

Determinants of Internet skills, uses and outcomes. A systematic review of the second- and third-level digital divide



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ABSTRACT

Recently, several digital divide scholars suggested that a shift is needed from a focus on binary Internet access (first-level digital divide) and Internet skills and use (second-level digital divide) to a third-level digital divide in which the tangible outcomes of Internet use are highlighted. A plethora of studies have been conducted to identify determinants of digital divides. Unfortunately, there is a lack of consistency in the terminology used. Moreover, terms are often not theoretically grounded. Therefore, we conducted a systematic literature review of digital divide determinants. The results show that the third-level digital divide was underexposed. The primary focus is on Internet use. More importantly, the identified determinants show that digital divide research is largely limited to sociodemographic and socioeconomic determinants.

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1. Introduction

The digital divide is defined as inequalities in access to and use of Information and Communication Technologies (ICTs), mostly the Internet (Castells, 2002). A plethora of studies have been conducted to identify determinants of digital divides. Unfortunately, there is a lack of consistency in the terminology used, both for the type of digital divide addressed (skills, uses and outcomes), as well as for the determinants. Scholars refer to the same concepts using different nomenclatures. Additionally, terms are often not theoretically grounded (Van Deursen et al., 2017). A comprehensive overview and categorization of the determinants of Internet skills, uses and outcomes would help to identify where future research should be directed. It will provide a framework for building digital divide theory and allow policy makers to identify the groups that are lagging behind. This will provide input for the development of adequate policies targeted at more egalitarian Internet use, finally aiming to decrease digital and subsequently social inequalities. This article aims to answer the following research question:

Which statistically significant determinants define Internet skills, uses and outcomes in the English-language academic digital divide literature between 2011 and 2016?

To answer this question, we strive to (1) identify the amount of research that has been conducted on each level of the digital divide (skills, uses and outcomes) and what determinants are found for each level, and (2) delineate the different terminologies that seem to cause confusion. To develop a comprehensive overview, we conducted a systematic literature review that focused on the second- (skills and uses) and the third- (outcomes) level digital divides in the past six years. Our contribution starts with an overview of digital divide theory, followed by an explanation of the applied method and ends with the results of the systematic literature review. In the final section, the implications and limitations of this study are discussed.

2. Theoretical background

2.1. From Internet access to outcomes

The digital divide became a topic of interest in the early 1990s as Internet access and the use of personal computers increased (Eastin et al., 2015) and has been evolving ever since. Initially, the approach to the digital divide was a simplistic study of the uneven distribution of Internet access (Eastin et al., 2015), observed as a binary distinction between those connected to the Internet and those who were not (Mehra et al., 2004; Riggins and Dewan, 2005). Those who had an Internet connection were perceived as being on the preferred side of the divide (Newhagen and Bucy, 2004). This type of digital divide is now referred to as the first-level digital divide. Subsequently, Hargittai (2002) noted that a distinction should be made between an Internet access divide and a skills divide, the latter indicating differences between groups of people in terms of skills necessary to effectively use the Internet. This development also departed from the deterministic idea that access to technology would automatically provide all of the benefits of the technology. Several scholars expressed concerns regarding the unilateral digital divide approach that focused solely on inequalities based on differences in Internet access (Fuchs, 2009; Selwyn, 2004; Van Dijk, 2005). Since in most Western countries the proportion of the population with an Internet connection is high, having a connection is no longer considered the primary or only barrier to (benefit from) the Internet. The relevance of a digital divide based on Internet access started to be questioned when broadband Internet access and digital devices became more prevalent. As a result, the focus of the digital divide discourse shifted to digital skills, part of the second-level digital divide (Hargittai, 2002) that also includes differences in use (usage gap) (Van Dijk, 2005). Research on digital skills moved forward when authors classified types of skills necessary to bridge the digital divide (Mossberger et al., 2003; Van Deursen and Van Dijk, 2011). Mossberger et al. (2003) distinguished between technical competence, or “the skills needed to operate hardware and software, such as typing, using a mouse and giving instruction to the computer to type records a certain way”, and information literacy, which involves “the ability to recognize when information can solve

a problem or fill a need and to effectively employ information resources". Recently, Van Deursen et al. (2016) classified technical competence as 'operational skills', or the basic skills needed to use the Internet. Additionally, they distinguished 'information navigation skills' (the ability to find, select, and evaluate sources of information on the Internet), 'social skills' (the ability to use online communication and interactions to understand and exchange meaning and acquire social capital) and 'creative skills' (needed to create different types of quality content and to publish or share this with others on the Internet).

Several scholars have argued that digital divides should be approached more comprehensively, in which not only Internet access, skills and use are addressed but also the consequences of Internet use (e.g., Fuchs, 2009; Selwyn, 2004; Van Dijk, 2005). Accordingly, the digital divide discourse has shifted from binary Internet access, to skills and use of the Internet, to a focus on the beneficial outcomes of Internet use, in 2011 labelled the third-level digital divide (Wei et al., 2011). This digital divide is present when the possession of digital skills and Internet use do not lead to beneficial outcomes (Stern et al., 2009; Van Deursen et al., 2016). The digital divide is increasingly considered "a multidimensional phenomenon that includes a set of complex divides [...], caused by a variety of factors" (Bruno et al., 2010, p.27). Furthermore, several scholars suggest that the digital divide plays a major role in the reinforcement of existing social inequalities (e.g., Helsper, 2012; Van Dijk, 2005; Witte and Mannon, 2010).

2.2. Determinants of digital divides

Studies of the first-level digital divide have shown that Internet access is unequally distributed among individuals with different demographic characteristics, such as age, gender, socioeconomic status, ethnicity and geography (e.g., Helsper, 2010; Mossberger et al., 2003). Many of these factors also determine skills and use. Blank and Grosej (2014), for example, found evidence that age, educational level and employment status cause a large proportion of the differences within the second-level digital divide. An Deursen and Van Dijk (2010) showed that similar determinants of Internet use determine Internet skills, although the relative influence of these determinants depends on the type of skills and use measured. Recently, researchers have focused on the determinants of Internet outcomes by distinguishing factors that are needed to capitalize on Internet use to acquire benefits (e.g., Van Deursen et al., 2017). Van Deursen et al. (2017) showed that different outcomes from Internet use were the result of different digital divide determinants. For example, while employment status was shown to be important for employment- and education-related Internet outcomes, it did not affect social outcomes.

3. Method

3.1. Systematic review

A systematic literature review was performed to develop a comprehensive overview of the determinants of Internet skills, uses and outcomes of the digital divide. This review followed the protocol of the Preferred Reporting Items for Systematic Reviews and meta-Analyses (PRISMA) for systematic reviews (Moher et al., 2009). This framework was chosen to ensure that the study was transparent and replicable. Systematic reviews are a method for identifying and synthesizing all available existing research on a topic and, therefore, are a method to meet the aforementioned research goals. From the research question, several search terms were selected after identifying Internet skills, uses and outcomes as primary terms.

3.2. Search terms

The query executed for this review was threefold. It established the determinants of Internet skills, uses and outcomes. A comprehensive search was conducted using the Web of Science, PsycInfo and Scopus, which together covered a wide range of social science journals. To obtain optimal results, three Boolean search strings were constructed. A Boolean search is performed to combine all search terms in a structured way. As illustrated below, all three search strings consisted of distinct parts. First, the main part, concerning skills, uses or outcomes was included. Then, search terms were added to ensure that the results would contain the determinants of the main part, including *indicators*, *predictors*, and *determinants*. Additional terms, such as *factors* or *antecedents*, did not deliver any additional useful results. Last, the term *digital divide* was added to the search strings to ensure that the determinants of the digital divide that were found were investigated and identified in the context of the digital divide and, therefore, applicable to our framework.

Skills. From the preliminary research the three most common terms used by researchers when writing about the ability to use ICTs were as follows: *online*, *digital* and *Internet skills*. In addition, several terms were found that were used in the same context, such as *digital literacy*, *digital competence* and *information literacy*. Including these terms in the search did not yield any additional results. The final Boolean search string used to search for papers related to Internet skills was as follows: ('Internet skills' OR 'digital skills OR 'online skills') AND (indicators OR predictors OR determinants) AND ('digital divide').

Uses. Both 'Internet use(s)' and 'Internet usage' are used interchangeably in existing digital divide literature. Moreover, the term *activities* also generated useful results, but only when used in combination with *online* or *Internet*. The term *digital activities* did not yield additional useful results. The combination and extension of these terms resulted in the following search string: ('Internet use' OR 'Internet activities' OR 'online activities' OR 'Internet usage') AND (indicators or predictors or determinants) AND ('digital divide').

Outcomes. From a detailed analysis of the literature on digital divides, we determined that the terms *outcomes*, *benefits*, *effects* and *opportunities* were the most commonly named benefits of using the Internet. The initial search delivered too many unusable results because the majority of the articles focused on benefits, outcomes or opportunities in general, not explicitly in the context of Internet use. Therefore, the concepts were combined with the term *Internet* in two ways, *outcomes of Internet* and *Internet outcomes*, to specify the type of results to be included. This resulted in the following Boolean search string: ('effects of Internet' OR 'Internet effects' OR 'outcomes of Internet' OR 'Internet outcomes' OR 'benefits of Internet' OR 'Internet benefits' OR 'Internet opportunities') AND (indicators OR predictors OR determinants) AND ('digital divide').

3.3. Selection criteria

Several search restrictions were applied to limit the amount of irrelevant results. The results had to meet the requirements that articles are published in (1) English language, (2) (peer-reviewed) academic journals, (3) between 2011 and 2016. The time span was chosen because we expected that within six years, all relevant second- and third-level digital divide determinants would be studied in at least one of the relevant articles. Criteria for inclusion of a search result in the review are as follows:

1. Articles should include determinants of the second- and/or third-level digital divide to ensure they referred to Internet skills, uses and/or outcomes.
 - Articles that included dependent variables such as *intention to* or *propensity to* were excluded.
 - Only articles that included determinants of Internet skills that focused on a specific type of skill, not general concepts such as *self-efficacy*, were included. However, the concept *Internet skills* could also be mentioned by means of terminology such as, *digital skills*, *e-skills*, *digital competence*.
 - Articles that suggested user typologies (e.g. sporadic user, entertainment user) that not explicitly refer to determinants of skills, uses or outcomes were excluded.
2. The term *digital divide* must have been used in a way that ensured that the author(s) took the digital divide (or digital inequality) discourse/perspective as point of interest.
3. Articles had to be generalizable and not focused on a specific profession, study, area of conflict or organization, except for universities. The shared characteristics of groups should not be narrower than typical digital divide factors, such as age, gender or educational level. Articles that focused on specific groups, such as pregnant women, geography teachers, welfare workers and refugee migrants, were excluded. The same applied to studies focusing on specific situations, such as the US elections of 2008 or local governmental initiatives.
4. Articles focusing on qualitative research were excluded from the review because of the lack of generalizability of possible determinants identified within those studies.

3.4. Study selection

The search resulted in the identification of 2148 articles. After the exclusion of duplicates (1202) and the inclusion of articles that were identified through other methods (2), 948 articles remained for systematic review. Articles were reviewed using a fixed structure, based on the PRISMA method. After applying the selection criteria, 126 articles were selected for inclusion in this review. Articles included in the review are indicated with * in the reference list.

3.5. Selection bias

When conducting a systematic literature review, there is the possibility of a selection bias in which the researcher unintentionally selects those articles that support his or her prior beliefs (Booth et al., 2016). Therefore, the reviewer rigorously aimed to include articles based on relevance by adhering to the predefined criteria. To verify that the selected articles met the selection criteria, a second independent researcher performed an analysis of >10% of the articles found with the search query. The resulting Cohen's Kappa was 0.67.

4. Results

Because of inconsistencies in terminology, theoretically grounded classifications were selected and adapted to present the findings (see Fig. 1).

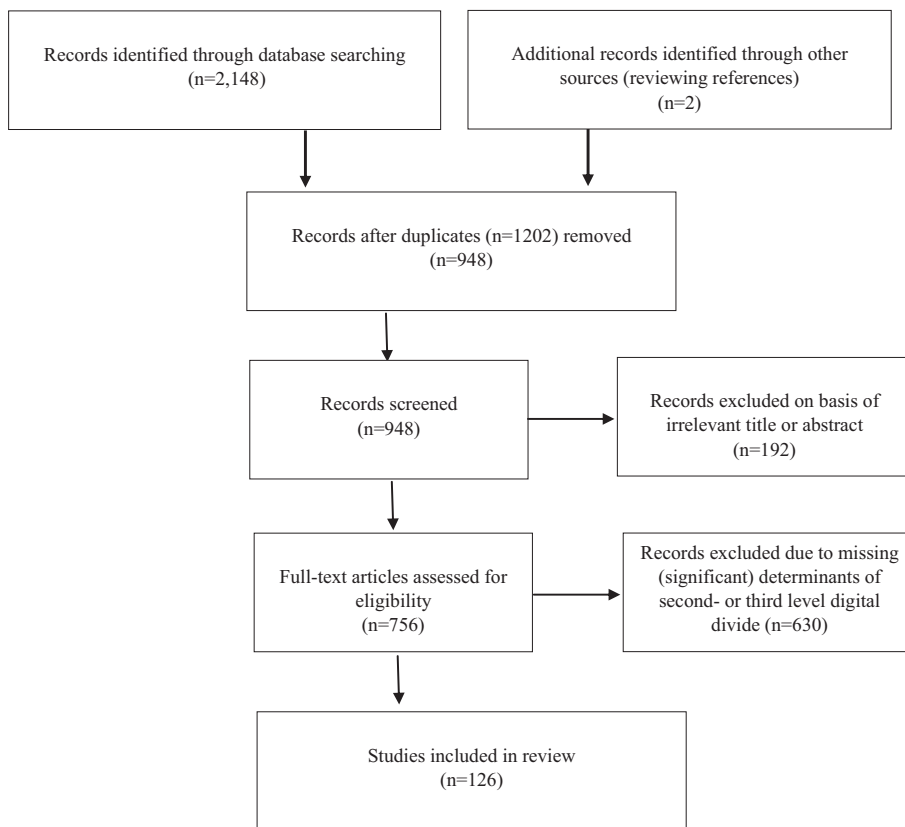


Fig. 1. PRISMA flowchart.

4.1. Categorization of digital divide types and determinants

Internet skills

The classification of Internet skills was predefined to ensure that all identified skills could be placed in a primary category (a complete overview of all identified skills is shown in Appendix A). There were four primary Internet skills groups defined (partly adapted from Van Deursen and Van Dijk, 2009):

- Medium-related, with subcategories software skills (including making spreadsheets, browser use and email, word processing and flow charts and software use and file manipulation) and operational skills (including instrumental skills)
- Content-related, including formal skills, information skills (including eHealth skills), strategic skills, creative skills and social skills (including communication and networking).
- Safety & security, under which Ethics, safety and acceptable use and security were combined.
- General, such as Internet skills, digital competence and digital literacy.

Internet use

Internet use can be defined in terms of frequency and the type of activities performed. For frequency we created the subcategory *frequency* of Internet use. The type of activities performed can be considered as variety of activities, and the specific activities. *Variety* of Internet use is placed in a separate subcategory. To categorize specific activities, we used Helsper's corresponding fields model (2012) which provides a theoretically grounded categorization of *economic*, *cultural*, *social* and *personal* uses and outcomes. All uses that were found using the review (see Appendix B) were placed in one of the four primary categories. In accordance with the model, these primary categories were then divided into subcategories. The economic category was subdivided into *employment and education*, *property* and *income and finance*. The cultural category included *belonging* and *identity*. The social group was divided into *informal networks*, *formal-civic networks*, *e-government* and *political networks*. We added *e-government* as a self-contained subcategory. Last, the *personal* group of Internet uses contained *health/well-being*, *self-actualization* and *leisure/personality*.

Internet outcomes

Internet outcomes were categorized in a similar way as the specific Internet activities. In addition to *economic, social, cultural* or *personal* categories, a general Internet outcomes category was created to classify Internet outcomes that did not fit into the other categories. See Appendix C for a detailed categorization of the Internet outcomes.

Digital divide determinants

All categorizations of determinants were made by evaluating the operationalization that researchers used for specific terms to ensure that the determinants were in the correct category. For example, *household income* and *work circumstances* were placed in the category termed *economic*. Additionally, determinants that focused on the frequency, intensity, breadth and variety of Internet use were divided into two categories: *frequency* of Internet use and *variety* of Internet use, which were both subcategories of the *motivational* determinants. In the end, seven determinant categories were established: *sociodemographic, economic, social, cultural, personal, material* and *motivational*. The *sociodemographic* category consisted of determinants such as *age* and *gender*, while the *social* category included determinants such as *social networking* and *political participation*. The *cultural* category contained determinants such as *cultural capital* and *cultural possessions*. Within the *personal* category, determinants were placed into the *leisure* or *health-related activities* subcategories. Both the *motivational* and *material* categories included determinants that were preconditions for Internet use. The *motivational* category included determinants such as *online skills* and *Internet attitude*. Last, the *material* category was characterized by the more material determinants, such as *home Internet access* and *number of devices*. An overview of the categories and subcategories of the determinants is shown in Appendix D.

4.2. Focus of digital divide research

First, the total amount of determinants mentioned in digital divide literature is analyzed. See Table 1.

Table 1 shows that the number of articles in each of the three divides reveals that in the past years, the main focus of digital divide research was on the second-level digital divide, especially addressing types of use. The third-level divide is underexposed. While the skills divide accounts for a minor share of the second-level digital divide determinants, it still delivers twice as many determinants compared to the Internet outcomes digital divide. Additionally, Table 1 shows that sociodemographic and socioeconomic determinants were the most common determinants studied in both the second- and third-level digital divide. By contrast, both social and cultural determinants were less studied, especially for Internet skills and outcomes divides. For the uses divide, social determinants were the most frequently addressed and were the result of factors such as *formal volunteering, online network size* and *offline social activities*.

Finally, Table 1 shows that *motivational* determinants (e.g., *Internet experience* or *frequency* of Internet use) were addressed the most frequently across the three divides. The second most frequent were *material* determinants (e.g., *Internet access* or *number of devices*), which were primarily applicable to Internet skills and uses. In the following sections, the determinants will be discussed in more detail.

4.3. Determinants of Internet skills

To identify determinants of Internet skills, we first needed to categorize the different terms that surfaced in the literature. For example, terms used for Internet skills included *digital skills, Internet skills* (n = 8), *e-skills* (n = 1) and *digital literacy* (n = 2). The term *skills* was used more commonly than the terms *literacy* and *competence*. Additionally, the term *digital skills* (n = 45) was more common than the terms *Internet skills* (n = 8), *digital competence* (n = 8) and *Internet literacy* (n = 5). All these terms were placed in the category of *general digital skills* to adhere to the goal of presenting the results clearly. Furthermore, the primary category of *general digital skills* also included *digital literacy* (n = 2), *ICT competencies* (n = 2) and *basic IT skills* (n = 1), which were added after studying the operationalizations. Other skills referred to more specific Internet skills, broader skills or subcategories, such as *eHealth literacy* (n = 16), *computer skills* (n = 4) or *media literacy* (n = 5). For these specific types of Internet skills, unique terms were used and, thus, no primary term was required.

Table 1
Number of Determinants for Internet skills, uses and outcomes.

Determinants	Divide			Total
	Skills	Uses	Outcomes	
Sociodemographic	42 (31.3%)	304 (35.2%)	19 (25.7%)	365 (34.0%)
Economic	40 (29.9%)	248 (28.7%)	15 (20.3%)	303 (28.3%)
Social	3 (2.2%)	81 (9.4%)	8 (10.8%)	92 (8.6%)
Cultural	4 (3.0%)	29 (3.4%)	1 (1.4%)	34 (3.2%)
Personal	10 (7.5%)	78 (9.0%)	6 (8.1%)	94 (8.8%)
Material	13 (9.7%)	42 (4.9%)	1 (1.4%)	56 (5.2%)
Motivational	22 (16.4%)	82 (9.5%)	24 (32.4%)	128 (11.9%)
Total	134	864	74	1072

Table 2
Determinants of Internet skills.

Determinants	Skills				
	Medium-related	Content-related	Safety & security	General	Total
Sociodemographic	10 (52.6%)	14 (24.6%)	3 (100%)	15 (26.8%)	42 (31.1%)
Economic	4 (21.2%)	18 (31.6%)	0	18 (32.1%)	40 (29.6%)
Social	0	1 (1.8%)	0	2 (3.6%)	3 (2.2%)
Cultural	0	0	0	4 (7.1%)	4 (3.0%)
Personal	0	6 (10.5%)	0	4 (7.1%)	10 (7.4%)
Material	2 (10.5%)	5 (8.8%)	0	6 (10.7%)	13 (9.6%)
Motivational	3 (15.8%)	13 (22.8%)	0	7 (12.5%)	23 (17%)
Total	19	57	3	56	135

Table 3
Determinants of Internet uses.

Determinants	Uses							Total
	Frequency	Variety	Beneficial	Economic	Social	Cultural	Personal	
Sociodemographic	41 (41.4%)	10 (40.0%)	3 (50.0%)	34 (27.6%)	69 (30.7%)	1 (25.0%)	136 (37.6%)	294 (34.8%)
Economic	32 (32.3%)	9 (36.0%)	2 (33.3%)	43 (35.0%)	58 (25.8%)	2 (50.0%)	100 (27.6%)	246 (29.1%)
Social	4 (4.0%)	1 (4.0%)	0	12 (9.8%)	29 (12.9%)	0	25 (6.9%)	71 (8.4%)
Cultural	3 (3.0%)	1 (4.0%)	1 (16.7%)	6 (4.9%)	14 (6.2%)	0	13 (3.6%)	38 (4.5%)
Personal	6 (6.1%)	1 (4.0%)	0	4 (3.3%)	26 (11.6%)	1 (25.0%)	32 (8.8%)	70 (8.3%)
Material	4 (4.0%)	1 (4.0%)	0	9 (7.3%)	10 (4.4%)	0	19 (5.2%)	43 (5.1%)
Motivational	9 (9.1%)	2 (8.0%)	0	15 (12.2%)	19 (8.4%)	0	37 (10.2%)	82 (9.7%)
Total	99	25	6	123	225	4	362	844

The majority of the determinants were linked to the categories of *general digital skills* and *content-related skills*. Table 2 shows that the *sociodemographic* and *socioeconomic* determinants were most common. *Social* and *cultural* determinants were less studied, while *motivational* determinants were important for *content-related skills* but not as important for *general digital*, *medium-related* and *safety & security skills*. Last, personal determinants (e.g., *health information seeking* or *personality traits*) represented a marginal share of determinants for *general digital* and *content-related skills* and were not determinants of *medium-related* or *safety & security skills* (see Appendix A).

4.4. Determinants of Internet uses

Concerning the terminology within both the uses and outcomes category, some determinants often appeared the same, but did cover slightly different concepts when the operationalizations were analyzed. For example, the *income* category often referred to one's individual income, while the *SES income* category referred to household income. A similar situation existed for the *mental health*, *health condition* and *health status* categories. Therefore, these concepts were combined to make the large number of determinants manageable and clear. A list of the aggregated use determinants is shown in Appendix B.

Table 3 shows that the offline determinant categories correspond with the corresponding online uses. For example, *economic* determinants predicted online economic activities. The same could be observed for *social* and *personal* categories. Furthermore, most studies focused on the determinants of *economic*, *social*, *personal* and *frequency* of Internet use. *Personal determinants* were connected to activities such as *health information seeking* (health), *watching videos* (leisure) or *blogging* (self-actualization). *Beneficial* and *cultural Internet uses* so far gained less attention. Again, *sociodemographic* and *economic* determinants accounted for the largest share, followed by *social* determinants. *Motivational* determinants were also relatively common in the *economic*, *social* and *personal* use categories, as was the group of *material* determinants (see Table 4).

Table 4
Determinants of Internet outcomes.

Determinants	Outcomes					Total
	Beneficial	Economic	Social	Cultural	Personal	
Sociodemographic	0	5 (38.5%)	15 (39.5%)	0	1 (5.3%)	21 (28.0%)
Economic	0	3 (23.1%)	8 (21.1%)	0	3 (15.8%)	14 (18.7%)
Social	0	2 (15.4%)	6 (15.8%)	0	0	8 (10.7%)
Cultural	0	0	1 (2.6%)	0	0	1 (1.3%)
Personal	0	1 (7.7%)	3 (7.9%)	1 (100%)	1 (5.3%)	6 (8.0%)
Material	0	0	0	0	1 (5.3%)	1 (1.3%)
Motivational	4 (100%)	2 (15.4%)	5 (13.2%)	0	13 (68.4%)	24 (32.0%)
Total	4	13	38	1	19	75

4.5. Determinants of Internet outcomes

Internet outcomes are far less studied than Internet skills and uses. Studies that focus on Internet outcomes primarily included *social* and *personal* determinants, followed by *economic* determinants. *Social* determinants of Internet outcomes were primarily linked to network building and strengthening, both formal and informal. *Motivational* determinants were mostly related to *personal* Internet outcomes.

5. Discussion

5.1. Conclusion

Internet access has become a standard for most Western populations. As a result, digital divide research shifted to focus on determinants of Internet skills, uses and outcomes. With regard to the research question, the review shows two limitations of digital divide research of the past years that warrant attention. First, research has primarily focused on identifying determinants of Internet uses and, to a lesser extent, Internet skills. To determine who benefits the most (or least) from Internet use, digital divide scholars should start including research on the third-level digital divide. Differences in Internet outcomes are likely to have profound consequences, not least in the reinforcement of existing social inequalities. Furthermore, research on Internet outcomes reveals the real stakes of being online and could stir the motivation of policymakers to create policies that lead to more egalitarian Internet use. The second limitation that the review uncovers is that the most common determinants studied across all digital divides are sociodemographic and socioeconomic. Demographic determinants are primary, but nevertheless descriptive and superficial factors with limited explanative power. Access and motivational determinants are also expected because they can be considered prerequisites for using the Internet. Second- and third-level digital divide research on social (e.g., digital support and formal volunteering) and cultural (e.g., cultural capital and religion) determinants need more attention and might provide better explanations of how Internet users obtain (or do not) beneficial outcomes. Social determinants can for example be used to study how individuals interact and negotiate with others in different contexts, such as home or labor. It is likely that social and cultural determinants require additional information in order to interpret their meaning. For example, a respondent stating to need support when using the Internet, might also be asked about where and how this support is found, or what it means for the way in which benefits from Internet use are obtained. Although social and cultural determinants demand more effort to unravel their exact meaning, preferably by means of qualitative research, they can provide us with extensive explanations for why some Internet users obtain more beneficial Internet outcomes than others.

The review revealed that many different terms were used to describe similar concepts. For future research we recommend to use the term *digital skills* when referring to the skills needed to use the Internet in general. Moreover, when referring to the terms for activities and outcomes used in specific studies, it would be convenient to use theoretically grounded categories, for example those proposed in Bourdieu's capital theory (1986), Helsper's (2012) corresponding fields model or Van Dijk's (2005) resources and appropriation theory. Taking Bourdieu as an example, his capital theory stated that people's actions are shaped by the social space they live in, as defined by institutions, norms and conventions. According to Bourdieu, it is important to not only take into account traditionally considered economic capital, but also social and cultural capitals for determining one's status and position. From this perspective, economic, social and cultural capitals could serve as overarching categories. Then, studies would become more comparable. Concerning the determinants, it will be difficult to compose universal, fixed digital divide terminology, because of the multiplicity. However, also here, adopting similar terms and classifications would make the literature more clear and manageable.

5.2. Limitations

In the current review, we departed from the unilateral view that Internet outcomes are generally beneficial, such as outcomes are typically operationalized within digital divide literature. Recently, more attention has been devoted to the less beneficial or negative outcomes of Internet use, such as problematic Internet use, Internet addiction or privacy issues. These negative consequences were not taken into account within this review, but do require attention in future research.

The systematic literature review was limited by some restrictions. First, only determinants mentioned in articles from 2011 onwards were included. Although the choice for this time span was substantiated, this review might have excluded relevant articles that were published before that time. In addition, within each of the three search strings the term *digital divide* was inserted, meaning that only articles mentioning or focusing on the digital divide were included. It might well be that indicators of Internet skills, uses and outcomes were also mentioned within articles that do not specifically adopt a digital divide focus. Future research could elaborate on this review by finding a way to include the determinants of Internet skills, uses and outcomes that were found in other fields of research.

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Appendix A. Determinants of Internet skills

	Medium-related			Content-related					Safety & Security	General
	Medium-related	Operational (instrumental)	ICT-software	Content-related	Information navigation	Strategic	Creative	Social		
Education	2	2		3	9	4				7
Gender	1	1	4	1	2	1			2	9
Age	2	2		3	6	1			1	6
Internet experience (years)	2	1		1	1					4
Household/family SES										5
Internet access	1			1						2
Cultural capital										4
Frequency of use					1					2
Traditional literacy					2					1
Parental education						1				2
Internet access type		1					1	1		
Operational skills					3	1				
Number of electronic devices used					1					2
Social-informal networks					1					1
Internet motivation/attitude				2						
Medium-related skills				2						
School performance					2					
Income										2
Formal skills					1	1				
Educational resources										1
Digital support										1
Internet access locations (amount)										1
PC at home										1
ICT autonomy										1
Personal-leisure/personality										1
Individual SES					1					
Employment status										1
Mastery orientation										1
Previous achievements										1
Personal-health					1					
Residency										
Health status					1					
Digital skills					1					
Internet access quality				1						
Information skills						1				

Appendix B. Determinants of Internet use activities.

	Fre- quency	Variety	Bene- ficial	Economic			Cultural		Social			Personal			
				Property	Education/ employment	Income/ Finance	Belonging	Identity	Informal networks	Formal networks	Political- networks	e-Gov	Health	Self- actualization	Leisure
Age	17	4	1	5	11		1		17	1	9	1	13	19	19
Educational level	18	4	1	7	8	1	1		15		9	4	16	15	15
Gender	12	4	1	3	6	2			7	3	11	4	15	22	22
Household income	5	2	1	5	1		1		7		6	2	6	11	11
Employment status	7	1		3	4	1			8		2		2	8	8
Residency	10	2	1	3	3				10			2	4	5	5
Ethnicity	3	1	1	2	2				13		1		5	4	4
Marital status	2			1					3		1		2	5	5
Digital skills	4				1	1			4	1	3		4	2	2
Offline socializing	2				2	2			6					3	3
Offline political orientation	1	1		1					1		8			2	4
Internet attitude	5	2		1	1				1	1	1			3	1
Internet access type	1			1	2	1			5					1	1
Internet access points (Amount)	3	1			2	1			1				1	1	
Personality traits- neuroticism					1				3		1			2	3
Offline news consumption	1								2					4	3
Parental status					1	1			2				1	2	2
Traditional literacy	3	1							1				2	2	
Personal-leisure/p ersonality					1				3		1				4
Frequency of use					1	1			3				1	2	2
Household/family SES		1			3				2					1	1
Social-informal networks											4		2		2
Personal-self-ac tualization					1				3		1				2

Appendix B (continued)

	Fre- quency	Variety	Bene- ficial	Economic			Cultural		Social			Personal			
				Property	Education/ employment	Income/ Finance	Belonging	Identity	Informal networks	Formal networks	Political- networks	e-Gov	Health	Self- actualization	Leisure
Use of other technologies									1				5		
Health status	2								1				1	1	
Household/family composition	1				3								1		
Digital support					2				1					1	1
Personality traits–openness									2		2		1		
Internet experience (years)						1				1				1	1
Instrumental skills						1			1					1	1
Individual SES	2	1											1		
Networking skills						1			1					1	1
Social-political networks											4				
Online network size					1				1		1				1
eHealth literacy													4		
Social class				1		1						1	1		
Economic–education/employment					1				1						2
Number of electronic devices						1							1		2
Creative skills									1					1	1
Information skills					3										
Operational skills					1									1	1
Trust in online health info	1												2		
Offline health activities							1						2		
Offline academic orientation	1				2										
Occupational class				2										1	
Internet self-efficacy					2									1	

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(continued on next page)

Appendix C. Determinants of Internet Outcomes

	Beneficial	Economic	Economic		Cultural	Social	Social			Personal			
			Property	Education and employment	Belonging		Informal networks	Formal-networks	Political-Networks	e-Gov	Health/well-being	Self-actualisation	Leisure
Internet use				1			1				8		1
Age				2			3	2	1		1		
Employment status			1	1			1	2			3		
Frequency of internet use			1			1		2			2	1	
Personal-self-actualization				1	1				2	1	1		
Gender							3	1	1				
Educational level			1	1			1	2					
Marital status			1			1	1		1				
Social-political networks				1					2				
Social-informal networks				1			2						
Household income		1						1	1				
Internet attitude/motivation	1						1						
Digital skills				1							1		
Household composition							1	1					
Content-related skills	1												
Internet use language							1						
Communication skills	1												
eHealth literacy	1												
Internet access											1		
Residency								1					

Appendix D

Sociodemographics	Age, gender, marital status, residency, living area, living environment, urban/rural dimension, life space.
Economic	Income, household income, household wealth, household poverty, family income, SES, household SES, individual SES, owning goods, financial situation, work situation, employment status, employment type, employment status parents, occupational status, social class, life stage, educational level, Years of schooling, educational resources, parental education, educational level parents, school sector, academic orientation, doing homework online, working hours, type of activity - job seeking.
Social	Household composition, family size, family composition, family living arrangement, parental status, having children, parental mediation, number of children, informal networks, connected family members, connected friends, amount of Facebook friends, network size online, socializing, social activity, social support, assessing digital support networks, Facebook friends' instrumental support, formal volunteering, degree of social isolation, social orientation, loneliness, type of activity – e-mailing, type of activity – Facebook, type of activity – social media, type of activity – social network, type of activity – Instant Messaging, type of activity – Social Networking Sites, Facebook interactions, express political content (Facebook), connections w/ political actors (Facebook), political networks, type of activity – social media for political purposes, cyber political participation, political orientation.
Cultural	Cultural, cultural capital, cultural status, cultural possessions, religion, ethnicity, Internet use language.
Personal	Type of activity - information seeking, type of activity – entertainment, type of activity - web support, groups (health related), type of activity - downloading/listening to music, type of activity – gaming, type of activity – podcast use, type of activity - online news, online news use, media use, traditional news media use, online media multiplexity, amount of media, offline news consumption, language integration, traditional literacy, literacy, language skills, English skills, previous achievements, school performance, academic performance, grade level, mastery orientation, shyness, confidence, self-efficacy, cognitive function, health status, mental health, health condition, health interests, physical activity, offline health activities, seeking offline health information, satisfaction with physician, trust in online health information, personality traits – neuroticism, personality traits – extraversion, personality traits – conscientiousness, personality traits – openness, personality traits – Agreeableness, psychological distress.
Material	Internet availability, Internet access, access locations, home access, home ICT access, school access, access type, access quality, number of electronic devices, PC at home, use of other technologies.
Motivational	Attitude towards ICTs, attitude towards computers, Internet attitude, Internet motivation, perceived Internet relevance, Internet use, frequency of Internet use, usage frequency, (amount of) time spent online, intensity of Internet use, Internet experience, years of experience, digital skills, Internet skills, e-skills, computer skills, ICT skills, operational skills, formal skills, information skills, strategic skills, medium-related skills, creative skills, ICT competence, digital competence, media literacy, Internet literacy, digital literacy, Internet efficacy, eHealth literacy, ICT autonomy, technological efficacy, Internet use at work.

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