MASTER THESIS

INTEGRATING INFORMATION LITERACY IN DUTCH LANGUAGE EDUCATION

Developing learning materials for information literacy in primary education

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Summary

This study investigated how information literacy skills could be integrated into Dutch language education in primary schools, by designing example learning materials, and evaluating the effectiveness accordingly. Information literacy is the ability to identify information needs, locate information sources, extract and organize information from sources, and synthesize that information. Information literacy is a sub-skill of the 21st century skill digital literacy, which points to the knowledge, skills and attitudes that are necessary to use the computer. Each 21st century skill points to a competence that is assumed to be important to respond to future needs. Previous research indicated that teachers are often unable to implement information literacy skills in their lessons, and are in need of support. This study aimed to respond to this need of support, and therefore consisted of two parts. First, based on instructional principles that were obtained from literature, which are embedded instruction, meaningful learning tasks, and guidance, an example lesson was designed in which information literacy is integrated in Dutch language education. Subsequently, the effectiveness of these materials was evaluated, using observations and interviews. The main research question is: 'To what extent do the example learning materials enable primary school teachers to integrate information literacy in Dutch language education?' A triangulated multiple case study design with eight participants was used to answer this question. Frequencies and percentages were used to analyse the observation data, and a thematic networks analysis was performed to analyse the interview data. Results indicated that teachers were often unfamiliar with teaching information literacy skills. Using the example learning materials helped the participants to become aware of the difficulty and the importance of addressing these skills. However, more time and attention is needed to implement information literacy skills effectively in primary education and to promote the transfer of the obtained knowledge and skills to new contexts. The information resulting from this study could be used advisory for the design of new learning materials for 21st century skills in general, as well as specifically for information literacy, because this study elaborately investigated how the intended users of the materials, which are teachers of primary schools, would like the learning materials to be.

1. Introduction

This section first describes the background of this study, in which the central research problem is discussed, after which the research questions are mentioned. Subsequently, a practical as well as a scientific relevance of this study is described. This introduction section ends with a description of the contents of the upcoming chapters.

1.1. Background

Society is subject to change, since it is changing from a more static industrial society to a knowledge economy, in which the development and transfer of knowledge becomes increasingly important (Voogt & Pareja Roblin, 2010; KNAW, 2012). Subsequently, this change in society has consequences for the labour market and therefore also for the kind of jobs that have to be fulfilled in the near future (Platform Onderwijs2032, 2016). Ideally, schools should prepare their students for these changing needs, it is however questionable whether schools fulfil this task adequately at the moment (Thijs, Fisser & Van der Hoeven, 2014; KNAW, 2012). To stimulate educators to pay more attention to prepare students for future jobs, the Dutch Government assigned the National Institute for Curriculum Development (SLO) to formulate specific skills that are assumed to be important for functioning in the society of the future, called '21st century skills' (Thijs et al., 2014). They formulated eight 21st century skills: creativity, critical thinking, problem solving skills, communication skills, collaboration skills, digital literacy, social and cultural skills, and self-regulation (Thijs et al., 2014). The importance of addressing these 21st century skills is also acknowledged by schools and teachers, however, it appears to be often unknown how to teach these skills in an effective way to pupils (Thijs et al., 2014; Meelissen, Punter & Drent, 2014). For that reason the Dutch Government assigned SLO to support schools and teachers with the implementation.

One of the 21st century skills, 'digital literacy', can be described as the knowledge, skills and attitudes that are necessary to use the computer effectively in several contexts (Fraillon, Schulz & Ainley, 2013). This study focuses on 'information literacy', which is a sub-skill of digital literacy. This sub-skill addresses the process of accessing and using digital information (Raes, Schellens, De Wever & Vanderhoven, 2012), in which the ability to determine the quality of digital sources is important. Yet it appears that many students do not use information literacy skills when searching for digital information (KNAW, 2012; Walraven et al., 2007). In addition to that, estimating the quality of digital sources is a difficult skill (Rodicio, 2015). Although the process is pointed to as difficult, it appears that especially in primary education little attention is paid to information literacy (Thijs et al., 2014), partly because of time issues, and partly because teachers do not know how to teach it (Meelissen et al., 2014; Thijs et al., 2014). Therefore, it is of great relevance that teachers and schools are supported in integrating these skills in the curriculum. Several forms of guidance can be provided to make this integration successful, of which developing example learning materials is one option (Thijs et al., 2014).

A preliminary investigation performed by Thijs et al. (2014) showed that teachers prefer help with integrating information literacy skills within subjects that are already taught. In addition to that, this preliminary investigation also indicated that information literacy skills are implemented to a lesser degree in primary education than in secondary education. An important subject in primary education is Dutch language education, nevertheless it appeared that little attention is paid to integrating information literacy in Dutch language education at primary schools (Thijs et al., 2014). Because of this underrepresentation, this is the focus of the current study.

1.2. Research questions

In order to address teachers' need for support, this study aims to develop example learning materials in which information literacy skills are combined with Dutch language education, and to evaluate mainly in a qualitative way to what extent these example learning materials are helpful for integration. The main research question of this study is: 'To what extent do the

developed example learning materials enable primary school teachers to integrate information literacy in Dutch language education?' To structure the research three sub-questions are added:

1 How could information literacy instruction be designed in order to be effective?
2 To what extent are primary school teachers able to integrate information literacy in Dutch language education when using the example learning materials?
3 How do primary school teachers value the developed example learning materials in which information literacy is integrated in Dutch language education?

1.3. Scientific and practical relevance

In this study a scientific as well as a practical relevance could be distinguished. First of all, this study has a scientific relevance. In this study, the classification of the information literacy process as developed by Brand-Gruwel and Walhout (2010) is used as main conceptual framework, and is therefore interwoven in each part of this study. This model will be more elaborately discussed in the theoretical conceptual framework section of this study (see paragraph 2.4). Based on this model the example learning materials, as well as the measurement instruments are developed. Therefore, at the end of the study, it might be possible to contribute to the validation of this model, by discussing the usability of it for the design of learning materials and measurement instruments.

Second, this study also has a practical relevance, since it is primarily aimed at designing effective learning materials for information literacy, and evaluating the effectiveness accordingly. Therefore this study tries to evaluate these materials in an extensive way, in order to obtain useful information for the design and evaluation of the developed learning materials. This is necessary in order to make the materials useful in primary education, by responding to the needs and wishes of the teachers. In order to achieve that, this study elaborately discusses the materials with the participants.

1.4. Description of the table of contents

In order to answer the research questions, the second chapter starts with a conceptual framework, which provides additional information about the core concepts of this study. Subsequently, the third chapter describes how the example learning materials were designed. Thereafter, the fourth chapter provides information on the research design and the methods that were used in this study, after which in the fifth chapter the results are described that arose from the observations and the interviews. Subsequently, the sixth chapter communicates the conclusions that resulted from this study, after which these findings are further discussed. This study ends with the provision of some recommendations.

2. Theoretical conceptual framework

In this theoretical part of the study the main concepts of the research are discussed. First, the relevance of teaching digital literacy skills is discussed. The second section defines and describes the concept of digital literacy in the current research literature. Subsequently, the sub-skill of digital literacy, 'information literacy' is discussed more elaborately, after which the conceptual model of this study is introduced, which is based on the classification of Brand-Gruwel and Walhout (2010). Fifth, the difficulties and the challenges that primary education students face in the information literacy process are described. Sixth, based on available literature in this subject, it is elaborated on how instruction for information literacy could be designed. This chapter concludes with a summary of the most important points that were discussed in this section.

2.1. Necessity of teaching digital literacy skills

Learning digital literacy skills is important for functioning in the contemporary society, mainly because people have become increasingly dependent of (digital) information (Van Deursen & Van Dijk, 2010; Rodicio, 2015). When certain groups of people are not able to obtain the skills that are necessary to function in the current (digital) society, this could lead to societal inequalities (Van Deursen & Van Dijk, 2010, 2015). According to Aesaert, Van Braak, Van Nijlen and Vanderlinde (2014) it is therefore necessary that learning ICT competences becomes a major and compulsory element in primary and secondary education. It is important that students have physical access to computers and are in the position to obtain internet skills (Van Deursen & Van Dijk, 2015). It is therefore advised to start teaching digital literacy skills to children early on in their primary school career (Aesaert et al., 2014)

However, there is no absolute consensus with regard to the necessity of teaching digital literacy skills to students. Some researchers, of which Prensky (2001) was the first, argue that it is not necessary to teach digital literacy skills to students, because these children are grown up with media all around them, and are therefore able to obtain these skills themselves. According to Prensky (2001) students changed considerably in such a way that they process information totally different than was the case for a few decades. To point to this new generation of students he introduced the term 'digital natives', to indicate those students that were born after 1980, and are therefore automatically able to understand and use these new technologies. People who were born before 1980, and therefore had to learn digital skills at an older age, are appointed to as digital immigrants. According to Prensky (2001) the main difference between these generations is that digital natives are able to learn digital skills naturally and for that reason do not need instruction to obtain those skills, as digital immigrants do need instruction.

After Prensky (2001) several other researchers investigated whether there are indeed differences in digital skills that are caused by age. According to several studies it can be concluded that in general, digital natives already possess a certain level of digital skills, but that it cannot be assumed that because of their age these students are able to perform all computer related skills naturally (Fraillon et al., 2014; Li & Ranieri, 2010, Ng, 2010; Davies, Halford & Gibbins, 2012). In addition to that, Davies et al. (2012) indicated that age is not the sole determinant of digitally competence, and that other contextual factors like the role of peers, family and educational level should be taken into account as well when determining the digital competence of people. These studies therefore conclude that instruction on digital skills is necessary, also for students that are referred to as 'digital natives'. This finding is confirmed by the *International Computer and Information Literacy Study* (ICILS 2013), which was the first international comparison study that measured the digital skills of 14 year old students from several countries (Meelissen, Punter & Drent, 2014). The results of the study showed that the majority of the participating students, who were all digital natives, was not able to attain more advanced levels of digital literacy.

ICILS 2013 also showed that the Netherlands is one of a few countries in which teaching ICT skills is no obligatory element of the curriculum (Meelissen et al., 2014). Furthermore, research has shown that providing instruction in digital skills appears to be difficult for teachers and is not implemented well in the curriculum at the moment (Meelissen et al. 2014; Thijs et al., 2014). This appeared to be mainly caused by the absence of sufficient time and support aimed to attend those teachers (Meelissen et al., 2014; Thijs et al., 2014). It could

therefore be concluded that previous research indicates that instruction is necessary for students to obtain these digital skills, but that in order to achieve that objective, the teachers should receive guidance on how to provide instruction on these skills first. Before the design of instruction will be discussed more deeply, first the core concepts of this study 'digital literacy', and 'information literacy' will be defined and elaborated on.

2.2. Digital literacy

As can be noted above, it appears to be important to pay attention to teaching digital literacy skills. However, there is no consensus about what is meant with digital literacy skills exactly. Digital literacy has been described as 'information and communication technology literacy' (Lau & Yuen, 2014), 'computer and information literacy' (Fraillon, Schulz & Ainley, 2013), or other comparable terms. In addition to the different terms that are used for this concept, there are also several definitions available. According to Lau and Yuen (2014) this is primarily caused by the fact that researchers often conduct research in isolation, whereby no consensus could be reached on which aspects of the concept are important, and need to be addressed. Although there are many different visions on the meaning, there is agreement on the fact that digital literacy should be a combination of skills, knowledge and attitudes (Thijs et al., 2014; Lau & Yuen, 2014; Voogt & Pareja Roblin, 2010).

Several definitions could be provided on digital literacy, of which a few examples are discussed more elaborately. The first example of a definition is the one formulated by KNAW (2012), who indicated digital literacy as "*the ability to use digital information and communication wisely, and critically assess the consequences of the us*e" (p.8). This definition, however, seems to primarily focus on the attitude that is necessary when using digital information, for example the importance of using information in a critical way. Nonetheless, it does not seem to pay lots of attention to skills and knowledge that are also necessary. A definition that does take these skills into account is the definition of Fraillon et al. (2013), who defined digital literacy as "*an individual's ability to use computers to investigate, create, and communicate in order to participate effectively at home, at school, in the workplace, and in society"* (p.17). This definition mentions several skills that are necessary to use a computer, however, in this definition the attitudinal aspect of digital literacy seems underrepresented. Therefore, based on the definitions provided above, it is decided to integrate both definitions, as an attempt to combine the strong elements of each of them and make it a more complete definition that focuses on all three aspects: knowledge, skills, and attitudes that are necessary to operate a computer. Based on the definitions provided above, in this study, digital literacy is defined as *"the knowledge, skills and attitudes that are necessary to use the computer to investigate, create and communicate effectively, wisely and critically, to be able to participate in several contexts of contemporary society".*

In addition to the different definitions, also several decompositions of the sub-skills are available. For example, in the study of Lau and Yuen (2014) three sub-skills are distinguished: 'information literacy', which focus on the information aspect, 'internet literacy', which points to the communication aspect, and finally 'computer literacy', which points to the technology aspect of digital literacy. Another version of a decomposition is provided by Van Deursen and Van Dijk (2010), in which operational internet skills, formal internet skills, information internet skills, and strategic internet skills are distinguished. Also Thijs et al. (2014) developed a classification for the digital literacy process, consisting of four sub-skills. The first sub-skill, 'basic ICT skills', includes the necessary knowledge and skills to operate a computer. Second, 'computational thinking', describes the required thinking processes to formulate, organize and analyse digital information. Third, 'media literacy', points to the necessity of an attentive and critical attitude towards the digitalized world. The final sub-skill, 'information literacy', addresses how to approach and assess (digital) information critically. In this study, the classification of Thijs et al. (2014) will be used, because this classification is based on recent research findings on digital literacy, is transparent, and seems usable and clear as a basis for instructional materials aimed at implementing these skills in education. The classification of Thijs et al. (2014) is visualized in Figure 1. The last sub-skill of the classification of Thijs et al. (2014), 'information literacy', is discussed in more detail below, since it is the core concept of the study.

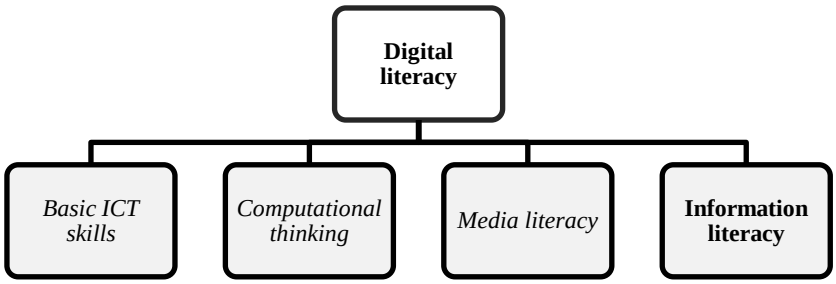

Figure 1. Classification of the 21st century skill 'digital literacy' and the relation to the sub-skill information literacy. Based on Thijs et al. (2014).

2.3. Information literacy

As mentioned above and is shown in figure 1, information literacy is one of the sub-skills of digital literacy, and focuses mainly on approaching and assessing digital information in a critical way. However, also for this concept several definitions and skill decompositions are available. First of all, information literacy skills are also denoted as information problem solving skills, although the process that is referred to is often comparable. Raes et al. (2012) describe information literacy skills as those skills that are necessary to access and use (digital) information. However, several other studies describe the process more elaborately, and indicate that the information literacy process consists of skills that require students to "*identify information needs, locate information sources, extract and organize information from each source, and synthesize information from a variety of sources*" (e.g. Argelagós & Pifarré, 2012; Brand-Gruwel & Gerjets, 2007). Since the latter definition is extensively used in a lot of studies to refer to information literacy skills, it is decided to use this definition in this study as well.

Also several studies proposed skill decompositions of the information literacy process. Lazonder and Rouet (2008) performed a review study in which several classifications are mentioned. Two of the studies that are described in this review are the studies of Walraven et al. (2008), and Wopereis et al. (2008) which both used a five-phase model to indicate the information literacy process. This process comprised the following steps: defining, searching, scanning, processing, organizing and presenting. A comparable skill decomposition, only using different terms, is provided by Kuiper et al. (2009), who mentioned the following steps: searching, reading and interpreting, and finally assessing and evaluating the information. Subsequently, another classification is developed by Van Deursen and Van Dijk (2010). The first step in their process is to decide which website or search engine to use to find the information that is needed, secondly to define the search options, after which information is selected from the websites that were selected. Lastly, an evaluating phase is included in which the obtained information is being evaluated. Especially the last phase of the skill decomposition of Van Deursen and Van Dijk (2010) is missing in the commonly used skill decompositions of Walraven et al. (2008), and Wopereis et al. (2008). Nonetheless, except the absence of an evaluation phase, the other steps seem to be comparable among the studies that are described. However, evaluation appeared to be a very important element in the information literacy process (Rodicio, 2015). A study that did include the evaluation phase in their skill decomposition, is the one that is developed by Brand-Gruwel and Walhout (2010). Their skill decomposition consists of the following phases: defining, searching, selecting, processing, organizing and presenting, and evaluating. This skill decomposition is described more elaborately below.

The first step in the classification of Brand-Gruwel and Walhout (2010) is called 'defining'. This step is aimed at identifying and defining the research problem, activating prior knowledge, determining the objectives and research question that should be met, and finally, thinking about which information is needed to answer the research questions. Sub-skills that need to be performed in this phase are therefore: activating prior knowledge, formulating the problem, formulating research questions, considering information, and making an action plan. Capitulatory, it can be stated that this first phase primarily focuses on preparation activities performed by the learner that are needed for the actual search process.

The second step is called ‘searching’, and is primarily aimed at seeking sites on which the information can be found to answer the research questions. Therefore this step entails considering which sources to use, for example by looking at the relevance and reliability of the sites. This step also includes determining which search strategies to use, for example deciding on applying a search engine, or a portal to search for appropriate sites. The sub-skills that belong to this phase are: inventorying available sources, selecting suitable sources, and applying searching strategies to find appropriate information. This phase is therefore aimed at making well-considered decisions on which sources to select in order to obtain usable and reliable information with regard to the research question.

Subsequently, the third step called ‘selecting’ aims at selecting and assessing the information that is acquired from several sites, and to decide on whether or not that information is suitable for answering the research questions. Therefore this phase mainly focuses on obtaining information from several sites, and highlighting those parts of the text that are usable for answering the questions. Also this phase comprises several sub-skills: highlighting information, selecting usable information, and selecting reliable information.

The fourth step of the process, called ‘processing’, is focussed on processing the information that was indicated to be relevant and useful in a critical way, and integrate the new obtained knowledge with the prior knowledge that one already had with regard to the topic of study. This phase aims to combine the retrieved information of several sources in such a way that it becomes a meaningful and logical whole, and provides an answer to the research question. For this phase two sub-skills are formulated: processing the information that was found, and rephrase that information in such a way that the information is formulated in their own words.

The fifth step is called ‘presenting’ and is aimed at organizing the information that is needed to answer the research question in a logical way, and to present the results. Therefore, this is the phase in which the students can present what they have learned. Several presentation forms could be chosen, based on the task requirements that were formulated, for example writing an essay, or making a presentation. In addition to that, it is important to mention or describe the information sources that were used. The sub-skills that are relevant in this phase are: choosing an appropriate presentation form, and mentioning the references that were used.

Finally, the last phase called ‘evaluation’ aims at evaluating the result with regard to relevance and usefulness. Also the learning process is evaluated, which means that the learner assesses his own task performance. This phase consists of the phases: evaluating the usability of the product, evaluating the reliability of the product, and evaluating the learning process.

Because of the fact that the skill decomposition of Brand-Gruwel and Walhout (2010) is largely comparable to the other models that are described, only extended with an evaluation phase, it is decided to use the skill decomposition of Brand-Gruwel and Walhout (2010) as main conceptual model in this study. This skill decomposition comprising the six phases is visualized in the research model below. Each of the steps is divided in certain sub-skills which will be called ‘criteria’ in the rest of the study.

2.4. Conceptual model

Based on the skill decomposition of Brand-Gruwel and Walhout (2010) a conceptual model is developed. It shows the information literacy process comprising six major phases, and several sub-skills. This conceptual model will be used throughout this study, and is visualized in Figure 2.

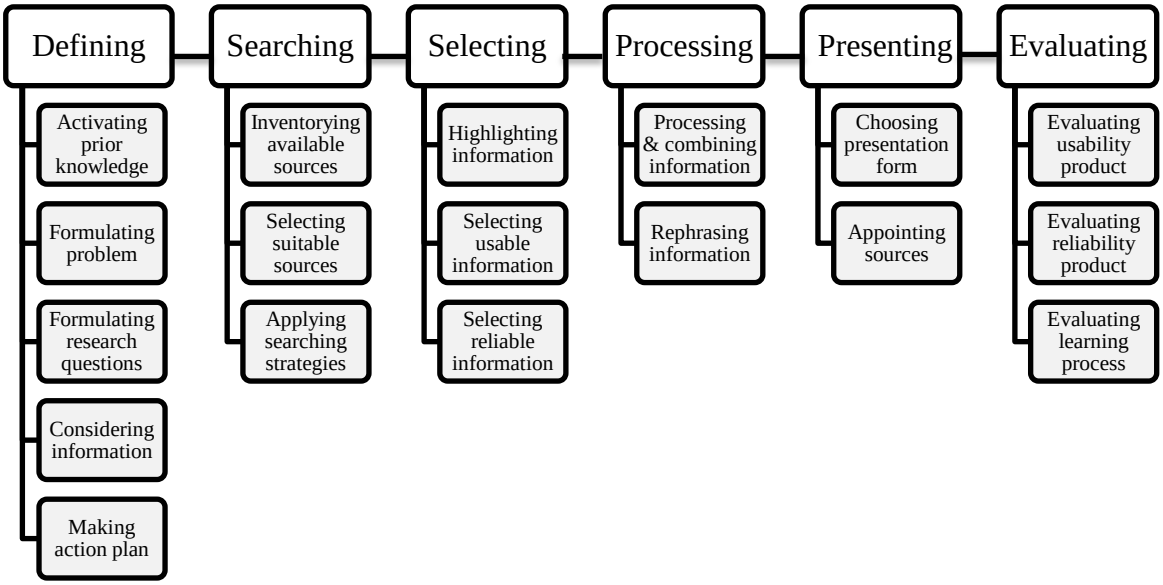

Figure 2. The information literacy skill decomposition (based on Brand-Gruwel & Walhout, 2010; Walraven et al., 2008)

2.5. Difficulties in the information literacy process

There are some studies available in which the difficulties that students experience in information literacy are being discussed. For example, Walraven et al. (2008) performed a review study on problems that students face when searching for digital information on the Web. Also, Wallace, Kupperman, Krajcik, and Soloway, (2000) studied the problems that students encounter in several phases of the information literacy process. Based on the phases of the conceptual model, namely defining, searching, selecting, processing, presenting, and evaluating, the most common difficulties that students encounter with regard to learning these information literacy skills are described.

2.5.1. Phase 1: Defining

According to Walraven et al. (2008) there are little studies that investigated which problems young children, aged six until 12 years old, encounter in the first phase of the information literacy process, called 'defining'. However, there appear to be studies that investigated these effects for teenagers, and it is therefore assumed that the same results will count for the younger children, since information literacy skills appeared to be improving over time (Ivankovic, Spiranec and Miljko, 2013; Walraven et al., 2008). First of all, many difficulties seem to appear when students need to formulate research questions (Walraven et al., 2008; Wallace et al., 2000). Especially thinking of useful and meaningful questions appeared to be difficult. The study of Wallace et al. (2000) concluded that students usually find it very hard to formulate questions that are feasible to answer. In addition to that, students also tend to give up searching for an answer to their question quite soon, or are inclined to change the question during the process when they are not able to find an answer to their original question without too much effort (Walraven et al, 2008; Wallace et al., 2000).

In addition to that, it often appears that students do not have the necessary prior knowledge about the topic of study, which makes it hard to determine which information is needed to be able to answer the research questions (Walraven et al., 2008). This finding is in line with the research outcomes of MaKinster, Beghetto and Plucker (2002), who concluded that higher levels of domain knowledge positively influence the chance on successful search results. This could be explained by the fact that higher domain knowledge makes it easier to formulate relevant search terms, which affect the chance on finding an appropriate answer to the research question. Finally, another common problem of this phase is that students often neglect to make a planning of the search process before actually starting with their search (Walraven et al., 2008).

2.5.2. Phase 2: Searching

With regard to the second phase of the information literacy process 'searching', in which students have to explore the internet for usable websites, also some common problems can be distinguished. First of all, problems occur when students need to formulate appropriate search terms (Argelagós & Pifarré, 2012). It appeared that students are often declined to use whole sentences to search for information, instead of summarizing the core of the question in several search terms (Walraven et al., 2008). Another difficulty in this phase is involved when judging the search results. MaKinster et al. (2002) indicated that students become easily overwhelmed, because of the extensive amount of sites and information that is available. In addition to that, the review study of Walraven et al. (2008) indicated that children often do not review all results of the hitlist. As possible explanation Wallace et al. (2000) mention that students often only pursue to find a website on which they can find a perfect answer to their research question. However, when this is not possible in a short timeframe, this could lead to feelings of frustration.

Another finding indicates that students often base their choice on whether or not to use a website on the rank of that site in the hitlist: the higher the rank, the more likely it is that the site will be opened (Walraven et al. 2008). Although search engines rank sites based on expected relevance, it is still important to critically judge the suggested sites on content-related criteria. This could for example be achieved by reading the summarizing sentences that accompany each search result, because this provides information on the context in which the search terms are used on that particular website. That information could be helpful to determine whether the site provides the desired information. It can therefore be concluded that the search results are often not judged in a systematical and reliable manner. This finding is confirmed by the research of Rodicio (2015) who also indicates that in many cases the search of students on the internet is based on superficial cues with regard to usability and reliability of the source, like the rank of a certain site in the hitlist, or the presence of search terms in the title of the webpage.

2.5.3. Phase 3: Selecting

The third phase of the information literacy process, 'selecting', in which relevant information is selected from the elected sites, also cause difficulties in certain ways. The first difficulty that students often encounter is that they find it hard to assess the usability and quality of the source that they have entered, and the information that is provided on that site (Walraven et al., 2008; MaKinster et al., 2002). It appears that students scarcely compare information from several information sources with each other to assess whether the information is reliable and useful for them, and easily assume that the information provided on the site is useful and reliable (Walraven et al., 2008). According to Metzger, Flanagin and Medders (2010) it is often the case that the chosen website is not elaborately studied, but only superficially. As a possible explanation for that finding it is mentioned that internet users often want to obtain information quickly and do not want to invest lots of mental effort to process the information elaborately to find the answer. Therefore it is often the case that information is selected based on superficial cues, like lay-out, appearance, or the language that is used (Metzger et al., 2010; Rodicio, 2015; Walraven et al., 2008). The main goal seems to be finding an answer to their question, and the judgment of sites based on validity, topicality, or the reputation of the authors, seems to be indicated as less important by students (Walraven et al., 2008). However, the effort that web users tend to invest in searching for appropriate information on the net, seems to also be related to motivation: when the motivation of the learner is higher, it is also more likely that the information is assessed more critically (Metzger et al., 2010).

2.5.4. Phase 4: Processing

Also in the fourth phase of the information literacy process, called 'processing', some problems seem to occur. The main problem that appears is that children often do not take the time to read the obtained texts in such a way that they are able to make sense out of the contents that are provided (Wallace et al., 2000; Walraven et al., 2008). It can be stated that students only read a text to find an answer to their research question, but not to fully understand the context and exact contents of the text (Wallace et al., 2000). In addition to that, other elements that appear to be difficult for students are saving important pieces of information, and rephrase the information that was found in their own words (Walraven et al., 2008). This finding is in line with the study of Probert (2009) who indicates that students are often declined to literally copy parts of the original text and use this information for their own assignment.

2.5.5. Phase 5: Organizing and presenting

With regard to the fifth phase, 'organizing and presenting', in which the information that was retrieved from the internet is structured logically in order to be able to present the information, the review study of Walraven et al. (2008) concluded that there is not yet enough information to draw conclusions with regard to the difficulties that accompany this phase, based on the studies that are performed so far. However, Brand-Gruwel and Walhout (2010) mention that it could be difficult for students to logically structure the information that should be integrated in the presentation.

2.5.6. Phase 6: Evaluating

The final phase of the information literacy process, 'evaluating' comprises the evaluation of the product as well as the learning process. However, this phase was no part of the most commonly used classifications of the information literacy process. Therefore, there is not much information available with regard to the difficulties in the evaluation phase that is part of the information literacy assignment. Nonetheless, one study does report a difficulty with regard to the evaluation phase. According to Brand-Gruwel and Walhout (2010), students appear to be declined to perform only those criteria that will be assessed. Therefore it seems advisable to consider the task requirements very well.

Based on the problems occurring in several phases of the process, one could conclude that information literacy skills appear to be difficult for students, what makes it important and necessary to instruct these skills to students (Argelagós & Pifarré, 2012; Kuiper et al. 2009). Therefore, in the following section it is discussed how instruction for information literacy skills could be designed effectively.

2.6. Designing instruction for information literacy

Information literacy skills are often indicated as complex higher order skills, what makes it difficult to decide on how to teach these skills to students, and on how to design instructions for it. It appears that currently there are not many instructions available for teaching information literacy skills (Walraven et al, 2008). In addition to that, Brand-Gruwel and Walhout (2010) indicate that one should consider the design of the lesson very carefully, in order to successfully implement information literacy skills in education. There have been several studies that investigated how instruction could be designed to obtain positive results with regard to information literacy skills (e.g., Kuiper, Volman & Terwel, 2009; De Vries, Van der Meij & Lazonder, 2008; Walraven, et al., 2008; Lazonder & Rouet, 2008). Also a review study was performed by Brand-Gruwel and Gerjets (2008) in which the abovementioned studies were shortly discussed. Another review study is performed by Lazonder and Rouet (2008) in which several studies on instructional support are being evaluated. Based on these findings it can be concluded that most of the designed instructions were effective, which means that information literacy skills can be taught (Brand-Gruwel & Gerjets, 2008).

Based on the literature mentioned above three instructional principles will be discussed, which appeared to have positive results on the information literacy skills of students: meaningful learning activities, embedded instruction, and guidance. These instructional principles could be indicated as general principles that are applicable for the design of a variety of tasks. However, it also appeared that similar instructional principles were used in studies in which information literacy tasks were successfully designed (e.g. Wopereis, Brand-Gruwel & Vermetten, 2008; Argelagós & Pifarré, 2012). Therefore it can be stated that these three principles are broadly applicable in many contexts, as well as specifically applicable for information literacy tasks.The three instructional principles are discussed more elaborately below.

2.6.1. Meaningful learning activities

One of the main objectives of teaching 21st century skills, and therefore also for teaching information literacy skills, is preparing students for functioning in the society of the future (Thijs et al., 2014). Therefore, it seems important to teach information literacy skills in such a way that it promotes transfer, which enables students to transfer the obtained knowledge and skills to future contexts and settings as well. This statement is confirmed by Brand-Gruwel and Gerjets (2008), who indicated that teaching students transferable strategies is also necessary to attain a

sufficient level of information literacy skills. Attaining a transfer is however quite difficult. Mayer (2008), who did a lot of research on designing effective instruction, indicated that it is often the case that students obtain knowledge and skills at school, but are unable to transfer these to settings outside the school. To avoid the gap between school settings and realistic settings, he therefore indicated that one should try to design lessons that foster meaningful learning, in which the obtained skills can be used in new situations as well. This statement is in line with findings of Kuiper et al. (2009), who also found that the learning of students is enhanced when the learning activities they are involved in are meaningful to them. This, however, raises the question how a learning activity becomes a meaningful learning activity.

According to Mayer (2008) there are a few conditions that need to be fulfilled to achieve such a result. First, it appears to be important that students actively construct knowledge, which means that students need to interpret the contents and create their own mental representations accordingly. This enables students to assign meaning to the learning experience. Second, a learning activity becomes meaningful when the assignment culminates into an actual end result, for example when students make a product that will actually be used. Third, it is assumed that the usage of authentic problems and learning tasks for teaching information literacy skills increases the involvement and motivation of the students, and therefore also for the likelihood of a successful transfer (Brown, 1997 as referred to in Brand-Gruwel and Walhout, 2010; Wopereis et al., 2008). A problem becomes an authentic problem when it is based on real-life learning situations that are relevant for students, intended to stimulate the integration of knowledge, skills and attitudes (Wopereis et al. (2008). An example of an authentic problem is assigning students to think of solutions for the street litter problem in their town.

2.6.2. Embedded instruction

Another instructional principle that could positively influence the information literacy skills of students is the embedding of information literacy skills in subject matter contents. Although the study of Walraven et al. (2008) concludes that there is no consensus about the most appropriate instructional form for teaching information literacy, embedded instruction appeared to lead to positive results. Several other studies indicated that embedded instruction leads to better results than when these skills are taught in separate courses (Brand-Gruwel and Walhout, 2010; Kuiper et al., 2009; De Vries et al., 2008; Argelagós & Pifarré, 2012). According to Kuiper et al. (2009) it is important that especially in learning information literacy skills activities like searching digital information and evaluating the reliability and usefulness of the retrieved information are not objectives in itself, but are used to achieve another goal, for example gaining more knowledge about a certain subject. Therefore, it seems desirable to design lessons in which information literacy skills are embedded in an instruction for a certain subject. In addition to that, De Vries et al. (2008) indicated that students get a feeling of ownership, when their assignment is useful and embedded in an actual learning task. The term that is used to describe this phenomenon is called 'contextualizing web searching', which appeared to contribute to prior knowledge activation and involvement in the assignment (De Vries et al., 2008). Further, enabling students to formulate their own research questions could contribute to a higher level of ownership and therefore also to the level of motivation and involvement among the students (De Vries et al., 2008).

Another addition with regard to the instruction of the lesson is provided by Walraven et al. (2008) and Wopereis et al. (2008), who emphasized the importance of teaching the complete information literacy process in each lesson, instead of teaching certain phases and skills separately. They state that better results are gained when the whole process is performed, but at an increasing difficulty level, than when the process is subdivided.

2.6.3. Guidance

Although information literacy skills can only be obtained by practice, which is a process that students largely have to perform themselves, it is necessary to provide them with a sufficient degree of guidance (Brand-Gruwel & Walhout, 2010). Therefore the third instructional principle that is formulated in this study is called guidance. Based on the findings in literature, one could roughly distinguish three categories of guidance: guidance of a teacher, guidance of peers, and guidance of the material.

The first form of guidance that is distinguished could be obtained via the teacher. A way in which teachers could provide guidance in this process, is by paying explicit attention to

certain phases of the process that appeared to be difficult for students, for example during the instruction of the lesson. Therefore, it is recommended to spend sufficient time on the introduction of the lesson. In order to make the process of information literacy successful, it is essential that students have a certain level of prior knowledge with regard to the information literacy process, as well as some knowledge about subject matter contents, before they actually start with the assignment (Brand-Gruwel & Walhout, 2010). This is necessary to integrate the new obtained knowledge with the prior knowledge of the student (Walraven et al., 2008), which could also affect the likelihood of a successful transfer (Brand-Gruwel & Walhout, 2010). In the introduction section attention could be paid to jointly construct a mental model, which can be achieved by discussing the core concept and connecting it to other related concepts. This process is primarily aimed at helping students with lower levels of prior knowledge, because it is a way to clarify the meaning of the concept. A way to develop such a mental model is by designing a mindmap (Brand-Gruwel & Walhout, 2010), which is a way to visualize the mental model, and therefore make it more concrete. A final way of teacher guidance could be provided by modelling parts of the task (Brand-Gruwel & Walhout, 2010). This form of guidance entails that the teacher shows certain steps of the process, while thinking aloud. For example, modelling the process of estimating the quality and reliability of digital sources. In all cases, the guidance that students receive from the teachers should decrease as the students obtain more knowledge and skills (Brand-Gruwel and Walhout, 2010).

Secondly, guidance can be provided by peers, for example by allowing students to cooperate on the assignment. It appeared that students achieved better results when they were allowed to work in heterogeneous groups on the same assignment (Mayer, 2007). According to De Vries et al. (2008), allowing students to cooperate also has positive effects on the interpretation and personalization of the information, because students try to make sense of the information together. This finding is in line with the study of Lazonder (2005), who revealed two positive effects of the interaction of peers on web-searching performance. First of all, cooperation required students to negotiate during the process, for example with regard to deciding on whether or not to include a certain source, which could lead to better informed decisions. Second, peer interaction appeared to be helpful in decreasing the chance on making mistakes during the process, because when students cooperate they critically observe one another and keep track of the jointly developed product. Further, the review study of Lazonder and Rouet (2008) reported positive results with regard to implementing collaboration during web searching activities. These positive results could be attributed to the fact that collaboration might influence the regulation of the process. According to Walraven et al. (2008) regulation skills are considered to be important in the process of information literacy. This finding is in line with Lazonder and Rouet (2008) who concluded that in several phases of the information literacy process, regulation skills are needed, for example when students make a planning, monitor the process, or evaluate the results.

The final form of guidance that could be provided, is guidance by the material, for example by the use of scaffolds that are interwoven in the material (Argelagós & Pifarré, 2012; Wopereis et al., 2008). For example De Vries, et al. (2008) studied the effect of a portal and a worksheet on student web search performance in their research. The portal was used to provide the students with some predetermined websites, intended to avoid that students spend all their time browsing, instead of also processing the information that they found. However, according to Kuiper et al. (2009) providing pre-selected websites is not helpful. They state that it is important to enable students to search the web and become critical web users, which can only be accomplished when they gain experience with it. The same applies for another scaffold that is sometimes indicated as usable to spare students in their cognitive processing, by providing students with ready-made research questions. According to De Vries et al. (2008) it is not recommended to provide students with ready-made research question. They indicated that it is important that students develop questions themselves, because in that case they are able to formulate those questions that are meaningful and personally relevant for them. The second scaffold that De Vries et al. (2008) investigated in their study was a process worksheet. This form of guidance appeared to be useful because the worksheet guided the students through the steps that needed to be performed. Also in the study of Argelagós and Pifarré (2012) the usage of a worksheet had positive effects on student performance. However, based on these findings it could be stated that the use of scaffolds should be considered carefully, and should depend on the objectives of the lesson.

2.7. Summary

In this theoretical framework the importance of teaching digital skills was discussed, which indicated that instruction on digital skills is necessary, also for students that are referred to as digital natives. Thereafter the core concepts of the study, namely digital literacy, and information literacy were defined and discussed. The 21st century skill 'digital literacy' is defined as *"the knowledge, skills and attitudes that are necessary to use the computer to investigate, create and communicate effectively, wisely and critically, to be able to participate in several contexts of contemporary society".* The digital literacy process could be divided in four sub-skills, of which the current study focuses on 'information literacy'. In this study information literacy is defined as the ability to "*identify information needs, locate information sources, extract and organize information from each source, and synthesize information from a variety of sources*". Review of literature has shown that information literacy skills are difficult for students in multiple ways. Also teachers appeared to find it difficult to teach these skills effectively. For that reason there seemed to be a need for proper instructions for information literacy. Literature revealed three main instructional principles that need to be taken into account in order to design instructions for information literacy. The first principle states that the assignments should be meaningful for students. Second, information literacy instruction should be integrated with subject matter contents. Finally, it appeared to be necessary to provide students with a sufficient degree of guidance during the process.

3. Designing instruction

This section aims to answer the first research question: 'How could information literacy instruction be designed in order to be effective?' This question is answered by using the literature that was proposed in the theoretical conceptual framework part of this study. This section starts with a description on how the instructional principles that were proposed in the theoretical framework were used in the design of the lesson. Thereafter a description of the final version of the instruction is included.

3.1. Design of the lesson

Based on the literature, which was described in the theoretical framework part of this study (see chapter 2), some choices were made with regard to the design of the lesson. First of all, a subject was sought that would be meaningful for students, and in which the efforts of the students would really lead to a result, since literature indicated that this leads to meaningful learning experiences (Mayer, 2008; Brand-Gruwel & Walhout, 2010; Wopereis et al., 2008). Therefore, the subject 'inviting an author of children's books' was chosen, because for this assignment the students had to use information literacy skills, and their efforts could result in the decision of the school principal to really invite an author of children's books at the school. In addition to that, the annual Dutch Children's Book Week was also at the same time as the data-collection phase of this study. For that reason it was assumed that the subject of the lesson would be appealing for the students, which could further influence their motivation.

The second instructional principle that was mentioned in literature, was the embedding of information literacy skills in subject matter contents, because that would lead to better results and a feeling of ownership of the students with regard to the contents (Brand-Gruwel & Walhout, 2010; Kuiper et al., 2009; De Vries et al., 2008; Argelagós & Pifarré, 2012). These positive results could be explained by the fact that in that way the instruction has a dual goal: practicing with information literacy skills, and at the same time obtaining knowledge about a subject. Therefore it was decided to integrate the information literacy instruction in an assignment for Dutch language education, also because it appeared that there are not many instructions available for this combination (Thijs et al., 2014).

The third instructional principle that arose from literature was that students needed to receive a sufficient degree of guidance while performing the assignment (Brand-Gruwel & Walhout, 2010). Therefore it was decided to include two versions of the instruction of the lesson: a more student guided version, in which less instruction was provided to the students, and a more teacher guided version, in which the teacher explains and models some of the steps first, after which the students are able to practice the skills themselves. This option enabled teachers to adapt the lesson in such a way that it aligns with their preferred way of teaching and the needs and the level of experience of the students. Further, guidance was provided by allowing students to cooperate and perform the assignment in duos or trios, whereby they could help each other with the assignment, and were also jointly responsible for the final result. This is in line with findings of De Vries et al. (2008) and Lazonder and Rouet (2008) who indicated that allowing students to cooperate had positive effects on the results of the information literacy task. A final way to guide the students in fulfilling the assignment, was by using student materials (De Vries et al., 2008). These student materials comprised a short explanation of the assignment and a progressive scheme for the students. Because these student materials included the steps that the students needed to perform, this provided guidance to the students. The student materials also assigned the student to write down which sites they used, and whether they think these were reliable and useful for answering their research question.

In addition to the three instructional principles that were derived from literature, a fourth principle could be distinguished which was not obtained from literature, but from practice. This fourth principle focuses on the target audience for which the materials are designed, which are teachers with low levels of prior knowledge with regard to teaching information literacy skills. This decision was made because preliminary investigations showed that in general many teachers do not feel sufficiently equipped to be able to teach an information literacy lesson (Thijs et al., 2014). In summary, it could be stated that the information literacy instruction that was developed for this study took into account the three instructional principles that were retrieved from literature, and one instructional principle based on practice. Therefore it is

expected that these materials, and specifically the ready-made instruction, could positively influence the information literacy skills of students, as well as providing support to the teachers.

3.2. Description of the lesson

The instruction of the lesson was designed based on the classification of Brand-Gruwel and Walhout (2010), who describe the information literacy process as consisting of six phases: defining, searching, selecting, processing, presenting and evaluating. It was decided to use this classification as the basis for the instruction, since it functions as the main conceptual framework of this study and seemed to be usable to base the design of the instruction on.

The topic of the lesson was 'inviting an author of children's books'. The students needed to investigate the possibility of inviting an author of children's books at their school, in order to advise the school principal whether it would be feasible to actually do that some time. However, in order to be able to advise the school principal about this possibility, students needed to search for information on the internet about relevant topics to indicate the feasibility of it. For example, it would be relevant for the school principal to know whether it involves costs, how much time beforehand one needs to plan a visit, whether there are also popular children's book authors available for visits, what kind of program an author could perform at the school, and how long a visit takes. In order to answer questions like these, students needed to use their information literacy skills to find answers to these questions on the internet.

The lesson was designed in such a way that teachers could choose between two instructional approaches: a student guided approach, and a teacher guided approach. The teacher guided approach primarily focused on providing students with sufficient instructions beforehand on how to search on the internet. In this approach the teacher functioned as the guide, and modeled parts of the process. On the contrary, the student guided approach primarily focused on enabling students to discover things themselves. In that case, help and support of the teacher was only provided when students were not able to continue.

The lesson starts with an introductory phase, which is based on the first phase of the information literacy process called 'defining' (Brand-Gruwel & Walhout, 2010). In this phase the context of the assignment is being outlined, namely by explaining to the students that the school principal needs their help by investigating the possibility of inviting an author of children's books at their school. After the central problem is defined, the students are assigned to think of relevant questions. In order to activate the prior knowledge of the students, the students are assigned to make a mindmap with possible subjects on which information could be sought. Depending on the instructional approach that was chosen, together, or in small groups, the students are assigned to convert the subjects into one or more relevant research questions.

After the introduction, the second part of the instruction is included, which is based on the second, third, and fourth phase of the classification of Brand-Gruwel and Walhout (2010), called 'searching', 'selecting' and 'processing'. In this part of the lesson the students first need to formulate search terms, decide on which information they need to look for, and make a planning, after which they start their search on the internet. In this phase it is important that sites are elected based on their usability and reliability. Thereafter students more extensively browse the internet and select appropriate information from several sites. Subsequently, the students need to process and combine the information that they found, in order to formulate an answer to their research question. Also in this phase the students are guided by the teacher, or do it more independently in little groups.

The last part of the instruction includes both the presentation of the findings, and the evaluation of the product and process. These phases are based on the phases 'presenting' and 'evaluating' of the classification of Brand-Gruwel and Walhout (2010). In this phase the students need to organize the information that they found in such a way that they are able to present the findings, and are able to discuss why they think their information is reliable. Finally, the product and the learning process are being evaluated. In the evaluation of the product a question could be stated whether the investigations were good enough to be able to advise the school principal. With regard to the learning process, it could be discussed what students learned from this lesson and what learning objectives they would have for the next time. The final version of the lesson design, can be found in Appendix A.

4. Research design and methods

This chapter discusses the research design and the methods that were used in this study. First, the research method is described, after which the measurement instruments that were used to evaluate the effectiveness of the example learning materials are described. Subsequently, it is elaborated on how the data that were retrieved from the observations and the interviews are analysed. Fourth, the example learning materials that were developed for this study are described. Thereafter the procedure section is included, in which the procedures are mentioned that were used to collect data in this study. This chapter ends with a short summary of the most important elements that were described in this chapter.

4.1. Research method

This study can be classified as a multiple case study design with triangulation. Yin (2003) describes the multiple case study design as a possibility for the researcher to investigate discrepancies within and between cases, aimed at reproducing the findings across cases. This design is appropriate when the context in which the study is performed is relevant for the study, when the study is aimed at answering 'how´ and 'when' questions, and when the study is not intended to manipulate the behaviour of the respondents (Yin, 2003). This research method seems appropriate for this study, since the multiple case study design enables the researcher to get insight into differences and similarities between cases, which in this study are teachers who perform the lesson in their classrooms. This is useful because this study is aimed at obtaining information on how the respondents experienced the example learning materials. Therefore, the context in which the case studies are performed play an important role in this study, which complies with the multiple case study design. Additionally, this study is not aimed at manipulating the behaviour of the respondents, because it is important that teachers perform the lesson as they would usually do, in order to see how the teachers use the materials and to evaluate the effect of the use for their teaching. Further, two out of three sub-questions that were formulated in this study are how-questions, which also fits the description of the multiple case study design.

The research goals of this study are developing example learning materials for information literacy, and evaluating to which extent these materials are helpful for teachers in primary education to integrate these skills in the curriculum. Therefore, this study consists of two parts. In the first part of the research a literature review is performed to obtain information on how to design effective instructions for information literacy, which resulted in the formulation of three instructional principles. Subsequently, based on these instructional principles, example learning materials are developed, comprising an example lesson and an information leaflet. The second part of the study aims to evaluate to what extent these developed learning materials are effective, by assessing it in two ways. First, observations are performed in order to evaluate the degree to which teachers are able to give an instruction on information literacy when they were provided with the example learning materials. Second, interviews are performed in order to obtain information on how teachers valued the example learning materials, by means of a conversation about their experiences with the materials.

As mentioned before, triangulation is used in this study, which is a way to increase the truth value of the data, because multiple sources of information are used to measure the same concept (Boudah, 2011). Triangulation is used in the second part of this study, since the observational data and the interview data are both used to determine the effectiveness of the example materials. Additionally, the design is sequential, since the data obtained from the observations form a part of the content of the interview, since notable things that are observed could be discussed in the interview.

4.2. Instrumentation

Two measurement instruments were developed for this study: an observation scheme and an interview scheme. Both instruments are further discussed below.

4.2.1. Observation scheme

The observation scheme is one of the measurement instruments that was developed for this study. The observation was aimed at evaluating the degree to which teachers were able to give an instruction on information literacy when they were provided with example learning materials. The observation scheme was designed based on the classification of Brand-Gruwel and Walhout (2010), because their classification also functioned as the main conceptual framework in this study. As is discussed more elaborately in the theoretical framework section of this study, this classification comprises six main phases in the information literacy process: defining, searching, selecting, processing, presenting, and evaluating. Each of these main phases could be sub-divided in several criteria, ensuring that the phases become measurable and more specific. The complete skill decomposition can be found in Figure 2 in the conceptual framework section of this study. The only adaptation that was carried out to this original model, was with regard to the formulation of the criteria. In the observation scheme the criteria were reformulated in such a way that the teacher assigns the students to perform certain tasks, instead of performing these tasks himself. An example item of the observation scheme is 'The teacher permits the students to inventory the availability and location of several digital information sources'. This item can be rated in two categories: either the criterion was fulfilled, or it was not fulfilled properly by the participants. The final version of the observation scheme (see Appendix B) was approved by several experts in educational research.

Before the actual data collection started, the observation scheme was tested by one of the participants. The aim was to test whether this measurement instrument was effective, or that some adjustments were necessary before it could be used in the rest of the study. It was assessed whether the criteria of the six phases of the information literacy process, as based on the classification of Brand-Gruwel and Walhout (2010), were measurable and relevant in the lesson. The outcomes indicated that it was not necessary to change the original observation scheme. Therefore it was decided to include these test data in the original study.

With regard to the rating of the observations, there are some reliability constraints involved, because the ratings of the observations are based on the findings of the main researcher only, since there was no second observer involved in the assessment procedure. Therefore, it was not possible to calculate an inter-observer agreement, because the observations were not scored by two independent observers at the same time, which influences the reliability of the findings (Boudah, 2011). The reason for not including a second observer was that it was not practically feasible to have two observers present at each location to be able to assess the observations together.

The observations could be indicated as full participant observations, indicating that the observer is physically present in class during the lesson (Boudah, 2011). Further, the observation is overt, since a notification of the study is provided to the parents of the students, and the observer is introduced. Also, the teacher knows the observer and the objectives of the observation. Additionally, openness is guaranteed in this research, since the participants are informed about the results of the study. It is a single observation per teacher which takes approximately one hour.

4.2.2. Interview scheme

The second measurement instrument that was developed for this study, was an interview scheme. The interviews were aimed at obtaining feedback from the participating teachers with regard to the example learning materials that they received, and their experiences with these materials. Additionally, the interviews were a way to find out how the materials could be improved to fit the needs and wishes of the teachers and the students.

In order to obtain useful information from the participants with regard to their experiences with the example learning materials, it seemed to be important to put the participants in the position to address those topics that they find relevant to mention. To respond to that need, it was decided to use the interview guide approach (Boudah, 2011), instead of a fully structured interview. According to Boudah (2010) the difference between an interview guide approach and a fully structured interview is that the first enables the teachers to give direction to the conversation, because only some possible topics of discussion are pre-determined, and the conversation is primarily guided by the interviewee. On the contrary, fully structured interviews focus on addressing each pre-determined question in the interview in a fixed sequence. In this study it seemed important to be able to flexibly interpret the questions

and to enable the interviewer to broach those topics on which teachers have a lot of information or personal experiences that they want to share. Therefore the interview guide approach seemed more suitable for attaining the research goals, than with fully structured interviews.

The topics of the interview guide are partly based on the classification of Brand-Gruwel and Walhout (2010), specific elements obtained from the example materials, as well as some more general topics of discussion. Topics of conversation that were mentioned in the interview guide with regard to the example lesson were for example: 'general impression of the materials', 'amount of information that is provided', 'utility of this lesson with regard to Dutch language education', 'feasibility of the time investment' etcetera. Also the topics of this interview were tested once before data collection started, to assess whether all relevant topics of conversation were included. The outcomes of this test indicated that it was not necessary to change the original interview instrument. For that reason it was decided to include these test data in the original study. The final version of the interview scheme can be found in Appendix C.

4.3. Data analysis

As described before, both observations and interviews were used to obtain data. These are more elaborately discussed below.

4.3.1. Observations

First of all, quantitative data were retrieved from the observations. The observation scheme consisted of several criteria per phase, which could be assessed in two categories, either the teacher fulfilled the criterion, or he did not fulfil the criterion properly. In addition to that, also notes could be written down per phase.

In order to analyse these quantitative results, the data were first tabulated to get an overview of the scores on each criterion per phase of the information literacy process, which was based on the classification of Brand-Gruwel and Walhout (2010). Therefore the data were inserted in a frequency table, which provided insight into the number of participants that performed a certain criterion properly. However, this table only indicates whether or not the participants performed a certain criterion and it does not provide information on the quality or the extent to which the criterion was performed. Subsequently, based on these frequencies, a percentage was calculated per phase which indicated the average level of performance of the eight participants with regard to the criteria that together form one phase of the information literacy process.

4.3.2. Interviews

Second, qualitative data were derived from the interviews. After all interviews were performed, each interview was literally transcribed and randomly labelled with an anonymous term, like teacher 1 until teacher 8, in order to ensure the anonymity of the participants. Because of these labels it is not possible to make a connection between quotes and the participants. Subsequently, these interview transcripts were analysed by means of a thematic networks analysis, which is described as "a way of organizing a thematic analysis of qualitative data" (Attride-Stirling, 2001, p. 387). In other words, the thematic network analysis functions as a non-content related tool, which can be used to provide an overview of the interview findings. It was decided to use this tool, because it is a way to present qualitative findings in an insightful way. Also, this tool can be used to perform the qualitative analysis of the interview data in a stepwise manner. Summarizing, the thematic network does not function as a content-related model, but only as a tool to represent the findings in an insightful manner. However, because of practical issues, it was not possible to have the interviews analysed by two independent coders. This is a limitation that should be taken into account, because it could negatively influence the reliability of the coding.

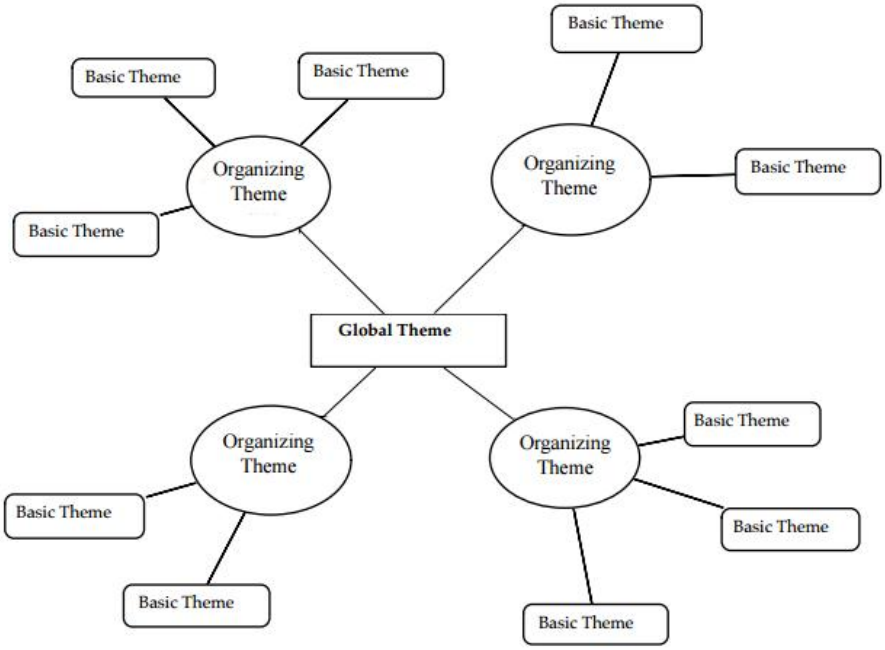

Figure 3. Structure of a thematic network (Attride-Stirling, 2001)

Attride-Stirling (2001) describes the thematic network analysis in six steps. The structure of the thematic network is visualized in Figure 3. The first step entails coding the interviews based on the contents of the transcripts, and structuring these codes in a codebook. Second, central themes are abstracted from this coded transcript. This means that it is tried to abstract overarching themes based on the codes. Thereafter, even more extensive thematic networks are composed, comprising a 'global theme', which is the core concept of the study, with accompanying 'organizing themes´, which are the themes, and 'basic themes', which are the codes that are obtained from the transcripts. The fourth step of the analysis contains describing and analysing the established networks in an elaborate way. In this step interpretation of the transcriptions takes place by means of the networks. This process is necessary to clarify the meaning of the findings. During the fifth step the main themes and patterns of the thematic network are summarized. This phase is actually the results section of this study, since the outcomes of the qualitative analysis of the findings are described. Also in this phase some quotes of the participants could be used to clarify the statements. These quotes are translated from Dutch to English, whereby it was tried to interpret the quotes in such a way that it corresponds to the original meaning. Finally, the distinguished patterns are interpreted to answer the research question. This phase equals the conclusion and discussion phase of this study, since this phase aims to answer the research question. The results derived from this qualitative analysis provide insight in how the example materials are being valued by teachers.

However, the qualitative data-analysis is primarily based on the interpretations of the researcher. Therefore two procedures are used to ensure the quality of the data. First, triangulation is used, since both observations and interviews are used to answer the main research question (Creswell & Miller, 2000). Secondly, member checking is used, which means that the respondents validate the interpretation of the researcher (Creswell & Miller, 2000).

4.4. Materials

For this study example learning materials were developed. The materials that the participating teachers received, consisted of two files: one document in which the instruction for the lesson and the assignment were explained, and one document which included the information leaflet, which functioned as background information for the teachers. Both materials are further discussed below.

4.4.1 Example lesson

The first document that the teachers received was the example lesson. This file comprised several elements: introduction, student materials, some accents, and the instruction.

The introduction consisted of general information about information literacy skills. Also some practical information about the lesson was included, amongst others the time investment and the core objectives. Second, the student materials were included. These materials comprised a short introduction to the assignment, the objectives of the assignment, and a progressive scheme for task performance, all formulated in student language. Subsequently, the third element that was included in the example lesson was a description of several accents. These accents were mentioned in order to point the attention of the participants towards some specific and important elements of the lesson, and to raise their awareness regarding these points accordingly. The final part of the example lesson was the instruction. This element was more elaborately discussed in chapter 3, in which the choices with regard to the design were being justified. The example lesson can be found in Appendix D.

4.4.2. Information leaflet

The second document that the teachers received was the information leaflet, which functioned as a document that provided teachers with additional background information about information literacy skills. This file consisted of three elements: introduction, an elaborated progressive scheme with additional information, and a checklist. First of all, the introduction provided some additional information about information literacy skills in the context of the 21st century skills. Also the importance of teaching this skill in primary education, as well as the definition of information literacy was mentioned. Second, the next element of the information leaflet comprised an elaborated progressive scheme. In this scheme the steps of the instruction were described more elaborately, by providing didactical cues and additional information per phase. The last element of the information leaflet was the checklist that could be used by teachers to assess whether or not they fulfilled the criteria per phase of the information literacy process. The final version of the information leaflet can be found in Appendix E.

4.5. Procedure

This study started with a literature review (see chapter 2). Based on literature, measurement instruments and example learning materials were developed. This process was more elaborately discussed in the previous sections 'instruments' and 'materials' (see paragraphs 4.2 and 4.4). After the materials were developed and approved, several local schools were approached and asked to participate. The sampling method used in this study is convenience sampling, since schools were approached based on their accessibility to the researcher (Boudah, 2011). This sampling strategy was chosen, since it enabled the researcher to find enough participants within a short timeframe, by approaching local schools. A disadvantage of this sampling strategy is that sampling bias occurs, because this sample is not a good representation of the entire population (Boudah, 2011). This study is therefore not aimed at generalising results, rather on exploring the applicability of the developed learning materials.

In first instance ten teachers appeared to be willing to participate in this study. However, two participants decided later on to refrain from participation in this study, whereby in the end eight teachers participated in the study. All participants were teachers of either grade 5 or 6 of primary education, since the lesson that was designed was aimed for children of 11 or 12 years old. The majority of the eight participants, namely seven out of eight, is female. The ages of the participants varied from 24 years to 55 years old. The respondents were all teachers of local primary schools nearby Apeldoorn, which is a Dutch city. Before the actual data collection started, the measurement instruments were tested at one of the participating schools. This test was aimed to assess whether the measurement instruments were already useful and clear. The outcomes of this test indicated that it was not necessary to change the instruments. Therefore, the data retrieved from this test could also be used in the actual study. After the test, the seven other participants were approached to make an appointment for the observation and the interview. Also the definite materials were send to the participants at that time. All participants were instructed to read the example materials thoroughly before the appointment. The participating schools were visited at different moments. An appointment with a teacher consisted of two parts: the lesson observation and the interview. In most cases it was possible to perform the interview immediately after the observation, although this was not always the case. In all cases the interviews and the observations were performed at the same day. The time span

between the first appointment and the last appointment with the participants was almost four weeks.

The observations were performed during the lesson. The teacher performed the lesson and this was observed by the researcher by means of the structured observation scheme. Per phase it was indicated whether or not the teacher sufficiently performed the criteria belonging to the phases of the information literacy process. The scoring was done in two categories: either the teacher performed it the way it was intended, or he did not perform it as intended, which was indicated as either yes or no. In addition to that, the observation scheme also included some blank spaces, which enabled the researcher to make notes of remarkable things. During the first part of the lesson, in which the lesson was introduced, the researcher sat in the back of the classroom. After the instruction, the students often split up in little groups, and were allowed to work on the assignment using work desks across the school. In that case the researcher walked around and visited several groups to observe more specifically what they were doing in those phases of the lesson. The observations took approximately one hour, depending on the time that the teacher needed for the lesson.

After the observation, an interview with the teacher took place. Before the interview started, the researcher asked the participant for approval for audiotaping the conversation using a Dictaphone. The audio tape enabled the researcher to transcribe the conversation afterwards. The interview comprised the topics that were described in the interview guide. However, the participant primarily guided the conversation, by deciding which topics to discuss more elaborately. Because the observations were held before the interviews, it was also possible to address some issues that were indicated as remarkable during the observations in the interview. The interviews took approximately 45 minutes per participant. Afterwards the interview data were transcribed, in order to be able to analyse the findings accordingly, a process that was more elaborately discussed in the data analysis section. These transcripts were labelled with anonymous terms, like teacher 1 until teacher 8, so no one except the researcher is able to link certain quotes to a participant. Therefore, all data were treated confidentially and anonymously.

4.6. Summary

This chapter described the research design and the methods that were used in this study. Summarizing, it could be stated that this study could be indicated as a multiple case study design in which triangulation is used, since both interviews and observations are used to answer the main research question. This study comprised two main parts. In the first part of the study a literature review was performed, which functioned as the basis on which the example learning materials were based. The second part of this study focused on evaluating to which extent these materials were helpful in order to integrate information literacy skills in Dutch language education at primary schools, using observations and interviews. The next chapter describes the results that were obtained from these observations and interviews with the participants.

5. Results

This section discusses the results obtained from the observations, as well as from the interviews. The observations were aimed at evaluating the degree of implementation of the lesson. Subsequently, the interviews were focussed on gaining insight into the experiences of the teachers with the materials. The results of both measures are described below.

5.1. Results of the observations

This section aims to answer the second research question: 'To what extent are primary school teachers able to integrate information literacy in Dutch language education when using the example learning materials?' In order to answer this question frequencies and percentages were used to analyse the data. The results of the observations are visualized in Table 1. This frequency table displays the number of participants that performed each criterion of the information literacy process properly (N= 8). Therefore, a frequency of 7 means that 7 out of 8 participants were able to perform that criterion. Subsequently, a percentage was calculated to indicate the degree to which each phase was implemented, based on the scores on the criteria. However, because some phases consisted of more criteria than other phases, it is not possible to compare the phases. Nevertheless, based on these scores it is possible to indicate which phases were perfomed to a greater extent, and which were performed in a lesser extent by the participants. However, the observations only assessed whether or not a criterion was addressed in the lesson. Therefore these data do not provide information about the quality to which the criteria were performed. The process, which comprises the six phases, defining, searching, selecting, processing, presenting, and evaluating, is based on the classification of Brand-Gruwel and Walhout (2010), which functions as the main theoretical framework in this study.

Table 1
Frequency table of the degree to which the criteria that accompany the phases of the information literacy process (based on Brand-Gruwel & Walhout, 2010) among the participating teachers (N=8).

Phases	Criteria	Frequency (N= 8)	Percentage per phase
Defining	Activating prior knowledge	8	57,5%
	Formulating problem	0	
	Formulating research questions	7	
	Considering information	8	
	Making action plan	0	
Searching	Inventorying available sources	8	91,7%
	Selecting suitable sources	8	
	Applying searching strategies	6	
Selecting	Highlighting information	0	45,8%
	Selecting usable information	8	
	Selecting reliable information	3	
Processing	Processing information	8	81,3%
	Rephrasing information	5	
Presenting	Choosing presentation form	0	37,5%
	Appointing sources	6	
Evaluating	Evaluating usability product	6	62,5%
	Evaluating reliability product	5	
	Evaluating learning process	5	

Table 1 shows that there are differences in the degree to which the phases of the information literacy process are already implemented during the lesson. It can be noted that the second phase ‘searching’ and the fourth phase ‘processing’ are implemented to a greater extent, as the fifth phase 'presenting' is implemented to a lesser extent. This section documents the results of each of the phases of information literacy more elaborately.

5.1.1. Defining

The first phase in the process of information literacy is called ‘defining’. This phase consists of five criteria, and all of these have been observed during the lesson. Table 1 presents the results of the analysis of this phase. The first criterion of this phase indicated the degree to which the teacher enabled the students to activate their prior knowledge about the subject of the lesson. As can be inferred from the table, all participants introduced the subject of the lesson to the students. Subsequently, the second criterion observed the degree to which the students were able to formulate the problem themselves. However, the table shows that none of the participants fulfilled this criterion: it appeared that the teachers formulated the problem, rather than the students. However, the results accompanying the third criterion showed that the degree to which students formulated research questions and sub-questions about the topic of the lesson was quite high; seven out of eight participants enabled the students to think about questions themselves. The fourth criterion about deciding which information is needed to answer the research question was implemented well, since all participants fostered their students to perform this step. Finally, the last criterion ‘making an action plan’, described the degree to which the teacher tried to foster the students to consider what information to look for, before actually starting their search on the internet. These results indicate that none of the teachers assigned the students to make such an action plan.

5.1.2. Searching

The second phase of the information literacy process is called 'searching'. This phase is subdivided in three criteria. The first criterion describes the degree to which the teacher enabled students to inventory available sources. As Table 1 shows, all participants fulfilled this criterion. The second criterion indicated whether the teacher enabled the students to select sources that provide the necessary information. Also this criterion is implemented by all participants. Finally, the third criterion observed whether the teacher enabled the students to use searching strategies when they searched for digital information. As the figure indicates, six out of eight participants implemented this criterion successfully. However, two of the participants did not assign their students to use searching strategies, which resulted in a more random searching process.

5.1.3. Selecting

The third phase of information literacy is called ‘selecting', and included gathering information from the internet, and selecting usable and reliable information accordingly. This phase consisted of three criteria. The first criterion assessed whether the teacher assigned the students to highlight the most important information in the sources that were used. However, as Table 1 shows, none of the participants performed this criterion sufficiently, which means that the students did not highlight important phrases in sources that they wanted to use. The second criterion indicated the degree to which the teacher assigned the students to select information from digital sources based on the usability of the information. The table indicates that all participants addressed the importance of selecting usable sources. Finally, the third criterion assessed whether the teacher enabled the students to assess the reliability of the information that they wanted to use. However, as Table 1 shows, the majority of the participants did not address this criterion sufficiently; only three out of eight participants focused on the reliability of sources.

5.1.4. Processing

The fourth step in the process of information literacy is called processing information, which entailed the student's processing of the information that was found on the internet. This phase comprised two criteria. The first criterion assessed whether the teacher enabled the students to process the information that was found on the internet, and the degree to which the students were able to combine the information that they found to the desired information, for example by using summaries, tables, graphics, and schemas. As Table 1 indicates, all participating teachers devoted sufficient attention to this first criterion. Additionally, the second

criterion assessed whether the teacher encouraged the students to reformulate the obtained information in their own words. However, the results in table 1 indicate that only five out of the eight participants assigned the students to reformulate the obtained information in their own words.

5.1.5. Presenting

The fifth phase of information literacy comprises presenting the information that was found. This phase consisted of two criteria. The first criterion assessed the degree to which the teacher enabled the students to choose an appropriate way to present their findings, for example, a PowerPoint presentation, tables and graphics, or a poster. Table 1 indicates that none of the participants enabled the students to choose a presentation form. In all of the cases, the teacher decided on how to present the findings, which in most cases was a short, oral explanation of the findings. Subsequently, the second criterion assessed whether the teacher assigned the students to mention the references that they used, to answer their research questions and to determine the degree to which these sources are reliable and usable. As Table 1 indicates, the majority of the teachers adapted this criterion in their lesson, except two of them.

5.1.6. Evaluating

The last phase in the process of information literacy is called evaluation, which contains an evaluation of the process, and an evaluation of the product which is the result from this lesson. This phase comprised three criteria. The first criterion assessed whether the teacher enabled the students to evaluate their product based on usability. As Table 1 shows, most of the teachers, except two of them, devoted time to evaluate the usability of the sources that the students used. In other words, they evaluated whether the students were able to find the information they were looking for, and the extent to which the information was useful. The second criterion was comparable with the first criterion, only the focus lies on the reliability of sources instead of the usability of sources. As Table 1 indicates, only five out of eight participants devoted time to evaluate the reliability of the sources that the students used to find their information. The last criterion assessed whether the teacher enabled the students to evaluate their learning process. In other words, it indicated whether the students were assigned to evaluate on what they have learned already, and what they still would like to learn with regard to information literacy skills in the future. Also this criterion is implemented by five out of eight participants.

5.2. Results of the interviews

This section aims to answer the third research question: 'How do primary school teachers value the developed example learning materials in which information literacy is integrated in Dutch language education?' In order to answer this question the interview data were analysed using a Thematic Networks Analysis (Attride-Stirling, 2001), based on the transcripts that were made of the interviews. This analysis started with coding the transcripts of the interviews, after which central themes were being abstracted from these codes. The codes that were used to analyse the interviews were sorted, defined and basic themes were abstracted from these general codes. Subsequently, these basic themes were converted into more organizing themes. The basic themes and the organizing themes together form one global theme, which is 'evaluation of the example materials of information literacy'. A visualization of this Thematic Network can be found in Figure 5.

The Thematic Network (Figure 5) should be read in a clockwise manner. All themes that are distinguished are retrieved from the interviews. It starts with pre-requisites, in other words, things that should be taken into account to enable teachers to perform an information literacy lesson. The second organizing theme comprises feedback concerning the example learning materials as the teachers received it: the example lesson, including the instruction, and the information leaflet. Subsequently, the feedback of the teachers with regard to the implementation of the steps of information literacy in the lesson is being discussed. In other words, this theme describes how the classification of the information literacy process, as developed by Brand-Gruwel and Walhout (2010), is evaluated by the participants, and which difficulties occurred in each of the phases. The fourth theme describes what the learning gains are resulting from working with the current learning materials on student level, teacher level and

school level. The final organizing theme describes some improvements that the participants mentioned to further develop the current materials.

This section discusses all organizing themes separately, by defining them, and by discussing the basic themes that accompany that particular organizing theme. Each organizing theme is elucidated by a few quotes of the participants. These quotes are translated from Dutch into English, whereby it is tried to translate the statement in such a way that the original meaning is not changed.

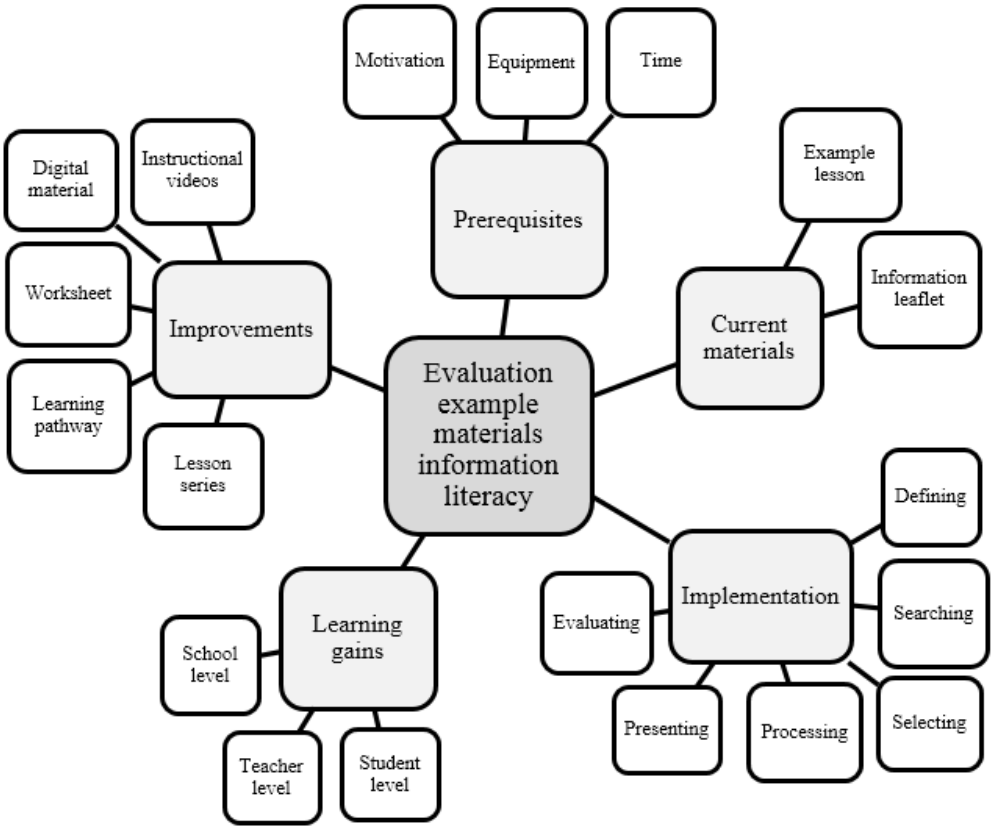

Figure 5. Thematic network for 'evaluation example materials information literacy'

5.2.1. Prerequisites

The first organizing theme that was abstracted from the interview data, is called 'prerequisites', which is defined as the conditions that the participants mentioned that need to be met in order to enable teachers to implement information literacy skills in their lessons. This organizing theme, which is visualized in Figure 6, consists of three basic themes: equipment, time, and motivation.

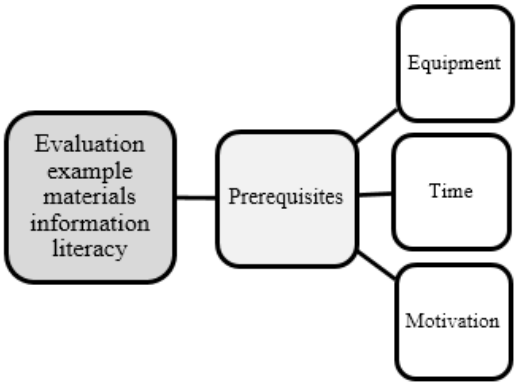

Figure 6. Organizing theme 'prerequisites'

Equipment is the first basic theme that is distinguished. It can be described as the materials that should be available to enable teachers to integrate information literacy skills within lessons. This means that there is a need for sufficient materials, like electronic devices that students can use to search for information to enable teachers to implement these skills in lessons.

In addition to the availability of sufficient electronic devices, also time is an issue that is often mentioned as prerequisite for implementing information literacy in lessons. Within this basic theme, two divisions can be distinguished. The first division points to the fact that teachers are busy and have to make choices about what to implement in order to avoid overload. Some participants feel they have not enough room in the curriculum to implement these skills, although they do find it important. Another division that is mentioned is that implementing these skills is a process that takes time. Therefore, sufficient time should be available to get acquainted with these skills and to implement these in a school wide manner.

Besides equipment and time, 'motivation' could be mentioned as the third prerequisite that is relevant in order to implement information literacy skills in lessons. Motivation in this case points to the degree to which teachers are actually motivated and willing to implement information literacy skills in their lessons, for example because the importance of teaching these skills is clear to them. Some participants indicated that they assume that motivation is related to the time and effort that a teacher wants to invest in teaching these skills, which presumably is an important determinant of the degree to which these skills will be successfully implemented.

Teacher 3 "It [implementation] depends on the curiosity of the teacher. (..) If you have a teacher who thinks at 15.45 'I will go home, see you later', or that he thinks 'I will stay here and do some searching on the computer myself'. That is the big difference. Because if you do not want, you can send a lot of nice example lessons, but in that case there will not change a thing".

5.2.2. Current materials

The second organizing theme that appeared from the interview data is called 'current materials', and includes all the feedback that the participants mentioned with regard to the original example learning materials, which they used to prepare and teach the lesson. This organizing theme, which is visualized in Figure 7, consists of two elements: the example lesson and the information leaflet.

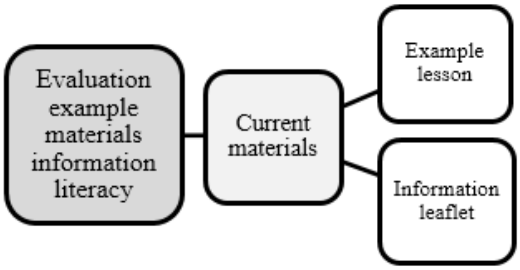

Figure 7. Organizing theme 'current materials'

5.2.2.1. Example lesson. This theme compasses the feedback that the participants provided regarding the current example lesson which they used to prepare and teach the lesson. The elements that are discussed more elaborately are based on the structure of the example materials, because all important elements that the lesson materials comprised, are mentioned separately. These elements are: 'provided information', 'objectives and planning', 'introduction and accents', 'lesson description', 'assignment', and 'student materials'. However, this category only describes the feedback with regard to the original materials, just like the teachers received it in the first instance. Improvements or adaptations arising from this feedback, are discussed in the last organizing theme, called 'improvements'.

The first element of the example materials that is discussed is 'provided information', which acts as an overarching term for the feedback with regard to the kind, the amount and the structure of the information that was provided in the example materials. Results of this basic theme indicated that generally, the teachers designated that the length of the total package should be much shorter, because there was quite a lot of information. However, the participants

differed in the extent to which they liked this amount of information. Some suggested that they prefer the information to be written down in a short and concise way, as others prefer to have some background information to be well prepared.

In addition to the kind of information that was provided, also a lot of feedback was provided on another important element of the example lesson, namely the objectives of the lesson. An important issue that accompanies this element is the feasibility of the objectives within the timeframe. It appeared that the participants unanimously indicated that it was not realistic to assume that all objectives could be met within this single lesson. However, the analysis also showed that there are differences between teachers and classes. Some teachers found it easier to accomplish the objectives than others. Additionally, it appeared that the high amount of objectives sometimes resulted in unclear situations for teachers, because they did not know on which objective to focus.

The third element that is discussed covers the feedback with regard to the introduction of the example lesson and to the accents. It appeared that the participants appreciated that fact that the core objectives and the references were mentioned in the introduction. However, with regard to the introduction, there were some divergent views. Some teachers liked to have some background information, others however, did not find this necessary, also because it made the length of the package and the amount of reading work increase. Regarding the accents, most of the participants indicated that this part could be shortened or even omitted.

After the introduction and accents part of the material, the instruction was included, which consisted of two sheets that provided an instructional manual for teaching the lesson. Most of the participants appreciated the information that was provided here, however some participants found the description rather extensive. A few additions to the current lesson description were provided, like adding more example research questions, providing some ideas about how to incorporate cooperative learning in this lesson, and finally, the desirability of providing some organizational cues.

Teacher 3 "(..) I did not strictly follow the lesson description, but it was nice to use it as a guideline. Additionally, I liked this [differentiation options: teacher guided or student guided]. This is something that makes it really useful for a variety of schools, that you can choose between student guided and teacher guided".

Another element of the example lesson was the student assignment, in which it was investigated whether it was possible to invite an author of children's books at the school. Therefore, the students needed, amongst others, to formulate research questions, and decide on which sites to use to gather information. Regarding the choice of the topic, there seemed to be some disagreement among the participants. Some of them found the topic appropriate, especially because the subject 'inviting an author for children's books' matched with the annual Dutch Children's Book Week that took place during the same period as the research. However, others found the topic too difficult and vague for the students, and preferred a more concrete and specific subject, to search information about. They assume that this would have made the assignment easier for the students, also because the majority of the students was not familiar with information literacy skills yet.

Teacher 1 "When I received everything, I thought 'how nice, that is going to be okay'! Also because it is just before the annual Dutch Children's Book Week, then you can pretend that it [inviting an author] will really happen and that you hope that there is a high level of involvement among the students".

Teacher 6 "I was thinking, it [the lesson] is not really about inviting an author for children's books, it is about searching for information. In that case, I would have chosen another subject, (..) in which you can search for information more broadly".

The last element corresponding to the current example materials included feedback about the current student materials, which compassed a short description of the assignment, and the steps to take to fulfil the assignment properly. It appeared that teachers appreciated the fact that there was some kind of student material included, especially by the teachers who taught the lesson in a student guided way. Additionally, it turned out that the teachers who taught the

lesson in a teacher guided way, mostly did not use the student materials at all. However, the participants that did use the current student materials were of the opinion that the contents and lay-out of the student materials could be improved.

Teacher 8 "In response to the student materials, (..) I was wondering whether the students would be able to filter out what they needed to do exactly, and where".

In summary, it could be stated that the current example lesson could be improved in certain ways. Especially the amount of information that was provided, was topic of discussion. The feedback of the participants indicated that the extent of the materials should be reviewed critically. Another important point that came forward is the difficulty of the assignment. It should be considered to change the subject, to make the assignment as a whole, and the core objective of the lesson, more attainable for the students.

5.2.2.2. Information leaflet. In addition to the example lesson, the information leaflet was the other basic theme corresponding to the current materials. The term 'information leaflet' can be defined as the additional information package that was included in the original materials. It consisted of an introduction, a progressive scheme with didactical cues, and a checklist that the teachers could use to assess whether they master several elements of information literacy. These elements are described more elaborately below.

First of all some feedback was provided with regard to the nature of the information, the amount of information, and the way in which the information was structured in the information leaflet. It appeared that most participants found the information leaflet quite extensive. A minority of the participants did not read the information leaflet at all. An appropriate indication for the length would be two sheets long, in which only the most important topics are mentioned. The participants agreed about the desirable structure of the information leaflet: a short introduction section followed by the progressive scheme, together at just one sheet, and on the backside the checklist.

Teacher 3 "For someone who never teaches such a lesson, this [information leaflet] is handy, but I browsed it through, and closed it again. So, actually I didn't do anything with it"

The first element of the information leaflet was the introduction section. The conclusion that can be drawn based on the interview data is that the introduction section of the information leaflet, must be shortened.

Subsequently, the second part of the information leaflet consisted of an elaborated progressive scheme section of the information leaflet. The results indicated that some teachers liked the extensive amount of information, because it was unknown to them. However, other teachers who already knew more about information literacy skills, found the scheme too extensive. In general, the progressive scheme should be shortened, but all the steps have to be mentioned.

The last element of the information leaflet was the checklist, which consisted of a list of criteria that need to be fulfilled in order to comply with the process of information literacy. The interview data revealed that in general all participants liked the presence of the checklist. A lot of the teachers indicated that it was easy to handle, short and concise. In addition to that, they appreciated this scheme because it enabled teachers to assess whether their teaching fulfils certain criteria that are relevant for information literacy.

Teacher 7 "This [checklist] could be a useful tool for checking. Before the lesson or afterwards you can check: did I do this and this and that? (..) And it is short and concise and only one page which makes it very useful. It is not too extensive or long".

Summarizing, it could be stated that there was some disagreement among the participants about the amount of background information that was provided in the information leaflet. However, it is indicated that it should contain only two sheets and be formulated in a short and concise way.

5.2.3. Implementation

The third organizing theme that is distinguished is called 'implementation'. This theme comprises all the feedback that teachers gave with regard to the implementation of the process of information literacy as based on the model of Brand-Gruwel and Walhout (2010). In other words, which steps do the students already master, and which steps need more attention. The basic themes accompanying this organizing theme are similar to the steps in the process of information literacy: defining, searching, selecting and assessing, processing, presenting, and evaluating (Brand-Gruwel & Walhout, 2010). These themes are visualized in Figure 8, and discussed more elaborately below.

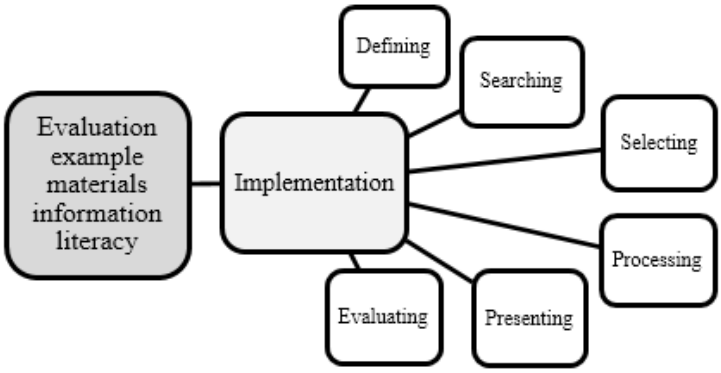

Figure 8. Organizing theme 'implementation'

The first basic theme is called 'defining', and includes all the feedback concerning the first step in the process of information literacy. This first step includes formulating the problem, formulating research questions, and deciding on which information is needed to be able to answer the research questions. Analysis of the interview data indicated that this first step was very difficult for a lot of students. Therefore, the majority of the participants decided to spend more time for the introduction phase. The participants indicated that they found it important to introduce the topic extensively, in order to involve the students and to make clear what was being expected from them. Further, it appeared that especially formulating research questions was very difficult for students.

The second basic theme is called 'searching', which included all the feedback concerning the second step in the process of information literacy, which comprised determining searching strategies for searching digital information, weighing which sources to use, and selecting usable and reliable sources. In general, it appeared that a lot of students did not make an action plan before starting. Also, in a lot of cases, the students searched for information in a superficial way. The participants indicated that students found it hard to decide on which key words to use, and to find the kind of the information they are looking for. Also, some participants were doubting whether the students already possessed the prior knowledge and skills that were needed to fulfil this assignment properly.

The third basic theme comprises 'selecting' information which is the third step of the information literacy process. This step is about reading the information of the sites that you chose more elaborately and critically, to make a decision about whether the information is useful for answering your research question. Some of the participating teachers indicated that students found it hard to decide on which site to use, and to estimate whether that information was useful for them.

The fourth step of information literacy is called 'processing' information, and includes reading the information critically. Some participants underscored the importance of reading the information on sites carefully and extensively. However, a minority of the students appeared to actually do so. Reading comprehension skills are necessary for answering the research question. However, it occurred in a lot of cases that students were not able to find an answer to their research question. Some participants indicated that this could cause some negative feelings, like frustration, which are not beneficial for learning.

Teacher 7 "Well, the emphasis should have been on the usability and reliability of sources, but the children were not occupied with that. They were occupied with finding

an answer to their research questions. And they really want an answer. They are not satisfied with [admitting that they were not] able to find an answer, or the answer does not exist, or there is no answer to that question at all".

The fifth basic theme that is mentioned is called 'presenting' which is the phase in which the students needed to organize the information that they gathered, and choose an appropriate way to present that information. As the interview data revealed, this phase is indicated as less important by the participants, primarily because of time issues. Therefore, the majority of the participants decided to only briefly discuss the findings of the separate groups.

Teacher 5 "[presentation] I have skipped that, because I did not find it appropriate for the core objective of this lesson, namely assessing whether a source is suitable to use or not".

The last theme is called 'evaluating' and comprised all the feedback with regard to either the evaluation of the product, or the evaluation of the learning process. Also in this phase, time issues seemed to be an important reason for not completely performing this phase of information literacy. Another notable fact was that participants were surprised to find out that many students easily assume that a lot of the information retrieved from the internet is reliable and useful for them.

Summarizing, the organizing theme 'implementation' indicates that there are differences between the difficulty level and the relevance of several phases of this lesson. Especially, the first step 'defining', appeared to be difficult for students. Because that phase was difficult, but important for the rest of the process, more attention was paid to this phase. For that reason, and also because of time issues, less attention was paid to other phases, like presenting the findings.

5.2.4. Learning gains

The fourth organizing theme is called 'learning gains' which can be defined as the yield resulting from working with the current materials. The learning gains are described at three levels, which are also the basic themes that accompany this organizing theme: student level, teacher level, and the school level. In other words, this organizing theme describes the visions and experiences of the teachers who worked with the materials, about what they consider to be the learning yield at several levels within the school after working with the materials. This theme is visualized in Figure 9.

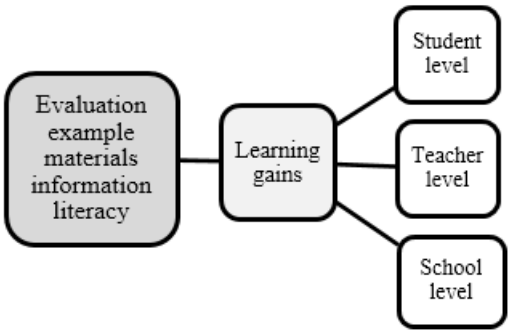

Figure 9. Organizing theme 'learning gains'

The first basic theme is called 'student level', which includes the learning gains of the students with regard to their information literacy skills after they have worked with the current materials. It appeared that the majority of the participants was of the opinion that these skills were quite difficult and new for students. In general, the participants were of the opinion that the students did make some progress during the lesson, however, even more attention should be paid to actually raise the awareness of students regarding this subject. Students, for instance, should be made more aware of the fact that the reliability of digital sources differs.

Teacher 1 "(..) We use the computer very often, for programming, making assignments, making a presentation, by which they use digital sources from the internet as well. For that reason I expected that this [assignment] would have been easier. I

noticed that this did not turn out as expected, I had higher expectations from them [students]".

Teacher 8 "(..) Even though they search for information on the computer a lot, they are not aware that these are information literacy skills. So that might be it for the student: what are you actually doing? Raising awareness".

The second basic theme is called 'teacher level' and describes the learning gains of working with these materials for the teachers. This theme describes the reactions of the teachers with regard to the learning outcomes of the students, and the changes with regard to their own thinking and acting. In general, the participants indicated that working with the materials has been an eye-opener for them, with regard to (their estimation of) the competence level of the students, as well as their own role in implementing the process in their lessons. In addition to that, many participants indicated that they became aware of the fact that this process is quite difficult to perform and to teach, although it is often seen as a matter of course.

Teacher 1 "Yes, I am encouraged to think about (..) what I want to accomplish and how I can design that. So, in that way it affected me. It brought me something".

Teacher 8 "(..) That it urges yourself as well. Well, they are taking the laptops, and you tell them to search information, but the question is whether they have the skills to search for information in the right way. Or are we ignoring that fact?"

The last level, and also the last basic theme that is discussed is called 'school level', which describes all the feedback that the participants gave with regard to desirable changes at the school level, resulting from the experiences that the participants gained from working with the materials. Generally, the participants indicated that a school wide implementation of these skills is necessary to make it successful. Therefore it is necessary that the whole team is aware of the importance of these skills and wants to implement it school wide. It appeared that currently too little is done with regard to teaching these skills.

Teacher 2 "What I perceive is (..) that we as a school are not up to that [information literacy skills] in a sufficient amount at the moment".

Teacher 8 "I am wondering whether this [information literacy skills] is familiar to other colleagues. So, that makes me wonder, (..) maybe it is a good idea to discuss this together".

In summary, it can be stated that the learning gains are primarily focussed towards raising awareness. It appeared that teachers are encouraged to think about implementing these skills.

5.2.5. Improvements

The last organizing theme that is distinguished is called 'improvements' and indicates how the current materials could be adapted or complemented, according to the participants. Five improvements are discussed: 'worksheet', 'lesson series', 'learning pathway', 'digital material', and 'instructional videos'. This theme is visualized in Figure 10.

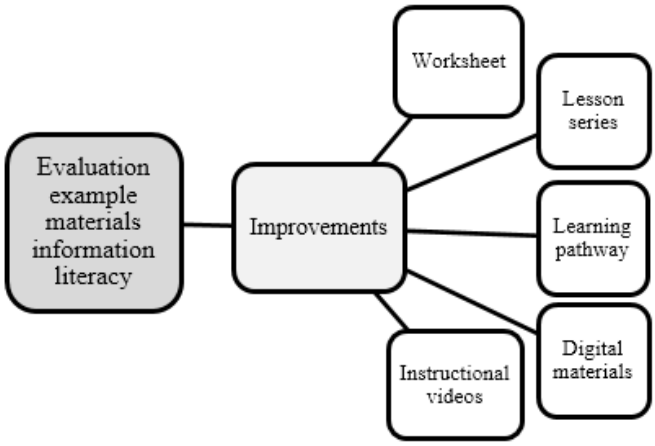

Figure 10. Organizing theme 'improvements'

The first improvement that was mentioned is called ‘worksheet’, which includes the implications that the participants mentioned to improve the current student materials. The current student materials only comprised the objectives, the steps that the students should take, and the assignment. However, the majority of the participants indicated that they would like to have a worksheet for students as well, where they can fill in answers. The participants expect that a worksheet would help the students to structure the assignment and better understand what is expected from them.

Teacher 4 “I do think that it would have been useful to include a sheet on which the question was stated, and has some free space below to fill in the answer. I think that in that case it would have been more appealing for the children”.

The second improvement is called ‘lesson series’, which includes all suggestions that the participants provided with regard to adapting this single lesson into a lesson series. In that case more attention could be paid to the separate steps of the information literacy process. It appeared that the objectives of the current lesson could not be fulfilled in just one lesson. Therefore, the participants agreed to make it a lesson series, instead of just one lesson, because in that case more time and attention could be paid to the separate steps.

Teacher 1 “(..) Maybe if you do want to teach all this information to the children, then I would divide it in smaller parts. One lesson about useful searching strategies, one lesson about the information and reliability of digital sources, (..) then I would use this assignment to enable the students to show that they master these skills”.

Teacher 8 “Now it was one lesson with everything in it, but it would have been perfectly possible to do it in multiple lessons, whereby the process could be build up. I think that, in that case, the result would have been different as well”.

Thirdly, the basic theme ‘learning pathway’ is mentioned, which discusses the desirability of including a learning pathway in the material. This learning pathway could be used to indicate at which level the students are performing at the moment, and what can be expected from them when they get more experience with information literacy skills. Some participants mentioned that such a learning pathway could be useful for school wide implementation. In that case teachers from different grades could adapt their lessons to each other, in order to make it a continuous process.

Teacher 1 “What I find difficult, and what could be an addition, is what should a student of a certain age be possible to do? What can you expect from your students? (..) Actually, I would like to have a learning pathway”.

The fourth basic theme is called ‘digital material’ and describes the desirability to include digital materials to complement the current materials in a digital way. Some participants indicated that they are used to work with digital materials in their lessons, for which the lesson outline, the objectives, and the assignments are already prepared and can be projected on the screen. Some of the participants wished to have access to digital lesson materials for this lesson as well. They indicated that this would make it easier to use, and requires less preparation for the teachers.

Teacher 7 “What I miss is (..) we work with instructional methods that include digital software. That all lessons are already prepared on the network, on internet. In that case you are able to log in and to browse through it [lesson] in a stepwise manner. So the objectives and the lesson outline, I made it myself [now]. That is something that I would miss”.

The last improvement is called ‘instructional videos’, which describes the usefulness of including short instructional videos to the materials. It appeared that some participants would

like to have access to short instructional videos of only a few minutes, in which the basics of a certain skill (in this case information literacy skills) are being explained.

In summary, it can be stated that the current materials can be improved in several ways. Especially, digital support appeared to be missing in the current materials. Additionally, the materials could be improved by including a lesson series, a worksheet and a learning pathway.

6. Conclusion and discussion

This section elaborates on the conclusions of this research, by answering the three sub-questions that were posed in the beginning of the study. Subsequently, these results are further discussed, after which the main research question is answered. This section concludes with some limitations.

6.1. Design of the example learning materials

The first sub-question that was stated was 'How could information literacy instruction be designed in order to be effective?' In order to answer this question a literature review was conducted at the beginning of this study. Literature revealed three main instructional principles that need to be taken into account in order to design effective instructions for information literacy. The first principle stated that the assignments should be meaningful for students. Second, information literacy instruction should be integrated with subject matter contents. Third, the literature review pointed to the necessity of providing students with a sufficient degree of guidance during the process. In addition to the principles that were obtained from literature, a fourth principle could be distinguished that was taken into account in the design. This fourth principle was the target audience, which were teachers with low levels of prior knowledge with regard to teaching information literacy skills. In the current study it was managed to integrate all four principles into the lesson design. The design of the example learning materials was based on the classification of the information literacy process as developed by Brand-Gruwel and Walhout (2010). This model appeared to be appropriate for the design purposes of this study, because the phases of the process as described in this model were practical and accessible, and therefore useful to form the basis for the instruction of the lesson. Also the inclusion of the evaluation phase appeared to be a useful addition to the model.

The length of the lesson design was a topic of discussion among the teachers, since some of the participants indicated that it would be better when the lesson is short and concise, as others prefer a more extensive version of the materials. However, this appeared to also be dependent on the level of prior knowledge with regard to teaching information literacy skills. In this study, it was decided to focus on low prior knowledge teachers as target audience for the materials, since this was also the fourth instructional principle in this study. However, it could be discussed whether this was a good decision. One could also state that teachers and schools need to ensure that they have a certain basic level of knowledge and skills with regard to information literacy skills. This could be obtained by for example attending trainings in which information and didactical cues are provided on teaching this skill. When teachers already possess a certain level of prior knowledge, it seems possible to design the lesson in a more concise way, which also responds to the wishes of the majority of the teachers that participated in this study.

Another addition for future designs might be to include even more forms of guidance. For example the usage of scaffolds, which is in line with the research of Argelagós and Pifarré (2012), was not implemented to a large degree in this study. Although the usage of scaffolds should be considered carefully, it might be helpful to include these scaffolds in order to enable students to perform parts of the assignment independently. In addition to that, it might be possible to convert this lesson design in a web-based instructional activity, which is in line with the study of Argelagós and Pifarré (2012). In that way students do not need a worksheet, but complete the assignment in a web-based environment. It might be that such a web-based environment is more appealing for students, which could positively influence their motivation for the task. Also, this could respond to the needs of teachers, who preferred digital materials to work with during this lesson.

6.2. Observed integration of information literacy skills

The observations were aimed to answer the second sub-question: 'To what extent are primary school teachers able to integrate information literacy in Dutch language education when using the example learning materials?' The results indicated that there were considerable differences in the degree of implementation of the separate phases of information literacy. Some scores on the criteria were quite similar among the participants, as other scores were more

divergent. When reviewing the observational data, it appeared that the second step ‘searching’, was implemented best. The phase that was implemented to a lesser extent, was the fifth phase, which contained the presentation of the information. Summarizing, it can be stated that on average some phases of information literacy were already implemented to a certain extent, however, more attention is necessary to further improve the degree in which the whole process is implemented.

As appeared from the results of the observations, the phases selecting and presenting are fairly underrepresented compared to the rest of the phases. This finding is in line with the interview data, which indicated that the presenting phase was often shortened or omitted, either because of time issues, or because the teachers were of the opinion that the presentation phase was not important for attaining the core objective. Additionally, there were large differences in the degree to which the criteria of the evaluation phase were implemented. However, this could be explained using the interview data on the evaluation phase, which indicated that some schools used their own evaluation manner to evaluate the lesson, as others did not have sufficient time to pay a lot attention to this last phase of information literacy. The interview data also confirm that teachers have different opinions about the relevance of evaluating the product and the process.

Another possible explanation for the underrepresentation of certain phases, is that the learning materials, of which the instruction was the main part, did not specifically enough point to the necessity of certain sub-skills, or that it was not even possible to implement certain criteria properly in this lesson. An example could be 'formulating the problem', which was a task that students needed to perform, instead of the teacher. However, it was questionable whether it was possible in this lesson to enable students to brainstorm in such a way that they were able to come up with the problem ‘how to invite an author for children’s books’ themselves. It could be that when the material or the teacher did not direct the students in that way, that they would never come to the problem on which the rest of the instruction was based. Therefore, it could be stated that it was not realistic to accomplish certain criteria due to the design of the current learning materials. This could be an explanation for the fact that some criteria were implemented in none of the cases. However, this reason does not explain all the divergent scores of the participants, therefore it is also assumed that the implementation of several other phases primarily depended on the effort and understanding of the participating teachers with regard to the need of certain sub-skills.

6.3. Experienced support of the example learning materials

The interviews were aimed to answer the third sub-question: ‘How do primary school teachers value the developed example learning materials in which information literacy is integrated in Dutch language education?’ The analysis of the interview data revealed five themes that should be taken into account when designing and evaluating learning materials for information literacy. It can be concluded that working with these materials has helped the participants. Especially, raising awareness that this process is difficult for students, and that teaching these skills is not as obvious as it looks like, have been important eye-openers. Also, the evaluation of the process indicated that especially formulating research questions is an element that needs more attention. In general it can be stated that this example lesson helped the participants to teach these skills, but that more time is needed to implement these skills effectively in the curriculum, and to promote transfer to other subjects as well. The interview results are discussed based on the themes that were distinguished in the thematic network.

6.3.1. Prerequisites

The first theme that was distinguished underscored the importance of complying with some prerequisites, in order to enable teachers to integrate information literacy skills in lessons. Although these preconditions might seem obvious, these are important factors in determining the success of the implementation. Equipment and time are both prerequisites that need to be facilitated by the direction of the school, since the school is responsible for ensuring that there are enough electronic devices available and that teachers receive sufficient time to teach information literacy skills in their lessons. This is confirmed by Thijs et al. (2014) who indicated that an absence of sufficient time and support could result in an implementation of information literacy skills in the curriculum that is not optimal. In addition to that, the teachers need to be aware of the importance of their own role in implementing the skills. The motivation of the

teachers, which was also the third prerequisite that was mentioned, also played a major role in that process. Therefore it can be assumed that the degree to which these prerequisites are realized, affects the likelihood to which these skills are actually integrated in existing subjects. However, this also seems to be related to motivation and will to change. This raises the question how the school board and the teachers can be encouraged to be motivated. A possible answer to this question could be by informing the participants about the relevance and difficulty of these skills for the students. This might be accomplished by providing trainings about these skills, aimed at raising awareness. Therefore it might be considered to include information literacy skills in the Dutch national core objectives.

6.3.2. Current materials

With regard to the example learning materials that were provided to the participants, it appeared that the example lesson as well as the information leaflet could be improved by making the package shorter, amongst others by formulating the information in a more concise way. This could result in documents that become easier to handle, which subsequently might result in the fact that teachers use the materials more often. However, the appreciation of the extent of the materials seemed to be related to the amount of prior knowledge that a teacher already possesses with regard to information literacy skills. This is one of the findings that resulted from the interview data. Some teachers who indicated that they had a lower level of prior knowledge seemed to appreciate the extra information, because this provided them with some grips about how to teach these skills to students. On the other hand, teachers who already had a certain level of prior knowledge, were sometimes of the opinion that the materials included some redundant information, because the information was quite obvious to them. This raises the question what the target audience should be for which the materials are designed. The question is whether it would be better to focus on teachers with an average level of prior knowledge, or whether it is important to focus on teachers with practically no prior knowledge. A subsequent question could be which of the target groups is more likely to really use the materials. It could be that teachers with higher levels of prior knowledge are already more independent and therefore feel that they are less in need of example learning materials. However, on the other hand, it could also be stated that schools and teachers are responsible for ensuring that they possess the necessary knowledge to teach such a lesson. In that case, the lesson materials do not have to be very extensive, because the teachers are also familiar with the basic knowledge and skills. Nonetheless, therefore it seems necessary that teachers obtain knowledge and skills, for example by professional development activities.

Another point of discussion is about the subject of the assignment. Currently the assignment was about investigating whether it could be possible to invite an author for children's books at the school, which was integrated in Dutch language education. This choice was made, because it was assumed that this assignment would be more meaningful for students, because the assignment could have a real result, whereby the efforts of the students could be rewarded. Some participants agreed with this statement that assignments should be useful, instead of performing assignments as occupational therapy. However, other participants indicated that this assignment was too difficult, especially because the topic was very specific, and in general, the experience that the students had with performing such tasks was very low. Some participants therefore indicated that they would expect the results to be better, when the topic would have been easier and broader. This last vision could explain the underrepresentation of assignments for information literacy skills combined with Dutch language education, which appeared from the research of Thijs et al (2014). The results of the interviews also showed that teachers would find it easier to integrate information literacy skills in subjects like history or biology, than in Dutch language education. The participants indicated that it is likely that an easier subject could have resulted into a better performance with regard to the information literacy process.

6.3.3. Implementation

With regard to the information literacy process, which was based on the classification of Brand-Gruwel and Walhout (2010), the interview data indicated that there were differences in the degree to which the steps of the process were indicated as difficult by the participants. In general, it appeared that a lot of the participants expected that information literacy skills would have been easier for the students. However, often this was not the case. Especially, the first

phase 'defining' appeared to be difficult, since the prior knowledge of the students with regard to these skills was low, and because formulating research questions appeared to often be unknown and difficult. Therefore this phase took more time than was expected. Because of the fact that formulating research questions appeared to be difficult, a lot of the participants decided to pay more attention to this phase. In addition, it was stated that because of the large amount of objectives, a lot of the participants spent less time on the phases 'processing information' and 'presenting information', because they were of the opinion that these were not the core objectives of the lesson. Therefore it can be stated that because of the high amount of objectives in this lesson, it was not possible to perform each phase elaborately.

With regard to the second and third phase of the process which were 'seaching' and 'selecting', it appeared from the interview data that many students were not really occupied with determining the reliability of the information of sources, but were primarily occupied with finding an answer to their question. This could partly explain why some participants noted that the students easily assumed that sources are reliable. This finding is in line with Van der Kaap and Schmidt (2007), who concluded in their research that the information literacy skills of students are often taken for granted by the teachers. Also the study of Rodicio (2015) confirmed that students are not very critical with regard to the reliability and quality of sources, or that they expect that many sites are reliable. Therefore these phases should receive sufficient attention, aimed at raising awareness of the students.

6.3.4. Learning gains

It appeared from this study that the participants experienced some learning gains when working with the materials. In general it could be stated that working with the example learning materials primarily resulted in an awareness process, since the participating teachers often did not expect that the execution of the information literacy process would be that difficult for students. It appeared that students were often unfamiliar with performing the steps of the information literacy process, although this was not expected in most cases. This finding is in line with the literature, amongst others with regard to the digital native debate (Prensky, 2001), in which it is discussed that young students who are grown up in a digitalized world are not always digitally competent to a sufficient degree (Fraillon et al., 2014; Li & Ranieri, 2010, Ng, 2010; Davies et al., 2012). This indicates that teachers often have too high expectations of their students, for example because teachers view their students as capable computer users, and therefore unfoundedly assume that the students are also able to critically assess digital information by using information literacy skills. However, it should be stated that the conclusion that is posed above should be interpreted in a somewhat nuanced way, because it is likely that these conclusions are not applicable to each primary school. It might be that the knowledge and ability of students to perform information literacy skills also depends on the educational concept of the school. It could be that schools in which a more student-guided approach is pursued are better able to perform information literacy tasks, because they are already familiar with the independency and autonomy that is needed to perform 21st century tasks, compared to primary schools in which the teacher plays an important role in the acquisition of knowledge.

Nonetheless, it appeared that the experiences with the materials caused a change in the attitude and thinking of the teachers. They seemed to become aware of the fact that they as a teacher have a very important role in teaching and guiding the students to learn information literacy skills, because the students do not possess these skills as a matter of course. However, some teachers indicated that they were not so sure about their own mastery and acquaintance with these skills either. Brand-Gruwel and Walhout (2010) therefore indicated that teachers should be able to take the time to become acquainted with the process and make it their own, because these are difficult skills for the teachers as well.

6.3.5. Improvements

Further, the interview data revealed a few improvements that could be deployed to ameliorate the current materials, either by adjusting the current materials, or by adding new elements to the materials.

The first improvement that was mentioned was designing a lesson series, in order to respond to the extensive amount of the objectives in the current lesson. There was consensus about the fact that it was not realistic to expect that these objectives could be accomplished in one single lesson. However, there were two views that came up with regard to the contents of

the lesson series. The majority of the participants indicated that they would like to have a lesson series in which they could teach one step or sub-process of information literacy at the time. They assumed that the overall results of the lesson would be better in that case, because the teachers have the possibility to devote more time and attention to teaching each specific element separately. However, the other view indicated that when you want to teach all these steps separately, that it takes too long before the whole process is performed. Also, it is questionable whether it is desirable to perform each step separately, because the steps in the information literacy process together form the process. This statement is in line with Walraven et al. (2008) and Wopereis et al. (2008), who both indicate that it is more desirable to perform the whole process, only at an increasing difficulty level, instead of addressing each skill separately.

Another improvement that was mentioned focused on including a learning pathway as core element of the information leaflet. The majority of the participants stated that they would like to have such pathway, because it provides insight into the current performance level of the students and what could be expected from them as a next step. Although many teachers indicated that the information leaflet was quite long, they do find it a valuable addition. A learning pathway seems to be a useful tool to enable teachers to integrate information literacy in other subjects as well, and to implement it in a school-wide manner.

The last two improvements that resulted from the interview data were both on the technological side: including digital materials that complement the current materials, and in addition to that, short instructional videos. Some participants indicated that they were used to the fact that there is digital material available in which the lesson outline, the objectives and the assignment were already presented. Another digital improvement that was mentioned were instructional videos. Some participants indicated that short instructional videos would be helpful to understand what a certain skill includes and how it can be taught. Also, videos are a flexible way of informing teachers, because they are free to decide when and where to watch the video. The statement that instructional videos might be helpful for this purpose, is in line with the outcomes of the study of Moreno and Ortegano-Layne (2008), who investigated whether classroom exemplars, like instructional videos, positively influenced the ability of pre-service teachers to bring theory into practice. They found that visual classroom exemplars are indeed helpful for mastering a certain skill. It can therefore be stated that providing instructional videos could be a useful and quick way to guide teachers with the implementation of the process. However, it is questionable whether these videos could be used instead of other ways of support like a training, because only a limited amount of information could be included in a video.

6.4. Conclusion

The main research question of this study was: 'To what extent do the developed example learning materials enable primary school teachers to integrate information literacy in Dutch language education?' Based on the answers that were provided to the three sub-questions, it can be stated that in many cases students, teachers, and schools are not familiar with teaching information literacy skills in primary education at the moment. It can be concluded that the teachers were able to integrate information literacy skills in the lesson to some extent, however, more time and attention need to be paid to this process in order to fulfil it successfully. Teaching these skills seems to also be a matter of raising awareness, which will only occur when the necessary facilities, like time and support are arranged, and the purpose of implementing these skills is clear for the students, teachers, and the school team. Therefore, it could be advised to invest time in showing schools and teachers the purposes and the importance of teaching information literacy skills. This might be accomplished by providing professional development activities, like trainings, or designing instructional videos.

6.5. Limitations

This research does have some limitations, primarily based on the fact that only eight teachers participated in this research. For that reason, the results and conclusions should be interpreted with caution, and cannot be generalized.

Another limitation that should be mentioned applies to the measurement instruments and data-analysis of this study. The first limitation is related to the data that were retrieved from the observations. In the observation scheme it could only be assessed whether a teacher fulfilled a

criterion or not, however, no indication about the extent or quality to which this criterion was implemented could be assigned. In addition to that, the scoring is based on the findings of only one observer, which makes the reliability of the findings questionable. The same applies for the coding of the interview transcriptions, which was also based on the analysis of only one coder.

The last limitation that is important to mention, is that it was a short term study, since the participants only performed one lesson, and only one observation and one interview per teacher have taken place. The findings are therefore based on their experience with one lesson, although there are more options available for designing such a lesson. In addition to that, this was a qualitative study, what makes it impossible to actually measure learning outcomes. Therefore no conclusions could be drawn based on the effectiveness of the materials on student performance or teacher performance. It would be interesting to investigate the long term effects of the experiences of teachers with the materials, and the effects on student performance on a qualitative as well as a quantitative way.

7. Recommendations

As described earlier, this study has a scientific relevance, as well as a practical relevance. Therefore this recommendation part of the study is subdivided in three sections: recommendations for future research on information literacy, recommendations for future lesson designs, and recommendations for national curriculum design.

7.1. Recommendations for future research

This part describes the recommendations that result from this study for future research on information literacy. In this study the classification of Brand-Gruwel and Walhout (2010) was used as main conceptual framework. This classification was chosen, because the phases of this model were clear and seemed usable as a basis for the design of learning materials. In addition to that, the model included a separate evaluation phase, which was not the case in other commonly used models for information literacy.

Because this was a small-scale qualitative study, it is not possible to make statements about the validation of the model. However, the model was used as the basis for the design of the lesson and the measurement instruments in this study, and appeared to be useful for these purposes. Also, based on the results of the observations and interviews, no additions to improve the model came forward. Therefore it can be concluded that in this study this information literacy model was useful as a basis for learning materials and measurement instruments.

7.2. Recommendations for future lesson designs

In this study example learning materials for information literacy were designed and evaluated. Based on the results of this study some recommendations for future lesson designs for 21st century skills in general, or more specifically for information literacy skills can be mentioned.

First of all, this study showed that the information literacy process is often still unknown for both students and teachers. Therefore, it seems important to design lessons in such a way that there is enough time to get acquainted with the process as a whole, for example by designing a lesson series. However, there appeared to be convergent views with regard to the division of the contents in such a lesson series. For that reason it can be advised to design instructions for 21st century skills in which no exact indication of time is provided. This enables teachers to decide for themselves how many lessons or how much time they want to spend on each phase of the process.

Further, this study indicated that it is important to spend sufficient time on the first phase of the process of information literacy called 'defining', which primarily calls on general inquiry skills of students. Important elements of this phase are formulating the research problem and formulating research questions, which appeared to be difficult sub-tasks in the current assignment. An extensive introduction phase could help to activate prior knowledge with regard to the topic of the assignment, which has a positive effect on the ability to formulate research questions, because students have a more elaborated view on the topic, which makes it easier to think of proper questions. Subsequently, proper research questions are necessary to be able to search effectively on the computer. Therefore, it is recommended to spend sufficient time on the introduction phase, because this positively influences student performance in the subsequent phases of the information literacy process. In addition to that, it seems necessary to practice general inquiry skills, like formulating research questions with students, since these skills recur in many of the other 21st century skills as well.

Another recommendation can be made with regard to the topic of the lesson. As appeared from the current study, teachers often guided the process to a great extent, for example with regard to formulating the central research problem. In addition to that, students found it hard to think of appropriate research questions. Therefore it seems important to consider the topic of the lesson very carefully in such a way that students are able to formulate the research problem and think of sufficient research questions. However, when considering the topic of the lesson it is also important to take into account the three instructional principles that were used in this study, because it appeared that these are important factors in promoting transfer of the obtained knowledge and skills, which is a main objective of 21st century lessons.

The last recommendation that is mentioned focuses on the differentiation options that were implemented in the lesson design. Although teaching 21st century skills requires a more student-centered approach, the teachers were able to choose between a more student guided and a more teacher guided version of the instruction. The interview results indicated that the teachers appreciated the fact that they were allowed to choose their preferred way, also because it is not likely that teachers are able to completely change their ordinary way of teaching all at once. It is therefore recommended to also provide differentiation possibilities with regard to the instruction in future lesson designs.

7.3. Recommendations for curriculum development

As the ICILS-2013 study (Meelissen et al., 2014) showed, the Netherlands is one of a few countries in which teaching digital skills is no obligatory component of the curriculum at the moment. However, as described in the advice of Platform Onderwijs2032 (2016), digital literacy skills will get a more prominent place in the Dutch curriculum in the near future, since it will become part of the core curriculum in the Netherlands. Because information literacy is one of the four sub-skills of digital literacy, it can be assumed that this sub-skill will also receive more attention in the future. When these skills become part of the Dutch national core curriculum, it seems to be necessary that core objectives are formulated for digital literacy skills, as well as for information literacy skills. It is therefore recommended to formulate core objectives for each of the four sub-skills of digital literacy.

When core objectives are formulated, this will have implications in several ways. First of all, it enables developers of teaching methodologies to use these core objectives for the design of new learning materials, which automatically results in the fact that digital literacy skills are integrated in learning materials for several subjects in primary and secondary education. Subsequently, this could ensure that teachers and schools receive support obtained from teaching methodologies, since it is likely that new learning materials will be developed for teaching digital literacy skills because of the change in the curriculum.

In addition to providing instructional support, it is also important to focus on the professional development of the teachers to make the implementation successful. In order to integrate digital literacy skills in Dutch education, it is important that teachers are aware of the value of these skills for students, and are motivated and willing to implement it in their lessons. In order to achieve this, it might be considered to organize professional development activities, like trainings, in which teachers can participate. This could contribute to enthusing and motivating individual in-service teachers, and help school teams to integrate 21st century skills in the curriculum in a school-wide manner. In addition to in-service teachers, it also seems important to prepare pre-service teachers to the changes that are occurring in education. Therefore it can be advised to adapt the teacher training college curriculum in such a way that pre-service teachers are also prepared for teaching 21st century skills to students and are aware of the relevance of it. These recommendations are in line with the advice of Platform2032 (2016), in which it was also mentioned to focus on in-service as well as pre-service teachers to obtain future-oriented education. In summary, it seems to be necessary to initiate change on the national level, in order to achieve changes at the school level, teacher level and student level.

8. References

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Appendix A. Lesson design

Introductie (10 minuten)

Formuleren van de probleemstelling
U start de les met het schetsen van de context. U vertelt de leerlingen dat de school graag zou willen weten in hoeverre het mogelijk is om een keer een kinderboekenschrijver op school uit te nodigen. De school heeft weinig ervaring op dit gebied en is nieuwsgierig wat daar aan voorbereiding aan vooraf gaat. Ze geven de leerlingen uit groep 7 of 8 de opdracht dit voor de school te onderzoeken.

De opbrengst zou een advies aan de schooldirectie kunnen zijn, en - als mogelijk vervolg- om daadwerkelijk een kinderboekenschrijver uit te nodigen, of dit te plannen. De centrale vraag is: In hoeverre is het voor onze school mogelijk om eens een kinderboekenschrijver uit te nodigen? Om deze vraag te beantwoorden gaan leerlingen in groepjes op internet op zoek naar digitale bronnen.

NB. Deze opdracht is in eerste instantie bedoeld als vooronderzoek om informatie te verzamelen over een onderwerp in een aansprekende context. De keuze is aan u/ uw school of u daadwerkelijk een schrijver uitnodigt. Het is echter wel van belang dat u hier vooraf over nadenkt om te voorkomen dat de opdracht uitloopt op een teleurstelling voor de leerlingen.

U vraagt de leerlingen na te denken over de informatie die de school nodig zou hebben om een beslissing op te baseren. Bijvoorbeeld:
Zijn er kosten aan verbonden?
Is het mogelijk een populaire schrijver uit te nodigen?
Hoe lang van tevoren moet een schrijver geboekt worden?

NB. In onderstaande tabel staan twee opties met betrekking tot het vervolg van deze lesfase. U kiest zelf of u de leerkrachtgestuurde variant of de leerlinggestuurde variant inzet.

Leerkrachtgestuurde variant	**Leerlinggestuurde variant**
De leerlingen maken in tweetallen of drietallen een mindmap van de informatie die je nodig hebt om een kinderboekenschrijver op school uit te nodigen. Na enkele minuten maakt u samen met de leerlingen een klassikale mindmap met daarin de belangrijkste onderwerpen waar informatie over gezocht moet worden. Deze onderwerpen worden vervolgens onder uw begeleiding omgezet in onderzoeksvragen. Alle tweetallen of drietallen krijgen een onderzoeksvraag toegewezen die zij gaan proberen te beantwoorden.	De leerlingen maken in twee- of drietallen een mindmap van de informatie die je nodig hebt om een kinderboekenschrijver op school uit te nodigen. Leerlingen zetten deze onderwerpen zelfstandig om in onderzoeksvragen. Leerlingen bepalen in hun groepje over welk onderwerp zij informatie gaan opzoeken en maken hiervoor zelf een plan van aanpak. De leerkracht loopt rond en begeleidt waar nodig.

Kern (40 minuten)

Het bepalen van zoekstrategieën (15 minuten)
Het eerste gedeelte van deze lesfase (kern) biedt twee mogelijkheden, namelijk ofwel het geven van instructie door de leerkracht, ofwel leerlingen onderzoekend te werk laten gaan. In het tweede gedeelte van deze lesfase gaan alle leerlingen in kleine groepjes zelf op zoek naar de benodigde informatie, ongeacht of ze veel of weinig begeleiding van de leerkracht hebben gehad.

Leerkrachtgestuurde variant	Leerlinggestuurde variant
Samen met de leerlingen bepaalt u aan de hand van de gemaakte mindmap welke zoektermen gebruikt kunnen worden om de benodigde informatie te verkrijgen. U bespreekt met de leerlingen welke informatie op welke sites gevonden zou kunnen worden, en of ze verwachten dat dit een betrouwbare bron is of niet. Dit geeft leerlingen sturing in de sites die ze kunnen raadplegen. Vervolgens laat u zien hoe het zoeken met een zoekmachine werkt en waar je op kunt letten om betrouwbare en bruikbare informatie te verkrijgen. Ieder groepje maakt een plan van aanpak. Nb. Voor aanvullende informatie over het bepalen van de betrouwbaarheid en de bruikbaarheid van sites, zie bijsluiter.	Leerlingen gaan meteen in kleine groepjes werken met de computer/laptop, en gaan zelfstandig op zoek naar goede zoekwoorden. Door te doen en door samen te werken komen leerlingen erachter of een site wel of niet betrouwbare informatie bevat. U loopt rond en stuurt zo nodig bij.

Het gebruiken en verwerken van informatie (25 minuten)

Vanaf dit moment gaan alle leerlingen in hun groepje op zoek naar digitale informatie over hun toegewezen onderwerp. De leerkracht loopt rond en begeleidt de verschillende groepjes waar nodig. De leerlingen werken samen, en overleggen over het invoeren van zoektermen, en het wel of niet selecteren en gebruiken van bepaalde sites.

De leerlingen houden een lijstje bij (op de computer of op papier) waarop ze de sites en de daarop gevonden informatie bijhouden. Ze schrijven erbij waarom ze ervoor gekozen hebben om die site te gebruiken, en waarom ze denken dat die site betrouwbaar en bruikbaar is. Dit vormt een belangrijk aspect voor de evaluatie die plaatsvindt aan het einde van de les. Ten slotte proberen de leerlingen aan de hand van de gevonden informatie in eigen woorden een concreet antwoord op hun vraag te formuleren.

Afsluiting (15 minuten)

Presenteren van informatie

In deze lesfase presenteren de groepjes kort hun bevindingen. De leerlingen benoemen:
welke onderzoeksvraag ze hadden
welke sites ze hebben gebruikt (bronvermelding), en waarom
het gevonden antwoord op hun onderzoeksvraag

NB. In deze fase is het belangrijk dat leerlingen duidelijk beargumenteren waar ze de informatie gevonden hebben en waarom zij vinden dat die site bruikbaar en betrouwbaar is. Vervolgens kunt u kort over de gekozen aanpak in gesprek gaan.
Na de groepspresentaties worden de antwoorden samengevoegd tot een klassikaal product**.**

Evalueren en beoordelen van informatie

Evaluatie van het product:
Was het klassikale onderzoek goed genoeg om nu te kunnen zeggen hoe het uitnodigen van een kinderboekenschrijver in zijn werk gaat?
Zijn de leerlingen als klas in staat om de directie te adviseren, waarom wel of niet?
Evaluatie op het proces:
Wat hebben leerlingen deze les geleerd, en wat zouden ze nog graag willen leren op het gebied van informatievaardigheden?

Appendix B. Observation scheme

Algemene gegevens	
Datum:	Tijd:
Naam leraar:	Geslacht:
Groep:	Aantal leerlingen:
Opstelling:	

1.Probleemstelling formuleren	Ja	nee	nvt
○ De leerkracht laat leerlingen hun voorkennis met betrekking tot het onderwerp activeren			
○ De leerkracht laat leerlingen in een gegeven situatie formuleren wat het probleem is			
○ De leerkracht laat leerlingen bij een probleem een onderzoeksvraag en deelvragen formuleren			
○ De leerkracht laat leerlingen nadenken over welke informatie nodig is om de onderzoeksvragen te kunnen beantwoorden			
○ De leerkracht laat leerlingen een plan van aanpak opstellen			

2. Strategieën om te zoeken	Ja	nee	nvt
○ De leerkracht laat leerlingen inventariseren welke bronnen beschikbaar zijn en waar deze te vinden zijn			
○ De leerkracht laat leerlingen bronnen selecteren die in de gevraagde informatie kunnen voorzien			
○ De leerkracht laat leerlingen (aangeleerde) zoekstrategieën toepassen			

3. Gebruik van informatie	ja	nee	nvt
○ De leerkracht laat leerlingen de gevraagde informatie in bronnen markeren			
○ De leerkracht laat leerlingen relevante informatie uit bronnen selecteren, daarbij lettend op de bruikbaarheid van de bronnen			
○ De leerkracht laat leerlingen relevante informatie uit bronnen selecteren, daarbij lettend op de betrouwbaarheid van de bronnen			

4. Verwerken van informatie	ja	nee	nvt
○ De leerkracht laat leerlingen informatie verwerken en combineren tot de gevraagde informatie, meestal in de vorm van een samenvatting, tabellen, grafieken, schema's of anderszins			
○ De leerkracht laat de leerlingen de gevonden informatie herformuleren, zodat de onderzoeksvraag in eigen woorden beantwoord kan worden			

5. Presenteren van informatie	ja	nee	nvt
○ De leerkracht laat leerlingen een passende presentatievorm kiezen			
○ De leerkracht laat leerlingen de resultaten van het onderzoek presenteren met een goede bronvermelding			

6. Evalueren en beoordelen van informatie	ja	nee	nvt
○ De leerkracht laat leerlingen het product beoordelen op bruikbaarheid			
○ De leerkracht laat leerlingen het product beoordelen op betrouwbaarheid			
○ De leerkracht laat leerlingen hun sterke en zwakke punten opsommen m.b.t. informatievaardigheden en aangeven wat ze nog zouden moeten/willen leren			

Gebruikte variant ondersteuning (kies één van de twee)	
Leerkrachtgestuurde variant	
Leerlinggestuurde variant	

Appendix C. Interview scheme

Inleiding	***Aan bod gekomen?***
• Toestemming vragen voor geluidsopname	
• Introductie m.b.t. onderzoek ○ Benoemen verwachtingen t.o.v. leerkracht	

• Onderzoeksvragen noemen
  ○ Hoe waarderen leerkrachten de huidige materialen?
  ○ Hoe kunnen deze materialen verbeterd worden?
  ○ Hoe worden de stappen van informatievaardigheid uitgevoerd in de praktijk?	

• Anonieme/vertrouwelijke gegevensverwerking ○ Toestemming voor SLO-medewerkers? (ja/nee)	
• Ondertekenen informed consent formulier	
• Verwachte tijdsduur (45 minuten)	

Algemene gegevens	
Datum	Tijdstip
Naam leraar	Geslacht
Leeftijd	Aantal jaar werkzaam onderwijs

Openingsvraag	***Aan bod gekomen?***
Hoe hebt u het werken met de materialen in algemene zin ervaren?	

Lesuitwerking	***Aan bod gekomen?***

• Algemene indruk van het materiaal
  ○ Positief/ negatief (zwakke punten, overbodig + wat mist?)
  ○ Hoeveelheid informatie?
  ○ Aard van informatie?	

• Inleiding + overzichtstabel
  ○ Positief / negatief (zwakke punten, overbodig + wat mist?)
  ○ Reële tijdsinvestering?	

• Leerlingenmateriaal ○ Positief / negatief (zwakke punten, overbodig + wat mist?)	
• Toelichting voor de docent (algemeen) ○ Positief / negatief (zwakke punten, overbodig + wat mist?)	

• Toelichting voor de docent (lesuitwerking)
  ○ Nuttig bij voorbereiding van les?
  ○ Positief / negatief (zwakke punten, overbodig + wat mist?)	

• Nut van deze les voor het vak 'taal' ○ Focus genoeg op taalvaardigheden tijdens de les? (zo nee, wat kan er verbeterd worden?)	

Bijsluiter	***Aan bod gekomen?***

• Algemene indruk bijsluiter
  o Positief / negatief (zwakke punten, overbodig + wat mist?)
  o Hoeveelheid informatie?
  o Aard van informatie?	

• Inleiding: belang en definitie o Positief / negatief (zwakke punten, overbodig + wat mist?)	

• Uitgewerkt stappenplan
  o Nuttig? (bij voorbereiding + tijdens les)
  o Positief / negatief (zwakke punten, overbodig + wat mist?)	

• Kijkwijzer (= observatieschema)
  o Gebruikt bij voorbereiding? Zo ja: geholpen?
  o Nuttig? Zou je die vaker gebruiken (collegiale consultatie)?	

• Alternatieve bijsluiter
  o Positief / negatief (zwakke punten, overbodig + wat mist?)
  o Welke bijsluiter werkt prettiger?
  o Zouden ze deze bijsluiter gebruiken?	

21e eeuwse sub-vaardigheid 'informatievaardigheden'	***Aan bod gekomen?***

• Wat vinden leerkrachten van de gegeven informatie over 'informatievaardigheden' in het materiaal?
  o Nuttig? Gebruikt? Genoeg? Teveel? Zelf aanvullende informatie gezocht?
  o Soort informatie? (goed, of juist meer praktisch/theoretisch/… gewenst?)
  o Voorkennis leerkracht	

• De stappen
1. Probleemstelling formuleren
2. Strategieën om te zoeken
3. Gebruik van informatie
4. Verwerken van informatie
5. Presenteren van informatie
6. Evalueren en beoordelen van informatie
  o Was duidelijk wat er binnen elke stap moest gebeuren?
  o Waren de doelen per fase haalbaar en meetbaar?
  o In hoeverre zijn de doelen per stap behaald?
  o Sluiten de gebruikte begrippen aan op de praktijk?
  o Suggesties voor verbetering / alternatieven?	

• Transfer andere lessen
  o Zouden ze nu zelf een les kunnen maken waarin aandacht is voor 'informatievaardigheden'?
  o Stimuleert het materiaal tot het geven van een les met 'informatievaardigheden' erin, lijkt het ze leuk?	

• Doel voorbeeldlesmateriaal is leraren ondersteunen in het lesgeven met de specifieke 21e eeuwse vaardigheid.
  o In hoeverre slaagt het materiaal daarin?
  o Zijn er nog andere vormen van ondersteuning wenselijk? (evt. combinatie van soorten ondersteuning, cursus oid)	

• Vaardigheid 'informatievaardigheden' bij leerlingen
  ○ Idee dat leerlingen door deze les stappen hebben gezet in 'informatievaardigheden' (groot/klein)
  ▪ Waarom wel/niet?
  ▪ Zo niet: zou daarvoor in materiaal wat anders moeten/kunnen?
  ▪ Rol handelen leerkracht daarin?
  ▪ Voorkennis leerlingen	

O.b.v. observaties	***Aan bod gekomen?***

• Op basis van observaties misschien nog punten
(zelf van tevoren per leraar noteren)
 	
  ○ Welke variant gebruikt en waarom? (leerlinggestuurd / leerkrachtgestuurd)
  ○ Mate van implementatie van de criteria (welke onderdelen niet/nauwelijks en welke heel goed geïmplementeerd)
  ○ Wat ging goed en wat zouden ze een volgende keer anders doen bij het geven van de les?	

Afsluiting	***Aan bod gekomen?***
• Nog vragen/opmerkingen?	

• Vervolg van het onderzoek
  ○ Wat gebeurt er met de gegevens
(Transcriberen, analyseren, gebruik quotes)
  ○ Op de hoogte stellen van resultaten
(Na onderzoek mailen van resultaten)
  ○ Mogelijkheid tot inzicht eigen gegevens (transcriptie)	

• Contactgegevens nog keer noemen	
• Vaker meewerken aan onderzoeken SLO?	
• Bedankje	

Appendix D. Example lesson

Het uitnodigen van een kinderboekenschrijver

Taalopdracht in het kader van de 21e eeuwse sub-vaardigheid 'informatievaardigheden'.

1. Inleiding

In deze opzichzelfstaande les leren leerlingen hoe ze op internet op zoek kunnen gaan naar informatie over het uitnodigen van een kinderboekenschrijver. Ze onderzoeken wat er allemaal bij komt kijken om een kinderboekenschrijver op school uit te nodigen. Ze krijgen in feite de taak om de directie van hun school te adviseren over of dit haalbaar is en zo ja, wat de voorwaarden daarvoor zijn, en hoe dit het beste aangepakt kan worden.

Naast de daadwerkelijke opdracht (informatie verzamelen) staat in deze les het proces van informatie zoeken op internet en het selecteren van betrouwbare digitale bronnen centraal. Vaak wordt snel aangenomen dat leerlingen die in staat zijn met de computer te werken, ook in staat zijn om de betrouwbaarheid van digitale bronnen te bepalen. Dit blijkt echter vaak niet het geval te zijn. Vandaar dat het van belang is dat het onderwijs hier aandacht aan besteedt.

In deze les worden informatievaardigheden geïntegreerd met een taalopdracht.

Vak	Nederlands
Schooltype	Primair onderwijs
Leerjaar	Groep 7-8
Tijdsinvestering	1 les, 60 à 70 minuten
Vakinhoud	Schriftelijk taalonderwijs: Leesvaardigheid
Kerndoelen	Aansluitend bij de kerndoelen: 4. De leerlingen leren informatie te achterhalen in informatieve en instructieve teksten, waaronder schema's, tabellen en digitale bronnen. 6. De leerlingen leren informatie en meningen te ordenen bij het lezen van school- en studieteksten en andere instructieve teksten, en bij systematisch geordende bronnen, waaronder digitale bronnen. 7. De leerlingen leren informatie en meningen te vergelijken en te beoordelen in verschillende teksten.
21e eeuwse vaardigheden	Digitale geletterdheid: informatievaardigheden en tevens: digitale geletterdheid: ICT-basisvaardigheden, mediawijsheid, computational thinking probleemoplossen creativiteit
Bronnen	Lesmaterialen en de bijsluiter zijn gebaseerd op werk van: Stichting Leerplan Ontwikkeling (SLO) Brand-Gruwel, S., & Walhout, J. (2010). *Informatievaardigheden voor leraren.* Heerlen: Open Universiteit, Ruud de Moor Centrum. Brand-Gruwel, S., & Wopereis, I. (2010). *Word informatievaardig! Selecteren, beoordelen en verwerken van digitale informatie*. Groningen: Noordhoff. Kaap, A. van der, & Schmidt, V. (2007). *Naar een leerlijn informatievaardigheden*. Enschede: SLO.

Inleiding

Hoe lang ben je hiermee bezig?
Je bent ongeveer een uur met deze opdracht bezig.

Waar gaat deze opdracht over?
De directie van jouw school wil onderzoeken of het mogelijk is om een keer een kinderboekenschrijver op school uit te nodigen. Ze weten alleen niet wat er allemaal bij komt kijken om dit voor elkaar te krijgen. Jouw opdracht is om hierover op internet informatie te zoeken, om zo de directie te kunnen adviseren.

Wat ga je leren, wat wordt er van je verwacht?
In deze les werk je aan informatievaardigheden:
Je leert hoe je een onderzoeksvraag op kunt stellen
Je leert hoe je op internet kunt zoeken naar informatie
Je leert hoe je kunt zien of een internetsite betrouwbaar is
Je leert hoe je kunt zien of een internetsite bruikbaar is
Je leert hoe je informatie van verschillende sites kunt combineren om je onderzoekvraag te beantwoorden

Daarnaast werk je deze les aan het verbeteren van je leesvaardigheid.

Voer je de opdracht alleen uit of met anderen?
Je doet deze opdracht in tweetallen of drietallen.

De opdracht

Luister eerst naar de uitleg van jouw juf of meester. Ga daarna aan de slag met de stappen hieronder.

Wat moet je doen?
1. Bedenk welke informatie je nodig hebt om een kinderboekenschrijver uit te nodigen.
2. Kies één vraag die je met jouw groepje gaat proberen te beantwoorden.
3. Ga op internet op zoek naar informatie.
4. Noteer welke informatie je van welke site haalt, en waarom je denkt dat deze site betrouwbaar en bruikbaar is.
5. Combineer de informatie van de verschillende sites en zet dit in eigen woorden.
6. Probeer antwoord te geven op je onderzoeksvraag.
7. Bespreek klassikaal de gevonden informatie en de gebruikte sites.

Leerlingen werken in deze les aan zowel taal als 21e eeuwse vaardigheden	**Wat leren leerlingen in deze les met betrekking tot informatievaardigheden?**
Centraal staan het vergroten van de volgende vaardigheden: digitale geletterdheid: informatievaardigheden leesvaardigheid Vaardigheden die ook aandacht krijgen in deze les zijn: schrijfvaardigheid, luistervaardigheid, en mondelinge vaardigheid digitale geletterdheid: ICT-basisvaardigheden, mediawijsheid, computational thinking probleemoplossen creativiteit Spelling & woordenschat staan in deze les ten dienste van de andere taalvaardigheden.	In deze les onderzoeken leerlingen hoe het uitnodigen van een kinderboekenschrijver in zijn werk gaat, door gebruik te maken van digitale informatiebronnen. <u>Daarnaast leren leerlingen:</u> hoofd- en deelvragen formuleren aan de hand van een probleem benodigde informatie selecteren ter beantwoording van deze vragen beschikbare digitale bronnen vinden en inventariseren relevante informatie uit digitale bronnen selecteren, lettend op de bruikbaarheid en betrouwbaarheid van de bronnen gegevens verwerken en combineren tot de gevraagde/gewenste informatie NB. Een compleet overzicht van alle lesdoelen is te vinden in de kijkwijzer van de bijsluiter.

Benodigde materialen voor deze les
Digibord (bijvoorbeeld om het zoekproces op voor te doen)
Beschikbaarheid van laptops, tablets of computers met een internetverbinding om de leerlingen van uw groep in tweetallen of drietallen naar informatie te laten zoeken op internet.

NB. Bij deze les hoort een bijsluiter. In deze bijsluiter vindt u achtergrondinformatie en didactische aanwijzingen met betrekking tot deze les.

Komt de schrijver echt?

Het onderwerp van de les is het onderzoeken wat er nodig is om een kinderboekenschrijver uit te nodigen. De keuze is echter aan uw school of er ook in de komende jaren daadwerkelijk een schrijver uitgenodigd kan/gaat worden. Wel is het van belang dat u zich ervan bewust bent dat de geschetste context het 'echt' maakt voor leerlingen. Dit brengt met zich mee dat de les in een teleurstelling kan uitlopen, wanneer blijkt dat de schrijver dit jaar niet meer gaat komen, terwijl leerlingen dat wel verwacht hadden. Vandaar dat het van belang is dat u benadrukt dat het alleen om een vooronderzoek gaat, om te bekijken of het mogelijk is om dat wellicht een keer te gaan doen.

Lesduur en complexiteit informatievaardigheden

Informatievaardigheden zijn complexe vaardigheden voor leerlingen. Deze les is een eerste kennismaking met de verschillende stappen die een rol spelen in dit proces. Echter, in werkelijkheid kosten deze stappen veel meer tijd. Het is dus niet realistisch om te denken dat het volledige proces in een lesuur optimaal doorlopen kan worden. De reden om informatievaardigheden toch aan te bieden in één les is om de mogelijkheid te creëren om in een vrij kort tijdsbestek kennis te maken met het gehele proces dat informatievaardigheden met zich meebrengt.

Differentiatie, aanbod op maat

Afhankelijk van het soort onderwijs dat uw voorkeur geniet, kunt u in een aantal lesfases kiezen tussen twee mogelijkheden met betrekking tot het vervolg van de les: 1) een meer leerkrachtgestuurde variant voor leerlingen die weinig ervaring hebben met informatievaardigheden en waarin veel begeleiding van de leerkracht nodig is, of 2) een meer leerlinggestuurde variant voor leerlingen die al ervaring hebben met informatievaardigheden, of wanneer u een meer onderzoekende stijl van leren prefereert.

Meer 21e eeuwse vaardigheden

Deze les is oorspronkelijk een onderdeel van een volledige lessenserie taal waarin verschillende 21e eeuwse vaardigheden voorkomen. Echter, deze les is op zo'n manier aangepast dat het als opzichzelfstaande les kan functioneren. Mocht u na het doen van deze les geïnteresseerd zijn in de rest van de lessenserie, dan kunt u 'bestand 3' openen. In dat bestand vormt deze les informatievaardigheden een geïntegreerd onderdeel met de andere lessen.

Instructie

Introductie (10 minuten)

Formuleren van de probleemstelling

U start de les met het schetsen van de context. U vertelt de leerlingen dat de school graag zou willen weten in hoeverre het mogelijk is om een keer een kinderboekenschrijver op school uit te nodigen. De school heeft weinig ervaring op dit gebied en is nieuwsgierig wat daar aan voorbereiding aan vooraf gaat. Ze geven de leerlingen uit groep 7 of 8 de opdracht dit voor de school te onderzoeken.

De opbrengst zou een advies aan de schooldirectie kunnen zijn, en - als mogelijk vervolg- om daadwerkelijk een kinderboekenschrijver uit te nodigen, of dit te plannen. De centrale vraag is: In hoeverre is het voor onze school mogelijk om eens een kinderboekenschrijver uit te nodigen? Om deze vraag te beantwoorden gaan leerlingen in groepjes op internet op zoek naar digitale bronnen.

NB. Deze opdracht is in eerste instantie bedoeld als vooronderzoek om informatie te verzamelen over een onderwerp in een aansprekende context. De keuze is aan u/ uw school of u daadwerkelijk een schrijver uitnodigt. Het is echter wel van belang dat u hier vooraf over nadenkt om te voorkomen dat de opdracht uitloopt op een teleurstelling voor de leerlingen.

U vraagt de leerlingen na te denken over de informatie die de school nodig zou hebben om een beslissing op te baseren. Bijvoorbeeld:
Zijn er kosten aan verbonden?
Is het mogelijk een populaire schrijver uit te nodigen?
Hoe lang van tevoren moet een schrijver geboekt worden?

NB. In onderstaande tabel staan twee opties met betrekking tot het vervolg van deze lesfase. U kiest zelf of u de leerkrachtgestuurde variant of de leerlinggestuurde variant inzet.

Leerkrachtgestuurde variant	**Leerlinggestuurde variant**
De leerlingen maken in tweetallen of drietallen een mindmap van de informatie die je nodig hebt om een kinderboekenschrijver op school uit te nodigen. Na enkele minuten maakt u samen met de leerlingen een klassikale mindmap met daarin de belangrijkste onderwerpen waar informatie over gezocht moet worden. Deze onderwerpen worden vervolgens onder uw begeleiding omgezet in onderzoeksvragen. Alle tweetallen of drietallen krijgen een onderzoeksvraag toegewezen die zij gaan proberen te beantwoorden.	De leerlingen maken in twee- of drietallen een mindmap van de informatie die je nodig hebt om een kinderboekenschrijver op school uit te nodigen. Leerlingen zetten deze onderwerpen zelfstandig om in onderzoeksvragen. Leerlingen bepalen in hun groepje over welk onderwerp zij informatie gaan opzoeken en maken hiervoor zelf een plan van aanpak. De leerkracht loopt rond en begeleidt waar nodig.

Kern (40 minuten)

Het bepalen van zoekstrategieën (15 minuten)

Het eerste gedeelte van deze lesfase (kern) biedt twee mogelijkheden, namelijk ofwel het geven van instructie door de leerkracht, ofwel leerlingen onderzoekend te werk laten gaan. In het tweede gedeelte van deze lesfase gaan alle leerlingen in kleine groepjes zelf op zoek naar de benodigde informatie, ongeacht of ze veel of weinig begeleiding van de leerkracht hebben gehad.

Leerkrachtgestuurde variant	Leerlinggestuurde variant
Samen met de leerlingen bepaalt u aan de hand van de gemaakte mindmap welke zoektermen gebruikt kunnen worden om de benodigde informatie te verkrijgen. U bespreekt met de leerlingen welke informatie op welke sites gevonden zou kunnen worden, en of ze verwachten dat dit een betrouwbare bron is of niet. Dit geeft leerlingen sturing in de sites die ze kunnen raadplegen. Vervolgens laat u zien hoe het zoeken met een zoekmachine werkt en waar je op kunt letten om betrouwbare en bruikbare informatie te verkrijgen. Ieder groepje maakt een plan van aanpak. Nb. Voor aanvullende informatie over het bepalen van de betrouwbaarheid en de bruikbaarheid van sites, zie bijsluiter.	Leerlingen gaan meteen in kleine groepjes werken met de computer/laptop, en gaan zelfstandig op zoek naar goede zoekwoorden. Door te doen en door samen te werken komen leerlingen erachter of een site wel of niet betrouwbare informatie bevat. U loopt rond en stuurt zo nodig bij.

Het gebruiken en verwerken van informatie (25 minuten)

Vanaf dit moment gaan alle leerlingen in hun groepje op zoek naar digitale informatie over hun toegewezen onderwerp. De leerkracht loopt rond en begeleidt de verschillende groepjes waar nodig. De leerlingen werken samen, en overleggen over het invoeren van zoektermen, en het wel of niet selecteren en gebruiken van bepaalde sites.

De leerlingen houden een lijstje bij (op de computer of op papier) waarop ze de sites en de daarop gevonden informatie bijhouden. Ze schrijven erbij waarom ze ervoor gekozen hebben om die site te gebruiken, en waarom ze denken dat die site betrouwbaar en bruikbaar is. Dit vormt een belangrijk aspect voor de evaluatie die plaatsvindt aan het einde van de les. Ten slotte proberen de leerlingen aan de hand van de gevonden informatie in eigen woorden een concreet antwoord op hun vraag te formuleren.

Afsluiting (15 minuten)

Presenteren van informatie

In deze lesfase presenteren de groepjes kort hun bevindingen. De leerlingen benoemen:
welke onderzoeksvraag ze hadden
welke sites ze hebben gebruikt (bronvermelding), en waarom
het gevonden antwoord op hun onderzoeksvraag

NB. In deze fase is het belangrijk dat leerlingen duidelijk beargumenteren waar ze de informatie gevonden hebben en waarom zij vinden dat die site bruikbaar en betrouwbaar is. Vervolgens kunt u kort over de gekozen aanpak in gesprek gaan.
Na de groepspresentaties worden de antwoorden samengevoegd tot een klassikaal product**.**

Evalueren en beoordelen van informatie

Evaluatie van het product:
Was het klassikale onderzoek goed genoeg om nu te kunnen zeggen hoe het uitnodigen van een kinderboekenschrijver in zijn werk gaat?
Zijn de leerlingen als klas in staat om de directie te adviseren, waarom wel of niet?
Evaluatie op het proces:
Wat hebben leerlingen deze les geleerd, en wat zouden ze nog graag willen leren op het gebied van informatievaardigheden?

Appendix E. Information leaflet

Toelichting voor de docent - bijsluiter

1.Inleiding

Informatievaardigheden is één van de deelvaardigheden van de 21e eeuwse vaardigheid 'digitale geletterdheid'. Informatievaardigheden hebben betrekking op het signaleren en analyseren van een informatiebehoefte en op basis hiervan kunnen zoeken, selecteren, verwerken en gebruiken (toepassen) van relevante en betrouwbare informatie (Brand-Gruwel & Wopereis, 2010). In feite zijn informatievaardigheden van belang bij iedere vorm van informatie (mondeling, schriftelijk of digitaal), maar in de context van 21e eeuwse vaardigheden gaat het hierbij specifiek om digitale bronnen.

Belang informatievaardigheden
Door het digitaliseren van bronnen en de steeds betere infrastructuur van internet kan iedereen wereldwijd snel informatie publiceren. Digitale informatie neemt toe doordat iedereen kan publiceren, maar ook omdat digitale informatie vele malen sneller gekopieerd, gemanipuleerd en verspreid kan worden. De hoeveelheid digitaal beschikbare informatie neemt daardoor exponentieel toe, en het wordt daarmee moeilijker om te bepalen welke informatie betrouwbaar is. Daarnaast blijkt uit onderzoek dat leerlingen nauwelijks sites en informatie beoordelen. Als ze al beoordelen dan gebeurt dit aan de hand van oppervlakkige criteria als lay-out, aanwezigheid van beeldmateriaal of de taal waarin de informatie is weergegeven. Criteria als de reputatie van de organisatie achter de site, het soort site (blog, forum, krant enz.) of de auteur worden niet gebruikt. In het kader van levenslang leren is het echter van belang om informatie beredeneerd te kunnen selecteren en gebruiken.

Definitie informatievaardigheden
Informatievaardigheden betreft het scherp kunnen formuleren en analyseren van informatie uit (digitale) bronnen en op basis hiervan kritisch en systematisch zoeken, selecteren, verwerken, gebruiken en verwijzen van relevante informatie en deze op bruikbaarheid en betrouwbaarheid beoordelen en evalueren.

Een leeractiviteit voor informatievaardigheden richt zich op het nauwkeurig bepalen van een vraag en een systematische onderzoekende en nieuwsgierige houding bij het beantwoorden van de vraag, en reflecteert op het zoekproces en op de gevonden informatie voor alle leerlingen op alle leeftijden en alle niveaus.

2. Uitgewerkt stappenplan informatievaardigheden

Bij informatievaardigheden gaat het om het doelgericht en systematisch omgaan met (digitale) informatie. De systematiek is vastgelegd in zes stappen. Deze stappen worden hieronder kort beschreven, waarbij per stap achtergrondinformatie en didactische aanwijzingen worden gegeven.

Stap 1. Formuleren van de probleemstelling

In deze stap wordt vastgesteld wat er moet gebeuren in de les (taakdefinitie), en wordt de doelstelling bepaald. Een deel van de taakdefinitie bestaat uit het vastleggen van het informatieprobleem, het opstellen van onderzoeksvragen en het bepalen welke informatie nodig is om de taak uit te kunnen voeren.

Didactische aanwijzingen bij deze stap:
Besteed voldoende aandacht aan het gezamenlijk schetsen van het probleem.
Activeer de voorkennis van de leerlingen. Op die manier zijn leerlingen in de latere stappen beter in staat om in te schatten welke informatie relevant is.

Stap 2. Bepalen van zoekstrategieën

Deze stap bestaat uit het aanbieden van strategieën om informatie te zoeken, het bepalen van mogelijke bronnen en het selecteren van de beste bron. Bij het zoeken naar digitale bronnen is het belangrijk te kijken naar betrouwbaarheid en bruikbaarheid van de informatie.

Enkele criteria om de betrouwbaarheid van digitale bronnen op te baseren:
Formulering: op basis van de formulering die gebruikt is op een site, kan bepaald worden voor welke doelgroep de informatie geschikt is. Daarnaast is formulering ook een indicator voor de betrouwbaarheid, bijvoorbeeld op basis van de aanwezigheid van taalfouten, woordkeuze, zinsbouw, structuur van de tekst en de verwijzing naar bronnen.
Opmaak: de opmaak van een site kan informatie geven over de betrouwbaarheid van de site, bijvoorbeeld aan de hand van kleurgebruik, lettertype of het gebruikte beeldmateriaal. Een zakelijke opmaak komt eerder betrouwbaar over dan een speelsere vormgeving.
Domeinnaam: iedere site heeft een URL (unieke bestandsnaam op internet). Deze URL bestaat uit verschillende onderdelen, waarvan de domeinnaam het laatste gedeelte is (bijvoorbeeld '.nl' of '.com'). Deze domeinnaam geeft informatie over de afkomst, en daarmee ook de betrouwbaarheid van de site. Zo staat '.com' voor een commerciële site, waaruit u kunt opmaken dat de site weleens gekleurde informatie zou kunnen bevatten.
Primaire of secundaire bron: het is van belang te bepalen of informatie afkomstig is van een originele bron (primaire bron) of dat de informatie gebruikt is op een andere site dan waar het oorspronkelijk vandaan kwam (secundaire bron).
Soort site en het doel dat ze nastreven: er zijn verschillende soorten sites, (bijv. gesponsorde links, blogs, forums, kranten). Sites kunnen verschillende doelen nastreven (zoals amuseren of informeren), wat de betrouwbaarheid van informatie kan beïnvloeden.
Reputatie van de site of auteur

Enkele criteria om de bruikbaarheid van digitale bronnen op te baseren:
Beschrijving bij zoekresultaten: een digitale zoekmachine draagt mogelijk relevante sites aan op basis van de ingevoerde trefwoorden. Al deze zoekresultaten bevatten een korte beschrijving met daarin de context waarin de ingevoerde trefwoorden gebruikt worden op de site. Deze beschrijving geeft een goede indicatie van de bruikbaarheid van de betreffende bron voor het beantwoorden van de onderzoeksvraag.
Tip: voorkom sites met reclame (advertenties) of persoonlijke uitingen.
Actualiteit: afhankelijk van de zoekvraag kan het relevant zijn sites te selecteren op basis van actualiteit. Hieronder vallen onder andere de criteria wanneer de laatste update van de site heeft plaatsgevonden en de relevantie van de informatie.

Didactische aanwijzing bij deze stap
Pas de mate van sturing en begeleiding dat u leerlingen in dit proces geeft aan naar de ervaring en kunde die leerlingen al hebben met deze vaardigheden.
Wanneer uw leerlingen nog weinig ervaring hebben met informatievaardigheden kan het handig zijn een gedeelte van het zoekproces klassikaal voor te doen.

Stap 3. Gebruiken van informatie
Het verwerven en selecteren van informatie.

Nadat de nader te bekijken sites zijn geselecteerd op basis van de criteria uit stap 2, is het van belang om dieper onderzoek te doen op de betreffende site. Dit kan gedaan worden door een bron eerst scannend te lezen op zoek naar de informatie die u zoekt. Wanneer de informatie op de betreffende site gevonden is, moet er bekeken worden of het daadwerkelijk bruikbare informatie is. Met deze informatie moet namelijk uiteindelijk de onderzoeksvragen beantwoord kunnen worden.

Didactische aanwijzing bij deze stap:
Wijs leerlingen op al aanwezige hulpmiddelen op een site om op zoek te gaan naar relevante informatie. Hulpmiddelen zijn het gebruik van een snelmenu, of de functie ‘CTRL F’, waarmee snel naar trefwoorden op de site gezocht kan worden.

Stap 4. Verwerken van informatie
Het verwerken van de informatie door bijvoorbeeld lezen, horen en kijken.

In deze stap staat het kritisch lezen van de gevonden informatie centraal. In deze fase is het belangrijk om leerlingen de gevonden informatie te laten verwerken, zodat de nieuw opgedane kennis gekoppeld kan worden aan de al aanwezige voorkennis. Mogelijke verwerkingsvormen zijn het maken van een samenvatting, een mindmap, een verslag of een presentatie. Wel is het van belang dat leerlingen hierbij een goede bronvermelding bijvoegen of benoemen.

Stap 5. Presenteren van informatie
Het organiseren van de verkregen informatie uit verschillende bronnen en het presenteren van het resultaat van de taak (= synthese).

Bij deze stap is het van belang dat leerlingen de gevonden informatie van de verschillende bronnen samenvoegen en in eigen woorden zetten. Dit is erg lastig voor leerlingen, vandaar dat het belangrijk is dat zij hierin begeleid worden. Daarnaast is het bij het maken van een eindproduct van belang dat de beoordelingscriteria vooraf duidelijk zijn. Hierbij kan bijvoorbeeld gedacht worden aan de lengte van het product, de doelgroep waarvoor dit gemaakt wordt, en de eisen aan de bronvermelding. Afhankelijk van het niveau van de leerlingen kunnen eisen gesteld worden aan het omgaan met bronnen, zoals het maken van een bronnenlijst, het gebruik van citaten of parafraseren (informatie van een site in eigen woorden zetten).

Stap 6. Evalueren en boordelen van informatie
Het evalueren van het product (op bruikbaarheid en betrouwbaarheid) en het proces.

Bij het evalueren is het van belang zowel aandacht te besteden aan het evalueren van het gemaakte product, als het doorlopen proces. In deze evaluatie spelen metacognitieve vaardigheden een rol, aangezien leerlingen de taak krijgen op hun eigen handelen te reflecteren.

3. Kijkwijzer voor leerkrachten - Informatievaardigheden

Deze kijkwijzer is bedoeld als hulpmiddel om na te gaan of uw handelen voldoet aan de doelen van informatievaardigheden. Het beschrijft puntsgewijs de zes stappen van informatievaardigheden met de bijbehorende criteria.

NB. Onderstaande doelen zijn geformuleerd voor eind funderend onderwijs. Om die reden zou het kunnen zijn dat deze doelen voor uw les of de context passend gemaakt kunnen worden.

1.Probleemstelling formuleren	-	±	+	nvt
De leerkracht laat leerlingen hun voorkennis met betrekking tot het onderwerp activeren				
De leerkracht laat leerlingen in een gegeven situatie formuleren wat het probleem is				
De leerkracht laat leerlingen bij een probleem een onderzoeksvraag en deelvragen formuleren				
De leerkracht laat leerlingen nadenken over welke informatie nodig is om de onderzoeksvragen te kunnen beantwoorden				
De leerkracht laat leerlingen een plan van aanpak opstellen				
2. Strategieën om te zoeken	-	±	+	nvt
De leerkracht laat leerlingen inventariseren welke bronnen beschikbaar zijn en waar deze te vinden zijn				
De leerkracht laat leerlingen bronnen selecteren die in de gevraagde informatie kunnen voorzien				
De leerkracht laat leerlingen (aangeleerde) zoekstrategieën toepassen				
3. Gebruik van informatie	-	±	+	nvt
De leerkracht laat leerlingen de gevraagde informatie in bronnen markeren				
De leerkracht laat leerlingen relevante informatie uit bronnen selecteren, daarbij lettend op de bruikbaarheid van de bronnen				
De leerkracht laat leerlingen relevante informatie uit bronnen selecteren, daarbij lettend op de betrouwbaarheid van de bronnen				
4. Verwerken van informatie	-	±	+	nvt
De leerkracht laat leerlingen informatie verwerken en combineren tot de gevraagde informatie, meestal in de vorm van een samenvatting, tabellen, grafieken, schema's of anderszins				
De leerkracht laat de leerlingen de gevonden informatie herformuleren, zodat de onderzoeksvraag in eigen woorden beantwoord kan worden				
5. Presenteren van informatie	-	±	+	nvt
De leerkracht laat leerlingen een passende presentatievorm kiezen				
De leerkracht laat leerlingen de resultaten van het onderzoek presenteren met een goede bronvermelding				
6. Evalueren en beoordelen van informatie	-	±	+	nvt
De leerkracht laat leerlingen het product beoordelen op bruikbaarheid				
De leerkracht laat leerlingen het product beoordelen op betrouwbaarheid				
De leerkracht laat leerlingen hun sterke en zwakke punten opsommen m.b.t. informatievaardigheden en aangeven wat ze nog zouden moeten/willen leren				