

The impact of digital literacy on e-government development

Agnieszka Agata Tomaszewicz, University of Szczecin, agnieszka.tomaszewicz@wzieu.pl

Abstract

The following article discusses the meaning of digital literacy and its' influence on the level of e-administration achieved in various countries. A comparison has been made between the level of e-administration development in particular European Union countries and their citizens' digital competence. Furthermore, the term 'digital literacy' was briefly characterized. Finally, it was indicated that the level of digital competences possessed by both citizens and administration workers is one, however, not the key determinant of e-administration development.

Keywords: e-government, digital literacy, information society, e-Government Development Index (eGDI)

Introduction

In the era of the information society, the efficient and precise flow of information is commonly considered as the key factor regarding the organizational development, including public administration. The digital skills constitute one of the grounds for the e-government development, allowing one to use, compose and share information.

E-government generally is connected with 'the complex reconstruction and modernization of the administration, which is implemented on the basis of the information and communication technologies (ICT) in such a way, that the public sector is open, clear, citizen-friendly and efficient as well' (Bogucki D., 2005); *Spółeczeństwo Informacyjne*, 2009). Definitions of e-government often include the aspect of digital literacy. According to the most common approach, e-government means 'the use of ICT in public administration together with the organizational change and new skills aiming at the improvement of public services and democratic processes and strengthening the support for public politics' (Podręcznik dobrych praktyk regionalnych. e-administracja, 2007; Kasprzyk B., 2011).

E-government is also understood as 'the use of ICT in public administration together with the organizational changes and obtaining new skills in order to improve the quality of public services, strengthen the citizens' involvement in democratic processes and support of countries' politics' (Eurostat). Regarding this aspect, possessing digital skills is essential because e-government is treated as 'making the public administration services (governmental and local) available by the network communication media, especially the Internet' (Małachowski A., 2005).

The development of e-government depends on the knowledge and understanding the external conditions which influence e-government, i.e. knowledge and skills, costs saving, reorganization, *back-office* integration, interoperability, sharing and reusing the data and altering the citizens' point of view; which all have considerable influence on the effectiveness of e-government (Podręcznik dobrych praktyk regionalnych. e-administracja, 2007). As the popularization of the civil society grows, people should feel the need to participate in the contribution, regarding e-services and new solutions within the scope of e-administration. Thus,

e-government development is based on the increase of demand (through education) and supply (through the construction of contents) for the provided e-services (Polska 2030). More frequently, one may observe the common belief presented in literature, which says that the indicator of the openness, efficiency and effectiveness of the country functioning are numbered and quality of the services rendered by electronic means. In order to achieve the said goal, it is necessary to stimulate the growth of digital literacy competences among citizens and on every level of the operating public administration as well (Program Zintegrowanej Informatyzacji Państwa, 2013). Driven by demand, it shall also be more efficient and effective, as far as costs are considered, and shall be in accordance with the global, citizen-oriented trend. The success of implementing the proposed e-services depends on the level of e-skills of all entities involved in the planned project. The level of electronic services development, however, depends on increasing the users' awareness about its availability.

The application of the administrative solutions is connected with the implementation of public e-services while the use of public e-services takes place among people who already know the procedures related to the delivery of services and have mostly acquired them during the traditional way of its realization. It is assumed that the interest in the use of public e-services will grow together with the popularization of the ICT use in various areas of social and economic life. It is also connected with the danger of increase of social exclusion and that is why, many strategies propose the corrective actions, which through education, will decrease social exclusion.

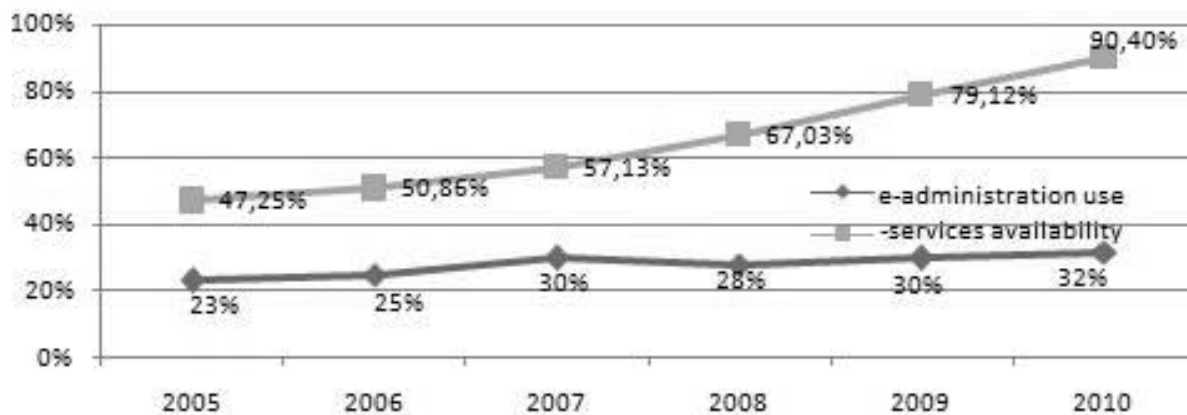


Figure 1. The comparison of e-administration use with the level of e-services availability in 2005-2010 in EU -27

Source: Eurostat; United Nations E-Government Survey 2012.

As presented in Figure 1, the use of public e-services in the EU-27 countries still remains limited and does not follow the fast growth of its availability. The studies conducted by the European Commission show, that the dynamics between the availability and demand for e-services is varied (United Nations E-Government Survey 2012). The availability of public e-services is determined by the ability to use the proposed e-government offer, which requires obtaining particular skills in using a computer and the Internet, thus obtaining the proper level of 'digital literacy' (Strategia kierunkowa rozwoju informatyzacji Polski do roku 2013, 2005). The

term ‘digital literacy’ defines the basic and essential communication skills which include the skill to use and manage the tools and services of information society, so generally speaking ICT. One may include the following skills (Eurostat):

- 1) Using the search engines in order to find information,
- 2) Sending e-mails with attachments,
- 3) Using on-line chats, groups and discussion forums,
- 4) Using the Internet for making phone calls,
- 5) Using the file exchanging programs,
- 6) Setting up websites.

However, Y. Eshet-Alkalai concludes that digital literacy includes also a large variety of complex cognitive, motor, sociological, and emotional skills (Eshet-Alkalai Y., 2004). A. Aviram, Y. Eshet-Alkalai mentioned that digital literacy consists of three main aspects (Aviram A., Eshet-Alkalai Y., 2006):

- technical-procedural skills, refers to basic computing skills necessary to operate technology using modern graphic interfaces; surfing the Web in non-linear ways;
- Cognitive skills, deals with pedagogical issues when considering digital literacy such as comprehension, critical reflection;
- creativity while emotional-social skills, who concerned with the social media aspect of computing in contemporary society.

Authors representing a holistic way of digital literacy, which recognize that the use of technology, particularly the Internet, is a reading appreciation issue, not just a techno-procedural one.

The level of obtained skills, regarding the use of the Internet, may be treated as an additional measure which may be helpful in assessing the condition of e-administration.

In 2013, the general level of digital literacy among the citizens of EU countries was found among about 25.7% of people. In Poland, according to the data obtained by Eurostat, the above mentioned skills possessed about 21% of citizens in 2013 (Eurostat), where 9% of people were on a high level (higher level occurs in case of having at least 5 or 6 of the above mentioned skills). According to the Social Diagnosis, Poles mostly use the Internet for browsing websites (more than 91% of the surveyed), copying and transferring the files and folders (these skills were found among about 70% of the respondents) (Diagnoza społeczna 2011).

In the Digitization of Poland program for the years 2014-2020 specified the percentage of people aged 16-74, who represent the average or high level of Internet skills with regard to 15 least developed regions in Poland. In 2011, it was as high as 35% and it is assumed that until 2023 it will grow by 19-percentage points, estimating it for 54% (Program Operacyjny Polska Cyfrowa na lata 2014-2020, 2013).

It is assumed, that digital literacy is one of the factors which determine the development of e-government. Thus, in order to ensure the further computerization development, it will highly depend on the activities conducted simultaneously on three levels providing the individual, business and administration's readiness. At the same time, it is vital to provide a proper market and political, regulatory and infrastructure environment. Within this scope, however, it is

important to obtain a high level of citizens' and companies' knowledge on the information and communication technologies. These technologies, especially the Internet, enable the realization of the basic social need, which is the access to information for citizens.

In order to present the influence of digital literacy on the level of public e-administration, Table 1 provides the comparison of the most developed European countries, regarding e-Government Development Index (eGDI) together with the corresponding average and high level of skills represented by citizens of these countries.

Table 1. The comparison of e-administration development and citizens' competence level in 2010

The position in 2010 eGDI ranking of European countries	Country	eGDI 2010- the index value	The position in 2010 eGDI in the world	The percentage of people having average and high Internet skills	The position in ranking on average and high skills in Europe
1	United Kingdom	0,8147	2	45 (9)*	12
2	Netherland	0,8097	5	54 (18)	3
3	Norway	0,8020	6	55 (12)	2
4	Denmark	0,7872	7	51 (11)	4
5	Spain	0,7516	9	36 (7)	22
6	France	0,7510	10	49 (18)	8
7	Sweden	0,7474	12	51 (14)	5
8	Germany	0,7309	15	41 (8)	14
9	Belgium	0,7225	16	38 (8)	17
10	Finland	0,6967	19	38 (5)	18
11	Estonia	0,6965	20	49 (17)	9
12	Ireland	0,6866	21	28 (5)	27
13	Iceland	0,6697	22	68 (23)	1
14	Austria	0,6679	24	37 (6)	21
15	Luxembourg	0,6672	25	51 (11)	6
	EU – 28	0,6547		39 (10)	
16	Hungary	0,6315	27	43 (12)	13
17	Lithuania	0,6295	28	47 (23)	11
18	Slovenia	0,6243	29	40 (12)	15
19	Malta	0,6129	30	38 (7)	19
20	Czech Republic	0,6060	33	39 (7)	16
21	Croatia	0,5858	35	30 (9)	25
22	Latvia	0,5826	37	48 (19)	10
23	Italy	0,5800	38	35 (12)	23
24	Portugal	0,5787	39	38 (11)	20
25	Greece	0,5708	41	22 (4)	29
26	Cyprus	0,5705	42	30 (6)	26
27	Slovakia	0,5639	43	50 (9)	7
28	Bulgaria	0,5590	44	25 (7)	28
29	POLAND	0,5582	45	33 (9)	24
30	Romania	0,5479	47	17 (1)	30

*The percentage of high skills is placed in brackets

Source: own elaboration on the basis of: Eurostat; UN E-Government Survey 2010 (2010).

E-Government Development Index (eGDI) is the basic measure which reflects the condition of public e-administration. Moreover, it constitutes a joint index of measuring readiness and skills of national administration for using information and communication technologies in order to provide public services [1].

$$eGDI = \frac{1}{3} * \text{on-line services Index} + \frac{1}{3} * \text{telecommunication infrastructure Index} \\ + \frac{1}{3} * \text{human capital Index}$$

Among the European countries, Iceland is the place where citizens seem to have the best skills connected with the use of the Internet and as much as 68% of people have average and high skills. Other leading countries appear to be Norway, Netherlands and Denmark. The analysis of the data provided in Table 1 shows, that the countries are also positioned high in reference to e-administration development, taking 3rd, 2nd and 4th place respectively (6th, 5th and 7th place in the world).

Poland, however, is incapable of showing satisfactory results regarding both, skills and the level of e-administration. In the first case, only 33% of our citizens possess average or higher Internet skills. In the second, eGDI index, which is 0.5582, Poland is in 29th place in Europe.

As the data provided in Table 1 show, there is a positive correlation between the percentage of people having average and high Internet skills and the level of e-administration development. The Pearson correlation coefficient was used to show the relation between two factors and the Spearman's correlation coefficient to show the relation between two ranks. It was calculated according to the following formula:

$$r = \frac{C(x,y)}{S(x)*S(y)} = \frac{\bar{x}\cdot\bar{y}-\bar{x}\cdot\bar{y}}{S(x)\cdot S(y)}, \text{ for the Pearson correlation coefficient}$$

and

$$R = 1 - \frac{c \cdot \sum di^2}{n(n^2-1)}, \text{ for the Spearman's correlation coefficient, where } di = \text{rang } x - \text{rang } y.$$

According to the adopted formulas, the value of the Pearson correlation coefficient equals 0.5494 and for the Spearman's 0.605339. Thus, one may infer, that there is rather a strong positive link between the level of acquired skills and the level of e-administration development.

Despite these links, while analyzing particular data for eGDI index in 2012, one may be surprised that Iceland is placed only on the 22nd position with the result of 0.7835. Interestingly, according to Eurostat research, Iceland is in the first place in Europe with regard to citizens' digital and Internet skills. The level of e-services development was assessed for only 47%, placing Iceland on only 55th place due to the value of the two other sub-indexes, i.e. telecommunication infrastructure index and human capital index, which still are on high level. In the first case, Iceland is in 4th position and in the second on 14th one (United Nations E-Government Survey 2012).

Thus, on the basis of the data presented in Table 1, one may conclude that digital literacy influences the development of public e-administration, however, as the example of Iceland

shows, it is not sufficient enough to acquire a high level of e-government development. Consequently, it shows that the willingness to use public e-services is necessary.

Furthermore, one may infer that skills and the availability of the teleinformation technology are not sufficient for the e-administration development. To an appreciable extent, the level of provided e-services is vital as well. Therefore, the countries which decide to develop e-administration shall focus on providing the integrated and user-oriented public e-services.

The level of digital literacy in Poland

In the case of Poland, the level of digital literacy regarding the use of the Internet is varied, however, only 1.4% of citizens does not possess any of the skills and 22.7% of society is on high level, which includes at least 5 of the above mentioned activities. The most considerable number of Poles (61.6%) is on the average level of digital literacy, which means they are able to perform about 3 or 4 activities connected with the use of the Internet (E-administracja w oczach internautów – 2013).

The level of digital literacy may be assessed by sending information to the office with the use of a trusted profile. The citizens from Lower Silesia province seem to find it the most problematic because only 20% of people can use it (www.epuap.gov.pl). These results, however, do not vary significantly from the average, which within the scope of these skills equals 24%. The skills scale regarding electronic signature is even lower. Only about 15% of the surveyed can use it. It is not encouraging, especially while regarding further development. Moreover, using a electronic signature constitutes a precondition in order to realize public e-services by companies (Figure 2).

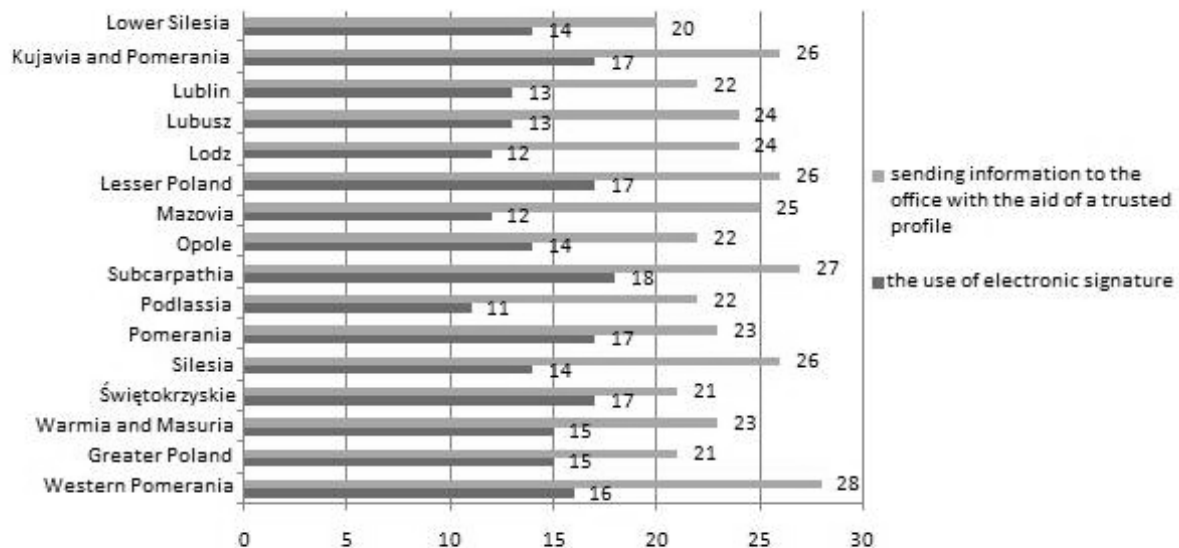


Figure 2. Declared Internet skills within the scope of e-government use

Source: own elaboration on the basis of: E-administracja w oczach internautów – 2013 (2013).

The largest proportion of people who can use the electronic signature was found in Subcarpathia province and was as high as 18%. About 1% less such people is found in Kujavia and Pomerania, Greater Poland and Pomerania provinces. In Western Pomerania province about 16% of people declared having the ability to use the electronic signature.

In the case of self-government administration, such a signature possess only 16% of the workers, what still is two times higher than in the case of government administration workers (17%) (Wpływ cyfryzacji na działanie urzędów administracji publicznej w Polsce w 2012 r., 2012).

It is worth emphasizing, that in the process of creating and further public e-administration development a key meaning, besides ICT, is ascribed to the level of IT education which is reflected in obtaining new IT skills. The purpose of the education is to let the people obtain such a level of competence so that they will be able to use public e-services (Hejnicka-Bezwińska T., 2000). Besides the obtained digital literacy skills, further, intense e-administration development in the EU countries depends mostly on (Podręcznik dobrych praktyk regionalnych. e-administracja, 2007; Strategia budowy społeczeństwa informacyjnego w województwie zachodniopomorskim na lata 2006-2015, 2005):

- the willingness of the citizens to use new, presumably better and easier public e-services, cheap and proper access to the Internet for everyone, lowering the costs and administrative procedures/duties etc.,
- the integration of teleinformation systems both, in internal and external communication in administration,
- entrepreneurship perspective regarding the e-administration economics and return on realized investment,
- administrative perspective connected with legal acts which keep pace with the changes resulting from the use of ICT solutions.

These elements, as well as the need for establishing the new type of relation between public authorities and the citizens, cause the recent modernization of public administration. They also help the citizens to use the solutions of e-administration effectively.

The digital literacy skills have an impact on the level of e-government development and effectiveness, which are considerably dependent on the human factor and are determined by influencing the level of competence and motivation among citizens and workers of public administration. The level of competence determines the efficiency of management systems, while the properly qualified staff has influence on the rationality of the decisions made. Therefore, an essential factor which results in the increasing use of the public e-administration is conducting the improving IT skills by means of staff trainings.

Conclusion

The main factor determining the public e-administration development is a positive verification of the needs within the scope of public e-services. Using e-administration services requires, however, necessary IT skills and the general skills needed for autonomous completion of the electronic service realization from both, office workers and citizens.

As the presented data show, the level of the obtained digital skills is meaningful with regard to further e-administration development. However, it is not a key factor, but availability and the level of complexity of public e-services.

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www.epuap.gov.pl. (Trusted profile- it is a free of charge alternative for the electronic signature thanks to which one may deal with administrative matters via the Internet. This service is available for all citizens who will set up an account on ePUAP).

Author's Biography

Agnieszka Agata Tomaszewicz, PhD, University of Szczecin, Faculty of Economics and Management Services, Poland. She received her PhD in economy with the specialization in e-government. Her principal research areas focused on information society, e-government and ICTs influence on quality of life.