available, they see no reason for implementing technology and making an investment in this field. Motivation is a crucial element in the **learning and developmental processes. Motivation refers to the individual's** behavior and effort as they relate to achieving a specific purpose, according to his/her own desire and/or will (Smithers & Walker, 2000). Motivation is an individual factor, but social environment has an important influence on this factor. The person must first believe that he or she can achieve a specific goal before making the decision to pursue that goal. Self-confidence can only be realized by the individual, though other people (friends, family et al.) can contribute to the process (Makinen, 2006). Awareness and motivation are more critical variables, as compared to technical access, **in terms of individuals' making** decisions for using or not using digital technologies. Technical access refers to hardware and software necessary for accessing the technological applications. On the other hand, as mentioned by Makinen (2006), if there is no imperative for use and there is no need or demand, having access to technology does not mean that it will be used. Empowerment is defined as special knowledge, skill and capability providing power to do something (Turkish Linguistic Society Dictionary, 2000). It points to the knowledge, skills and capabilities necessary for use of digital technologies. In addition, it includes digital literacy that is necessary to understand the messages of digital technologies. Individuals who possess these four elements can constructively participate in the information world where technology is dominant. This point is critical because these elements enable people to implement new technologies, design new tools and play a significant role in the development of their society (Makinen, 2006).

Many researchers conducted studies in the subject of the use of digital technologies in education and the development of technology using skills among individuals, and emphasized the importance of the subject (Groot, 2002; Thienmongkol & Polpinij, 2008; Ferri, Cavall, Costa, Mangiatordi, Mizzella, Pozzali, & Scenini, 2009; Goossens, Jefferies and Bullen; 2008). The importance of education in decreasing the digital divide by reaching large numbers of people, and training human resources – which is necessary for the information society – is by enabling the increase of individual empowerment cannot be denied. Digital technologies must be used to increase the quality of learning environments by students and teachers (Zhou, Burgoon, Zhang & Nunamaker, 2004). Digital technologies continue to develop rapidly. The information explosion is experienced, and individuals/institutions must acquire digital empowerment (Achuonye, 2004). Today, it is clear that those who are either denied access to or cannot use technology in an educational context will lose out – they will not be empowered. This can lead to backwardness, in both an economic and social context. Therefore, the necessary infrastructure must be put in place and technology usage must become an integral element of national educational strategy. Digital technologies must be used to support individual and social empowerment or to start an empowerment process in society. We can increase levels of empowerment by enabling communities to significantly participate in the information society by using digital technologies. This is a critical process;

young people are an important factor in the formation of a digital society. For instance, awareness in the matter of technical access for young people and in the need for increased motivation is necessary in order for these people to achieve competence in using digital technologies. Digital empowerment involves the skill set of using digital technologies as tools to access specifically needed information within vast quantities of available information, comprehending and evaluating that information and, also, producing information (Dijk, 2000). This brings about the concept of information literacy.

Information Literacy

Information literacy is about developing people's critical and creative abilities. Information literate individuals are well prepared for challenges and changes arise in their careers and personal lives (Breivik, Hannock & Senn,1998). Information literacy is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (ALA, 1989). Being information literate requires recognizing a need for information, know how to clearly define the information need, select the appropriate terminology that expresses the subject under investigation, formulate a search strategy that takes into consideration different sources of information, identify and locate appropriate information sources, know how to gain access to the information contained in those sources, analyze the data collected for value, relevancy, quality and suitability and subsequently turn information into knowledge (ALA, 1989; Doyle, 1994). Possessing information literacy skills is essential to be equipped for digital empowerment. Feeling confident and competent in using these skills is also necessary. Success is not only based on the possession of necessary skills, it also requires the confidence to use these skills effectively (Bandura, 1977). Bandura (1977) stated that learning certain skills is not enough, but that individuals should also develop confidence in the skills that they learn. According to Kurbanoglu, Akkoyunlu and Umay (2006) possessing information literacy skills, individuals (teachers) of today's societies must also feel competent and confident in the use of these skills. In other words, attainment of a high sense of self-efficacy beliefs is as important as possessing information literacy skills.

Self-Efficacy Belief

According to Bandura (1995), self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (p. 2). In other words, self-efficacy is a person's belief in his or her ability to succeed in a particular situation. Bandura described these beliefs as determinants of how people think, behave and feel (1993). Bandura (1992) stated that self-efficacy beliefs begin to form in early childhood as children deal with a wide variety of experiences, tasks, and situations. However, the growth of self-efficacy does not end during youth, but continues to evolve throughout life as people acquire new skills, experiences and understanding (Bandura, 1992). According to Bandura (1995; 1997), there are four major sources of self-efficacy. These are mastery experiences, social modeling, social persuasion and

psychological responses. Virtually all people can identify goals they want to accomplish, things they would like to change, and things they would like to achieve. However, most people also realize that putting these plans into action is not quite so simple. Bandura (1997) has found that an individual's self-efficacy plays a major role in how goals, tasks and challenges are approached. Self-efficacy beliefs influence human functioning and provide the foundation for human motivation, well-being and personal accomplishment. According to Bandura's (1995, 1997) theory, people with high self-efficacy – that is, those who believe they can perform well – are more likely to view difficult tasks as something to be mastered rather than something to be avoided. In other words, people tend to perform tasks and activities in which they feel competent and confident and avoid those in which they do not (Kear, 2000; Pajares, 1992). Self-efficacy beliefs also determine how much effort individuals will expand on an activity, how long they will persevere and how resilient they will be in the face of difficulties, and adverse situations. Self-efficacy is a critical determinant of self-regulation which is a key component of both information literacy and digital empowerment. Bandura (1995) underlines that people who develop a strong sense of self-efficacy are well equipped to educate themselves when they have to rely on their own initiative. If individuals feel themselves competent and confident about their information literacy skills they will easily become self-regulated learners and they will be willing to undertake digital empowerment activities.

The Importance of Digital Empowerment and Information Literacy Self-Efficacy Belief for Teachers

Given the range of learning needs people face daily, and the ever continuing expansion of available information, educational institutions can never directly meet all the learning needs of their graduates throughout their lifetimes, but they assume significant responsibility for ensuring that their graduates can learn outside of formal learning situations (Breivik, Hannock & Senn, 1998). They can assume significant responsibility for creating generations of independent learners by equipping their students with digital empowerment and the information literacy skills, and also helping them to improve their information literacy self-efficacy beliefs. Educational institutions have a great responsibility in enabling individuals to acquire digital empowerment, i.e., acquisition of information literacy and life-long learning skills. One of the purposes of an education is to train individuals in accordance with the needs of the society. For that reason, nowadays, educational systems are responsible for turning out individuals who have the attributes appropriate for the information age and who can meet the expectations of the information society. For digital empowerment to take place, each individual must be allowed to participate in the changes influencing their life, through using digital technologies, and they must be encouraged in this direction. Digital empowerment, for instance, can be realized when students increase their skills and knowledge, they learn how to share information, they form new information flows and they increase their interactions and participation in information channels. Individuals can have digital empowerment when they

are aware of and competent in the use of digital technologies, when they use the Internet, e-mail lists, Web 2.0 tools, online social networks, digital cameras and mobile phones as tools for accessing information, when they comprehend and evaluate the information they access and when they make contribution to information production (Norris, 2001; Garrison & Anderson, 2003).

People will only plan for consistent learning activities throughout their lives if they possess related skills and if they have strong self-efficacy beliefs for these skills. They will not want to continue to learn if they do not have the basic skills necessary and positive self-efficacy beliefs to be able to employ them effectively. They will not feel motivated to take part in learning and they will not want to invest time, effort and money for digital empowerment.

Schools must adjust curriculum and technological infrastructure in a way that can meet the expectations of the workplace. According to research conducted on the use of new mass media and technology by youth, technology must not only be used to increase information acquisition, but also to encourage students to be influential and reliable participants in our ever more digitalized world. All young people can be taught digital literacy and digital participation skills just in this way (Hague & Williamson, 2009). Besides, teachers must be prepared to "teach students to become critical thinkers, intellectually curious observers, creators, users of information and have digital empowerment." The goal is to prepare students early on to "learn how to learn" and carry these skills into other areas of their lives so that they can be independent seekers and consumers of information throughout their lives and use digital technologies effectively to access, evaluate and produce information. Teachers cannot prepare their students for the digital world and cannot equip them with digital empowerment skills, unless they themselves possess information literacy skills and digital empowerment. Consequently, information literacy skills and digital empowerment are among the key skills required for success in the digital world. Thus, teachers who undertake the responsibility of teaching and leading others should possess these skills. Besides possessing, developing a high sense of efficacy in these skills will also affect the success of their work performance.

The purpose of the study is to search the prospective teachers' digital empowerment and their information literacy self-efficacy in order to design learning environments for equipping prospective teachers with digital empowerment and information literacy skills.

To achieve the objective of this study, three research questions were formulated:

> a.   What is the strength of prospective teachers' self-efficacy beliefs about IL in general and for different aspects of IL?

> b.   What is the strength of prospective teachers' digital empowerment in general and for different aspects of digital empowerment?

> c.   Is there a relationship between the level of teachers' self-efficacy beliefs about IL and their digital empowerment?

Method

Research Design

The study adopted a descriptive survey research design to find out the prospective teachers' digital empowerment and their self-efficacy beliefs about IL and in general and in different aspects of IL.

Sample

The sample of this study was 169 fourth grade elementary level prospective teachers from Hacettepe University Faculty of Education. Of the participants, 20,7% (35) were from elementary mathematics education, 22,5% (38) were from early childhood education, 31,4% (53) were from elementary education and 25,4% (43) were from elementary science education departments.

Research Instruments

Digital empowerment scale and information literacy self-efficacy scale were conducted in Spring 2010 to collect necessary data. *The Digital Empowerment Scale* was developed by Akkoyunlu & Yılmaz Soylu (2010). The *Digital Empowerment Scale* (DES) consisted of 45 seven-point items. Statements on the digital empowerment scale (such as "Digital technologies help us conduct research"; "Digital technologies help us reach information in the needed subject via the Internet tools"; "Digital technologies enable us to express our ideas and opinions in online social networks"; "I like participating in online social networks in order to develop my critical thinking skills"; "I believe that I will be more successful in my life if I have digital empowerment"; "I actively participate in the classes where digital technologies are used"; "I use digital sources (database, CD, DVD, etc.) in the library" were classified in 4 main categories. Namely as follows: 1. Awareness; 2. Motivation; 3. Technical Access; and 4. Empowerment.

Generally, the overall DES score may range from 45–315. Meanwhile, the overall score for each dimension may range differently, such as awareness score may range from 9–63, motivation score may range from 10–70, technical access score may range from 10–70 and empowerment score may range from 16–112. The range and degree of digital empowerment as determined by its authors, Akkoyunlu & Yılmaz (2010) are summarized in Table 1.

Table 1
Degree of Digital Empowerment According to Total Score

	Total Score	Degree of Digital Empowerment
Overall of Digital Empowerment	45 - 135	Low
	136 – 225	Medium
	226 - 315	High
Awareness	9 – 27	Low
	28 – 46	Medium
	47 - 63	High
Motivation	10 – 30	Low
	31 – 50	Medium
	51 – 70	High
Technical Access	10 – 30	Low
	31 – 50	Medium
	51 – 70	High
Empowerment	16 – 47	Low
	48 – 80	Medium
	81 - 112	High

Each item was followed by responses in the form of a seven‑point Likert scale, ranging from 7= almost always true, 6= usually true, 5= often true, 4= occasionally true, 3= sometimes but infrequently true, 2= usually not true, 1= almost never true. As mentioned before, the 45 items were categorized into four sources of digital empowerment – awareness, motivation, technical access and empowerment. Mean and standard deviation were calculated for each of the four sources of digital empowerment.

The information literacy self-efficacy scale (ILSES) was developed by Kurbanoğlu, Akkoyunlu & Umay (2006). Participants were required to indicate their level of efficacy at each item on a 28 item with a seven-point Likert scale anchored with notations: 7=almost always true, 6=usually true, 5= often true, 4= occasionally true, 3=sometimes but infrequently true, 2=usually not true, 1=almost never true. For the evaluation a mean of 6.01 to 7.00 indicates almost always true; 5.01 to 6.00 indicates usually true; 4.01 to 5.00 indicates often true; 3.01 to 4.00 indicates occasionally true; 2.01 to 3.00 indicates sometimes but infrequently true; 1.01 to 2.00 indicates usually not true; and 0 to 1 indicates almost never true. The original ILSES's Cronbach alpha was 0.92.

Statements on the information literacy self-efficacy scale (such as I feel confident and competent "to define the information I need"; "to identify potential sources of information"; " to locate information sources in the library"; "to initiate search strategies by using keywords and Boolean logic"; or "to evaluate information sources") were classified in 7 main categories: 1. Defining the need for information; 2. Initiating the search strategy; 3. Locating and accessing the resources; 4. Assessing and comprehending the information; 5. Interpreting,

synthesizing and using the information; 6. Communicating the information; and 7. Evaluating the product and process.

Procedure for Data Collection

The scales were administered to prospective teachers in their selected courses. Copies of the instruments were given to prospective teachers in the courses after due permission had been granted by the course teachers. Data collection was completed within a period of one month.

Data Analysis

Three statistical procedures, run on data collected through the seven-point Likert scale, were used in data analysis: a) prospective teachers' digital empowerment and self-efficacy beliefs were analyzed by using descriptive statistics; b) correlation was used to find out if there is a relationship between mean scores of prospective teachers' digital empowerments and their self-efficacy beliefs about information literacy.

Findings and Results

The Overall Digital Empowerment

The overall mean of prospective teachers' digital empowerment score was 230.1, which indicates the *high* level on the scale and is quite satisfactory (see Table 2). In addition to this general evolution, the prospective teachers' digital empowerment was further examined in detail according to four major categories referred to earlier.

Digital Empowerment Categories

With regard to prospective teachers' digital empowerment scores related to categories varied between 51,26 and 72,98 (see Table 2), which indicate the *high* level for awareness, motivation, technical access and medium level for empowerment. The findings of this study have indicated a high level of prospective teachers' awareness and motivation of the empowering potentials of digital technologies. It is considered that such awareness is likely to empower prospective teachers to initiate actions to bridge the digital divide. As Makinen (2006) stated when the students were aware of the potentials of digital technologies, they were also motivated to become digitally empowered. The issue of high level of access to digital technologies found in this study is quite gladsome. High level of technical access would make students' awareness and motivation to become digitally empowered. The results showed a medium level of prospective teachers' empowerment. Such a finding means that participants suffer from a diminished digital empowerment. It is obvious that steps need to be taken to remedy this problem.

Table 2
Prospective Teachers' Mean Scores of Digital Empowerment in General and for Different Aspects of Digital Empowerment

	Aspects of Digital Empowerment	N	$\overline{x}$	Sd
1	Awareness		54,13	0,49
2	Motivation		51,26	1,16
3	Technical Access		51,72	1,46
4	Empowerment	169	72,98	0,61
	Overall		230,1	,490

In 1997, teacher training programmers in Turkey have been restructured. As a result of the restructuring efforts, curricula in teacher training programmes were redesigned and enriched with technology. Results showed that restructuring of the teacher training curriculum and giving big importance for using and integrating technologies into the curriculum contributed the prospective teachers' technology skills and motivated them to become digitally empowered.

The Overall Self–Efficacy Beliefs for Information Literacy

The overall mean of prospective teachers' self-efficacy beliefs about IL score was 5,68, which indicates the *usually true* level on the scale (see Table 3). In addition to this general evaluation, the prospective teachers' self-efficacy beliefs about IL were further examined in detail according to seven major categories referred to earlier.

Information Literacy Categories

When evaluated on the Likert scale, prospective teachers presented higher self-efficacy beliefs for certain categories such as *defining the need for information, locating & accessing the resources, initiating the search strategy, locating & accessing the resources* and *communicating information* indicating level *almost usually true.* In other words they perceive themselves as sufficient in performing the tasks related to information literacy.

Prospective teachers' self-efficacy beliefs about the *assessing & comprehending the information* was 5,45, which indicates the *usually true* level on the scale. However, *interpreting, synthesizing & using the information* and *evaluating the product and process* are the categories the level of which the teachers' self-efficacy beliefs were even weaker, indicating *often true level.* One conclusion that can be drawn from these results is that although the level and strength of the prospective teachers' self-efficacy beliefs generally reaches to the *almost usually true* on the scale, however, the results in higher order thinking skills such as *assessing & comprehending the information, interpreting, synthesizing* and *evaluating the product and process* are not satisfactory, especially when prospective teachers' future role as mentors is taken into account. In this respect, prospective teachers' perceived information literacy level would have strengthen through research homework and projects.

Table 3

Prospective Teachers' Mean Scores of Self-Efficacy Beliefs for Different Aspects of Information Literacy in General and for Different Aspects of IL

	Aspects of Information Literacy	N	$\overline{x}$	Sd
1	Defining the need for information		6,09	1,10
2	Initiating the search strategy		6,02	,316
3	Locating & accessing the resources		6,14	,371
4	Assessing & comprehending the information		5,45	,368
5	Interpreting, synthesizing and using the information	169	4,98	,375
6	Communicating information		6,13	,334
7	Evaluating the product and process		4,96	,337
	Overall		5,68	.222

Major principles of designing in teaching and learning environment in the information age has been dramatically changed. As a result of this, teachers are not any longer presenting ready information to their students on the contrary, they design learning environment according to individual needs of their students and workplace. Therefore, possessing information literacy skills as well as developing high self efficacy beliefs on information literacy has never been crucial as it is today. Attainment of experience in the field of information literacy could be gained through teacher training curricula. Information literacy could take place in teacher training curricula, and learning environments should be designed according to equip prospective teachers with information literacy skills.

Relationship Between Self-Efficacy Beliefs about IL and Digital Empowerment

Further analysis was carried out to study the relationship between prospective teachers' self-efficacy beliefs about IL and their digital empowerment (Table 4). The results in Table 4 show a significance level of $p < 0.05$ for the Pearson correlation between prospective teachers' self-efficacy beliefs about IL and their digital empowerment. The research found a moderate but significant positive relationship between prospective teachers' self-efficacy beliefs about IL and their digital empowerment, $r = 0.57$, $p < 0.01$.

Table 4
Pearson Correlations – Self-Efficacy Beliefs About IL and Digital Empowerment

(n = 169 for all cases)	*Digital Empowerment*
Self-Efficacy Beliefs about IL	0.57*

*Correlation is significant at 0.01 level (2 – tailed)

Possessing information literacy skills is essential to be equipped for digital empowerment. Feeling confident and competent in using these skills is also necessary. According to Bandura (1977), success is not only based on the possession of necessary skills, it also requires the confidence to use these skills effectively. In other words, learning certain skills is not enough; individuals should also develop confidence in the skills that they learn. Hence, besides possessing information literacy skills and digital empowerment, teachers of today's societies must also feel competent and confident in the use of these skills.

Conclusions and Suggestions

Although prospective teachers' self-efficacy beliefs on the *interpreting, synthesizing & using the information* and *evaluating the product and process* are not fully satisfactory, modification of teacher education and performance expectations to include specifically designed information literacy courses and how to integrate information literacy skills into learning and teaching processes should be taken into consideration. The results showed that prospective teachers' empowerment is also unsatisfactory. Prospective teachers' were not highly aware of the potentials of digital empowerment in daily life.

Teacher education programs should organize their programs and learning environment for equipping students with information literacy skills and digital empowerment. Therefore, they should consider digital technologies to help students become more aware and motivated for digital empowerment.

Although it is not statistically possible to generalize, the findings data obtained from the subjects gives us important clues about the self efficacy and digital empowerment levels of prospective teachers, which helps us on how to arrange effective teaching and learning environment for them. Based on our findings, it is recommended to develop and maintain information literacy and digital empowerment programs for prospective teachers. Informing prospective teachers about the importance of information literacy skills and digital empowerment prior to the instruction programs will affect the overall success.

Diffusion of information literacy and digital empowerment in schools and in the society should be taken into government's development policies. The only way of creating an information literate society and digital empowerment are to

train teachers who posses both information literacy skills, high level of efficacy believes and digital empowerment for these skills and support their training by the governmental policies. Undoubtly, realization of these aims will require time, patience, funding and cooperation among education specialists, librarians and government authorities.

Limitations

As evaluations of the prospective teachers' digital empowerment and their information literacy self-efficacy are a relatively new field, a discussion of the limitations of this study deserves examination. One of the limitations of this study was that results belong to a faculty-wide research; therefore, results cannot be generalized.

The other limitation was the lecturers' digital empowerment and their information literacy self-efficacy was not measured in the study. Therefore, it was impossible to determine how the lecturers' digital empowerment and their information literacy self-efficacy effected to the students' digital empowerment and their information literacy self-efficacy. A longitudinal study is being planned to evaluate the students' digital empowerment and their information literacy self-efficacy with an inclusion of an analysis of lecturers.

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Öğretmen Adaylarının Sayısal Yetkinlik ve Bilgi Okuryazarlık Algıları Üzerine Bir Çalışma
(Özet)

Problem Durumu

Günümüzde, teknolojiye erişim olanakları ve kullanma becerilerine sahip kullanıcı sayısı değişik coğrafi alanlarda sosyo - ekonomik koşullar bakımından farklılık göstermektedir. Bu farklılıklar ise toplumdaki bölgeler ya da toplumlar arasında dengesizlik yaratmaktadır. Bilgi ve iletişim teknolojilerinin ve özellikle Internet'in iş yaşamında hızla yaygınlaşması, hem kişisel gelişim hem de yapılan işin geliştirilebilmesi için bu teknolojilerin kullanımını kaçınılmaz kılmaktadır. Bilgi teknolojilerinin erişim ve kullanımındaki farklılıklar yeni bir ekonomik ve sosyal bölünmeye yol açmıştır.

Dünya'da genel anlamda sayısal teknolojilerin yeni teknolojiler ile hızlı bir şekilde gelişmeye devam ettiği kabul edilmektedir. Yaşanan bilgi patlaması karşısında bireylerin ve kurumların daha büyük oranda sayısal yetkinlik kazanmasının gündeme gelmesiyle sayısal olarak yetkin ve uyumlu hale gelmek, sayısal teknolojilerin potansiyellerinden en iyi şekilde faydalanmak gerekmektedir. BİT (Bilgi ve İletişim Teknolojileri), bireylerin bilgi toplumunda katılımcı olmalarına, kendilerini ifade etmek için yeni beceriler edinmelerine olanak sağlamıştır. Bilgi toplumunun koşulları sürekli öğrenme, becerilerin ve bilgilerin güncellenmesi ve yeni teknolojiler ile başa çıkabilme yeteneğini gerektirmektedir. Ancak, bunun gerçekleşmesi, sadece sayısal olanaklara sahip olup kullanma ile değil, bunun için yetkinliğe sahip olma ile mümkündür. Yetkinlik sözcüğü burada bireylerin kendileri için önemli olan şeyleri yapmalarına olanak tanıyan; yaşamları ve çevreleri üzerinde kontrol sahibi olarak yetişmelerini sağlayan - mümkün kılma anlamında kullanılmaktadır. Sayısal yetkinlik bir tür mümkün kılma sürecidir. Bu süreç ön koşullardan beceri ve bilgideki gelişmelere ve oradan da topluluk ve üyeleri için yetkinlik seviyesini ifade eden sonuçlara götüren bir sarmal gibi işlemektedir. Bu süreçte ortaya çıkan değişiklikler sadece tek taraflı gelişmeler değil, birbirini yansıtan ve etkileyen gelişmelerdir. Sayısal yetkinlik sarmalı dinamik ve değişken bir süreçtir çünkü toplumdaki değişikliklere göre şekil almaktadır.

Sayısal bir toplum oluşturulmasında kritik bir süreç olarak gençlere büyük önem verilmektedir. Örneğin üniversitelerde, gençlerin teknik erişim konusunda

farkındalık yaratılması, motivasyonlarının artırılması ve sayısal bilgi ve iletişim teknolojilerinin kullanımında yeterli olmaları beklenmektedir.

Sayısal yetkinlik yaşam boyu öğrenme için de bir basamak oluşturmaktadır. Sayısal yetkinlik kavramı, sayısal okuryazarlık, bilgi okur yazarlığı ve yaşam boyu öğrenme kavramlarını da içeren bir sarmala benzetilebilir. Yaşam boyu öğrenme, bireylerin yaşam sürelerince içinde bulunacakları her türlü rol, ortam ve çevre için gereksinim duyacakları tüm bilgi, değer ve becerileri sağlamalarına olanak tanıyan bir süreçtir. Bilgi okuryazarlığı, bilgi problemlerini çözme becerisidir. Bilgi okuryazarları, bilginin nasıl düzenlendiğini, almaları gereken kararlar ve yaptıkları işler için gereksinim duydukları bilgiyi nasıl bulacaklarını ve nasıl kullanacaklarını, dolayısıyla nasıl öğreneceklerini bilirler.

Sayısal yetkinlik dinamik ve değişken bir süreçtir ve toplumdaki değişikliklere göre şekil almaktadır. Bireylere bilgi okuryazarlığı, yaşam boyu öğrenme becerilerinin kazandırılması gibi sayısal yetkinlik kazandırmada da eğitim kurumlarına büyük sorumluluklar düşmektedir. Eğitimin amaçlarından biri de, bireyleri toplumun gereksinmeleri doğrultusunda yetiştirmektir. Bu nedenle, eğitim sistemleri günümüzde bilgi çağına uygun, bilgi toplumunun beklentilerini karşılayacak özellikler taşıyan bireyler yetiştirmekle yükümlüdür. Konunun önemi ve eğitim kurumlarının sorumlulukları dikkate alındığında öğretmenlerin söz konusu becerilere başka bir deyişle, bilgi okuryazarı olmaları, sayısal yetkinlik becerilerine sahip olmaları oldukça önemlidir. Öğretmenlerin ve öğretmen adaylarının hem kendi kendilerini geliştirmek hem de öğrencilerini yönlendirebilmek için bu iki alanda bilgi ve beceri sahibi olmaları gerekmektedir. Ayrıca başarılı uygulamalar geliştirebilmeleri için söz konusu alanlarda bilgi ve becerinin yanı sıra, özyeterlik algılarının da gelişmiş olması gerekmektedir. Öz-yeterlik algısı, kişinin bir işi yapmak için gerekli becerilere sahip olduğu konusundaki inancıdır. Günümüzde bireylerin, bilgi problemi çözme etkinliklerini başarıyla yürütebilmeleri; kendi kendisini yönlendiren, motive eden, yaşam boyu öğrenebilen bireyler haline gelebilmeleri için bilgi becerileri konusunda pozitif bir öz-yeterlik algısı geliştirmeleri gerekmektedir.

Araştırmanın Amacı

Çalışmanın amacı öğretmen adaylarının sayısal yetkinlik ve bilgi okuryazarlığı öz yeterliklerini belirlemektir

Araştırmanın Yöntemi

Öğretmen adaylarının sayısal yetkinlik ve bilgi okuryazarlığı öz yeterliklerini belirlemek amacıyla betimsel araştırma tasarlanmıştır. İlköğretim bölümünde okuyan 169 öğretmen adayına sayısal yetkinlik ve bilgi okuryazarlık özyeterlik ölçeği uygulanmıştır.

Araştırmanın Bulguları

Elde edilen bulgulara göre öğretmen adaylarının genel bilgi okuryazarlığı özyeterlik inancı orta düzeyde iken, "bilgi ihtiyacının belirlenmesi", "bilgi kaynaklarına ulaşma", "araştırma stratejilerini başlatma" gibi alt basamaklarda yüksek düzeydedir. Elde edilen sonuçlar, öğretmen adaylarının genel sayısal yetkinlik düzeylerinin de yüksek olduğunu göstermektedir. Ayrıca öğretmen

adaylarının, sayısal yetkinliğin alt basamaklarından farkındalık, motivasyon ve teknik erişim düzeylerinde de yetkinlikleri yüksektir. Ancak, yetkinlik alt basamağında ise orta düzeydedir. Bilgi okuryazarlığı özyeterlik inancı ile sayısal yetkinlik arasındaki ilişki düzeyinin 0.57 olduğu görülmüştür. Bu pozitif ve oldukça yüksek bir ilişkidir.

Araştırmanın Sonuçları ve Öneriler

Araştırma sonuçlarına dayalı olarak, öğretme yetiştiren kurumların programlarının ve öğrenme ortamlarının, öğretmen adaylarına bilgi okuryazarlığı ve sayısal yetkinlik becerilerini kazandıracak şekilde düzenlenmesi önerilmektedir. Bunun yanı sıra, hükümet politikalarının da okullarda ve toplumda bilgi okuryazarlığı ve sayısal yetkinliğin yaygınlaştırılmasına yer vermesi zorunludur.