

## Internet (Information/Skill) Literacy in Iran

Saied Reza Ameli\*  
Ebrahim Mohseni Ahooei

(Received 17 April 2018; accepted 28 June 2018)

### Abstract

This study examines the associations of internet information literacy with two variables: (1) the ability to work with technical aspects of the internet (internet skill), and (2) attitudes about the need for qualitative necessities in the development of e-services. A hierarchical regressions software analyzes data from a national sample of 2134 internet users. In this paper, internet literacy is considered as a literacy which has two-dimensional aspects including information literacy and skill literacy. In an articulation as this, many of the capabilities associated with the internet such as technical, critical, analytical, and structural factors are studied. In addition, abilities that lead users to make distinctions between useful, safe and healthy data and fake, hateful and unhealthy data are taken into account. The analysis shows that the internet information literacy is positively related to internet skills. It is also shown that more internet information literacy leads to more demands for e-services' qualitative necessities (in the eight indicators of cheapness, availability, usability, quickness, security, integrity, reliability, and transparency). Furthermore, some sociodemographic characteristics (i.e. age, gender, education, income, and place of residence) are explicitly associated with internet skills. Strategy suggestions are concluded for policy making in the respective fields.

**Keywords:** e-service, internet information literacy, internet skill.

**Saied Reza Ameli:** (Corresponding author) Professor, Media and Communications, Faculty of Social Sciences, University of Tehran, Tehran, Iran- Email: [ssameli@ut.ac.ir](mailto:ssameli@ut.ac.ir)

**Ebrahim Mohseni Ahooei:** PhD Student, Department of Communication, University of Vienna, Vienna, Austria and Senior Researcher, Cyberspace Research Policy Center, University of Tehran, Tehran, Iran- Email: [emohseni@ut.ac.ir](mailto:emohseni@ut.ac.ir)

## Introduction

With emphasis on the distinction between internet information literacy and internet skills, the purpose of this study is to assess the associations between these two separate literacies and examine the role of internet information literacy in the demands on e-service development.

Theoretically, the popularization of internet literacy can result in more capabilities to benefit public from the virtual space. But, decreasing the notion of literacy to skill-based capacities neglects the importance of the interpretive, formative, and unadventurous perceptions of information, contents, processes, and interactions on the internet. The distinction between internet information literacy (which is related to information, contents, processes, and communications) and internet skill literacy (which refers to a person's potential ability to work with tools and technologies) is a way to offset unilateral approaches to internet literacy.

The difference between internet information literacy and internet skill was ambiguous in earlier studies (Aufderheide, 1993; Livingstone, 2004; Banta & Mzumara, 2004; Buckingham, 2007; Farmer & Henri, 2008; Potter, 2010), but in recent studies this significant distinction becomes more prominent (van Deursen & van Dijk, 2011; Julien, 2014; Kim & Yang, 2016).

In addition to the vital importance of internet information literacy and its difference from internet skills, the relation between these two kinds of literacy is important as well. Furthermore, if internet information literacy is about critical and effective understanding (Buckingham, 2007) and evaluating of the internet (Banta & Mzumara, 2004), so is the effect of internet information literacy development on public demands for enhancing qualitative necessities of e-service is in question.

This paper begins with an inspection of the discussions on internet literacy, internet information literacy, and internet skills literacy reviews prior studies and research hypotheses. Then, the study analyzes the internet information literacy in relation to internet skills and attitudes about the e-service development.

## Internet (information/skill) literacy: Definitions and Classifications

Many definitions of internet literacy and related literacies, such as ICT, digital, or cyber literacy have been conferred. One of the most extensive definitions (Julien, 2014) identifies internet literacy as knowledge, skills, and behaviors that are widely applied in the application of digital devices. The definition takes into account three different and essential characteristics of internet literacy. In his definition, knowledge refers to

information, skills refer to the potentials for working with devices, and behavior is about the actual operations.

Also, there are many other definitions around the concept of “ability”. All of such definitions agree with each other in terms of capabilities in the form of abilities such as the ability to access, ability to assess, ability to investigate, ability to create, ability to understand, or ability to produce. Farmer and Henri (2008) referred to other abilities, including the ability to find, manage, use, and assess. Their seven-dimension classification has divided internet literacy to tool literacy, resource literacy, social structural literacy, research literacy, publishing literacy, emergent technology literacy, and critical literacy. Buckingham (2006) also added to this list of abilities, critical and creative ability, including the ability to read critically, creative production, and critical perception, and Banta and Mzumara (2004) have focused on the knowledge of the evaluation and interpretation of internet literacy.

Although in all these definitions and classifications, internet literacy means both the knowledge for understanding something and skills for doing them, but it was van Deursen and van Dijk (2011) who conceptualized two components of internet information literacy and skills. Internet skills refer essentially to the collection of essential skills expected to use online technologies and internet literacy is related to the ability to sift through information to realize genuine requirements by searching, collecting, recognizing and assessing content (Kim & Yang, 2016). van Deursen and van Dijk (2011) divided internet skills into four categories: operational, formal, information and strategic. Then, they integrated these four categories into a group including formal and operational skills and a content-related group including information and strategic skills.

Maybe the last definition presented by PC Encyclopedia (2016) is closer to today’s reality of internet literacy which defines it as the knowledge necessary to take advantage of the digital age. To take the advantage of the digital age, both knowledge and skills are necessary. In a general sense, the advantage here means a position regarding the development, effects and social relations bound in technology.

The education or training of both internet information literacy and skill is not limited to academia, but the international community is the target of these types of literacy. As scholars mentioned, the scope of these types of literacy are both the ability to work with technologies and tools and, the development of analytical and critical understanding about the issues like security, privacy, rights, property, etc. Acquisti, John, and Loewenstein’s (2013) survey in the field of behavioral economics, as an

example, has proved that people leave their privacy rights to gain a small short-term benefit. Such a warning, shows the needs for learning internet information literacy alongside expanding and updating internet skills.

As mentioned, while in the early studies on internet literacy (Livingstone, 2004; Banta & Mzumara, 2004; Buckingham, 2007; Farmer & Henri, 2008) the difference between internet information literacy and internet skills was unclear, in recent studies this distinction has become clearer (van Deursen & van Dijk, 2011; Julien, 2014; Kim & Yang, 2016). Focus on the concept of advantage in the definition of PC Encyclopedia (2016) can explain the recent efforts to emphasize the distinction between internet information literacy and internet skills. The old readings of internet literacy, suggest critical perspectives about the role of people in expanding their skills in the course of developing the advantages of fundamental financial organizations which benefits from the internet ability and skills of people in the form of social networks and platforms. Such a situation suggests that internet skills without internet information literacy can jeopardize the advantages of the people. In fact, in contrast to early viewpoints, as Hinrichsen and Coombs (2014) mentioned, internet literacy reveal complexity, variation, and disputation. So, we need to return to Internet information literacy and internet skill as a new field of domination and submission.

With the distinction between internet information literacy and internetskillliteracy, Kim and Yang (2016) found that internet information literacy and not internet skills literacy is related to civic engagement. It shows internet information literacy or internet literacy in short, is more related to critical and analytical thinking required for civic engagement as a social-political knowledge-based activity. Also, it is proved people with higher level of internet information literacy and not internet skills, have an effective control over their personal information online (Park et al., 2011). Here again, we can see the importance of internet information literacy as a requirement for the critical understanding of issues like privacy and rights which are directly related to individuals advantages.

Due to the new critical importance of internet information literacy and its different areas of effect, is there the correlation between internet information literacy and internet skills? Also, is internet information literacy effective on individuals' attitudes on the requirements for internet service provision? In other words, does internet information literacy associated with public demand for the development of the quality requirements of e-services as a civic engagement?

Using these definitions and classifications of internet information literacy and internet skills, this article examines whether internet

information literacy is related to internet skills and general demand and attitudes about enhancing the quality of e-services.

## Hypotheses

This study examines the effect of internet information literacy on internet skills and attitudes about the e-services quality development criteria. The effect of sociodemographic characteristics are also taken into account. Three hypotheses were developed regarding these three sets of data.

At macro level, the function of knowledge, has a specific literacy impact on the related skill and attitude. Studies (Hargittai, 2004; Kwak, 1999; Neuman, 1991) considered the different impacts of literacy to analyze the individual skill.

*Hypothesis 1 (H1): Internet information literacy will be positively associated with the level of internet skills.*

In addition, based on Bennett (2008), and Flanagan and Levine (2010), the promotion of internet information literacy will be effective in encouraging engaged people. More engagement is expected to lead to higher quality of online services.

*Hypothesis 2 (H2): Users with higher level of internet information literacy are more likely to have positive attitudes about developing e-services qualitative necessities than those with lower level of literacy.*

The differences in sociodemographic status may be associated with internet skills. Many studies designated the role of the sociodemographic and socioeconomic situation to generate several levels of internet skills (for example see Hargittai, 2002, 2004; DiMaggio et al., 2001; Loges & Jung, 2001; Castells, 1996).

*Hypothesis 3 (H3): There are meaningful associations between the socio-demographic situation of users and their internet knowledge.*

*Hypothesis 3a (H3a): Age is positively associated with the level of internet knowledge.*

*Hypothesis 3b (H3b): Gender (male: higher) is directly associated with the level of internet knowledge.*

*Hypothesis 3c (H3c): Educational level is negatively associated with the level of internet knowledge.*

*Hypothesis 3d (H3d): Income is positively associated with the level of internet knowledge.*

*Hypothesis 3e (H3e): Place of residence (big cities: higher) is also positively associated with the level of internet knowledge.*

## Methodology

### *Sample and procedures*

This study examines a national sample of 2134 adult internet users (aged 15 and above) in May 2015. The sample is selected from all 31 provinces in Iran and the random cluster sampling was used to ensure the demographic characteristics are not different from those of the national internet user population. The survey participants in all clusters were selected randomly. Table 1 presents the descriptive statistics of the sociodemographic characteristics of the respondents in comparison to that of the national internet users produced by the National Internet Development Management Center (NIDMC) 2013.

*Table 1. Sociodemographic characteristics of participants*

|           | CRPC 2015 N=2134 |      | NIDMC 2013 N=57m |      |
|-----------|------------------|------|------------------|------|
|           | M                | SD   | M                | SD   |
| Gender    | 1.63             | 1.74 | 1.66             | 1.75 |
| Education | 2.71             | 1.68 | 2.68             | 1.68 |
| Age       | 2.12             | 1.74 | 2.13             | 1.78 |

Note: CRPC: Cyberspace Research Policy Center. NIDMC: National Internet Development Management Center. For gender, female was coded as 1 and male as 2. Education and age in CRPC survey were measured in 8 categories/ age groups. We recoded both of them to 3 categories to match NIDMC poll 2013.

The mean level of gender and age was slightly lower and the mean level of education was somewhat higher in CRPC survey sample. The time dissimilation between the CRPC survey and NIDMC poll may have been caused by these differences. These differences should be considered when making generalizations about the results.

The administration of the survey took place between March 01 and May 23, 2015. The process was conducted by the Cyberspace Research Policy Center (CRPC) at the University of Tehran. The survey was signed by a group of trained researchers who asked participants and filled the printed version of questionnaires. All data analyses were conducted using the Statistical Package for the Social Sciences Version 23. The analysis conducted by presenting mean and standard deviation as descriptive data of overall grades of variables. Then a series of hierarchical regressions tested the hypotheses. Age, gender, education, income, and place of residence located in the first block, internet information literacy in the second block. Internet skills and e-services necessities were examined as dependent variables.

## **Measurements**

**Internet information literacy.** The questionnaire asked the respondents to self-assess their internet information literacy on a 5-point rated Likert scale (1= very low, 5= very high). The five part questions related to internet information literacy were designed according to the variables used by van Deursen & van Dijk (2011). The following four criteria were used: content familiarity, interaction (with/ through the internet) familiarity, technical familiarity, and security and privacy policy and law familiarity.

**Internet skills.** The level of internet skills were measured based on Schumacher and Martin (2001), Ford and Chen (2000), van Deursen and van Dijk (2011) criteria. The 5-point rated Likert scale was used here again. The participants ranked their skills in eleven areas: registering and completing online forms, searching and finding intended URLs, connecting to the internet and online platforms, conducting online transactions, using general and administrative online software, setting up and managing online communication tools like social networks, installing internet software, installing internet hardware, applying hard and/or soft security settings, applying privacy settings on online devices, platforms, and software, and launching a website.

**E-services necessities.** Based on Santos (2003), Cristobal, Flavián and Guinalú (2007), and Papadomichelaki & Mentzas (2012), there was also a group of 8 criteria to examine the attitudes of participants about the necessity of developing e-services. These variables were measured on a 5-point rated Likert scale (1= Not necessary, 5= High necessary). The following criteria were used cheapness, availability, usability, quickness, security, integrity, reliability, and transparency.

**Sociodemographic characteristics.** This study also aimed to examine the potential effects of sociodemographic characteristics on internet skills as they have traditionally been considered influential skills. Five sociodemographic variables (age, gender, education, income, and place of residence) were examined.

## **Results**

### ***Identifying the overall trends***

Table 2 shows the different levels of knowledge on four areas of internet information literacy. The overall result of internet information literacy from the average data in these four areas show a moderate level of internet information literacy (M=3.13, SD= 1.9). Specifically, the results show a significant user familiarity with online content (M=3.59, SD=1.34). The users were also familiar with interaction with or through the internet (M= 3.37, SD = 1.34). In fact, 51.6% of users gained high or very high on this issue.



Table 2. Descriptive statistics of internet information literacy

| Internet information literacy                        | N    | Min. | Max. | M    | SD   |
|--|------|------|------|------|------|
| Content familiarity                                  | 2134 | 1    | 5    | 3.59 | 1.34 |
| Interaction (with/ through the Internet) Familiarity | 2134 | 1    | 5    | 3.37 | 1.34 |
| Technical familiarity                                | 2134 | 1    | 5    | 3.10 | 1.30 |
| Security and privacy policy and law Familiarity      | 2134 | 1    | 5    | 2.57 | 1.10 |

The technical familiarity ( $M=3.10$ ,  $SD=1.30$ ), and familiarity with security and privacy policy and law ( $M=2.57$ ,  $SD=1.10$ ) are two areas with low levels of ranking. Just 19.1% of users show a high or very high familiarity with issues of security and privacy policy and law.

Table 3 shows the different levels of skills on the eleven areas. The overall average of inputted data for these areas show a moderate level of user skill ( $M=3.15$ ,  $SD=1.11$ ), relatively higher than the overall level of internet information literacy. In particular, these results show significant user skill on registering and completing online forms ( $M=3.65$ ,  $SD=1.32$ ), searching and finding intended URLs ( $M=3.56$ ,  $SD=1.35$ ), connecting to the internet and online platforms ( $M=3.37$ ,  $SD=1.22$ ), conducting online transactions ( $M=3.33$ ,  $SD=1.30$ ), using general and administrative online software ( $M=3.30$ ,  $SD=1.37$ ), setting up and managing online communication tools like social networks ( $M=3.20$ ,  $SD=1.42$ ), and installing internet software ( $M=3.16$ ,  $SD=1.29$ ).

Table 3. Descriptive statistics of internet skills

| Internet skills                                    | M    | SD   |
|--|------|------|
| Registering and completing online forms            | 3.65 | 1.32 |
| Searching and finding intended URLs                | 3.56 | 1.35 |
| Connecting to the internet and online platforms    | 3.37 | 1.22 |
| Conducting online transactions                     | 3.33 | 1.30 |
| Using general and administrative online software   | 3.30 | 1.37 |
| Setting up and managing online communication tools | 3.20 | 1.42 |
| Installing internet software                       | 3.16 | 1.29 |
| Installing internet hardware                       | 2.76 | 1.23 |
| Applying the hard and/or soft security settings    | 2.71 | 1.25 |
| Applying privacy settings on online devices        | 2.66 | 1.27 |
| Launching a website                                | 2.64 | 1.31 |

Note: For all variables  $N = 2134$ ,  $Min.=1$ , and  $Max.=5$ .



Users showed the minimum skill levels in four areas of hardware, security, privacy, and programming issues. Installing internet hardware ( $M=2.76$ ,  $SD=1.23$ ), applying hard and/or soft security settings ( $M=2.71$ ,  $SD=1.25$ ), applying privacy settings on online devices, platforms, and software ( $M=2.66$ ,  $SD=1.27$ ), and launching a website ( $M=2.64$ ,  $SD=1.31$ ) showed significant lower skill levels in users. The high or very high skilled users in these four issues were respectively 28.2%, 17.1%, 15.8%, and 17%.

Table 4 shows the attitudes about eight criteria on e-services necessities. The overall average of inputted data for these eleven areas show a relatively significant positive attitude about e-services necessities ( $M=4.42$ ,  $SD=0.85$ ). The participants show a positive view on the qualitative criteria of online services which are the development requirements of e-services at a national level.

Table 4. Descriptive statistics of e-services necessities

| E-service necessities | N    | Min | Max | M    | SD   |
|-----------------------|------|-----|-----|------|------|
| Reliability           | 2134 | 1   | 5   | 4.61 | 0.76 |
| Quickness             | 2134 | 1   | 5   | 4.59 | 0.75 |
| Security              | 2134 | 1   | 5   | 4.59 | 0.78 |
| Transparency          | 2134 | 1   | 5   | 4.58 | 0.75 |
| Usability             | 2134 | 1   | 5   | 4.52 | 0.75 |
| Availability          | 2134 | 1   | 5   | 4.45 | 0.83 |
| Cheapness             | 2134 | 1   | 5   | 4.29 | 0.94 |
| Integrity             | 2134 | 1   | 5   | 3.80 | 1.23 |

## Hierarchical regression analysis

### *Internet skills*

To understand the effects of internet information literacy and sociodemographic characteristics on internet skills, we conducted regressions. Table 5 shows the result of this analysis.

To examine Hypothesis 1 (the positive associations between internet information literacy and the level of internet skills), the average of overall items of internet skill were analyzed. As expected, there is a significant relationship between the respondents' internet information literacy and the level of internet skills. The participants' technical familiarity ( $\beta=0.34$ ), interaction with/ through internet familiarity ( $\beta=0.26$ ), and security and privacy policy and law familiarity ( $\beta=0.24$ ) were the strongest predictors of their internet skills. The participants'

content familiarity ( $\beta=0.11$ ) showed some statistical significance too. So the level of internet information literacy increased as the participants' level of internet information literacy increased.

Table 5. Hierarchical regression analysis of internet skill

|   | Internet skills |          |
|---|-----------------|----------|
|   | $\beta$         | <i>P</i> |
| <i>Sociodemographic Characteristics</i>         |                 |          |
| Age   | -0.12           | -0.13    |
| Gender  | 0.07            | 0.09     |
| Education                                       | 0.23            | 0.27     |
| Income  | -0.01           | -0.02    |
| Place of residence                              | 0.01            | 0.03     |
| <i>Internet information literacy</i>            |                 |          |
| Technical familiarity                           | 0.34            | 0.46     |
| Content familiarity                             | 0.11            | 0.20     |
| Interaction with/ through internet familiarity  | 0.26            | 0.39     |
| Security and privacy policy and law familiarity | 0.24            | 0.42     |

Note. Regression coefficients are standardized. Cell entries are final-entry ordinary least squares (OLS) standardized coefficients. Multi-collinearity was checked.

Some sociodemographic characteristics were related to the participants' level of internet skills. The level of participants' education ( $\beta=0.23$ ) was positively related to their level of internet skills. Age also showed some statistical significance in relation to internet skills. The direction of the coefficients of age and income were negative, indicating age ( $\beta=-0.12$ ) and income ( $\beta=-0.01$ ) decreased the participants' internet skills, but the effect of income seems unimportant.

It seems that the internet information literacy and not sociodemographic characteristics have significant effects on the participants' levels of internet skills. The participants' technical familiarity, interaction with/ through internet familiarity, and security and privacy policy and law familiarity also mattered in relation to their internet skills.

### ***E-services necessities***

The second set of analyses focused on the relationship between internet information literacy and attitudes about the necessities of e-services development. Table 6 shows the results.

Table 6. Hierarchical regression analysis of e-service necessities

|   | <i>Sociodemographic characteristics</i> |                     |                  |                  |                 |                  |                    |                     |         |
|---|---|---------------------|------------------|------------------|-----------------|------------------|--------------------|---------------------|---------|
|   | <i>Cheapsness</i>                       | <i>Availability</i> | <i>Usability</i> | <i>Quickness</i> | <i>Security</i> | <i>Integrity</i> | <i>Reliability</i> | <i>Transparency</i> |         |
|   | $\beta$                                 | $P$                 | $\beta$          | $P$              | $\beta$         | $P$              | $\beta$            | $P$                 | $\beta$ |
| Age   | 0.09                                    |                     | 0.08             |                  | 0.06            |                  | 0.10               |                     | 0.13    |
| Gender  | -0.06                                   |                     | -0.07            |                  | -0.09           |                  | -0.09              |                     | -0.06   |
| Education   | 0.08                                    |                     | 0.07             |                  | 0.17            |                  | 0.28               |                     | 0.38    |
| Income  | -0.15                                   |                     | -0.16            |                  | -0.06           |                  | -0.14              |                     | -0.07   |
| Place of residence                                    | -0.07                                   |                     | -0.08            |                  | 0.05            |                  | -0.05              |                     | 0.01    |
| <i>Internet information literacy</i>                  |   |                     |                  |                  |                 |                  |                    |                     |         |
| Technical familiarity                                 | 0.10                                    |                     | 0.07             |                  | 0.07            |                  | 0.07               |                     | 0.04    |
| Content familiarity                                   | -0.08                                   |                     | -0.06            |                  | 0.10            |                  | 0.09               |                     | 0.04    |
| Interaction with/<br>through Internet<br>familiarity  | 0.23                                    |                     | 0.10             |                  | 0.07            |                  | 0.32               |                     | 0.27    |
| Security and privacy<br>policy and law<br>familiarity | 0.11                                    |                     | 0.07             |                  | 0.14            |                  | 0.17               |                     | 0.15    |

Note: Regression coefficients are standardized. Cell entries are final-entry ordinary least squares (OLS) standardized coefficients. Multi-collinearity was checked.

To examine Hypothesis 2 (the positive associations between internet information literacy and attitudes about the necessities of e-services development), we conducted regressions for each variable of the nine e-services necessities. In four internet information literacy areas, technical familiarity was the only significant area in relation to integrity ( $\beta=0.27$ ) indicating technical familiarity increased the participants' view about the necessity of integrity in e-services development. Content familiarity was also significant in relation to usability ( $\beta=0.21$ ), integrity ( $\beta=0.22$ ), and transparency ( $\beta=0.28$ ).

Interaction with/ through internet familiarity had the most powerful and meaningful influence on the participants' attitudes about all e-services necessities. It was significant in relation to cheapness ( $\beta=0.23$ ), availability ( $\beta=0.28$ ), usability ( $\beta=0.13$ ), quickness ( $\beta=0.32$ ), security ( $\beta=0.35$ ), integrity ( $\beta=0.15$ ), reliability ( $\beta=0.34$ ), and transparency ( $\beta=0.15$ ).

Security and privacy policy and law familiarity also had a meaningful effect on e-services necessities. However, the effects were less significant to that of interaction with/ through internet familiarity criterion. Security and privacy policy and law familiarity was significant in relation to cheapness ( $\beta=0.11$ ), availability ( $\beta=0.14$ ), usability ( $\beta=0.13$ ), quickness ( $\beta=0.28$ ), security ( $\beta=0.26$ ), integrity ( $\beta=0.20$ ), reliability ( $\beta=0.29$ ), and transparency ( $\beta=0.24$ ).

Sociodemographic categories also had a partial influence on participants' attitudes about all e-services necessities. Most of all, education was a significant factor in relation to usability ( $\beta=0.21$ ), quickness ( $\beta=0.28$ ), security ( $\beta=0.49$ ), integrity ( $\beta=0.32$ ), reliability ( $\beta=0.29$ ), and transparency ( $\beta=0.30$ ). Age also showed some statistical significance. It was significant in relation to security ( $\beta=0.13$ ), reliability ( $\beta=0.13$ ), and transparency ( $\beta=0.17$ ). Gender was only significant in relation to availability ( $\beta=-0.15$ ). The study also shows women believed in the importance of availability on e-services development more than men. Income was also significant in relation to cheapness ( $\beta=-0.15$ ) and quickness ( $\beta=-0.14$ ).

The study also indicates income decreased the participants' attitudes regarding both the cheapness and quickness of online services. The place of residence only had influence on integrity ( $\beta=0.14$ ). It means people in larger cities relied on the importance of the integrity of online services.

### **Hypotheses**

*Hypothesis 1 (H1):* That internet information literacy is positively associated with the level of internet skills- was supported. All kinds of

internet information literacy appeared as a significant contributor to the level of internet skills in participants.

*Hypothesis 2 (H2):* That users with higher level of internet information literacy are more likely to have a positive attitude about the need to develop e-services qualitative necessities than those with lower level of Internet information literacy was partially supported. Two categories of internet information literacy (interaction with/through internet familiarity and security and privacy policy and law familiarity) were significantly related to all e-services categories. Also, two other categories (technical familiarity and content familiarity) were significantly related to some e-services categories.

*Hypothesis 3 (H3):* There are significant associations between the socio-demographic status of users and their internet knowledge was only supported for H3c.

*Hypothesis 3a (H3a):* That age is positively associated with the level of internet knowledge was not supported. Age was negatively related to the level of internet skills.

*Hypothesis 3b (H3b):* That gender (male: higher) is positively associated with the level of internet knowledge was not supported. Gender was negatively related to the level of internet skills.

*Hypothesis 3c (H3c):* That education is negatively associated with the level of internet knowledge – was supported. The level of education of participants was positively and significantly related to their internet skills.

*Hypothesis 3d (H3d):* That income is positively associated with the level of internet knowledge was not supported. The level of income of participants showed no statistical significance.

*Hypothesis 3e (H3e):* That place of residence (big cities: higher) is positively associated with the level of internet knowledge was not supported. The place of residence did not appear as a significant contributor to the level of internet skills.

## Discussion

In this study, our aim was to assess the associations of internet information literacy with internet skills and the attitudes about e-services necessities. The particular concern was on participants' level of literacy and skills. We applied the definitions of internet information literacy and internet skills derived from multiple research directions and arranged them in a particular order.

The results show overall level of user skill was relatively higher than the overall level of internet information literacy. In the subject of internet

information literacy, content familiarity was the most significant aspect of internet information literacy. This means people are more familiar with online information than other issues. In contrast, the overall level of security and privacy policy and law familiarity was at the lowest point. Security and privacy issues play a significant role related to users' rights and benefits. The low level of literacy in this area is one of the important challenges of internet development. Users' literacy on interactions and technical issues related to online processes is only a little bit higher than security and privacy policy and law.

The participants' internet skills showed a better situation compared to their literacy levels. It means users were more engaged with these skills. Maybe it is because users find experimental knowledge more practical and tangible. The level of internet information literacy varied from registering and completing online forms with the highest level of skill to launching a website at its lowest level. The change in the level of skills from the higher level in general skills to the lower level for more professional skills was predictable.

The findings supported the hypotheses that derived from literature on internet information literacy and earlier empirical studies. The findings supported the hypothesized relationship between internet information literacy, internet skills, and attitudes about e-services development. Although content familiarity showed a fragile statistical significance, all other three aspects of internet information literacy had a powerful significant effect on the participants' levels of internet skills. Although hypothesis 2 was partially supported and some aspects of internet information literacy had only effect on some e-services necessities, the overall effect is significant. Thus, the main thesis was robust, showing the internet information literacy is a predictor of their internet skills and their attitudes about the development in e-services necessities.

The results shed light on the value of a multilevel model that derives from the thesis. Each level of predictors, (a) internet information literacy, (b) internet skills, and (c) socio-demographics were significant.

## Conclusion

The results of the studies carried out for this article strengthen the findings that internet information literacy can be considered as a different kind of literacy versus that of internet skills. Most of the studies presented in this paper have assumed internet information literacy is just about skill-based abilities. Our emphasis here was a theoretical distinction between these two separate types of literacy. While internet skills refer to working

with online tools, the internet information literacy is about the meaning and purpose of those tools. Both of these skills are necessary to stay on the right track on the internet. Although our study showed significant similarities between them, equating them is a strategic mistake. In fact, public policies which work on internet information literacy make some strategic defects without paying attention to their differences.

The study also shows that internet information literacy is associated with attitudes and demands on qualitative necessities for developing e-services. The importance of this issue refers to the new meaning of internet information literacy which can be defined as the users' ability to pursue their advantages more than anything else. E-services are one of the most important areas of advantage conflicts between the public, the government, and institutions. The referent of such advantage is the added value resulting from people; data; processes; and things. The study proves internet information literacy is associated with the demands for e-services enhancement. It means the higher level of internet information literacy leads to higher level of demands for better quality of e-services.

Internet information literacy can be seen as a key factor for the public to pursue their advantages in the realm of virtual space, and at the same time, it plays a central role for governments to develop and enhance their online services. Supporting both internet information literacy and skills will lead to more efficiency and effectiveness as internet information literacy and internet skills respectively refer to doing the right things (effectiveness) and doing things right (efficiency).

### **Declaration of conflicting interests and funding**

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. The data used in this article resulting from a research project titled "Virtualization of the Islamic Republic of Iran: Dual-spacization approach to formulating the roadmap and action plan". The project was implemented by the Cyberspace Research Policy Center, at the University of Tehran in 2015 and funded by the National Center for Cyberspace of I.R.Iran.

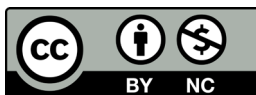
### **References**

- Acquisti, A., John, L. & Loewenstein, G. (2013). What Is Privacy Worth? *The Journal of Legal Studies*. 42(2): 249-274.
- Aufderheide, P. (1993). *Media literacy: a report of the national leadership conference on media literacy*. Aspen, CO: Aspen Institute.
- Banta, T.W. & Mzumara, H.R. (2004). Assessing information literacy and technological competence. *Assessment Update*. 16(5): 3-14.



- Bennett, W.L. (2008). *Civic online life: Learning how digital media can engage youth*. Cambridge, MA: MIT press.
- Buckingham, D. (2006) Defining digital literacy– What do young people need to know about digital media? *Nordic Journal of Digital Literacy*. 4: 263-276.
- Buckingham, D. (2007). *Beyond technology: Children's learning in the age of digital culture*. Polity Press.
- Castells, M. (1996). *The rise of network society*. Oxford, UK: Oxford University Press.
- Cristobal, E., Flavián, C. & Guinalú, M. (2007). Perceived e-service quality (PeSQ): Measurement validation and effects on consumer satisfaction and web site loyalty. *Managing Service Quality: An International Journal*. 17(3): 317-340.
- DiMaggio, P., Hargittai, E., Neuman, W.R. & Robinson, J.P. (2001). Social implications of the internet. *Annual Review of Sociology*. 27: 307-336.
- Farmer, L.S. & Henri, J. (2008). *Information literacy assessment in K-12 settings*. Lanham, MD: Scarecrow Press.
- Flanagan, C. & Levine, P. (2010). Civic engagement and the transition to adulthood. *The Future of Children*. 20(1): 159-179.
- Ford, N. & Chen, S.Y. (2000). Individual differences, hypermedia navigation, and learning: An empirical study. *Journal of Educational Multimedia and Hypermedia*. 9(4): 281-311.
- Goodfellow, R. (2011). Literacy, literacies and the digital in higher education. *Teaching in Higher Education*. 16 (1): 131-144.
- Hargittai, E. (2004). Internet access and use in context. *New Media and Society*. 6(1): 137-143.
- Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills. *First Monday*, 7(4). Retrieved from <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/942/864>.
- Hinrichsen, J. & Coombs, A. (2014). The five resources of critical digital literacy: a framework for curriculum integration. *Journal of Research in Learning Technology*. Retrived at 20. Jan 2016. Online at [http://www.researchinlearningtechnology.net/index.php/rlt/article/view/21334/pdf\\_1](http://www.researchinlearningtechnology.net/index.php/rlt/article/view/21334/pdf_1).
- Julien, H. (2014). *Digital literacy*. Encyclopedia of Information Science and Technology, Third Edition. IGI Global Publication.
- Kim, E. & Yang, S. (2016). Internet literacy and digital natives' civic engagement: Internet skill literacy or Internet information literacy? *Journal of Youth Studies*. 19(4): 438-456. DOI: 10.1080/13676261.2015.1083961.

- Kwak, N. (1999). Revisiting the knowledge gap hypothesis. *Communication Research*. 26: 385-413.
- Livingstone, S. (2004). Media literacy and the challenge of new information and communication technologies. *Communication Review*. 1(7): 3-14.
- Loges, B. & Jung, J. (2001). Exploring the digital divide: Internet connectedness and age. *Communication Research*. 28: 536-562.
- Neuman, R. (1991) *The future of the mass audience*. Cambridge, MA: Cambridge University Press.
- Papadomichelaki, X. & Mentzas, G. (2012). e-GovQual: A multiple-item scale for assessing e-government service quality. *Government Information Quarterly*. 29(1): 98-109.
- Parker, J.D.A., Taylor, R.N., Eastabrook, J.M., Schell, S.L. & Wood, L.M. (2008). Problem gambling in adolescence: Relationships with internet misuse, gaming abuse and emotional intelligence. *Personality and Individual Differences*. 45(2): 174-180.
- Potter, W.J. (2010). The state of media literacy. *Journal of Broadcasting & Electronic Media*. 54: 675-696.
- Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. *Managing Service Quality: An International Journal*. 13(3): 233-246.
- Schumacher, P. & Martin, J.M. (2001). Gender, internet and computer attitudes and experiences. *Computers in Human Behavior*. 17(1): 95-110.
- van Deursen, A.J.A.M. & van Dijk J.A.G.M. (2011). Internet skills and the digital divide. *New Media & Society*. 13(6): 893-911.



This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (CC BY NC), which permits distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.