# Are the Principles for Digital Development useful to bridge the Dutch Digital Divide?

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**Abstract.** ICT4D aims to empower disadvantaged communities by providing them with ICT solutions to issues they may have. Developed countries such as the Netherlands also struggle with the notion of a Digital Divide where certain groups fail to keep up digitally. The international development community has reassessed the mainstream practices in ICT4D programs and projects by examining and understanding the successes and failures in digital development. It has formulated nine principles to make ICT4D projects and programs more user-centered, scalable and sustainable. In this thesis I investigated to what extent the principles are useful and realistic to implement in a developed context and what the similarities, differences and constraints are among practitioners in the Netherlands. It appears that the practitioners are applying all principles and consider them as essential to project success except for one principle. Moreover, this paper provides theoretical implications on the addition of a new principle, namely Maintaining the User. This principle is concerned with sustaining users after the development process by assisting them with navigating and understanding the service developed.

**Keywords:** Digital Divide · Digital Inclusion · Disadvantaged Communities · Principles for Digital Development · ICT4D.

## 1 Introducing the Digital Divide in the Netherlands

Although the notion of poverty and marginalized communities is often thought to be prevalent in developing countries, the concept of Digital Divide is also dealt with in first world countries, especially in the Netherlands [4]. The Digital Divide is defined as the gap between those who have access to the internet and those who do not, or the gap between those who use digital technologies and those who do not [13]. Particularly elderly people, people with a migrant background, minimums and mentally disabled people are groups that have difficulty keeping up digitally [19]. As a result, they do not feel as fully-fledged citizens of the society [19]. Unfortunately, exactly this part of the population that could potentially benefit the most from internet use, is doing the worst [23]. According to Van Deursen, digital inequality is problematic since the Internet reinforces existing forms of inequality. The more resources a person has at his disposal (for example, income, property or a social network), the more the internet provides

[23]. The fewer resources available, the smaller the contribution to a person's well-being [23]. Thus, people who are already in a vulnerable position are further marginalized [23].

According to the latest figures from the survey "ICT use of households and persons 2018" by Statistics Netherlands (CBS), 6 percent of the Dutch population aged 12 or over stated that they had never used the internet in 2018 [6]. Among the people without an internet connection at home, in 2017, they simply stated that they were not interested in the internet or they did not find it useful (64 percent). Other frequently mentioned reasons were lack of knowledge or skills (35 percent)[6]. In the Netherlands, around 2 million people find it difficult to work with digital devices, such as a computer, smartphone or tablet [2]. According to Alexander van Deursen and Jan van Dijk, there certainly is a connection between the degree of literacy and the use of the internet. If one is digitally unskilled, one has an increased risk of being low-literate. However, low-literate people are not necessarily digitally unskilled [24].

The Vrije Universiteit Amsterdam and a working group of the municipality of Amsterdam did a large study named 'Bouwstenen voor Digitale Inclusie'[25]. The participatory research shows that minimums only see the need to become more digitally skilled when there is a need for it in their daily life [25]. For example, they are able to watch instructional videos via YouTube, as it requires little language skills and it is also free to use. In this way they develop so-called digital splinter skills: a limited number of digital skills that are highly developed, while other skills lag behind such as arranging government affairs online or finding directions [25]. In conclusion, to make the target group more digitally skilled, their needs and their environment should be well accounted for [25].

Information and communication technologies for development (ICT4D) is a field that studies the application of information and communication technologies (ICT) toward social, economic, and political development, with a particular emphasis on helping poor and marginalized people and communities in developing contexts of emerging and least developed countries [1,16,7]. In recent years, the field of ICT4D has grown rapidly [26]. It aims to help in international development by bridging the digital divide and providing equitable access to technologies [28]. Although the situation in developed countries is quite different from developing contexts, policy makers and practitioners in developed and developing regions could potentially learn from each other since they are both attending to marginalized communities. For example, in the Netherlands there is the advantage of a good digital infrastructure and the widespread availability of advanced technologies such as a smartphones and personal computers. However, there is not any research done yet concerning frameworks to guide projects catered to the bridging the Digital Divide and it is unknown if frameworks are even being used. Thus, it is fundamental to study how the different frameworks once developed for the developing context, fits into the situation in the Netherlands. On the other hand, the context in the Netherlands could also bear new insights to the frameworks used in developing countries.

## 2 Background and Context

### 2.1 Moving from Digital Divide to Digital Inclusion

In this section the findings of my interview with The Ministry of the Interior and Kingdom Relations (BZK) will be reported as a means to explore their outlook and to provide more context of the current state of the Digital Divide according to the government. Table 1 presents a summary of these findings.

To start off, the BZK does not often speak of a Digital Divide within their department due to existence of different understandings and concepts of what it actually entails. They prefer the term Digital Inclusion, which they view as supporting and promoting the basic skills of all individuals in the Netherlands, so that everyone can be a part of the digital society. This is done by providing grants to other parties such as the Royal Library, who can then make it possible. Hence, the BZK is not the party that develops online learning tools or give courses.

The government wants to ensure that everyone can be part of the digital society, even people that require extra help such as minorities. At the end of 2018, two actions plans were made with the goal to make it possible for everyone to participate in the (digital) society[1]. Since the plans have to reinforce each other, four main goals have been determined. Firstly, making digital services easier for everyone. It is important that as many people as possible can communicate with the government by themselves. This requires that everyone has access to the government and must be able to understand government information. Secondly, helping people deal with digitization. Although, the government is already doing a lot to help people with it, it is still not enough. The BZK plans to collaborate more with other government organizations. For example, with ministries working on social affairs and on education. And also with municipalities, because they have direct contact with people who need extra help. Thirdly, explaining the consequences of digitization. Digitization provides opportunities, but also risks. The government wants to provide more information about digitization and explain the consequences. This allows people to think about the role of digitization in their lives. Lastly, collaborate with companies and other organizations. Since companies, scientists and other organizations also know a lot about digitization, BZK wants to make use of this. Since last summer, various organizations in a network have been thinking together about digitization. This network is called the 'Alliantie digivaardig Nederland'. The aim is to expand this network and use it more intelligently. In this way even more knowledge and experience can be shared in the Netherlands.

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[1] https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/toegankelijkheid/digitale-inclusie/

**Main Challenges**

The BZK has identified two main challenges when it comes to fostering the Digital Inclusion. Firstly, researching and determining who is and who is not digitally skilled is very complicated. BZK states that "if you take a deeper look into how researchers investigate whether someone is digitally skilled or not, then you get very standard questions such as can you log in with DigiD or have you ever done business with the digital government. However, if someone were to answer yes, then he/she is defined as digitally skilled. On the other hand, if someone has not done online business with the digital government, he is not non-digitally skilled by default. Thus, the question remains as to how you can properly determine if someone is digitally skilled. Secondly, reaching the group that is not digitally skilled is also a challenge. The BZK expresses that 'it is funny that people say it is easy to reach the target group, since it often occurs that people do not know they have a problem. Organisations generally target specific target groups, so I can imagine that they have a pretty good picture of their target groups'. The difference between the government and a party from the market is that as a company, a product can be suitable for 80% of the people and they can simply choose not to cater to the remaining percentage. However, the government can never take that approach which makes matters more complicated. Furthermore, they also notice that the group of people who are not digitally skilled is very heterogeneous. It is not as simple as claiming that all elderly or all low-literate people are not digitally skilled. It is in all levels of the population which makes it difficult to reach the right people with one type of communication message or one motivation at the same time. Moreover, they have yet to see an enormous reach in people by libraries who have been giving computer courses to people at a local level for years.

**Focus towards the Digital Inclusion**

The BZK reports that the focus on Digital Inclusion has been immense in the past 1 to 2 years compared to before. There are many more movements and collaborations from the national level. The Digital Inclusion is currently high on the agenda, however, BZK also understand why some parties would want even more attention. The BZK does not want to claim that a lot is being done, but that it is being built up now.

**Fragmentation**

There are different clubs that use materials and also different organisations that produce materials, however, it is not all collected on one platform/place, which makes it unclear for users. Last year BZK spoke to many parties and the parties also indicated that it is a problem. It is difficult for them to resolve it together, since they all have some sort of self-interest and they indeed try, where possible, to complement each other. However, a certain competition arises and that is actually not desirable for this issue because everyone just want to help as many people as possible. The BZK is thinking of maybe doing something about it and they are also talking to the parties involved. It is natural to think that if the

**Table 1.** Summary of the findings of the interview with BZK.

| Theme | Findings |
|---|---|
| Main Challenges | Determining who is and who is not digitally skilled<br>Reaching the group that is not digitally skilled |
| Focus towards Digital Inclusion | Since the past year or two, the attention and sense of urgency of the Digital Inclusion is increasing |
| Fragmentation | There are different organisations producing materials, however, it is not all collected on one platform |
| Grants | The government grants subsidies, however, some parties want to remain self-organized which results in a dilemma as to whether they want the government to aid them financially |
| Municipalities | Every Municipality has its own agenda and has the power to prioritize what is important |
| Leaving it to the Market | The government aims to form an alliance between public and private organisations to effectively deal with the issue of Digital Inclusion |
| Bridging the Digital Divide | In order to bridge the Digital Divide the question of 'What is Digitally skilled' should be better understood and everyone should work together more intelligently |
| Actions | The government is actively looking at how they can reach the right people<br>A public campaign is planned to be launched in 2020<br>Lots of pilots are being ran to determine what works and what does not<br>The government is forming alliances and discovering more targets |

BZK makes sure that money runs differently, they might be able to do something about it. However, it is not that simple since those parties have all worked very hard and long and with good intentions on their products. Moreover, it is also quite difficult for the government to actively manage, since it will probably mean that preferences will have to be expressed and that is not necessarily what the governments wants.

**Grants**
There are some parties in the market that develop basic skills courses. These are organisations that have been self-organized for a long time, with some help of grants, although the government has not given much control from above. The BZK states that based on interviews that they held last year, the organisations themselves indicated that 'they are not yet in the ideal situation, even though they are able to decide stuff themselves', and suggest that the government could manage one approach at the national level. However, that always remains a field of tension because if the government takes one approach, every party will wish to remain in a position where they can determine their own operations. In addition, some parties generate their income by selling materials to ROC's which for the most part receives money from the government. Thus, indirectly there is government money involved. The BZK does not necessarily disagree with granting more money to small innovative organisations rather than established institutions and thinks that it is actually happening quite a bit since a great deal of money is going to the municipalities who are allowed to choose who or what they grant money to and that can also be small local initiatives. However, by granting money to all sorts of small parties and enabling a lot of freedom and diversity, the issue of fragmentation arises. On the question of whether government subsidised organisations do not effectively cater to users, the BZK stated that it is good point of attention and that certain grant conditions are being looked at and renamed. They recognize the danger of parties receiving grants becoming less alert on certain things at a given moment.

**Municipalities**
According to the BZK, there is a team from Vereniging van Nederlandse Gemeenten (VNG) working on the Digital Inclusion, however, not every municipality feels fully represented by the VNG. It is often the case that every municipality thinks a little different about things. If one body has deemed something as important, it is not the case that the others will unquestionably agree with it. It is always a field of tension, thus, the pursuit of Digital Inclusion really depends on where it stands on the agenda at the local level.

**Leaving it to the Market**
The BZK claims that they do not leave as much as possible to the market because of having a lack of possibilities and opportunities. The government has indeed directed a great deal of work at public and social organizations in recent years.

However, what is quite special for a broad issue such as the Digital Inclusion and digital skills, is the inclusion of companies since they have employees and customers and everyone must become digitally skilled at some point. A lot of companies are benefiting from digitization, they offer loads of products digitally or they have developed other products based on that, but they have not yet taken accountability and that is something that the government is currently pointing out to them. The BZK noticed that a lot of companies think that this a subject they also want to work on, so they also see the importance. The BZK does not see this as a way out of it, that 'we can not do it ourselves, so we leave it to the market', but rather we find it strange that we have not thought about doing it before. The government has also been inspired by the UK where they have the Good Things Foundation [2] which is a joint venture between public and private organisations. Through resources such as the government, there are all kinds of local parties, including libraries and small companies or organizations that can claim the resources that have been provided by the foundation and they can provide support in their own area.

**Bridging the Digital Divide**
The BZK expresses that an enormous amount of material has been developed in the meantime. There is not much more material to be developed and the big change will not come from modifying them. The BZK thinks that bridging the Digital Divide lies in everyone working together more intelligently and learning to understand the problem better, so that more suitable messages can be communicated. There are different types of people in different situations, so it is necessary to be able to better assess what digitization can mean for them.

**Actions**
Finally, there are different actions being undertaken by the BZK to foster the Digital Inclusion such as:

– The government is actively looking at how they can reach the right people and how to help them in the right way to do it themselves.
They have been having many conversations and acquiring experts and people to look at the problem from the outside or who have been involved with it for a long time, however, it is not that simple. Besides a large group of people not being digitally skilled, there is also a very large group that thinks that they do not have to be digitally skilled or that it is not something for them. They often do not realize that so much is happening online nowadays, for example, looking for a new home or applying for benefits or also social networks. The government does not want to force the people who do not want to be digitally skilled, however, they would like to inform them on what they are missing, by showing that it has an impact on our daily lives and not by praising technology.

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[2] https://www.goodthingsfoundation.org/

– The government will probably launch a public campaign in 2020.
  In recent years, the government has been giving local parties a lot of room to coordinate communication with the people they want to reach or what best fits in their particular environment.
– The government has been running a lot of pilots, from all sorts of people with ideas in order to test out what works and what does not for the people they are trying to target.
  Although this initiative brings some small insights, nothing has happened yet of which there was a double amount of registrations from one day to the other.
– The government is aiming to not only be the party that is connecting everyone, but also forming alliances, discovering more targets and looking at the accessibility of website and applications.

## 2.2 Frameworks & Approaches

As indicated by the situation outlined in previous sections, the circumstance in the Netherlands requires a study into the practices of Dutch organizations involved in bridging the Digital Divide. Since frameworks are not known to be used in this particular context, I resort to ICT4D frameworks to gain insight in to the practices of Dutch organisations. This section presents a set of different frameworks and approaches created to guide ICT4D projects in the developing context.

As can be seen from the high rate of unsuccessful projects, designing, building and deploying ICTs for people in low resource environments is challenging [7,15]. The occurrence of unsuccessful projects is mainly attributed to the lack of sustainability, evaluation and scalability [17]. Due to these issues, there are currently different sets of frameworks and methodologies to guide digital development projects constructed by researchers, practitioners and communities.

Keijdener et al. has identified development phases that are common to ICT4D frameworks [18]. Most frameworks start with an understanding phase to understand how the environment works and to identify stakeholders [18]. Afterwards, there is a requirement gathering phase. The third phase is a formalization phase where requirement analysis techniques are utilised to get clear requirements and formulate a design[18]. The fourth phase is a sustainability assessment and the final phase is the build (development), where the prototype is iteratively developed into the final product and implemented [18].

ICT4D frameworks often employ iterative methodologies. According to Joost Dijkers et al., agile improves ICT4D projects by facilitating user collaboration, improving team communication, enhancing organizational learning, and by frequently delivering software [8]. Examples of such frameworks are:

– ICT4D 3.0
  This framework focuses on a collaborative, adaptive, and iterative methodology [5].

- The DistRibuted Agile Methodology Addressing Technical Ictd in Commercial Settings (DRAMATICS)
  DRAMATICS is a repeatable software development methodology enabling the creation of sustainable, scalable and reusable ICTD solutions [9].

- Speedplay
  This framework combines agile iterative development with principles drawn from action research and participatory design [10].

- The Nordic Model
  The Nordic Model incorporates agile design methods with elements such as demand driven approach, non-hierarchical management, inclusion of diverse target groups and formative evaluation [12]

- The Analytical Framework
  This framework incorporates a project design approach using iterative development that could help practitioners in the field incorporate empowerment objectives for the marginalised participants to participate [11].

In 2012, a group of the most influential international development donors and multilateral organizations gathered, to reconsider policies and practice and institutionalize lessons learned for ICT4D [27]. The international development community has reassessed the mainstream practices in ICT4D programs and projects by examining and understanding the successes and failures in digital development [27]. It has formulated nine principles to make ICT4D projects and programs more user-centered, scalable and sustainable [27]. The nine Principles for Digital Development, were mainly established from the 2009 UNICEF Innovation Principles and the Greentree Principles created by 40 mHealth practitioners in 2010 [27]. A series of round table conferences in 2015 and 2016 among a broad community of ICT4D practitioners revealed barriers in putting these principles into practice [27]. Therefore, in addition to principles, the report also provides recommendations for Development Actors, Donor and Multilateral Organisations and Development Implementers to move from the principles to practice [27].

Moreover, the BID initiative principles, the UKs government Design Services Digital Principles and the World Banks Open Development Principles, have all used the nine principles as reference point [3,22,29].

As there are no publications on practitioners in the Netherlands and frameworks, I chose to assess the nine Principle for Digital Development for this research, since it a fairly recently published framework and it is the most thorough. A group of international development donors and multilateral organizations have gathered at several meetings to deliberate the principles specifically [27]. Therefore, it is also the framework that is mostly used and supported. In order to move from the Principles to Practice, practitioners were also part of the meetings and discussions [27]. Now the questions remains as to which extend these principles are indeed adequate in practice specifically in the Dutch context.

### 2.3    The Principles for Digital Development

According to Waugaman, the principles are nine high-level concepts that should be considered, ideally before funding, designing or implementing any technology supported development work [27].

The principles are formulated as [27]:

1. *Design With the User*
   *This principle is concerned with user-centered design in which the information gathered, leads to building, testing and redesigning tools until they effectively meet the users needs, by continuously gathering and incorporating users feedback. Through this approach, digital tools can be built to better address the specific context, culture, behaviors and expectations of the people who will directly interact with the technology.*

2. *Understand the Existing Ecosystem*
   *Analyzing the ecosystem, helps to ensure that selected technology tools will be relevant and sustainable and will not duplicate existing efforts. Moreover, by analyzing the ecosystem, factors that can affect an individuals ability to access and use a technology or to participate in an initiative are being considered*

3. *Design for Scale*
   *Designing for scale, aims to deal with the scalability issue of initiatives not moving beyond the pilot stage. It means thinking beyond the pilot and making choices that will enable widespread adoption later, as well as determining what will be affordable and usable by a whole country or region, rather than by a few pilot communities.*

4. *Build for Sustainability*
   *Building sustainable programs ensures users and stakeholder support and that their contributions are not minimized due to interruptions, such as a loss of funding. Such program is more likely to be embedded into policies, daily practices and user work-flow.*

5. *Be Data Driven*
   *A data driven initiative ensures that quality information is available to the right people when they need it and that they are using the data to take action. No amount of data will lead to accelerated impact if it is not used to inform decision making.*

6. *Use Open Standards, Open Data, Open Source, and Open Innovation*
   *An open approach to digital development can help to increase collaboration in the digital development community and avoid duplicating work that has already been done. Hence, programs can maximize their resources and ultimately their impact.*

7. *Reuse and Improve*
   *By reusing and improving, programs can adapt and enhance existing products, resources and approaches. While an existing tool or approach may not exactly fit all the needs for reuse, improving and building on it, rather than creating something entirely new should be considered. Furthermore, the time needed for development, testing and costs can be significantly reduced.*

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8. *Address Privacy & Security*
   *This principle involves careful consideration of which data are collected and how data are acquired, used, stored and shared. Measures must be taken to minimize collection and to protect confidential information and identities of individuals represented in data sets from unauthorized access and manipulation by third parties.*
9. *Be Collaborative*
   *Being collaborative means sharing information, insights, strategies and resources across projects, organizations and sectors, leading to increased efficiency and impact. By collaborating, those working in digital development and beyond can pool their resources and expertise not only to benefit each initiative but also to strengthen the global community* [27].

This paper is structured as follows: section 3, introduces the problem statement, research questions and research objectives. Section 4 elaborates on the Research Methodology and Approach by explaining the data collection and analysis process. Moreover, section 5 maps the field of practice to provide an overview of all the organisations interviewed. Section 6 presents the results from the different analyses performed, which includes a case analysis and a theme analysis. Finally, section 7 discusses the results and findings and section 8 presents the conclusion.

The contribution of this paper will redound to the usefulness of the Principle for Digital Development in contexts other than the developing context, particularly in the context of the Netherlands. Furthermore, it provides insights into the practices of service providers catered to the Digital Divide in the Netherlands that may be useful to ICT4D practitioners. Finally, it presents an overall view of the current Digital Divide in the Netherlands by combining insights from policy and practice.

## 3 Problem Statement & Research Question

Although the work and effort from the international development community seems thorough and well-thought, the question remains as to what extent the principles are realistic to implement by practitioners and if they will eventually lead to more successful outcomes. This research is focused on the Digital Divide in the Netherlands and intends to assess the principles in this context as well. Since the aforementioned frameworks and studies are mainly focused on international ICT4D, this study aims to explore what the situation in the Netherlands is like, considering that the Netherlands context differs from the international one. There has not been research conducted yet in to the state of affairs of organisations in the Netherlands that are trying to bridge the Digital Divide. This research is the first study to analyze the context on the side of service providers and policy makers. Therefore, the research question of this study is: How useful are the Principles for Digital Development according to Digital Divide practitioners in the Netherlands?

In order to provide more meaning to the term 'useful' some additional sub questions have been formed which are:

– Which are the most relevant/important principles?
– Which are the least relevant/important principles?
– Which principles are deemed as challenges?
– Which principles are not deemed as challenges?
– Are there principles/concepts that were not mentioned but are still relevant/important?

This paper aims to offer answers to whether the nine design principles are applicable for the context in the Netherlands and if there can be lessons learned from these principles. The results of this research are intended at providing a reference point to other practitioners who are implementing ICT4D projects in practice and to inform policy about the implications of the principles in practice. Additionally, this research studies the policy and practice in the Netherlands and combines findings from the government at the highest level and the different service providers at the lower level in order to present an overall picture of the Digital Divide in the Netherlands.

## 4 Research Methodology and Approach

### 4.1 Research Design

To answer the research question, an exploratory multiple-case study was performed where different practitioners who are engaged in bridging the Digital Divide were consulted, to discover how they view the nine principles with regard to their own practices and projects. Thus, the unit of analysis of this research is Digital Divide practitioners. This research method is applicable for this study since several cases were examined to understand the similarities and differences between the cases. This study is exploratory since the intention is to gain insight into existing Digital Divide practices and analyze to what extent they coincide with the nine design principles [30].

### 4.2 Data collection

In order to answer the research question, data was collected through interviews with key Digital Divide practitioners of several organisations that are involved in bridging the Digital Divide. For feasibility reasons, the Digital Divide practitioners are all based in the Netherlands. The interviews with the practitioners were conducted in a semi-structured way, in order to thoroughly obtain valuable qualitative data [14] (See Appendix A). A table with the list of interviewees and interview information can be found in table 1.

The aim was to interview as much service providers involved in bridging the Digital Divide in the Netherlands. In the initial stage of the research I attended the Digi Challenge 2 event by Pact where I got contact details from two organisations. From these interviews I got a few additional contact details. In order

**Table 2.** Information about the interviewees and the interviews.

| Name | Organisation | Position | Duration of Interview |
|------|------|------|------|
| Interviewee 1 (I1) | Stichting Expertisecentrum Oefenen.nl | Director | 60 minutes |
| Interviewee 2 (I2) | Stichting Lezen & Schrijven | Educationalist | 29 minutes |
| Interviewee 3 (I3) | SeniorWeb | Manager of the Editorial Department | 40 minutes |
| Interviewee 4 (I4) | Instruct Educatieve Uitgeverij | Product Developer | 56 minutes |
| Interviewee 5 (I5) | Stichting Leer Zelf Online | Creative Director | 36 minutes |
| Interviewee 6 (I6) | Lost Lemon | Customer Success Manager | 54 minutes |
| Interviewee 7 (I7) | The Ministry of the Interior and Kingdom Relations (BZK) | Senior Policy Officer (Digital Inclusion) | 66 minutes |

to further obtain more contacts, I had to resort to online research and online contact forms on organisations' websites where I was fortunate enough to attain a couple more contacts. Finally, through the department at the university I was also brought in to contact with an organisation. The organisations I interviewed were chosen based on whether they are service providers catered to the Digital Divide in the Netherlands. In addition, I opted to interview the BZK to gather an overall picture of the current state of the Digital Divide at governmental level. Overall, the organisations involved were all very enthusiastic to be part of the research and were quick to reply and make appointments. Since the BZK is part of the government and does not actually develop digital materials, a different set of interview question had to be constructed to suit the case (See Appendix B). The questions from the interview with the BZK were mainly established from information collected through interviews with the service providers. Most of the interviews were conducted by phone due to the busy schedules of the persons involved. As a result of the semi-structure nature of the interviews and the enthusiasm of the interviewees on the topic I was able to gather plentiful data without having to consistently intervene and guide the conversation. At times, however, what was meant by certain principles was not clear, so further explanation had to be provided. I was surprised at the openness of all interviewees and their non reluctance in sharing information and opinions. I tried to incorporate every new insight gathered from a interview in to the next one. Especially for

the interview with BZK, all the insights from the service providers were collected and afterwards transformed in to questions.

### 4.3 Data Analysis

The data was analyzed by using an inductive approach and by following the iterative method of First and Second Cycle coding proposed by Miles (2014) [20]. Firstly, the data collected was coded by using elemental methods such as In Vivo and Process coding. Moreover, a set of Provisional codes were also generated based on the Principles for Digital Development. Thereafter, pattern coding, as a Second Cycle method was applied to group the First Cycle codes into a smaller number of themes relating to the nine principles to determine the extent to which the data conforms with the theory. The idea was to analyse each case separately, and then explore patterns of similarity or difference with regard to the theory.

The data analysis was performed by following these steps:

1. Transcribe data
   In order to obtain verbatim record from the conducted interviews, the interview recordings were manually transcribed.
2. Organize data
   In this step, the data was organized to familiarize with the data and structure the data. The data was organized according to the themes of the nine design principles by utilizing ATLAS.ti[3]. During this process the data was also cleaned to eliminate information that may not be important and filtered to identify the most important points and the less important ones.
3. Code data
   The remnants of the previous step were coded based on patterns found in the data and categorized into themes and categories.
4. Analyze data
   Finally, the cases were analyzed on the basis of the nine design principles. The focus was on finding patterns of similarity and difference through text analysis. To further interpret the data, primary and secondary data comparison was utilized. Which means that the findings of the interviews are compared to the theory of the nine design principles and the difference between them discussed.

## 5 Mapping the field

This section presents a case description to provide background information on the companies interviewed and what they are focused on with regards to bridging the Digital Divide in the Netherlands. As aforementioned, I was able to get in contact with the organisations through attending events, online research and contacts established. Table 3 presents an overview of the organisations, their target group and the amount of users they cater to.

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[3] https://atlasti.com/

**Table 3.** Information about the organisations interviewed.

| Organisation | Target Group | Users |
|---|---|---|
| BZK | Every citizen of the Netherlands | N/A |
| Stichting Expertisecentrum Oefenen.nl | Low-literates, Computer illiterates, Seniors | aprox. 500.000 |
| Stichting Lezen & Schrijven | Low-literates | aprox. 80.000 |
| SeniorWeb | Seniors | aprox. 150.000 |
| Instruct Educatieve Uitgeverij | Primary, Secondary and Secondary vocational education students, Low-literates | All regional training centers in the Netherlands |
| Stichting Leer Zelf Online | Mentally disabled people, Low-literates, Seniors | aprox. 1.000.000 |
| Lost Lemon | Low-literates | 50 municipalities as client |

***Stichting Expertisecentrum Oefenen.nl*** [4] is an organisation that provides people with a platform where they can improve their basic knowledge and skills. Their target group consists of low-literates, computer illiterates and seniors. There are a number of organisations such as libraries that have a license on oefenen.nl, however the focus is on individual users at home. They design materials to help improve skills such as language, maths and digital skills. A large part of the programs consists of videos, animations and interactive exercises. In this way, learning becomes extra attractive. They also have modules dealing with money, education and health. Their program aimed at improving digital skills is named Klik&Tik. The programs are made for the users to practice with so they can eventually improve their skills. Thus, oefenen.nl is not made for someone that has no digital skills whatsoever. People who successfully complete the exercise program receive a certificate.

***Stichting Lezen & Schrijven*** [5] was first focused on low-literates, but has now recently transitioned to helping to improve basic skills and knowledge such as language, maths and digital skills. The existing teaching method Success! is now expanded with 'Success! Digitale Vaardigheden' and a matching e-learning environment. In the course of 2019, various pilots will start to test the new material. It is intended for people who want to improve their digital skills, such as in using a smartphone, laptop, tablet or desktop. Moreover, it increases the understanding of the digital world such as searching and reviewing information, app, mail and be aware of digital security and privacy. The programs come with

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[4] https://oefenen.nl/
[5] https://www.lezenenschrijven.nl/

exercise books that contain daily situations from the lives of adults and it is a method intended to be used with guidance by a volunteer. Succes! Digitale vaardigheden is part of a collaboration program named Taal voor het Leven. Taal voor het Leven is offered by Stichting Lezen & Schrijven and financed by the Government.

**SeniorWeb** [6] develops step-by-step content and various materials to make senior citizens digitally skilled in programs such as Windows 10, tablets and smartphones, WhatsApp, internet security and more. They focus on seniors 67 years and older. In addition to the content they offer, they also offer PC help. People can contact them online and ask questions or even get help at home from one of the 2900 senior volunteers. SeniorWeb also has 420 learning centers throughout the Netherlands where experts and volunteers give computer courses, workshops and open sessions. The course topics offered are diverse: tablets, Facebook, Windows, security, photo editing, order on your PC and more.

**Instruct Educatieve Uitgeverij** [7] is an educational publisher, which means that they mainly make materials for primary, secondary and secondary vocational education. They do not make materials for higher education. Instruct offers methods for digital security, social media, language and math, computer skills, IT and typing skills. The method that Instruct has created for Digital Literacy is named DIGIT. It offers modules such as Basic Knowledge ICT, Information Skills en Computational Thinking that provide a broad basis for the efficient use of computers, tablets and mobile devices. In the Media Literacy section, students learn how to deal with and become aware of a large number of possibilities of social media. Besides DIGIT, Instruct also offers other methods catered at improving Digital Skills. Recently, they started working on materials for low-literate people.

**Stichting Leer Zelf Online** [8] is committed to making vulnerable groups in society more self-reliant in a world that is becoming increasingly complex. The foundation does this by giving all people the opportunity to learn online by themselves and, where necessary, to support them offline. They develop websites and apps for people with mental disabilities, low-literates, seniors, people with temporary impaired cognitive skills and for everyone who can use it. They use an intuitive design, with clear buttons to make the programs easy to operate. The content of the e-learning environment is characterized by simple text, short sentences and frequently used words. Visualization of the content is used as much as possible and all texts are read aloud when desired. All their products are developed with focus groups, usage tests, panel studies and a strong involvement of the end user in the broadest sense of the word. They have a method named Steffie which is aimed at making programs and digital information easier. Steffie helps with topics such as DigiD, banking, insurances and voting, to name a few.

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[6] https://www.seniorweb.nl/

[7] https://www.instruct.nl/methoden/digit/

[8] https://www.leerzelfonline.nl/home/

**Lost Lemon** [9] mainly helps 50 Dutch municipalities with bridging the digital gap. They provide the tools so that the municipalities can create digital forms that are both optimized and easy to use. They also provide support training on the lesson-learned from previous trajectories and how to optimally construct a digital form. Municipalities can also request a form design session with target groups.

# 6 Assessing Practice against the Principles

This section contains the two different analyses done. It consists of a case analysis where the Principles for Digital Development are analyzed and a theme analysis offering additional concepts that emerged.

## 6.1 Case Analysis

In this sub section I analysed the cases with regards to the Principles for Digital Development. I reported the results from the interviews for each nine principle respectively. Additionally, a summary of the findings can be found in Table 3.

**1. Design with the User**
Most organisations reported that they are usually applying this principle, with the exception of (I6) stating that "We want to do it, we know we have to, however, we can not always do it because it is just very expensive. We are now doing it ad hoc, so when the municipality deems it important and supports us financially, we do it". The difference between the organisations applying this principle lies in the extent to which they design with the user and when they do it. For example, (I3) states that "It depends on what kind of content we are developing and the risks attached to it". If there is a very low risk, they will usually use statistics afterwards to look at how the users are responding to it and modify the materials accordingly. In the case of a higher risks, they lean more towards testing to minimize risks and ensure successful materials. (I3) states that "We always test, we test a lot with our seniors. We have a panel where we can present a lot to". Another example is (I1) stating that "We don't do much with designing with the user, since we work with many people who have direct contact and experience with the target group and with their needs. I am well aware that doing everything with a target group is seen as 'hip', however, it is not necessary for everything". They only do it when they run in to something or when they are in doubt. On the other hand, (I5) thoroughly designs with the user and does everything with focus groups and states that "Focus groups is actually the basis of everything".

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[9] https://www.lostlemon.nl/

**Table 4.** Summary of the analysis of the Principles for Digital Development.

| Principle | Similarities | Differences | Constraints |
|---|---|---|---|
| Design with the User | Every organisation is applying it except for (I6) | An organisation such as (I5) is thoroughly applying it while others claim that it depends on the scenario | Very expensive & time consuming (I6) |
| Understand the Existing Ecosystem | Every organisation deemed this principle as very relevant | (I1) claims that its target group does not necessarily go along with every new technology and advancements | New technologies emerge fast |
| Design for Scale | Every organisation claims to have this principle adequately implemented | - | - |
| Build for Sustainability | All organisations have a form of income and their own way of keeping afloat | All organisations have different ways of dealing with the principle such as licences or yearly subscriptions | Difficulties finding funding |
| Be Data Driven | Every organisation view it as indispensable and are applying it in some way | All the organisations have their own way of handling and utilizing data | - |
| Use of Open Standards/Data | Most organisations are not applying this principle | (I6) is major proponent of this principle and is the only organisation applying it | Not being able to be self-sufficient due to sharing information |
| Reuse and Improve | Every organisation claimed that this principle is an essential principle that they are applying | (I2) claims that they are not necessarily reusing but more improving | - |

| Principle | Similarities | Differences | Constraints |
| --- | --- | --- | --- |
| Address Privacy & Security | None of the organisation indicated having difficulties with this principle and they all agree with being cautious with their users data | - | - |
| Be Collaborative | Every organisation interviewed sees the importance of being collaborative and are applying this principle | (I4) is not profusely dealing with the principle as the other organisations are | - |

## 2. Understand the Existing Ecosystem

Every organisation deemed this principle as very relevant, particularly since by applying this principle they are able to keep the content they offer appropriate and updated to the needs of their users. However, the organisations reported that this principle is difficult to keep up with since nowadays new technology emerges fast. (I2) stated that "We must always know what is being used, however, the technological development is going very fast and the ecosystem is constantly changing". Similarly, (I1) states that "We see the possibilities of new technology and they are actually progressing way too fast to keep up with". However, (I1) also stated that "We work with a target group that does not go along with the technology and advancements, but we do follow the developments".

## 3. Design for Scale

Every organisation claimed to have this principle adequately implemented. (I4) stated that "We certainly ran into issues in the beginning because we had not properly estimated how many users should use the environment simultaneously, which caused delays. However, after so many years we really have it set up properly".

## 4. Build for Sustainability

The organisations all have different ways of dealing with this principle. For example, (I3) states that "We are an association but we must fend for ourselves, so we do not receive any government support, nothing at all. People can join us for 32 euros per year". (I4) also has a revenue model and states that "That is also the reason why we have opted for subscriptions or licenses to ensure that there is continuous cash flow. New licenses must be purchased after every year or two years". Other organisations such as (I1) and (I5) believe in providing a free service for the end users. (I5) states that "We want everything for the target group

itself to be free. Hence, the municipalities and companies that use it pay, but always provided that it is free for their end users". On the other hand providing a free service can be conflicting, (I1) states that "Every year, the point of which we do not know if we can continue to exist is present. We succeed every time. The dependence on large customers such as the Royal Library, is very tricky for us. We would prefer to stay focused on end users but there are others who pay and you have to tackle that". (I5) states that "What we spend a lot of time on is finding funding because at times it is difficult to find". (I6) has taken into account for their clients to continue on utilizing their solutions stating that "Because we use open source solutions, that is possible. We have agreements with our customers that should we go bankrupt, we will hand over everything".

### 5. Be Data Driven
This principle is viewed differently among the organisations, although, they all view it as indispensable and are applying it in someway. (I6) states that "We are very much driven by data and data that can be found, so we can use it and make it useful". They are using data to make predictions, to monitor where people are making mistakes on a website and to design standards with which you can exchange data between systems. (I1) also reported to be using data to monitor where people are making mistakes, it states that "Every year we receive an overview of data where people get stuck in the programs and we use this information to make adjustments to the materials". However, (I1) also states that "We have so many people online, so then we should do something with their data. I do not know anything about data, I only see that it has to be done, so we have to find people with knowledge about data". Moreover, (I4) uses data in an alternative way as well stating that "We do not use data to develop the content of our products, but we are looking at how we can efficiently get our potential customers' attention". On the other hand, (I5) states that "Data driven is a must, but I think it's a bit of a hyped term. It also ignores the people who use it. We look at what is in demand, but it is not that we collect user data or location data. We only use data for the sole purpose of developing the materials. Being data driven must never be a goal in itself". Finally, (I3) believes that "You can never blindly work on information alone. Information can only give a signal of a certain trend or something, but then there is also a piece of common sense".

### 6. Use Open Standards, Open Data, Open Source, and Open Innovation
Most organisations are not applying this principle. (I4) states that "We are a publishing company. We are self-sufficient, so we just have to make sure that we sell our products so that we have a right to exist. Therefore, we do not share things via open source, because that does not produce anything, we cannot survive of that". (I1) has a different outlook and states that "It is just how you define open source. Our materials are available to everyone free of charge, I also call that open source. With regards to the technology no, we need something tailor-made because most technologies do not focus on this target group". Fur-

thermore, it was also revealed that (I1) once tried to implement Google's speech technology, however, the conditions changed and they had to stop using it. (I1) states that "But that is also the thing with open source, it's constantly changing, so we do not use it. But where possible, we will use it". On the other hand, (I6) is a major proponent of open source and states that "We do that as much as possible, we cannot always use it, because we also work with systems from large parties and they are not always keen on open standards and open source. However, our starting point is always open source and open standards and our customers want that too".

### 7. Reuse and Improve
Every organisation claimed that this principle is an essential principle that they are applying. (I3) states that "I think that is the basis. If our content is not up-to-date, then we have a problem. This actually takes the most of our time, building something new is not that difficult, but keeping existing content neat and relevant is the biggest challenge. Furthermore, (I6) states that "We ensure that the municipalities are able to reuse things from each other. We have a cloud solution, so there is a collection of systems on it and they are constantly being improved, because what we implement for one, the other can use". Finally, (I2) states that "We especially expand on our existing projects, we are not yet in the phase where we are really reusing, but we are improving existing projects. Our digital skills materials came from improving existing projects".

### 8. Address Privacy & Security
None of the organisation indicated having difficulties with this principle and they all agree with being cautious with their users' data. (I1) states that "We don't collect that much data at all from our users, and we deliberately chose to do so because we deal with a target group that is a bit anxious". Similarly, (I4) states that "We are aware of what data we store, we store student data and test results data and we make sure that we deal with it properly and that we are not easy to hack". Finally, (I6) states that "Our customers just think it is very important, everything that the customers fill in on those forms is only allowed to be accessed by the receiving parties. We cannot offer our products at a social service if we do not have security and privacy in order".

Noteworthy is most organisations mentioning the European privacy law 'Algemene verordening gegevensbescherming' (AVG) when discussing this principle.

### 9. Be Collaborative
Every organisation interviewed sees the importance of being collaborative and are applying this principle. Every organisation except for (I4) says that they are profusely dealing with this principle. (I4) states that "We do not have many partners with whom we develop content together with, but we do have some", whereas (I1) goes as far as stating that "We have to work together, we cannot do anything by ourselves. We actually only collaborate".

## 6.2 Theme Analysis

In addition to the principles above, some themes have also emerged during the coding process. These are findings that are not related to the theory of the principles and that I personally found relevant to report. Table 4 presents a summary of these findings.

**Face-to-Face guidance**
This theme involves the importance of providing face-to-face guidance to end users. (I3) states that "Face-to-face guidance is very important for the elderly, but what also makes a big difference is speaking the language of the senior and that often means having a good understanding of the problems their dealing with". They also have 420 learning centers throughout the Netherlands. Many are in the library and central public accessible places. Furthermore, (I4) states that "We think it is very important that our users are well aware of the possibilities within the environment and if they are not, we will brush them up and that is always free for paying customers, it is just part of the service package". Additionally, (I1) states that "We are strong proponents of not only online learning but also to face-to-face guidance, because people make more progress this way. In the group of low-literates, people also have the social need to sit in a group together.

**Challenge VS no challenge reaching the marginalised community**
This theme highlights the opposing views when it comes to reaching the disadvantage community. (I5) states that "If you just step out to the neighborhood and chat with people, you establish contact and you hear what happens. We have a very broad social scope". Similarly, (I1) reports that "We experience no challenges in reaching marginalized community, although that is the perception of the municipality". Moreover, (I3) states that "We reach a lot of people, we often come across Twitter or other social media channels where people report that they found an answer at Seniorweb. The question often is whether people also want to pay for the information and you can see a difference in that as the younger someone is, the less open they are to it since they are used to information being available for free". Contrarily, (I6) states that "According to me, designing together with the target group is the most challenging for all organisations because you have to have a good overview of your target group and you have to be able to find them and every time you have to have a fresh batch of target users because a low-literate person is not low-literate anymore after 3 test sessions. The positive is that you make them digitally proficient with test sessions and the disadvantage is that you cannot use the same people again". Their research group together with the library, developed a method for finding low-literate people when doing a project.

**Table 5.** Summary of emerged themes.

| Theme | Findings |
| --- | --- |
| Face-to-face guidance | Providing face-to-face guidance is important to end users and they make more progress this way |
| Teachers | Teachers must be digitally proficient and must also be taught in order to effectively help end users |
| Newsletters | Newsletters are important in helping users to stay updated and find content |
| Challenge vs No Challenge reaching the marginalised community | The opinions as to whether reaching the disadvantage community is a challenge differs greatly among the organisations. Some reports that it is not a challenge at all, while others think it is the most challenging |
| Other ways of working | (I4) mainly develops course materials based on published learning goals<br>(I6) firmly believes in open source and tries to incorporate it as much as possible<br>(I5) has a very practical way of working and believes that this should be the norm especially when dealing with disadvantaged communities<br>(I3) incorporates a step-by-step method in all its materials in order to cater to their target group |
| Recommendations | There is never a wrong formula, as long as your always testing with your users<br>Express things as clear and simple as possible for the end users<br>Make valuable data available to the world so everyone can learn from them. In this way, a network of people dealing with the same issues is created<br>Listen carefully to people and address the biggest problem first and quickly produce results<br>Stop with producing scientific research but rather take action |

| Theme | Findings |
| --- | --- |
| Government | Municipalities simply do not have enough money to allocate, they receive a huge number of tasks to deal with and they find it difficult to spend the money in a proper way |
| | The central government does not have the Digital Divide high enough on their agenda, so within the Netherlands there is just not enough attention towards the issue |
| | The BZK does not always have the possibilities/opportunities and hopes to leave as much as possible to the market |
| | The government should give less money to established institutions and more to small innovative companies that solves issues through practice |

**Teachers**

This theme is concerned with the persons teaching and helping end users to be digitally skilled. According to (I1), there is a bottle neck when it comes to digital skills materials that stems from teachers and not from students. (I1) reports that "Teachers are not digitally proficient in any way and often keep participants away from materials that are available. In the meanwhile, basic skills modules have also been developed for teachers. The discussion is now about what knowledge a teacher must master so that they can effectively help the end users. (I2) also mentioned that they offer training to volunteers that are teaching end users. Furthermore, (I3) have their own way of teaching end users and states that "End users can even get help at home, one of our senior volunteers comes by for a small fee. Our volunteers are all seniors themselves, so they understand exactly where users run into problems". The courses they offer varies per lesson location and are also dependent on the volunteers what knowledge and expertise is available at a particular location.

**Newsletters**

This theme addresses the importance of newsletters by taking (I3) as an example who stated that "We have a lot of newsletters, which is also specific to the target group because if you don't specifically point them out, then they often do not find it".

**Other ways of working**
In this theme all the alternative or peculiar ways of working will be addressed. (I4) makes course materials based on learning goals that have been published. They ensure that all learning outcomes are incorporated into the material. This way of working has its perks as some modules are reviewed by examination offices which they receive an approval certificate for. Furthermore, (I6) firmly believes in being open source. (I6) states that "If I put the technology in order for one municipality, the other 49 municipalities can participate at the same time. In this way, they can all exchange with each other and get better from it. Hence, the other municipalities can use it even though one municipality is the only that paid for it. Moreover, (I5) does not believe in scientific research but more in doing. (I5) states that "We really believe in practical work. We ask people, we do a lot of field research with people with a mental disability, or people who come to the food bank. We go into the neighborhoods and we interview the people there. You often come across more this way, than with all kinds of scientific research. The only thing is that it is very practical. You have to focus on the conversation and you have to make sure you ask open questions and you have to make people feel comfortable, so always bring food, a gift card, Chinese food, pizza ... you name it. These ingredients are much more important than any method or research". Finally, (I3) incorporates a step-by-step method in all its materials. (I3) reports that "We have a step-by-step method especially in favor of the elderly, but that is also something that everyone likes, but with seniors it is explicitly important to have a step-by-step method". However, this way of working brings challenges relating to fragmentation and keeping information up-to-date and tailor-made for seniors to remain relevant. (I3) states that "If there is a deviation between the reality and the material, for example, if something has 4 steps instead of 3 or the button is in a different place or it has a different name.. Well if you are a little younger, you will figure it out but a senior will think "I can't find it" so he/she quits".

**Recommendations from Service Providers**
This theme provides a list of recommendations given by the organisations.

- There is never a wrong formula, as long as you are always testing with your users.
- Express things as clear and simple as possible for the end users.
- Make valuable data available to the 'world' so everyone can learn from them. In this way, a network of people dealing with the same issues is created.
- Listen carefully to people and address the biggest problem first and quickly produce results.
- Quit producing scientific research but rather take action, since many reports are already written and screams bloody murder, however, if no one does anything then nothing will ever change.

**The Government's role according to the Service Providers**
A reoccurring theme in the interviews held was the government. This theme reports the different opinions and views the organisations mentioned.

– Municipalities simply do not have enough money to allocate, they receive a huge number of tasks to deal with and they find it difficult to spend the money in a proper way.
– The central government does not have the Digital Divide high enough on their agenda, so within the Netherlands there is just not enough attention towards the issue.
– The BZK does not always have the possibilities/opportunities and hope to leave as much as possible to the market.
– The government should give less money to established institutions and more to small innovative companies that solves issues through practice. This is much more effective than, subsidising government-related clubs that burn a lot of money without providing valuable output.

## 7   Discussion

In this section I present and discuss the findings of this research in order to answer the research questions.

### 7.1   The application of The Principle for Digital Development among practitioners in the Netherlands

To start off, there was only one principle that most organisations were not applying and regarded as less important except for one organisation, which is Use Open Standards, Open Data, Open Source and Open Innovation. Most organisations are self-sufficient which results in the thought that they cannot adopt an open approach, otherwise they will lose income and cease to exist. The reason for which [I7] is in favor of an open approach may stem from its customers mainly belonging to the public sector and the fact that its service is not catered to developing materials as the other organisations are.

There are two principles in which all organisations interviewed reported not having difficulties with and deemed evident namely: Design for Scale and Address Privacy & Security. Both principles are technology related which explains why they are no challenges to the organisations involved. The principles for Digital Development were essentially constructed for the context of developing countries where technology is not yet readily available, as opposed to Netherlands where technology is readily available. Furthermore, Design for Scale was considered one of the least important principle since organisations consider it as something evident.

Every organisation thought of these next three principles as important and indispensable which are Be Collaborative, Reuse and Improve and Be Data Driven. There were only minor differences regarding the application of these principles

for some organisations. Although, the organisations are not keen on an open approach which can help to increase collaboration, they do see the importance in collaboration. As for Reusing and Improving, the organisations all stated that it is a core part in developing their materials especially in the context of digital materials that are constantly changing. Be Data Driven is mainly applied to inform decision making with regard to the materials developed. In other aspects most organisations are not actively using data with some thinking that what they are currently doing is sufficient and that information obtained from data should be validated at all times.

The remaining three principles which are Design with the User, Understand the Existing Ecosystem and Build for Sustainability are all principles with some form of constraint attached although some of them are considered the most important principles. Design with the User is a principle regarded as very important among all the organisations, although they are not always actively working with their end users as [I5] is. Some organisations have a very defined target group, which makes it possible to have a process in place to fully commit to their target group without the need to always have the users to be part of every step of the design process. Furthermore, the organisations receive feedback on their materials on a regular basis from learning centres that directly work with the users. The context in the Netherlands facilitates this principle as in a developing context the logistics are not as optimal. Understand the Existing Ecosystem is a principle very relevant to the context in the Netherlands since technology emerges fast along with the e-government and all sorts of online services. For this reason, this principle is much more difficult to keep up with in the Netherlands than in a developing context. Although the majority of users might not keep up with technology advancements, as an organisation in this context it is still important to keep up with the advancements and updates in order to cater to all users and their respective needs. In essence, the organisations are not applying Build for Sustainability in the way that is intended to, which is with institutionalization as end-goal. Through the interviews it became apparent that most organisations do not aspire to achieve this end goal as they want to be able to make their own decisions at all times. (I2) is the only institution among the organisations. The organisations are all doing what they can do to keep their business running with some organisations even offering free access to materials, although it might be difficult sometimes to acquire funds. In this regard, the context in the Netherlands is also different from the developing context since end users and the public sector in the Netherlands are not necessarily poor and have the means to be able to pay for services.

To conclude this section, Table 6 presents a categorization of the principles according to the interviewees. As can be seen from Table 6, Understand the Existing Ecosystem belongs to the mostly important and challenging principles and Design for Scale to the least important and least challenging principles. Although the principle Reuse and Improve is an indispensable principle that is greatly applied, it is not considered belonging to none of these categories.

**Table 6.** The principles categorized

| | |
|---|---|
| Mostly Challenging | Understand the Existing Ecosystem<br>Build for Sustainability |
| Least Challenging | Design for Scale<br>Address Privacy & Security |
| Most Important | Design with the User<br>Understand the Existing Ecosystem<br>Be Collaborative |
| Least Important | Design for Scale<br>Be Data Driven |
| Mostly not applied | Use Open Standards, Open Data, Open Source and Open Innovation |

## 7.2 Further Findings

In order to effectively aid end users in this context, face-to-face guidance, teachers and newsletters are essential. It is known that face-to-face guidance and teachers are mutually inclusive and should not be underestimated [21]. As end users often have difficulties finding what they are looking for online, newsletters are a convenient way to help keeping them informed. Additionally, in this particular context it must be ensured that teachers are digitally proficient as well and continuously taught so they do not inhibit end users who are often already confused.

## 7.3 Tying it all up

It can be concluded that all principles are being applied except for Use Open Standards, Open Data, Open Source and Open Innovation, thus the manner in which the practitioners view these principles is as quite relevant and important. Additionally, most principles are realistic to implement as well, except for aforementioned principle which stems of the self-sufficiency approach most practitioners take when applying Build for Sustainability. The Principles for Digital Development definitely ensures successful outcomes, however, in the Netherlands organisations are already actively applying them, with some principles such as Design for Scale and Address Privacy & Security not even being challenges due to the self-evident nature of the principles. Thus, in this case the extent to which the principles lead to more successful outcomes cannot be concluded. However, there are very important principles such as Design with the User, Understand the Existing Ecosystem and Be Collaborative which ensures project success. Finally, applying the principles cannot be deemed effortless since Understanding the Existing Ecosystem and Building for Sustainability are considered as challenges.

From my further findings I concluded that there should be a principle in place that deals with the users after development as well. Thus, not solely Designing with the Users, however, also Maintaining the Users. This will enable organisations to further extent their users' commitments and the sustainability of their service by not only designing something catered to their needs but also ensuring they know how to fully and properly utilize the solution. Similar to the service providers in the Netherlands, Maintaining the User should take a long-term approach by regularly sending out newsletters and providing learning centers with teachers who are constantly trained in working with the service.

## 7.4 Bridging the Digital Divide in the Netherlands

In this section some suggestions on the steps needed to bridge the Digital Divide will be presented based on the findings of this research.

Firstly, what is important to note is the opposing views when it comes to reaching the disadvantaged community. On one hand you have some practitioners claiming that reaching the disadvantage community is not a challenge while the government believes that it is. In this case, following the recommendation of one of the practitioners expressing to stop pursuing scientific publications and to take action will likely help resolve this issue, although it is time intensive. The government reported that determining who is not digitally skilled is one of the biggest challenges in bridging the Digital Divide. According to van Deursen, the most valid research method to determine the level of digital skills are through performance measurements which are inevitably time-consuming and costly [23]. The government has a duty to cater to every citizen in the Netherlands, which has to be the approach they take. The Digital Divide will probably only keep on growing onward, thus, spending a great deal of time on understanding the problem rather than actively taking action will not solve this issue since the group is very heterogeneous and in all levels of the population. As the government also mentioned, most people are not even aware that they might not be digital skilled so the issue should firstly be tackled on a national level with campaigns and the promotion of training facilities where everyone is welcome. The insights from this initiative can be utilized as a means for figuring out more direct and effective approaches.

Furthermore, the issue of fragmentation should be addressed. A great deal of materials are being developed by diverse organisations and there is no overview of all the materials available in order to inform end users and to prevent duplicate efforts. It was suggested by the representative of BZK to create a platform with the necessary information, however, the proper manner in which this should come about is unclear. A first step should be taken in at least developing such platform and afterwards looking at the technicalities of competition. Setting up something such as the Good Things Foundation where everyone effectively collaborates together with the one main goal in mind of bridging the Digital Divide seems promising. The government has to make it appealing for the organisations to participate in such initiatives by showing the organisations that this is an

issue the government think of as important and by providing the appropriate resources.

# 8  Conclusion

In this paper I attempted to answer the research question 'How useful are the Principles for Digital Development according to Digital Divide practitioners?' In addition, I presented an overall picture of the Digital Divide in the Netherlands. In order to answer the research question, I investigated the application of the Principles of Digital Development in several organisations involved in bridging the Digital Divide in the Netherlands. It appears that the organisations are applying all principles except one and consider them as essential to project success. The difference between the organisations lies in the extent to which a principle is viewed as important and whether a principle is seen as a challenge.

Moreover, this paper provides theoretical implications on the addition of a new principle, namely Maintaining the User. This principle is concerned with sustaining users after the development process by assisting them with navigating and understanding the service developed, to further ensure user commitment and sustainability of the service.

In order to bridge the Digital Divide at national level, the problem of who is digitally skilled and how to reach them should indeed be understood, however, this will only be possible by taking more effective actions instead of pondering on research that has not been deemed as useful. Additionally, the issue of fragmentation should be addressed and prevented. Organisations should work more closely together and the government should continue pursuing the alliance between the public and private sectors.

This study has a limitation to be discussed which is that only 6 organisations have been consulted due to the difficulty of coming in to contact with organisations. Studying the application of the principles in more organisations could have yielded more interesting and representative results. Finally, since research on the Principles for Digital Development have yet to be widely conducted it bears many opportunities. Studying the application of the Principles for Digital Development in other countries or cities could bring more interesting insights and ways of working to effectively cater to disadvantage communities.

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# Appendix A   Interview Questions for Digital Divide Practitioners

## Context

1. Please briefly explain what your company does in the field of Digital Divide
2. Please briefly explain what your role is and what you do.
3. What for methodology do you use/What for process do you follow to develop Digivaardigheden projects?
   a. Do you think it can be improved? In what way?
   b. Do you have this methodology/process in detail somewhere?
4. Which constraint do you experience in reaching/contacting serving the marginalized community?
5. Describe your most successful projects.
   a. Are they still running?
6. Do you offer a live trainer/facilitator/face-to-face interaction?
7. Do you offer (pre/post) tests to measure impact or the retention of materials?
8. Do you plan for maintenance, such as periodic content updates, hardware and software improvements?

## The Principles for Digital Development

1. Do you know what the Principles for digital development are?
   a. Principle 1 - Design with the User
   b. Principle 2 - Understand the Ecosystem
   c. Principle 3 - Design for scale
   d. Principle 4 - Build for Sustainability
   e. Principle 5 - Be Data Driven
   f. Principle 6 - Use Open Standards, Open Data, Open Source, and Open Innovation
   g. Principle 7 - Reuse and Improve
   h. Principle 8 - Address Privacy and Security
   i. Principle 9 - Be collaborative
2. Can you identify points from the list which you are not using?
   For every point identified:
   a. Why are you not applying it?
   b. Are you considering applying it after reading what "From Principle to Practice" suggests/recommends?
   c. Do you think the suggestions/recommendations are useful? Why or Why not?
   d. Do you think the suggestions/recommendations are feasible? Are there constraints to implement them? Why or Why not?
3. Can you identify points from the list which are challenging?
   For every point identified:
   a. Which aspect is a challenge?
   b. Do you think you applying/practicing what "From Principle to Practice" suggests/recommends will lead to better outcomes?

   c. Do you think the suggestions/recommendations are useful? Why or Why not?

   d. Do you think the suggestions/recommendations are feasible? Are there constraints to implement them? Why or Why not?

4. Can you identify points from the list which are not challenging?
   For every point identified:
    a. Why isn't it a challenge?
    b. Can you provide a detail process of how you do it?
    c. Do you think you will have more success after reading what "From Principle to Practice" suggests/recommends?
    d. Do you think the suggestions/recommendations are useful? Why or Why not?
    e. Do you think the suggestions/recommendations are feasible? Are there constraints to implement them? Why or Why not?

5. Which principle(s) is/are in your opinion the most important to project success? And why?

## Reflections

1. What are your thoughts of the Principles for Digital Development?
2. In which way do you think they can be improved?
3. Are you open to implement the Principles for Digital Development as part of your methodology? Why or Why not?
4. From 1 to 5, where 1 is Not at all and 5 is Fully Applying. With which number would you rate your application of the Principles for Digital Development? And why?
5. Especially any recommendations on what you think would enable you/someone else to overcome barriers to successful development of Digivaardigheden projects?
6. Are there any other interesting reflections or lessons-learned that you'd like to share that we haven't covered?

# Appendix B    Interview Questions for BZK

## Context

1. Give a brief explanation of the government is doing to bridge the digital divide.
2. Briefly explain what your role is and what you do.
3. What are the biggest challenges in bridging the digital divide?
4. What limitations do you experience when reaching / contacting the marginalized community?
5. Describe your most successful projects.

## Derived Questions

1. Some companies claim that reaching marginalized communities is not a challenge, although this is the image of the municipalities. What can you say about it?
2. Research shows that there is no hard correlation between digits and low literacy. What do you think about this?
3. Some believe that the central government is not sufficiently focused on the digital divide, thus it is not high enough on the agenda within the Netherlands. What can you say about this?
4. Organizations claim that there are many fragmented initiatives from the government / municipality and that a lot of money is being invested in fragmentary solutions and that there is no real policy behind them. What do you think?
5. Is money being spent on organizations that make digital materials? How often does this happen? Why not?
6. Organizations believe that the government should spend less money on established institutions and more on small innovative companies. What do you think about this?
7. Some claim that "companies" that receive grants from the government do not function effectively because they are not sufficiently practice-oriented? Is this correct? How is it measured whether the problem of the digital divide is improving?
8. For example, Steffie.nl has a DigiD and a practice with ballot paper solutions that they have made and that they have largely financed themselves. Financing such a solution is actually the task of home affairs  , municipalities and provinces. Why was such solutions not funded by you?
9. It is claimed that municipalities simply do not have money, they have received a huge number of tasks and they find it very difficult to spend the money properly. Can this be correct?
10. It is claimed that there are some in home affairs who are very involved with the digital divide, but they do not always have the possibilities and hope to leave as much as possible to the market. Is this correct?

## Reflections

1. Do you think that enough is being done by the government to solve the problem of the digital divide?
2. Do you have recommendations on what you think would help to develop successful Digital Skills projects?
3. What do you think is the most important thing that needs to be done to bridge the digital divide?
4. What do you think of the principles for digital development?
5. Are there any other interesting reflections or lessons learned that you would like to share that we have not covered?