Raising risk awareness and changing unsafe behavior on social network sites: A design-based research in secondary education

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"There was of course no way of knowing whether you were being watched at any given moment. It was even conceivable that they watched everybody all the time. But at any rate they could plug in your wire whenever they wanted to. You had to live — did live, from habit that became instinct — in the assumption that every sound you made was overheard, and, except in darkness, every movement scrutinized."

George Orwell ~ 1984

Toen George Orwell's boek gepubliceerd werd in 1949 was het wereldbeeld dat hij schetste er een van surrealistische en angstaanjagende sciencefictiontaferelen. Wanneer ik om me heen kijk, blijkt echter hoe weinig mensen beseffen dat we ons al bij al goed kunnen vinden in een maatschappij waarin zo goed als elke handeling die we uitvoeren en bijna elke emotie die we ervaren, gedeeld wordt met een groot publiek. Ik ben dan ook erg tevreden dat ik een steentje kon bijdragen aan deze nieuwe digitale maatschappij, door jongeren via onderwijs iets bij te brengen over wat sociale netwerksites zijn, en wat dit betekent voor hun privacy.

Het afronden van dit doctoraat was voor mij eveneens een beetje sciencefiction, die nu werkelijkheid wordt. Het was dan ook nooit gelukt zonder de hulp en steun van vele mensen rondom mij. Een woordje van dank is op zijn plaats.

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Ellen

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Chapter 1
General introduction

Abstract

This chapter provides a general introduction to the studies described in this dissertation. First, the research context of the studies is described followed by three research challenges corresponding with three main research objectives of this dissertation. Next, the research methodology – a design-based research approach – used to attain the proposed goals is clarified. Finally, an overview of the content of the different chapters is given, which demonstrates how the design-based research approach structures the entire dissertation.

Research context

Social network sites

In the current cyber society, new participatory platforms for communication are rapidly evolving. Social network sites (SNSs), also called online social networks, are an expression of these new communication technologies. Basically, SNSs are Internet communities that allow individuals to interact online through profiles representing their identities and their networks of connections (Acquisti & Gross, 2006). These websites typically share the same structure and characteristics, and are therefore defined by boyd & Ellison (2007) as

> *"Web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system" (p. 211).*

The first key feature is the personal, online profile that is created by the user of a SNS and contains a variety of content such as text, images, video, audio and links (boyd, 2007). This content can be shared publicly or with numerous 'friends', namely other users that are marked as friends (depending on the SNS they can be named otherwise, for example 'fans' or 'followers'). This list of other users is a second typical feature of SNSs and can include real-life friends, acquaintances, online contacts that share a certain interest, but also total strangers (boyd, 2007). SNS providers often use a system of acknowledgement to build this list: you can only be added to the friend-list if a person acknowledges you as a friend. The third key feature of a SNS is the commenting feature: users can post messages on other users' profiles (boyd & Ellison, 2007). These messages again can be shared publicly or kept private (i.e., not readable by other friends or strangers, but always readable by the service provider).

In addition to the common features that most SNSs share, there are some characteristics that distinguish the numerous SNSs from each other. Most often, the specific theme or the connecting

interests of the users make the website unique. For example, Linked In focuses on professional networks, Academia.edu connects researchers, Last.fm is centered around music interests and Badoo is a place to build new social relationships (e.g., van Dijck, 2013).

Although SNSs only recently arose, in no time they have expanded from a niche phenomenon to a commonly used media tool (Acquisti & Gross, 2006). An explicit example of this revolutionary change is the growth of Facebook. Founded in 2004 by Mark Zucherberg and his college roommates, this SNS was aimed at a niche community of Harvard students. However, given its initial success it expanded to other college and high school communities (Acquisti & Gross, 2006; Watson, Smith, & Driver, 2006) and subsequently it quickly spread to thousands of colleges. Finally, it was accessible for everyone over 13 years old (Taraszow, Aristodemou, Shitta, Laouris, & Arsoy, 2010). By the end of 2006, more than 12 million people used Facebook, and by the end of 2009, this number had increased to 350 million active users (Hew, 2011). In about five years, Facebook evolved from a SNS reaching only one college community to the most popular SNS with more than a billion users all over the world (Hampton, Goulet, Rainie, & Purcell, 2011; Ortutay, 2012). This growth is exemplary for the increasing popularity of SNSs in general, with both young and older users. Research shows that in Europe 73% of the 13-14 year olds and 82% of the 15-16 year olds now have a profile on a SNS (Livingstone, Haddon, Görzig, & Olafsson, 2011).

Risks on social network sites

The primary purpose of using SNS platforms is communication, interaction and maintaining relationships (Hew, 2011; Taraszow et al., 2010) with people users know from the offline world rather than in view of establishing new contacts (Ellison, Steinfield, & Lampe, 2007). This is facilitated by the fact that SNSs enable communication across time and space (Taraszow et al., 2010). In this way, SNSs offer the opportunity for adolescents to develop their social capital, supporting and strengthening their relationships with peers and allowing community building (Vandoninck, d' Haenens, Cock, & Donoso, 2012). A number of other opportunities of SNSs have been described in the literature as well, such as the opportunity to construct a digital identity (Hum et al., 2011; Liu, 2007) and benefits for users experiencing low self-esteem and low life satisfaction (Ellison et al., 2007).

Although many authors emphasize the numerous opportunities SNSs offer, there are also many documented risks accompanying the use of SNSs (Christofides, Muise, & Desmarais, 2012). Popular media report several cases of negative consequences of risky behavior on SNSs, causing concern among researchers and policy makers about the dangers of using SNSs (Safer Internet Programme, 2009; Walrave & Heirman, 2013; Watson et al., 2006). Given these concerns, much research has been set up to determine the actual risks and related consequences (Christofides et al., 2012; Livingstone et al., 2011; Vandoninck et al., 2012; Watson et al., 2006). As reflected in Figure 1, the risks described in the literature can be divided into three main categories corresponding to the three categories of Internet risks described by De Moor et al. (2008). This categorization results from a review of the literature and interviews with youngsters, parents
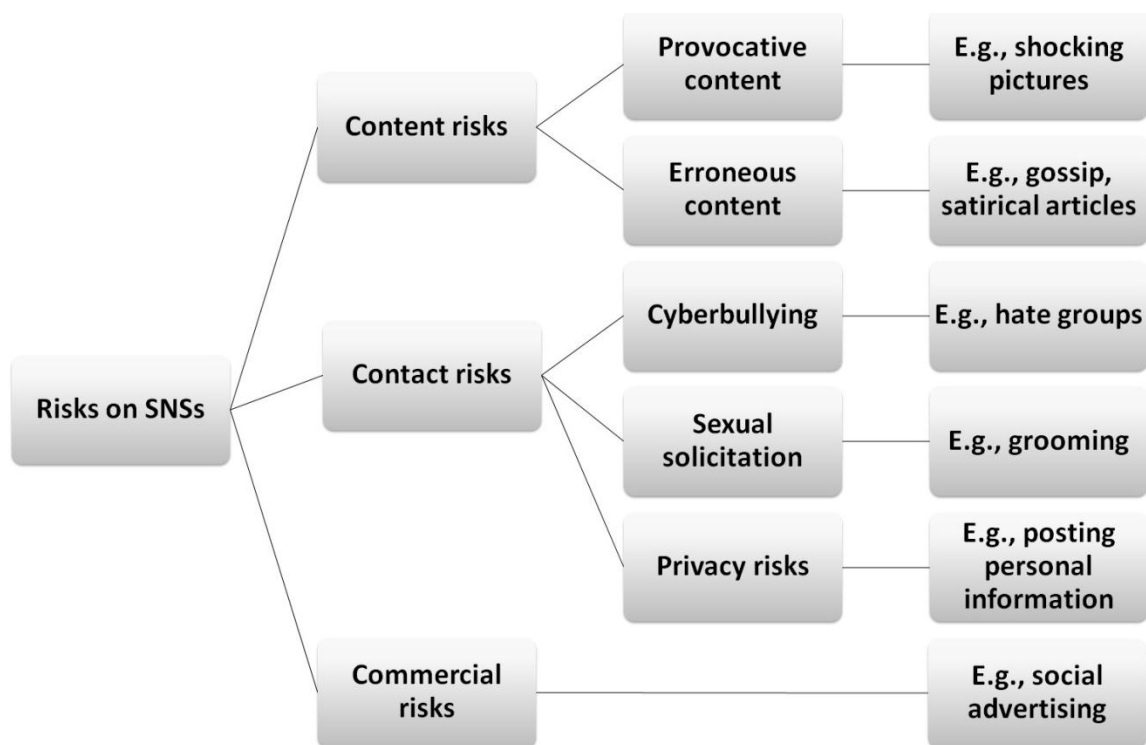
Figure 1. Risks teenagers face when using the Internet (based on De Moor et al., 2008).

and teachers (Walrave, Lenaerts, & De Moor, 2009). Although this overview of risks is mainly about Internet use in general, it is fully applicable to the use of SNSs.

The first category of risks brings together content risks. These are risks caused by the nature of the content on SNSs, including provocative and erroneous content. A large-scale study involving children from 25 European countries found that over half of the children think that there are things on the Internet that will bother children of their age (Livingstone et al., 2011). Examples of provocative content could include hate-messages, shocking pictures and shocking status updates. Moreover, children need to develop critical skills to judge the reliability of information as the content on SNSs can be erroneous. Typical examples of wrong information include gossip, jokes and satirical newspaper articles, such as articles from the satirical journal The Onion (www.theonion.com).

The second category of risks describes contact risks finding their source in the communicative and interactive aspect of SNS platforms. Three groups of contact risks can be distinguished: cyberbullying, sexual solicitation and privacy risks (De Moor et al., 2008; Livingstone et al., 2011). Next to instant messaging, SNSs are the most popular media used for cyberbullying (Livingstone et al., 2011). Children using SNSs are more likely to be bullied and are more susceptible to harassment such as the spreading of rumors (Lenhart, 2007) than children without a SNS profile. Additionally, SNSs can also be used to send sexual messages (Livingstone et al., 2011), and girls especially report having experienced unwanted online contact that made them scared or uncomfortable (Smith, 2007). A typical example of sexual solicitation is seen in the process of grooming, where an adult with sexual intentions manages to

establish a relationship with a minor by using the Internet (Choo, 2009). The possibility for obtaining contact information by surfing on SNSs also increases the risk of offline contact risk. Finally, teenagers also face privacy risks as they post personal and sometimes risky information online (Livingstone et al., 2011). This in particular challenges their privacy when they do not use the privacy settings of their SNS in a way to protect their information from strangers. Research has shown that 29% of teens sustain a public profile or do not know about their privacy settings and 28% opt for partially private settings such that friends-of-friends can see their page (Livingstone et al., 2011). While friends-of-friends may sound reasonably familiar, these people are mostly strangers.

The commercial risks, the third category, include the commercial misuse of personal data. For the average user, SNSs are seen as free entertainment platforms as no payments or membership fees are required for most existing SNSs. However, SNSs provide an ideal, data-rich environment for microtargeted marketing and advertising as users are encouraged to post a lot of personal information on their profile page (Debatin, Lovejoy, Horn, & Hughes, 2009). This personalization of SNS profile pages creates new opportunities for marketers, reflected in the use of targeted advertising or so called behavioral targeting, that is personalized marketing based on customer's unique preferences, behaviors and psychological profile (Montgomery & Chester, 2009). Another important characteristic of SNSs which has led marketers to love these new digital platforms is the fact that the nature and extent of the users' social relationships become apparent, allowing them to exploit these networks for peer-to-peer marketing (Montgomery & Chester, 2009). An example of such social advertising can be found in Facebook's social ad system, in which a user's name appears with ads to promote certain brands with their SNS friends. The aggregation of personal data, including information about social relationships, and its potential commercial exploitation by third parties tends to remain invisible for the average user but explains how SNSs can operate without any fees from its users (Debatin et al., 2009). The invasion of users' privacy that corresponds with this data exploitation is therefore of concern to many researchers and policy makers, especially when the users are children, as their ability to distinguish the entertainment and marketing purposes of SNSs has been questioned (Debatin et al., 2009; Montgomery & Chester, 2009; Walrave & Heirman, 2013).

In conclusion it can be stated that the use of SNSs inevitably exposes children and teenagers to several risks which can be grouped into three categories: content risks, contact risks and commercial risks. While it should be noted that these risks are not necessarily leading to harm and a lot of teenagers develop resilience for coping with them (Vandoninck, d' Haenens, & Segers, 2012), it has been shown that a significant number of teenagers experience harm, negative experiences, and emotional distress after exposure to online risks (Livingstone et al., 2011; Mcgivern & Noret, 2011; Ybarra, Mitchell, Wolak, & Finkelhor, 2006). In this respect, Internet harassment is seen as a significant public health issue with aggressors facing multiple psychosocial challenges including poor parent-child relationships, substance use, and delinquency (Ybarra & Mitchell, 2004). Therefore, the risks on SNSs can be seen as a threat to the health and safety of the children in the 21st century.

Regulatory policies with regard to social network site risks

Given these risks and the possible consequences, the importance of safer Internet for children is high on the international agenda. In the United States, regulatory policies were adopted reflected in the Children's Online Privacy Protection Act (COPPA). This act specifies rules for websites or online services directed to children under 13 years of age that are collecting personal information (Children's Online Privacy Protection Act, 1998). In summary, these services require parental consent if they collect information from children and they must specify which personal information they collect and for which purposes. In the European Union, users of SNSs are legally protected with regard to the processing of their personal data by the Data Protection Directive (European Parliament & Council, 1995). In summary, it states that users have the right to be informed about the identity of the data controller and the purposes of the data processing, the right to access and rectify the data, and the right to deny processing for direct marketing purposes. Most often, these obligations can be fulfilled by SNS services by providing a privacy statement or privacy policy that must be accepted by their users (Walrave & Heirman, 2013).

The problem with these regulations is the lack of compliance and the disputed age limit (Walrave & Heirman, 2013). The special regulations for children under 13 years old, as defined by COPPA, are not protecting older minors. While a lot of SNSs are now restricting the use of their services for users under 13 years old (e.g., Facebook), they are still aiming at teenagers who are not protected by COPPA. Several studies show that these teenagers might be particularly vulnerable in terms of their online privacy (Walrave & Heirman, 2013). Additionally, these laws specifically act on online privacy risks and commercial data exploitation, but they are not necessarily helpful with regard to content risks, cyberbullying and sexual solicitation. Therefore, additional measures were necessary.

Consequently, the European commission and U.S. Homeland Security have signed a joint declaration in 2012 to "work collectively and in partnership to reduce the risks and maximize the benefits of the Internet for children" (Department of Homeland Security and the European Commission - Joint Declaration, 2012). Several non-profit organizations such as i-SAFE, iKeepSafe, Family Online Safety Institute (FOSI) and National Cyber Security Alliance (NCSA) help to obtain this mission in the United States. Furthermore, the European Commission proposed a Digital Agenda for Europe – a Europe 2020 Initiative – including the objective of "scaling up awareness and empowerment including teaching of digital literacy and online safety in all EU schools" (European commission, 2012). Worldwide support for this digital agenda is also revealed by the international support of Safer Internet Day which is annually organized by 103 countries across the world to promote safer and more responsible use of online technology and mobile phones, especially amongst children and young people ("Safer Internet Day," 2013).

Role of school education

Following this international safety agenda, the role of school education to teach online safety has been emphasized by different stakeholders, including teenagers themselves, parents, teachers, policy makers and researchers (Livingstone & Haddon, 2009; Marwick, Murgia-Diaz, & Palfrey, 2010; Safer Internet Programme, 2009; Tejedor & Pulido, 2012). Boyd (2007) describes three groups of educators: those who have an entirely negative view of social technologies, those who ignore the problems associated with the use of SNSs hoping that they will just disappear, and those who believe that it is crucial to understand and embrace these technologies to guide young people regarding the associated risks. In any case, there is a common belief that schools have a broad educational agenda, including the enhancement of pupils' character, health and civic engagement (Greenberg et al., 2003). School education needs to enable pupils to participate fully in public life (The New London Group, 1996). Thus in the 21st century, schools have a responsibility to teach teenagers how to behave safely on SNSs.

For this reason, online safety has been formally included in school curricula in many European countries as part of a broader media literacy or technology program (Safer Internet Programme, 2009). Media literacy has been defined by Livingstone (2003) as "the ability to access, analyze, evaluate and create messages across a variety of contexts" (p. 3), now including participatory online environments. An analysis of international technology curricula revealed that they are based on the rationale that all children must be digitally literate to be prepared for the knowledge-based society (Tondeur, Van Braak, & Valcke, 2007). Since teens are better at accessing and finding information online than they are at avoiding risks posed by the Internet (Livingstone, 2004), the critical and safe use of social media and SNSs is a crucial aspect of general media literacy and technology education at schools.

The Flemish educational context can serve as an example for explaining the implementation of online safety in a compulsory curriculum defined by the government. In Flanders, online safety is part of the cross-curricular information and communication technology (ICT) attainment targets in the first grade of secondary education. Examples of such attainment targets include "students use ICT in a safe, responsible and effective way" and "students can use ICT to communicate in a safe, responsible and effective manner." Moreover, online safety is integrated in the cross-curricular attainment targets in the second and third grade of secondary education in terms of 'media literacy', such as "students are careful when using media," and "students participate in public life through critical media usage" (Flemish Ministry of Education, 2010).

These target attainments stay rather vague, and the concrete content of courses or how these attainments are obtained is up to the school to decide (Vanderlinde, Braak, & Hermans, 2009). Therefore, these sorts of curricula are situated on the macro level (system or state level) and refer to the concept of intended curricula – that is society's underlying vision (Vanderlinde et al., 2009). However, research shows that there is often a discrepancy between this intended curriculum and the implemented curriculum at the micro level (classroom level). Indeed, although the topic of online safety is formally included in the school curricula in a number of

countries, the implementation at the classroom level appears to be inconsistent (Safer Internet Programme, 2009). Studies with teachers in England indicate that 42% of the teachers never lecture about online safety, and only 11% report frequently doing so. The same survey also points out that SNSs are often blocked in schools. While claiming to take responsibility by preventing teenagers from facing risks on SNS during school time, schools fail to teach children essential skills for managing their online identity. Blocking SNSs in school often even encourages teenagers to subvert filters or restrictions (Sharples, Graber, Harrison, & Logan, 2009).

Even so, the number of prevention campaigns and awareness raising interventions has been expanded tremendously helping with the implementation of the curriculum in the classroom (see Insafe, 2014, for an overview of European packages). However, a systematic review showed that almost none of these packages has been empirically evaluated (Mishna, Cook, Saini, Wu, & MacFadden, 2010), so it is unclear whether they have any impact on teenagers' awareness, attitudes or behavior. The few evaluation studies that were conducted show that an increase in Internet safety knowledge is often obtained, but changing unsafe behavior is much more difficult to achieve (Mishna et al., 2010). This is in line with the findings about media literacy education in general where quantitative intervention studies in classroom settings typically reveal that media literacy education increases knowledge about the specific topic of the course, but that attitudinal and behavioral changes are mostly not found (Duran, Yousman, Walsh, & Longshore, 2008; Steinke et al., 2007). For now, it is unclear which characteristics can guarantee that interventions and prevention campaigns are effectively changing awareness and unsafe behavior (Livingstone & Bulger, 2013).

Research objectives

The main goal of this dissertation is to ensure that teenagers are aware of the risks on SNSs, and to decrease unsafe behavior on SNSs if necessary. To obtain this goal, we started from several gaps that were revealed in the research literature and research context described above. Particularly, three important research challenges can be distinguished:

(1) Research shows that teenagers face several risks when using SNSs, but it is quite unclear which problems most urgently need an intervention. Moreover, there is currently no research about the impact of the topic of online safety in school on students' awareness and behavior, or about the needs of teachers and educational stakeholders. This means that the relationship between school interventions and actual online behavior remains unclear. Explorative studies that map teenagers' behavior on SNSs, the most prominent risks they face, and the relationship with school education about online safety are needed.

(2) While researchers and governments agree that education about online safety for children is an important future challenge, initiatives that contribute to the organization of such education are not evidence-based. Moreover, the impact of these initiatives remains unclear. Therefore, new evidence-based and empirically evaluated educational materials are necessary.

(3) A number of awareness raising initiatives and prevention campaigns have been developed, and non-profit organizations and teachers keep developing learning materials to teach children how to behave safely on SNSs. However, little is known about the conditions under which these materials work. Theoretical information about the characteristics of effective interventions, which are attaining the goals put forth (e.g., an increased awareness of risks and safer behavior on SNSs), is necessary. More research is needed leading to design principles that can guide future developers during the creation of new materials in the context of online safety.

Based on these research challenges, the general objective to increase risk awareness and to change unsafe behavior with teenagers on SNSs can be divided into three concrete research objectives:

Research objective 1 (RO1): Formulating a state-of-the-art proposal with regard to the current educational situation related to online safety and formulating a concrete and clear problem statement taking into account the needs of teenagers and educational stakeholders.

Research objective 2 (RO2): Developing evidence-based educational materials that can be used in secondary education that fulfill the needs as defined by the research conducted in the context of RO1.

Research objective 3 (RO3): Developing design principles that can be used by future practitioners, researchers and developers when creating new educational materials concerning the problem statement within the context of RO1.

The different studies in this dissertation aimed at fulfilling these three research objectives and are thus providing a theoretical contribution to the academic environment and a practical solution to improve educational practice.

Research method

The main research approach used to fulfill the proposed research objectives is the design-based research methodology. In the following, this research approach is defined and it is explained why this methodology has been chosen to pursue the three research objectives.

What is design-based research?

The design-based research methodology is a well-used research approach in the Learning Sciences (Barab & Squire, 2004; A. Brown, 1992; The Design-based Research Collective, 2003) and relies on multiple sources of evidence, both quantitative and qualitative, which are triangulated (Cohen, 2011). Yet, although a design-based research approach includes several well-established research methods and is based on existing norms for sampling, data collection and data-analysis (McKenney & Reeves, 2013), the approach as a whole is fairly recent evolving in the beginning of the 21st century (Anderson & Shattuck, 2012). The method mostly stands out because of the goals it puts forth: it seeks to bridge theoretical research and educational practice, thereby resulting in both an increase of theoretical knowledge and a societal

contribution, such as school programs (McKenney & Reeves, 2013; Reeves, 2006; Vanderlinde & van Braak, 2010). The methodology has been defined by Wang and Hannafin (2005) as:

> *"A systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real world settings, and leading to contextually-sensitive design principles and theories"(p. 6-7).*

This definition includes different important characteristics of design-based research described by several authors and summarized by Anderson and Shattuck (2012). First of all, it focuses on the design and testing of a significant intervention. It therefore starts from problems that are both scientifically and practically significant, as revealed in an initial problem analysis (Edelson, 2002; McKenney & Reeves, 2013). Second, it involves multiple iterations of testing and refining of problems, solutions, methods and design principles (Phillips, McNaught, & Kennedy, 2012). Third, throughout all phases of the design-based research, a collaborative partnership between researchers and practitioners takes place. Fourth, the research needs to be conducted in real educational contexts, and not in lab-settings. Fifth, next to the development of practical solutions, design principles, or 'prototheories,' that help communicate relevant findings for other researchers and practitioners are proposed (The Design-based Research Collective, 2003). Finally, another characteristic that is not explicitly apparent in the given definition, is the fact that the approach makes use of mixed methods including a variety of research tools and techniques with integrative research and varying methods to meet new needs and issues that emerge during the process (Wang & Hannafin, 2005).

Refinement of problems, solutions, methods and design principles

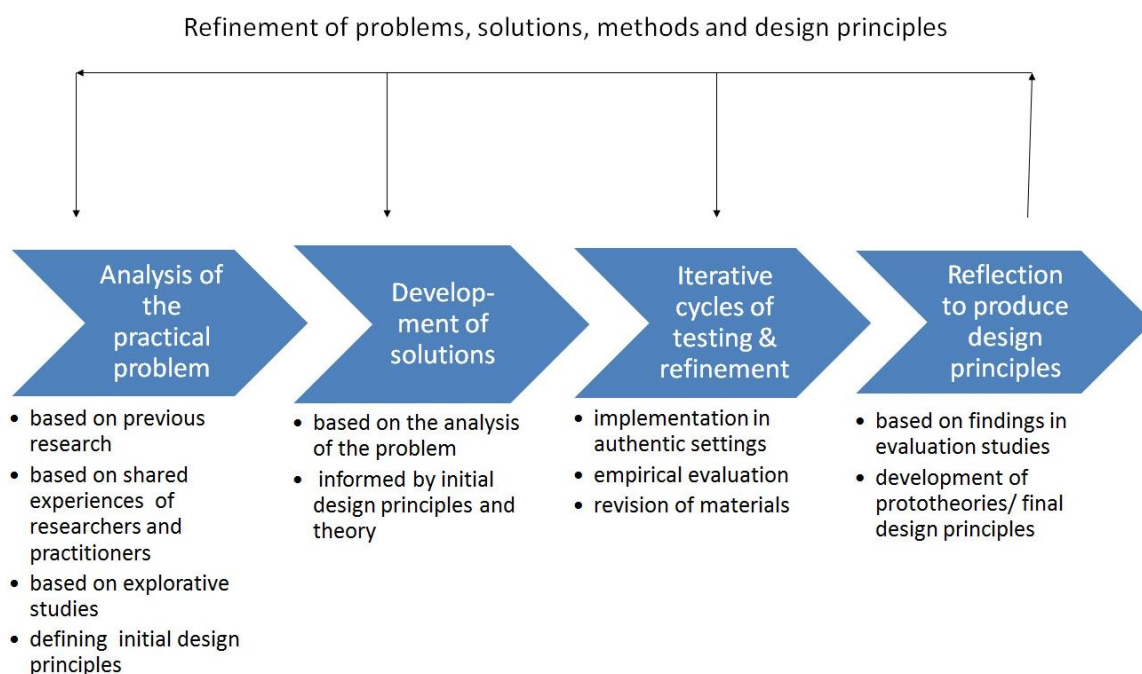| Analysis of the practical problem	Develop-ment of solutions	Iterative cycles of testing & refinement	Reflection to produce design principles
• based on previous research • based on shared experiences of researchers and practitioners • based on explorative studies • defining initial design principles	• based on the analysis of the problem • informed by initial design principles and theory	• implementation in authentic settings • empirical evaluation • revision of materials	• based on findings in evaluation studies • development of prototheories/ final design principles

Figure 2. Iterative steps of design-based research, based on Reeves (2006)

Following these characteristics, the procedure of design-based research, depicted in Figure 2, iteratively involves four sequential steps (Reeves, 2006): (1) the analysis of practical problems, (2) the development of solutions based on existing knowledge, (3) evaluation research of the solutions in practice, and (4) reflection to produce design principles.

Why choose a design-based research approach?

The design-based research approach is partly a reaction to the lack of a theoretical base in designing and developing interventions to improve learning, the lack of evaluation studies in authentic settings, and the lack of theoretical implications of intervention research (Phillips et al., 2012; The Design-based Research Collective, 2003). These gaps correspond to the research challenges regarding education about online safety described earlier. Because the methodology eliminates the boundary between design and research (Edelson, 2002) and results in both theoretical contributions and practical solutions, this research approach is appropriate to obtain the three research goals that were proposed in this dissertation. The first research objective is to formulate a clear problem statement – corresponding to the first phase of design-based research: problem-analysis. The second research objective is to develop evidence-based educational solutions completed in the second and third phases of design-based research using iterative cycles of development, evaluation and revision. The third research objective is to develop design principles to help future developers and researchers, typically formulated in the last phase of a design-based research procedure. Therefore, the structure of the design-based research process is ideally suited to achieve the three proposed research objectives.

Additionally, a number of advantages of design-based research have been described in the literature. Edelson (2002) summarized the three most important reasons for choosing a design-based research approach. First of all, it provides a productive perspective for theory development as it starts from a fully specified theory, shows inconsistencies of this theory by evaluating the design that was based on it, and ends in context specific design principles. The goal-oriented nature of the design-based research guides this theory development (Edelson, 2002). A second advantage of design-based research is the usefulness of the results. Edelson states that in the past, practitioners often complained that they did not know how to implement the results found in research in their daily practice. Design-based research not only results in practical solutions that can be used immediately in the learning context, it also delivers design principles that can be used easily to develop similar interventions. The third reason to use a design-based research approach, following Edelson, is the fact that design-based research directly involves researchers in the improvement of education. Whereas previously the design was often in the hands of publishers and practitioners, the expertise and knowledge of researchers now directly influences the development process, making innovative designs based on recent educational studies possible.

Next to these three advantages described by Edelson (2002), several other advantages have been described in design-based research literature. One of these is the use of real-life settings, in contrast to lab-settings, ensuring ecologic validity (Phillips et al., 2012). Generalizability is highly

valued as it ensures the usability of materials in the classroom. Another advantage is fulfilling the general norms of good research, including the articulation of clear goals and research questions, the cumulative and systematic nature of gathering evidence and the use of methodologies that are appropriate for the research goals (Phillips et al., 2012).

Ethical considerations

Given the topic of this dissertation, several ethical aspects needed to be taken into account during this research project. Aiming to develop a solution for certain security concerns about children's use of SNSs, we ourselves also needed to respect the privacy and security of the teenagers that participated in the different studies conducted in the context of this dissertation. Therefore, a number of measures have been taken.

First of all, teachers and schools were always informed about the research goals and procedures and were asked for their consent to let the students participate in the study. If the school did not have an agreement with parents about letting students participate in scientific research, informed consent from the parents was obtained. If no informed consent could be obtained because of the nature of the study (e.g., in the study described in Chapter 2), a review board from Ghent University, the Ethical Committee Psychology and Educational Sciences, approved the research design and waived the need for written informed consent from the participants.

Second, the datasets were guarded and stored anonymously. In cases where no informed consent could be obtained, no personal data in the strict sense were gathered and the dataset was anonymous from the beginning as no names were used during the research procedure. More details can be found in Chapter 2. In the cases where pre- and posttest data were gathered, full names were collected only for the purpose of merging pre- and post data. Afterwards, datasets were anonymized.

Finally and evidently, we always kept the best interest of the teenagers in mind. However, certain decisions that might be questioned by other researchers, such as putting forward the goal of changing unsafe behavior and guiding teenagers to think and/or act a certain way were inevitably put forward. While it can be argued that teenagers deserve to be informed in order to make informed decisions when using SNSs, it can also be argued that it is unethical to decide how they actually should behave. Developing interventions in an attempt to influence users' attitudes and behavior raises important ethical questions about the extent to which a researcher can impose his or her values (Kimmel, 1988). Claiming that the influence is for the users' own good is a violation of the principle of autonomy, freedom or self-determination justified by the principle of beneficence (Kelman, 2001). Indeed, forcing people to behave 'safely' in SNSs can be judged as paternalistic or even undemocratic. One should keep in mind that developing educational materials always includes the developer's expectations of desirable attitudes and behavior. This is not always in line with the goals and expectations of the pupils. Maybe every individual has the right to not care about certain risks, and to choose to behave 'unsafely' on SNSs if that is what he or she wants, given the benefits this entails. In any case, it is essential to

keep in mind that influencing behavior, even under ideal conditions, is an ethically ambiguous act (Kelman, 1965).

For this reason, we feel that it is important to be transparent about the motivations that led us to the decision of aiming to impact teenagers' behavior. Despite the ethical objections, there are other important considerations to take into account in this decision, such as teenager's developmental skills. Can we expect that a teenager is able to make good decisions when disclosing information on SNSs? It has been found that young SNS users are more impatient, have a harder time controlling their impulses and are less likely to recognize the risks and future consequences of their decisions (Cauffman & Steinberg, 2000; Lewis, 1981). Another argument when aiming for behavioral changes is the general belief that schools have broad educational responsibilities, including enhancement of pupils' character, health and their possibilities to participate in public life (Greenberg et al., 2003; The New London Group, 1996). In this line of thought, putting forward the goal of behavioral change in addition to raising awareness seemed appropriate.

Still, if researchers decide to aim at behavioral change, there are different degrees of imposing this change corresponding to the autonomy of the pupils. Kelman and Warwick (1978) state that the goals of an intervention vary from coercion, over manipulation and persuasion toward facilitation of a certain behavior. These different means of intervention are extensively described by Kelman (2001). Coercion implies that people are forced to take actions in contradiction with their preferences. Examples of coercion are parents that forbid their children to use SNSs or school boards that forbid the use of SNSs at school. Manipulation entails a change in the structure of alternatives that users get, for example by making certain privacy settings default in SNSs. This leaves the person free to make choices, but within a deliberately modified framework. Persuasion relies on the strength of argumentation, reasoning and debate to persuade people's attitudes and behavior. Several awareness raising campaigns can be categorized as a form of persuasion, as they deliberately try to explain why you should not post certain information, rather than just informing about the risks (e.g., R. M. G. Brown, 2012). Finally, facilitation is a technique that focuses on offering different resources. With regard to privacy interventions, examples include awareness raising campaigns that do not try to convince people to act a certain way, but offer information and several tools and strategies that can be used whenever users choose to use them.

This continuum shows a gradual increase in freedom that the person being influenced has. Persuasion and facilitation are generally seen as consistent with the principle of autonomy and freedom, and therefore ethically more acceptable than coercion and manipulation (Kelman, 2001). Still, researchers and developers should be especially careful when trying to influence minors by school interventions, because of the hierarchical relationship that arises between the teacher and the pupils. This hierarchical relationship blurs the lines that exist between coercion, manipulation, persuasion and facilitation (Kelman, 2001). For example, persuasion can easily change into manipulation when parents or teachers are trying to influence teenagers. Therefore, it is important to considerately decide whether and how influencing the behavior of teenagers is

ethically justified. Because the facilitation-method is ethically most justifiable, we chose to use this method in the current design-based research when developing and evaluating educational materials. This ethical decision has been made with careful consideration and will be discussed further in the closing chapter of this dissertation (Chapter 11: discussion and conclusion).

The specific role of theories

Design-based research is sometimes criticized for being nothing more than action research or a formative evaluation methodology, as it is also a naturalistic, process-oriented and iterative methodology that aims at the design of interventions that work in complex social settings (Anderson & Shattuck, 2012; Barab & Squire, 2004). However, while the lessons of the design efforts in action research or formative evaluation are restricted to the particular design and the individuals involved, design-based research also aims at the advancement of a theoretical agenda (Anderson & Shattuck, 2012; Barab & Squire, 2004; Edelson, 2002). As stated before, it provides a productive perspective for theory development as it starts from a fully specified theory, shows inconsistencies of this theory by evaluating the design that was based on it, and ends in context specific design principles (Edelson, 2002).

Following this important role of theory in design-based research, the current research is theoretically founded on two levels. First, it starts from initial theoretical design principles, which are based on findings in general prevention research (Nation et al., 2003), and specific instructional design principles drawn from constructivism, which is the leading theory in the field of learning sciences (Gordon, 2008). These principles are described in Chapter 3 and Chapter 5 of this dissertation. Based on the results of the studies described in the second part of this dissertation (development and evaluation of solutions), these principles are revised in the third part (reflection to produce revised design principles). Second, the separate studies described in this dissertation are supported by several specific theories. For example, the revisions in the intervention studies described in Chapter 6, 8 and 9 are partly based on the theory of planned behavior that describes the importance of significant others as a predictor of behavior (Ajzen, 1991).

Overview of the dissertation

The different parts of this dissertation mainly follow the structure of the design-based research approach as described above. As stated, the procedure of design-based research, depicted in Figure 2, iteratively involves four sequential steps (Reeves, 2006): (1) the analysis of practical problems, (2) the development of solutions based on existing knowledge, (3) evaluation research of the solutions in practice, and (4) reflection to produce design principles. The research that is described in the current dissertation is framed by these steps. The results comprise three main parts of the dissertation corresponding to the three proposed research objectives: (1) problem analysis and formulation of initial design principles, (2) development and evaluation of solutions and (3) a reflection to produce revised design principles. As can be seen, the second and third step of the design-based research were combined in one step as they

iteratively alternate. Figure 3 presents a schematic overview of the different chapters and their position within the three parts of the design-based research process.

Chapter 1 and 11 are general chapters which respectively introduce and conclude the entire dissertation. Parts of these chapters are based on journal articles that have been published or submitted for publication in international journals or as a book chapter. Chapter 2 through Chapter 9 all compromise research articles that have also been published or are submitted for publication in international journals or as a book chapter and Chapter 10 is partly based on such a publication. A detailed overview of the different studies, their research goals and methodology is provided in Table 1. In the following, all chapters are described separately in order of their appearance in the dissertation.

This first chapter is an introductory chapter in which the research context is presented. Three research challenges are described leading to the three research objectives proposed for the current dissertation. The design-based research method is introduced as a well-suited methodology to obtain the proposed research objectives. Characteristics and advantages of this research approach are given. Finally, this chapter presents an overview of the different studies that are included in the dissertation.

After the first chapter, part 1 of the dissertation starts. This first part focuses on the problem analysis and the formulation of initial design principles. As can be seen in Figure 2, the analysis of the problem in the first phase of the design-based research is based on a number of input sources – a literature review, explorative studies and shared experiences between researchers and practitioners. To obtain the first research objective, the first phase of the design-based research was therefore conducted in the form of a literature study that was extended with three explorative studies. These studies are the first three research chapters of the dissertation: Chapters 2, 3, and 4, respectively. In these chapters, a theoretical framework describing initial design principles is also put forth.

Chapter 2, *How safe do teenagers behave on Facebook? An observational study,* presents a study providing more insight in teenagers' SNS behavior. In this chapter, the following research questions are proposed: (1) What kind of information do teenagers post on their Facebook-profile page? (2) Do teenagers manage privacy settings to secure this information? and (3) Does the available information entail particular risks? To answer these research questions, 1050 Facebook profiles of teenagers between 13 and 18 years old were observed and analyzed. This chapter is published in the multidisciplinary open-access journal *Plos One.*
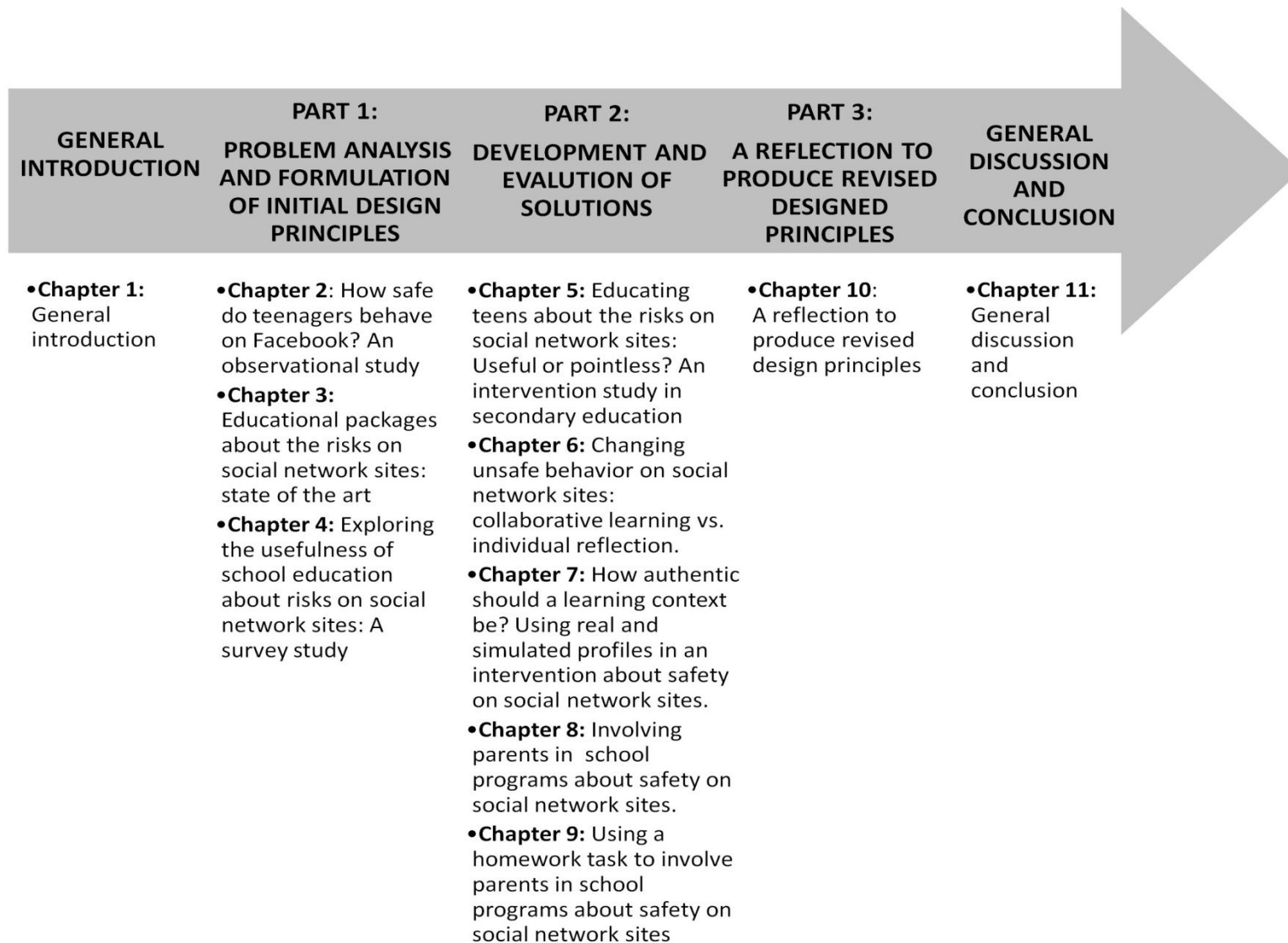
GENERAL INTRODUCTION

- **Chapter 1:** General introduction

PART 1:
PROBLEM ANALYSIS AND FORMULATION OF INITIAL DESIGN PRINCIPLES

- **Chapter 2**: How safe do teenagers behave on Facebook? An observational study
- **Chapter 3:** Educational packages about the risks on social network sites: state of the art
- **Chapter 4:** Exploring the usefulness of school education about risks on social network sites: A survey study

PART 2:
DEVELOPMENT AND EVALUTION OF SOLUTIONS

- **Chapter 5:** Educating teens about the risks on social network sites: Useful or pointless? An intervention study in secondary education
- **Chapter 6:** Changing unsafe behavior on social network sites: collaborative learning vs. individual reflection.
- **Chapter 7:** How authentic should a learning context be? Using real and simulated profiles in an intervention about safety on social network sites.
- **Chapter 8:** Involving parents in school programs about safety on social network sites.
- **Chapter 9:** Using a homework task to involve parents in school programs about safety on social network sites

PART 3:
A REFLECTION TO PRODUCE REVISED DESIGNED PRINCIPLES

- **Chapter 10**: A reflection to produce revised design principles

GENERAL DISCUSSION AND CONCLUSION

- **Chapter 11:** General discussion and conclusion

Figure 3. Schematic overview of the different chapters and their place in the design-based research process

Table 1. *Research objectives, the proposed research goals, research design, data collection and analysis techniques for the different studies.* RO = Research objective

Chapter	Research objective	Research goal	Research design and data collection	Analyzing techniques
1		General introduction (Research context, research objectives, research method, ethical considerations, the role of theory and overview of the dissertation)		
2	RO1	To map teenagers' behavior on SNSs. To explore the amount of risk teenagers actually face when using SNSs.	Observational study (n =1050)	ANOVA, binary logistic regression, χ^2-tests, ordinal regression (SPSS)
3	RO1	To map the existing educational packages about risks on SNSs. To map the needs of educational stakeholders.	Literature review, theoretical evaluation Focus group	
4	RO1	To map the existing role of school education with regard to risks on SNSs.	Survey study (n=638)	Regression analysis, bootstrap mediation analysis (SPSS)
5	RO2 R03	To evaluate the three initial interventions about the risks on SNSs.	Pretest-posttest survey design - 3 experimental conditions: course content risks (n = 520), course contact risks (n=730) and course commercial risks (n=489) - Control condition (n=682)	Multilevel analysis (MLwiN) χ^2-tests (SPSS)
6	RO2 RO3	To evaluate the revised educational materials with more time for individual reflection.	Pretest-posttest survey design - 2 experimental conditions: course collaborative learning (n = 342), course individual reflection (n=421) - Control condition (n=734)	Multilevel analysis (MLwiN) χ^2-tests (SPSS)
7	RO2 RO3	To evaluate the revised educational materials with a more authentic context.	Pretest-posttest survey design - Experimental condition (n=40) - Control condition (n=40)	ANCOVA (SPSS) χ^2-tests (SPSS)
8	RO2 RO3	To evaluate the revised materials extended with a parental information evening.	Pretest-posttest survey design Experimental condition (n=307)	Multivariate repeated measures analysis (SPSS)
9	RO2 RO3	To evaluate the revised materials extended with an integrated homework task to involve parents.	Pretest-posttest survey design - Experimental condition (n=117) - Control condition (n=90)	Multivariate repeated measures analyses (SPSS)
10	RO3	To formulate critical design principles to develop educational materials about the risks on SNSs.	Based on the results of intervention studies of Chapters 5 to 9.	
11		General discussion and conclusion (overview of main results, strengths, limitations and suggestions for future research, implications of the dissertation)		

Chapter 3, *Educational packages about the risks on social network sites: state of the art*, describes a theoretical evaluation of existing educational packages about safety on SNSs. In this study, five existing Flemish educational packages were investigated using two theoretical evaluation frameworks. The first framework was based on the possible risks teenagers might entail when using SNSs, as described in previous literature. The second framework described principles of effective evidence-based prevention campaigns (independent of the topic). Next to this theoretical evaluation, a focus group was organized to study how the packages are perceived by educational stakeholders and what these stakeholders consider important characteristics of good materials. This study revealed several gaps and challenges that can guide the development of new materials. This chapter has been published in the journal *Procedia - Social and Behavioral Sciences*.

Chapter 4, *Exploring the Usefulness of School Education about Risks on Social Network Sites: A Survey Study*, establishes the relationship between students' attitudes and behavior and school attention for the topic of safety on SNSs. In this chapter the link between the two first studies, the link between SNS behavior and the role of school education, is described. The following research questions were put forth: (1) Do teenagers care about privacy on SNSs in general, and are there any individual differences with regard to gender, age and education form? (2) Do teenagers show unsafe behavior on SNSs in general, and are there any individual differences with regard to gender, age and education form? and (3) Does raising awareness in school education have a positive impact on privacy care and/or the safety of teenagers' behavior on SNSs? This chapter has been published in *The Journal of Media Literacy Education.*

The second part of the dissertation describes the second and third phases of the design-based research. These phases include the development, revision and evaluation of educational materials. The research articles in this second part describe these different intervention studies. After developing the first version of materials, these materials were implemented in authentic, Flemish classroom settings in secondary education. The impact of the materials on the awareness, attitudes and behavior of the pupils involved during the intervention were measured. Based on the results, materials were refined and implemented again in other classrooms. In total, there were five iterations of development, evaluation and refinement. A pretest-posttest quasi-experimental setting was used in all evaluation studies, comparing an experimental condition (intervention with revised materials) with a control condition (intervention before revision) to indicate the added value of the revised materials. The methodology was mostly equal for the five different intervention studies except for some small changes in the surveys used. This is a typical characteristic of design-based research, where flexibility concerning the methods used is necessary to meet new needs and issues that are revealed during the process (Wang & Hannafin, 2005). Figure 4 shows the evolution of the educational materials across these different studies, revealing how the results of evaluation studies guided the revisions. The five iterations of development, implementation and evaluation are described in five sequential chapters in the second part of this dissertation: Chapters 5, 6, 7, 8, and 9.
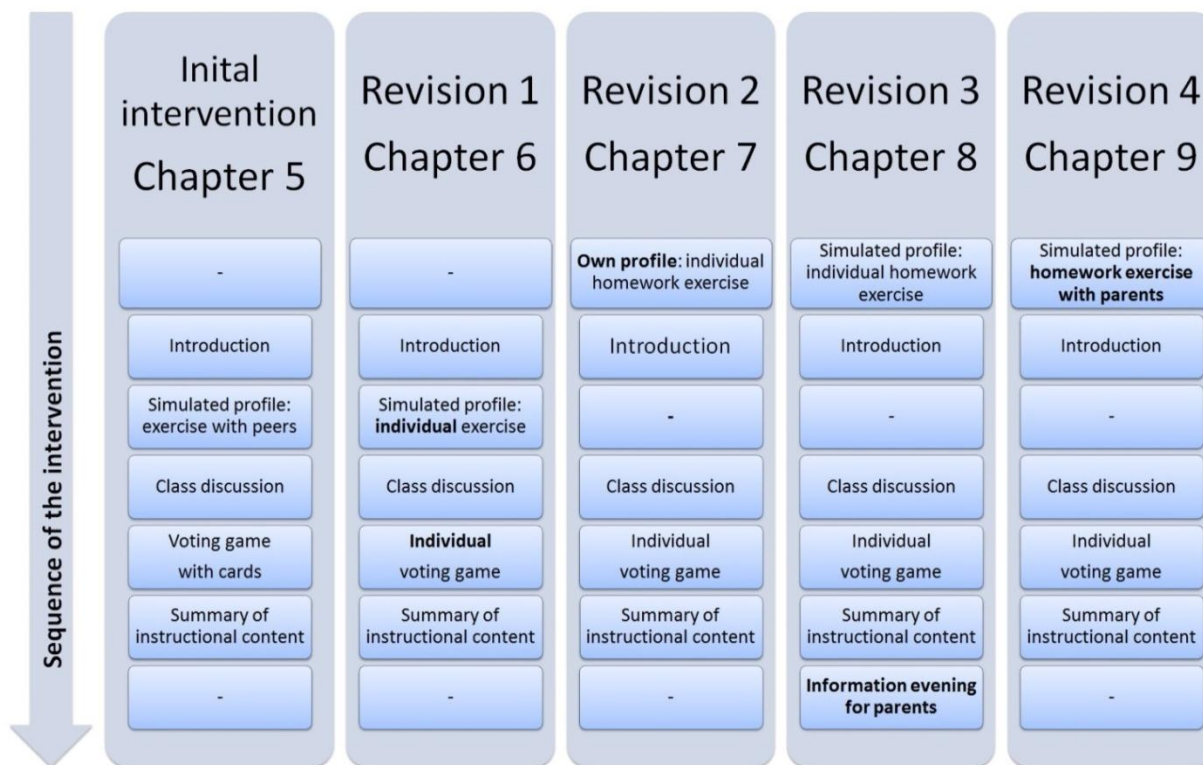
Figure 4. Schematic overview of the evolution of the educational intervention over five iterations. Evaluation studies of each intervention are described in five successive chapters. Items in bold refer to the specific changes in the intervention in this study.

In Chapter 5, *Educating Teens about the Risks on Social Network Sites: Useful or Pointless? An intervention study in Secondary Education,* initial educational materials were developed and evaluated. The research question that was tackled was: does a short term intervention about content, contact or commercial risks have an impact on the awareness, attitudes and/or behavior of teenagers with regard to these risks? To answer this research question, an intervention study involving 2421 students in secondary education between 11 and 19 years old revealed that behavioral changes are harder to obtain than an increase in risk awareness. This chapter has been accepted for publication in the journal *Comunicar* and is now in press.

Chapter 6, *Changing Unsafe Behavior on Social Network Sites: Collaborative Learning vs. Individual reflection*, describes the second intervention study. This intervention study evaluated the revised materials, adapted based on the study described in Chapter 5, the remarks of teachers and observers, and several theories. In this study, it was hypothesized that the adapted materials that gave the pupils more time for individual reflection and less time for collaborative learning would be more effective. To verify this hypothesis, the study tested whether there is a different impact of a course on contact risks using SNSs with an emphasis on individual reflection rather than an emphasis on collaborative learning, by implementing both courses in secondary classrooms involving 1497 pupils between 11 and 19 years old. Both a course with individual reflection and a course with collaborative learning have a positive impact on

awareness, but only a course that provides the opportunity for individual reflection had an impact on attitudes and behavior. Therefore, an intervention with time for individual reflection was proposed as a better solution. This chapter was accepted as a chapter of a book volume that will be published by *Springer*.

Again, the previously developed materials were adapted and evaluated in a third intervention study described in Chapter 7, *How authentic should a learning context be? Using real and simulated profiles in an intervention about safety on social network sites*. In this chapter, the importance of the authenticity of the context and scaffolding opportunities was verified in an intervention study involving 80 pupils between 13 and 19 years old. More concretely, the study tested whether increasing the authenticity of a context, thereby decreasing scaffolding opportunities, had an added value. The following research question was put forth: is it educationally more valuable to work with an existing, authentic context or to create a simulated context when teaching about safety on SNS? No added value was found when the materials were made 'more authentic;' on the contrary, the scaffolding questions about the simulated profile were found to be more effective in teaching the teenagers about the different categories of risks that were tackled. This chapter has been accepted for publication in the *International Journal of Cybersociety and Education*.

Chapter 8, *Involving parents in school programs about safety on social network sites,* describes the fourth intervention study designed after revision of the previous materials and involved 307 pupils between 11 and 14 years old. Quantitative and qualitative results provided an answer to the two research questions that were put forth: (1) Is an intervention involving parents effective to teach teenagers how to use SNSs safely? and (2) Is organizing an information evening an effective way to involve parents in school programs? Only a few parents showed up at the information evenings. Although parents that attended were enthusiastic and reported to have learned a lot, we concluded that organizing information evenings is not sufficient for involving all parents. This chapter has been published in the journal *Procedia - Social and Behavioral Sciences.*

Chapter 9, *Using a homework task to involve parents in school programs about safety on social network sites,* presents a study that tried to fill the gaps of the educational materials described in Chapter 8. Based on the results of this study, the materials were adapted again. Actively involving parents was attempted by making them participate in a homework task. This study tested whether actively involving parents is valuable with regard to increasing risk awareness and changing unsafe behavior. The materials were implemented in secondary school classes involving 207 pupils. Involving parents by using a homework task is especially beneficial for boys. This chapter was resubmitted for publication in *The Journal of Primary Prevention,* after a revision based on reviewers' comments*.*

In the third and last part of the dissertation, the final step of the design-based research is described: reflection for producing revised design principles. In Chapter 10, all research is summarized and the resulting design principles are proposed. This chapter is based on a

manuscript that has been resubmitted for publication in *Educational Technology Research and Development,* after a second revision based on reviewers' comments*.*

Finally, Chapter 11 provides the discussion and conclusion of the total research procedure and all studies conducted. In this chapter, we discuss the strengths and weaknesses of the presented research. Special attention is given to the role of interpretation in this design-based research, and the role of the researchers' norms and values pertaining to certain (ethical) decisions that need to be made. As a final point, practical implications are discussed.

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PART 1

Problem analysis and formulation of initial

design principles

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Problem analysis and formulation of initial design principles

In the first step of the design-based research process, the practical problem needs to be analyzed and a theoretical framework has to be articulated, including initial design principles to proceed to the next step (development). Therefore, this first part of the dissertation focuses on an extensive problem analysis. To analyze the practical problem three important resources can be consulted: previous literature, shared experiences of researchers and practitioners and one or more pilot studies (Reeves, 2006).

In the current design-based research, a literature study led the answers to the questions about the nature of the problem: do teenagers care about their privacy, are they behaving risky on social network sites (SNSs), are they aware of the existing risks on SNSs and what is the role of school education? The results of this literature study are described in the introductions of the following chapters, that is Chapter 2, 3 and 4.

Additionally, the literature study has been extended with three explorative studies, that are described consecutively in the following chapters. Chapter 2 describes an observational study of Facebook profiles that was conducted to establish what teenagers are doing on Facebook and whether they adopt risky behavior. Chapter 3 describes a theoretical evaluation of existing educational packages about safety on SNSs that showed the gaps and challenges to develop new materials. Additionally, in Chapter 3 the experiences of practitioners were taken into account by organizing a focus group with educational stakeholders (i.e., teachers, developers of educational materials, educational counselors). Finally, in Chapter 4, a survey study is described that showed the impact of school attention for the topic of safety on SNSs on students' attitudes and behavior.

To finalize the first step of the design based research, a framework with initial design principles was formulated based on previous literature and theories. This framework contains design principles derived from general prevention research (described in detail in chapter 3), and from instructional science research (described in detail in Chapter 5).

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2 | How safe do teenagers behave on Facebook? An observational study

This chapter is based on:

Chapter 2
How safe do teenagers behave on Facebook? An observational study

Abstract

The substantial use of social network sites (SNSs) by teenagers has raised concerns about privacy and security. Previous research about behavior on SNSs was mostly based on surveys and interviews. Observational research overcomes problems inherent to this research method, for example social desirability. However, existing observational research mostly focuses on public profiles of young adults. Therefore, the current observation-study includes 1050 public and non-public Facebook profiles of teenagers (13-18) to investigate (1) what kind of information teenagers post on their profile, (2) to what extent they protect this information using privacy-settings and (3) how much risky information they have on their profile. It was found that young people mostly post pictures, interests and some basic personal information on their profile. Some of them manage their privacy-settings as such that this information is reserved for friends' eyes only, but a lot of information is accessible on the friends-of-friends' pages. Although general risk scores are rather low, more detailed analyses show that teenagers nevertheless post a significant amount of risky information. Moreover, older teenagers and girls post more (risky) information while there are no differences in applying privacy settings. We found no differences in the Facebook behavior of teenagers enrolled in different education forms. Implications of these results are discussed.

Introduction

In the current cyber society, new participatory platforms for communication are rapidly evolving. Social network sites (SNSs) are an expression of these new communication technologies, also called online social networks. In about five years, Facebook evolved from a SNS reaching only one college community to the most popular SNS with millions of users all over the world (Hampton, Goulet, Rainie, & Purcell, 2011). This growth is exemplary for the increasing popularity of SNSs in general, with both young and older users. Research shows that in Europe 73% of the 13-14 year olds and 82% of the 15-16 year olds have a profile on a SNS (Livingstone, Haddon, Görzig, & Olafsson, 2011).

This increasing popularity raises some concerns about privacy and security, since SNSs are based on providing personal information to connect and communicate with others. Due to these raising concerns, research has been set up to study how young people behave on SNSs. However, the existing research is mainly based on surveys and interviews, which reflects many deficiencies, for example social desirability (Phillips & Clancy, 1972). Research based on alternative designs – such as observational research – remains rather scarce and mainly focuses on public profiles of young adults. To counter these shortcomings, an observational study of

public and non-public (i.e., visible by friends or friends-of-friends) Facebook profiles of young adolescents (13-18) was conducted, trying to map the way they behave on SNSs and whether this entails risks. Moreover, we tried to identify possible individual differences between users of different age, gender and education form.

Content of social network site profiles

In a survey based study, it was found that American teenagers put a variety of personal things on their profile; the most common things are their first name (82%) and pictures of themselves (79%) (Lenhart & Madden, 2007). Next, 29% post their last name, 66% include pictures of friends, 61% include their city or town and 29% include videos. Other researchers found comparable results with Belgian teenagers, except for the higher amount of posted videos (37%) and last names (46%) (Paulussen, Courtois, Mechant, & Verdegem, 2010). The latter is probably caused by the growing popularity of Facebook – currently the most popular SNS (Hampton et al., 2011) - in which the use of a last name is mandatory. These researchers also focused on a typical functionality of Facebook, namely liked links (which can be collected by pressing the I like-button), which 17% of the questioned teenagers incorporated in their profile (Paulussen et al., 2010). Posting comments on other users' walls and posting pictures has also been found to be very popular among teens (Lenhart, Purcell, Smith, & Zickuhr, 2010).

Only limited research focuses on differences in the content of profiles considering age, education or gender. Regarding these demographic variables, it was found that older teenagers (15-17 years old) tend to post more pictures and other personal information on their profile (Lenhart & Madden, 2007). Girls post more pictures, while boys give more contact information. These findings were confirmed in a survey research involving Flemish teenagers (Vandoninck, d' Haenens, Cock, & Donoso, 2012). Additionally, there are no differences related to users being enrolled in different education forms in sharing general descriptive information, but pupils enrolled in vocational education and technical education share more contact information than those enrolled in general education (Vandoninck et al., 2012).

Privacy settings

While young adults (18-19) put all kinds of content on their Facebook profile, most of them also reported to have changed their privacy settings to some extent (boyd & Hargittai, 2010). However, other researchers found that still 31% of their respondents - college undergraduates - did never change their privacy settings (Debatin, Lovejoy, Horn, & Hughes, 2009). Similar results were found in a survey study involving younger children (9-16), with 29% sustaining a public profile or not knowing about their privacy settings and 28% opting for partially private settings so that friends-of-friends could see their page (Livingstone et al., 2011). While friends-of-friends suggests a friendship-based relationship, these people are nevertheless mostly strangers. This is especially the case considering that 46% of the children being questioned, accepted people as friends they met on the Internet and did not know face-to-face (Livingstone et al., 2011).

Furthermore, it was found that while older teens tend to make more personal information available (Lenhart & Madden, 2007), they are not more likely to adopt more stringent privacy settings (Livingstone et al., 2011). Additionally, girls tend to change their privacy settings more than boys (Lewis, Kaufman, & Christakis, 2008; Livingstone et al., 2011).

Risky behavior on social network sites

When talking about risky behavior on a SNS profile, most authors focus on the disclosure of personal information, allowing the viewer of the profile to identify and contact the profile owner, and on the use of privacy settings (Livingstone et al., 2011; Nosko, Wood, & Molema, 2010; Taraszow, Aristodemou, Shitta, Laouris, & Arsoy, 2010). Indeed, a vast amount of studies find that teenagers post a lot of personal information on their profile and do not use privacy settings (see above). Unintended consequences of revealing these sorts of *risky information* include damaged reputation, gossip, stalking, identity-theft and the use of personal information by third parties like advertisers or by superiors like teachers (Debatin et al., 2009; Livingstone & Brake, 2010).

However, in addition to revealing personal information, revealing other types of information can be recognized as risky behavior as well, such as revealing information that could compromise teenagers' safety or that could lead to problematic outcomes (Christofides, Muise, & Desmarais, 2012; Patchin & Hinduja, 2010; Watson, Smith, & Driver, 2006). Examples of these sorts of information are cyberbullying related messages, or pictures that demonstrate alcohol and drug abuse (Walrave & Heirman, 2011). A survey study indicated that 20% of the adolescents with a SNS profile published profile items they would not want current or prospective employers to see (mostly alcohol-related pictures or comments, Peluchette & Karl, 2008). Moreover, 18% of publicly available MySpace profiles of adolescents showed evidence of alcohol use, 5% included pictures in swimsuit or underwear and 33% included swear words in their comments (Hinduja & Patchin, 2008). In a more recent survey, it was found that 17% of the participants posted pictures on their profile in which they can be seen drinking alcohol (Mcgivern & Noret, 2011).

Furthermore, as already stated, the likelihood of providing personal information increases with age (Lenhart & Madden, 2007) and boys tend to disclose more personal information than girls (Paulussen et al., 2010). Additionally, boys share significantly more self-promoting and risky pictures or comments (involving sex or alcohol), while girls were more likely to post romantic or cute pictures and information (Peluchette & Karl, 2008). Moreover, pupils enrolled in vocational and technical education might be more vulnerable, as they share more contact information (Vandoninck et al., 2012).

The behavior as revealed in the previous studies may reflect a threat, since the exposure of personal information on SNSs is indeed associated with negative online experiences (Mcgivern & Noret, 2011). As they only focused on personal information in general, we can assume the consequences to be even worse when publicly exposing risky information related to alcohol and drug abuse, pictures in underwear, signs of aggression, etc. Indeed, exposure/unintentional

disclosure of information or pictures is one of the four main reasons that adolescents report to have had bad experiences on Facebook (Christofides et al., 2012).

Surveys versus Observation

As stressed earlier, most available SNS research involving teenagers is based on self-report measures (Hew, 2011). Due to the nature of these studies, available information about SNS profiles, the nature of privacy settings, and the level of risk behavior might be biased resulting in a low reliability and validity. Indeed, pupils might have given wrong answers, either because of social desirability (Phillips & Clancy, 1972) or because they do not know the right answer. Researchers emphasize that teenagers' mental model of their privacy settings does not always match the actual settings (boyd & Hargittai, 2010).

Above research drawbacks can be overcome by observing and analyzing teenagers' SNS profiles, so that the information can be coded objectively. Moreover, an observational approach gives the possibility to gather more detailed information about the amount and the nature of the content found online. However, due to practical reasons, this kind of studies is rather scarce in available literature. Moreover, the few studies available building on a content analysis of observed profiles, mainly focused on particular information types, for example profile pictures (Hum et al., 2011; Watson et al., 2006) or on publicly available profiles (e.g., Hinduja & Patchin, 2008; Morgan, Snelson, & Elison-Bowers, 2010; Taraszow et al., 2010). Since Facebook incorporates the safety precaution that minors can only share their profile with friends-of-friends, teenagers' profile pages on Facebook are non-public by design (but not private, as it can be visible for friends-of-friends, i.e., possible strangers). Therefore, observational research about the behavior of adolescents on SNSs has mainly focused on undergraduate students, a rather accessible research population in academic contexts (Hew, 2011). As a result, it is difficult to come to decisive conclusions about currently applied privacy settings or the amount and nature of risky behavior of teenagers. Information of these younger users is however especially interesting considering the fact this behavior is shaped at an earlier age and in view of the development of appropriate education about SNSs.

For this reason, the current observational study extends the results found in previous observational research by focusing on Facebook-profiles of 13 to 18-year olds. The study aimed at answering the following research questions: (1) What kind of information do teenagers post on their Facebook-profile page? (2) Do teenagers manage privacy settings to secure this information? and (3) Does the available information entail particular risks? Additionally, for every research question individual differences based on age, gender and education form were explored.
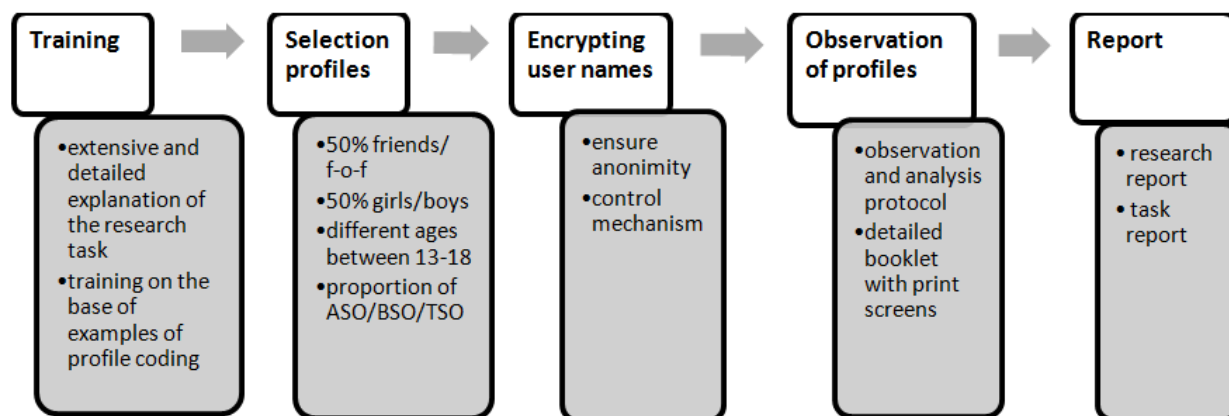
Figure 1. Sequential steps of the research procedure

Method

Procedure

The research procedure is depicted in Figure 1 and explained below. Next to the main researchers, a large group of research-assistants were involved in the study. These received an extensive training on how to code profiles using a detailed codebook. The different steps of the analysis procedure were explained extensively. The stringent protocol could also be found on a website, continuously accessible after the training. Moreover, a codebook with print screens of coded example profiles and clear instructions were handed over to all trained research-assistants.

Secondly, profile pages were selected. Since we wanted to extend previous research by collecting information about non-public profiles on Facebook, we needed a more complex sampling method. Pages of friends and friends-of-friends can only be seen by friends and friends-of-friends, and not by the main researchers. Our sampling method overcame this problem by involving 179 research-assistants as observers in this study. These research-assistants were randomly divided into groups of four. Every group carried out the observational analysis of 24 Facebook profile pages of Flemish teenagers. All groups picked 12 profiles of their friends and 12 profiles of friends-of-friends, following a stratified random sampling procedure with age, gender and education form as strata.

The selection procedure resulted in the analysis of 1050 Facebook profiles. The final sample reflected a proportional participation of gender (49% boys, 51% girls), age levels (30% 13-14, 35% 15-16, and 35% 17-18 years old) and education forms as found in the Flemish secondary school population (Table 1).

Table 1

Comparison of our sample and the Flemish population with regard to education form

	Sample	Flemish population[*]
General secondary education (ASO)	47%	41%
Technical secondary education (TSO)	31%	31%
Vocational secondary education (BSO)	19%	26%
Art education (KSO)	3%	2%

[*]Flemish Minestry of Education (2012)

After profile selection, user names were transformed using an encrypting tool made available on a specific research website. This guaranteed anonymity of profile owners and also prevented unintentional double inclusion of the same user profile.

After profile user encryption, the observational analysis took place on the base of a detailed codebook. All information on a user profile was coded by determining the type of information – pictures, videos, contact information -and the extent to which this information was available. Finally, all groups of researcher-assistants had to write a report. This report gave us insight in the quality of their performance, as it showed that all observations appeared to be rigorously executed.

Measures

All Facebook profile elements were coded (e.g., profile picture, name, count of friends, interests, textual wall posts, pictures, videos, or notes). This information was coded two times, first when being logged out of the SNS (focus on information accessible for everyone) and secondly after logging into the SNS. For each item, observers had to determine whether this information type could be found on the profile, and if so, to what extent. If possible, coding resulted in a continuous measure (e.g., how many pictures), otherwise in a categorical, but ordinal measure, giving the highest score when most information is given (e.g., profile picture: 4= recognizable picture of the user, 3= non-recognizable picture of the user (e.g., group picture, picture taken from far away,..), 2= a picture, but not of the user (e.g., a cartoon), 1= no picture).

Moreover, for particular information types, that is interests, pictures, videos and contact information, it was coded if and how much *risky information* was present, for example signs of alcohol abuse, hate messages, etc. (based on literature review, see above). The amount of risky information was coded following a 4-point scale for every single identified indicator of risk (1= no risk, 4 = a lot of risk). A mean score of all individual risk indicators was calculated for every separate information type to give an indication of the amount of risk in interests (13 indicators, e.g., signs of hate messages), pictures (14 indicators, e.g., signs of nudity), videos (14 indicators,

e.g., signs of alcohol use) and contact information (6 indicators, e.g. presence of e-mail address). A general mean score was calculated as well, to give an indication of the total amount of risky information displayed on a profile page.

Ethics Statement

The institutional review board, Ethical Committee Psychology and Educational Sciences, approved the research design and waived the need for written informed consent from the participants. Obtaining informed consents would have jeopardized the reliability of the study. Teenagers could have changed their Facebook-profile after being informed about the study before observations took place. However, for ethical reasons it was carefully guarded that the dataset stayed anonymous - by name encryption - and that no personal information was stored. Only the fact that particular information was visible on a profile – and not the information itself - was registered and coded. As such, this research is also aligned within the terms of use of Facebook, and no extra explicit demand for permission was necessary.

Results

The results are reported following the three research questions. ANOVA was used to study differences in continuously measured variables regarding age, education or gender. To find the effects of age on dichotomous measured variables, a binary logistic regression was used. To find out if education and gender were independent of dichotomous measured dependent variables, χ^2-tests were carried out. Ordinal regression was used to find the effect of age, education or gender on ordinal dependent variables with more than two categories. Concerning the latter, normality of the distribution was checked and subsequent analysis approaches were adopted (Chan, 2005). Only χ^2-statistics (model fit) are reported below. A significance level of $p < .05$ was put forward.

RQ 1: What kind of information do teenagers post on their Facebook-profile page?

To answer this question, only information on the friends-pages was taken into account, since it is possible that on friends-of-friends-pages not all information was visible because of privacy settings. Table 2 summarizes the information types dominantly present on Facebook profile pages.

Most profiles of friends contained at least personal information such as name, date of birth and gender. The presence of pictures and interests (especially 'I like'-interests) is proportionally high, while videos, textual wall-posts, games/applications and notes seem to be less popular aspects of Facebook.

Table 2
Types of information, percentages and average number on friends' Facebook profiles.

Type of information	Examples	Percentage	M count
Personal information	Correct family name	98%	
	Surname	98%	
	Correct date of birth	80%	
	Correct gender	90%	
Pictures	Self-posted	100%,	298
	In which they are tagged	91%	208
Interests	I like	95%	223
	Music	85%	21
	Movies	65%	4
	Television	76%	8
Videos	Self-posted	35%	
	In which they are tagged	50%	
Wall		47% < 10 posts	
Games/ applications		49%	
Notes		8%	

It was found that younger children play more games ($\chi^2(1)=72.07$, $p<.001$) than older ones. Additionally, they post more information about sports ($\beta=-.09$, $t(1045)=-2.90$, $p=.004$), athletes ($\beta=-.08$, $t(1045) = -2.67$, $p=.008$) and sports teams ($\beta=-.07$, $t(1045) = -2.09$, $p=.037$). Older teenagers on the other hand, post more pictures ($\beta=.17$, $t(1045) = 5.71$, $p<.001$), videos ($\chi^2(1)=11.64$, $p=.001$) and textual wall posts ($\chi^2(1)=6.31$, $p=.012$).

Regarding gender, it was found that girls post more pictures, are more tagged in pictures and tag more other persons in pictures than boys ($F(3,874)=31.28$, $p<.001$). Girls also post more videos ($\chi^2(1)=9.99$, $p=.002$) and are tagged in more videos ($\chi^2(1)=4.44$, $p=.035$). Moreover, they post more personal interests ($F(1,1044)=16.35$, $p<.001$), have more textual wall posts ($\chi^2(1)=13.14$, $p<.001$) and include more notes ($\chi^2(1)=4.31$, $p=.038$). However, boys play more games than girls ($\chi^2(1)=9.54$, $p=.002$) and more regularly share their mobile number ($\chi^2(1)=10.37$, $p=.001$) and website, ($\chi^2(1)=5.97$, $p=.015$). Concerning the education form in which teenagers are enrolled, no significant differences regarding profile content could be found.

RQ 2: Do teenagers manage privacy settings to secure information?

Privacy settings on Facebook are managed as such that for most information types, one chooses between visibility for friends, friends-of-friends, or everyone. There is also an additional option which makes it possible to differentiate between friends.

To determine information visibility for "everyone", the profile was analyzed being logged out of Facebook. Since Facebook protects minors by setting their privacy settings to the minimal

level of friends-of-friends, information of minors could not be seen. Therefore, we checked profiles of the 18-year olds in our sample (n=182). 63% of their profiles could be accessed without being logged in; e.g., by using Google or the Facebook search engine. In 90% of the cases, profiles revealed their real name and surname, which is actually mandatory on Facebook. Moreover, 70% showed a recognizable picture of themselves on their profile and 73% showed their interests. Other pictures and wall-posts appeared to be better protected and were only accessible in 4% of the cases.

To determine whether teenagers protect their information for friends-of-friends using their privacy settings, the proportion of information visible on friends' pages was compared with the proportion of information accessible on the friends-of-friends' pages. If in general, teens do not change their privacy settings to visibility for friends only, we expect to observe the same proportions of information on the friends' pages as on the friends-of-friends' pages. However, if a significant amount of teenagers changes their privacy settings to visibility for friends only, we expect to observe less information on the friends-of-friends pages. As shown in Table 3, there is no significant difference regarding name, surname or gender. Yet, there is a significant difference regarding pictures, interests, wall posts, videos, e-mail address, relationship status, and date of birth. The percentage of pages of friends-of-friends where this information could be observed was significantly lower compared to the pages of friends, indicating that a significant amount of teenagers set their privacy settings to 'friends-only' regarding these aspects. However, if we have a closer look at the actual percentages, we have to conclude that the amount of pages including pictures, interests and textual wall posts accessible for friends-of-friends, is still high (86%, 79% and 48% respectively). This means that although a significant amount of teenagers changes privacy settings to friends-only, another large amount of teens does not protect this information for friends-of-friends.

Table 3
Proportion of pages of friends and friends-of-friends that include different types of information. χ^2 tests the significance of the differences in proportions. Phi's coefficient is given as a measure of effect size.

	Friends	**F-of-F**	**χ^2(1)**	**ϕ**
Name	96%	97%	1.94	.04
Surname	90%	90%	.12	.01
Gender	90%	91%	.03	.01
Posted pictures	100%	86%	71.52***	.26
Interests	95%	79%	57.48***	.23
Date of birth	80%	64%	32.10***	.18
Wall	88%	48%	37.13***	.21
Relationship status	58%	38%	42.55***	.20
Posted videos	35%	16%	47.03***	.22
E-mail address	85%	5%	681.85***	.81
Religion	10%	6%	5.48*	.07

*** = p<.001, * = p<.05,

A comparable pattern could be found regarding age levels and gender. However, relationship status and date of birth are not protected by younger teenagers, aged 13 to 14 (χ^2(1)=0.94, p=.332 and χ^2(1)=0.01, p=.920 respectively), while this information is protected by older teenagers of 15 to 18 years old (χ^2(1)=48.84, p<.001 and χ^2(1) = 47.63, p<.001 respectively). No clear effects of education form could be found, implicating that teenagers enrolled in art, vocational, technical and general education use their privacy settings equally.

RQ 3: Does available information entail particular risks?

The average amount of risky information found on Facebook profiles, as measured by calculating a mean score building on individual risk indicators, was 1.55 (SD 0.36), on a 4–point scale. The mean amount of risk in interests was 1.43(SD 0.49), in pictures 1.97 (SD 0.60), in videos 1.31 (SD 0.42) and in contact information 1.34 (SD 0.43). These scores are rather low. However, some risk indicators might be less regular than others, causing the mean score to decrease. A more detailed interpretation of this rather low but non-negligible amount of risky information was therefore derived by calculating percentages of the presence of different risk indicators. The percentages of the most notable risk indicators are summarized in Table 4. The amount of risk represented in pictures and videos is not very high. Moreover, in line with our findings in the previous section, we find that significantly less teenagers show risky pictures to friends-of-friends than to friends (see Table 4 for χ^2-statistics). However, still 23% are tagged in pictures of themselves partying, 13% in pictures in which they use alcohol and 16% in pictures of themselves in swim-or underwear, while these pictures can be seen by friends-of-friends. Moreover, privacy settings seem to be less used for videos and interests (as can be seen by the χ^2-statistics and effect sizes in Table 4). Nevertheless, the percentages of risky information displayed in their interests are rather high. A lot of teenagers press the 'I like'-button in relation to topics about partying, alcohol, bad attitudes toward superiors or school and hate messages. The amount of commercial aspects reflected in their interests also shows the implicit commercial risks they are facing.

The analysis of the nature and amount of private contact information shows that this information is rather scarce. While some information is available for friends – e-mail (85%), instant messenger (23%) - this information is mostly protected from friends-of-friends (e-mail (5%) and instant messenger (1%)). Only the city where they live is not well protected, and can also be found on 43% of the friends-of-friends pages.

An ANCOVA was conducted with gender and education as fixed factors, age as a covariate and the amount of risk as a dependent variable. A significant relationship with age (F(1,934)=72.81, p<.001), and a significant gender difference (F(1,934)=7.33, p=.007) were found, but there were no differences concerning education form (F(3,934)=1.71, p=.163). Older teenagers and girls post more risky information on their profile, but there was no significant interaction between age and gender (F(1,933)=0.24, p=.630). Additional ANCOVA's based on the amount of different types of risky information, with age as a covariate and gender as a predictor, show us that older teenagers post more risky pictures, videos, interests and contact information. Girls post more

Table 4

Percentages of risk behavior on Facebook profiles (F=friends, FOF=friends of friends) χ^2 tests the significance of the differences in proportions. Phi's coefficient is given as a measure of effect size

Risky information	Posted pictures				Tagged pictures				Videos				Interests			
	F	FOF	$\chi^2(1)$	ϕ	F	FOF	$\chi^2(1)$	ϕ	F	FOF	$\chi^2(1)$	ϕ	F	FOF	$\chi^2(1)$	ϕ
Partying	28%	15%	26.54***	.16	55%	23%	114.66***	.33	7%	5%	2.54	.05	47%	35%	15.85***	.12
Alcohol	13%	6%	15.21***	.12	34%	13%	62.22***	.24	3%	2%	1.74	.04	37%	26%	14.85***	.12
Nudity	18%	9%	19.63***	.14	41%	16%	78.83***	.27	2%	1%	2.68	.05				
Bad attitudes directed to school													54%	37%	31.65***	.17
Bad attitude directed to superior													40%	27%	19.82***	.14
Hate messages													37%	31%	4.37*	.07
Commercial messages													41%	35%	5.32*	.07

*** = p<.001, * = p<.05

Table 5

Age and gender differences in the amount of risks as related to types of information on their Facebook profile page. Cohen's f indicates the effect size (Cohen, 1988)

Risks in	Age			Gender			
	B	F(1,1033)	Cohen's f	Boys M(SD)	Girls M(SD)	F(1,1033)	Cohen's f
Pictures	1.33	121.66***	.34	21.14(6.57)	22.10(6.96)	9.00**	.10
Video	.99	42.53***	.20	6.82(7.94)	8.22(8.54)	9.80**	.10
Interests	.33	6.09*	.10	17.89 (6.82)	18.70 (7.35)	3.88*	.00
Contact information	.04	6.32*	.10	6.72(.94)	6.66(.78)	1.26	.00

* = p<.05, **= p<.01, *** = p<.001

risky pictures, videos and interests than boys, but no significant gender difference is observed in the amount of contact information (Table 5). Moreover, no significant interaction effects could be found. Effect sizes show that all effects found are small to moderate (Cohen, 1988).

Discussion

This study extends the results found in previous exploratory research by observing both the public and non-public (i.e., only visible for friends or friends-of-friends) Facebook-profiles of teenagers, a target group which was unrepresented in previous observational research. The objective was to map (1) the nature of information that teenagers post online, (2) their use of privacy settings and (3) the amount of risk that is related to SNS usage by teenagers, by building on the strengths of an observational research design.

As an answer to the first research question, we observed that teenagers post a variety of information types on their SNS profile, that is mostly pictures, interests and some basic personal information. This can be interpreted in the context of constructing an online identity (Madden & Smith, 2010; Zhao, Grasmuck, & Martin, 2008). This seems to be especially the case for older girls, who seem to post more pictures, interests, wall-posts, etc. Pictures and interests indeed help in building and revealing one's identity (Hum et al., 2011). Although this process has always existed, SNSs give the personal and social identity construction a new dimension. The profile pages used to build an identity are often available for more people than just the peers they were built for, thereby complicating the process of privacy protection.

However, privacy can be protected by managing privacy settings in a conscious way. Yet, as an answer to our second research question we found that although a significant amount of teenagers change privacy settings to 'friends-only', another large amount of teenagers still reveals a lot of information to friends-of-friends. If we take into account the average number of friends (M=384), friends-of-friends might imply *a lot of strangers*. Still, another way to protect privacy is by selecting the content of a SNS profile page carefully. As an answer to our third research question we observed that teenagers did not post a large amount of contact information on their profile page. This might be the result of the ongoing safety messages that society, peers, parents and teachers give to teenagers: do not make your address or phone number available online! It has been found that - in the European context - parents restrict their children in giving personal information to others, such as contact information (but not pictures, videos,..), and that girls between 13 and 16 years old are more restricted than boys of this age (Livingstone et al., 2011). This can explain why - unlike other risky information - no gender differences were found in the amount of contact information teenagers make available online. However, particular information seems to "slip" teenagers' attention. For example, it was found that the place (town, village) where teenagers lived was visible for friends-of-friends in almost half of the cases. This information can, combined with the name and surname, be sufficient to track detailed contact information. Moreover, we observed that a lot of - potentially risky - information was present on profile pages, such as items referring to alcohol abuse, partying, or

nudity. In line with Lenhart & Madden (2007), it was also found that older teenagers post more information, and more risky information on their profile page. The last suggests that teenagers care about posting information, but forget to erase information. Moreover, the fact that the management of privacy settings remains restricted - a replication of previous findings (Livingstone et al., 2011)- might indicate that teenagers' awareness of privacy risks has not increased over age, and/or that they lack adequate technical skills to manage profile pages in a safer way.

Observational research versus Survey based research

To answer the three research questions about SNS use of teenagers and their management of privacy settings, an observational research design was used to overcome possible disadvantages of research methods based on self-report. It is therefore interesting to study to what extent the present results differ from previous survey based research. Building on a quantitative self-report study, it was found that 46% showed their name, 86% their surname, 65% posted pictures and 17% had 'I likes' on their SNS profile (Paulussen et al., 2010). In the present observational study, higher proportions were found (96%, 98%, 100% and 95% respectively). Moreover, compared to the results previously found in a survey based research (Peluchette & Karl, 2008), our results did not confirm the finding that boys share more self-promoting and risky pictures and girls post more romantic or cute pictures. In the present study, we found the opposite: girls tend to post more risky pictures. These divergent findings can possibly be explained by socially desirable answers on surveys by girls, who might not want to admit that they have risky pictures on their profile. It has been found in previous research that girls might be more susceptible to social desirability (e.g., Chung & Monroe, 2003). Moreover, we did not find any differences between pupils enrolled in different education forms, while differences in sharing contact information have been found in survey based research (Vandoninck et al., 2012). Again, social desirable answers in the survey research can explain these contradicting findings. The desirability of sharing contact information might be context-related, causing divergent social desirability bias on surveys between pupils enrolled in different education forms. Further research is necessary to entangle the exact reasons for the observed differences in research findings, but they already exemplify the potential disadvantages of self-report based measures.

Focusing on the management of privacy settings, the newly acquired information is more detailed as compared to what can be obtained via surveys. For every information item on the profile page, it could be determined if this was accessible for everyone, friends-of-friends or friends only. This analysis approach is even more detailed as compared to previous observational studies (e.g.,Hinduja & Patchin, 2008; Nosko et al., 2010), which only focused on public profiles. Our results show for example that a large set of information is still visible on friends-of-friends pages. Our more detailed observational approach might also explain why we did not find gender differences in privacy settings, contradicting previous research (Livingstone et al., 2011).

Possibly also because of our focus on non-public profile pages (including pages that could only be seen by friends or friends-of-friends), we could identify higher percentages in risky information as compared to previous research (Patchin & Hinduja, 2010), like signs of alcohol abuse. We found that 34% of the friends' profiles had pictures in which they were tagged using alcohol, while also 13% of the friends-of-friends' profiles contained pictures in which they were tagged using alcohol. This is in sharp contrast with previous studies (Patchin & Hinduja, 2010) that only found signs of alcohol use in 2% of their observed –public- profile pages. This indicates that our observational methodology might result in more detailed and possibly more discomforting information.

Limitations

Yet, the results of the present study also have to be considered in the light of some limitations. First of all, the comparison between results of survey studies and this observational study should be interpreted cautiously, since no direct statistical comparisons could be made. Ideally, a follow-up study should compare the results of observation and the results of surveys from the same teenagers. In the current study, this was not possible since the owners of the observed Facebook profiles were completely anonymous, for ethical reasons.

Second, in this study we only observed Facebook profile pages. Although this is currently the most used SNS, different results might be found when focusing on different SNSs. This implies that change in the design of a SNS might cause changes in related behavior we are currently not aware of. The rapidly changing context of SNSs and the corresponding adjustments of the SNS architecture also entail changes in the nature of the risks that teenagers face (Stutzman, Gross, & Acquisti, 2013). Although we tried to be as exhaustive as possible with regard to the coding of risky behavior, examples of risky behaviors that were not included in the current research, but might increase in importance in the future, are the disclosure of medical information (that might be sold to insurance companies) and the use of the Facebook function to reveal one's location (that might invite burglars). Generally, it is hard to predict what the role of SNSs will be in the lives of teenagers in five to ten years, or what SNSs would look like in the future, if they still exist. Therefore, the results of the current research are temporary and will need follow-up studies in the future.

Third, we only observed profile pages of Flemish teenagers. Though our results help to map user profiles of Flemish teenagers, replication studies are needed to validate our findings in broader cultural contexts. Indeed, previous research shows that there might be important cultural differences in people's behavior on Facebook (Vasalou, Joinson, & Courvoisier, 2010). Especially with regard to disclosure, culture and religious background might have an important impact, not only on behavior but also on the amount of risk associated with the behavior. For example, drinking alcohol and showing nudity in pictures can have a different moral impact in Western countries compared to Arabic regions (e.g., Hajinejad, 2013). Therefore, similar studies in countries with a different cultural background are invaluable.

Fourth, a limitation of this observational research is that it does not lead to explanations for the observed facts. For example, we found that older teenagers have more (risky) information on their profile, but there is no way to know why this result was observed. Since time registered on the SNS was not taken into account, this result could mean both that older teenagers are posting more information, but also that it was accumulation of information gathered over time. Future research should focus more deeply on the nature of the relationships that were established in this research.

Finally, although we tried to optimize the randomization of profile page selection, bias could have entered in the selection procedure. However, since we used a stratified random sampling procedure, controlling for age, gender and education form, we remain confident that our sample is representative for Flemish teenagers. Moreover, by involving 179 independent research-assistants we mirror closely a randomized sampling procedure. This way, we could go beyond the limitations of a focus on public profiles only, resulting in an innovative contribution to the literature by presenting information and conclusions about minors, an important and vulnerable group of users of SNSs thus far hardly studied in the literature.

Implications

Since we found that teenagers still post a lot of personal and risky information on their profile page and they hardly manage their privacy settings, we can conclude that awareness-raising interventions and/or regulatory policies remain necessary. Since in our study no differences were found regarding the education form teenagers were enrolled in, generic interventions should be set up involving teenagers enrolled in all types of education forms. However, the focus of the interventions should be different for different age-groups: 13 to 14 year olds seem to be more vulnerable to commercial risks and privacy risks resulting from third companies (by playing games), while 15-16 year olds are more concerned about building their personal/social identity, and should be alerted to the risks related to the content they post online.

While researchers, parents and policy makers emphasize the role of school education about safety on SNSs (Marwick, Murgia-Diaz, & Palfrey, 2010; Patchin & Hinduja, 2010; Safer Internet Programme, 2009), research about the impact of interventions in scarce. Moreover, it was found that even a brief e-mail intervention can already redirect online behavior (Moreno et al., 2009). However, further research about successful educational approaches within schools remains necessary.

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3 Educational packages about the risks on social network sites: state of the art

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Chapter 3

Educational packages about the risks on social network sites: state of the art

Abstract

Teenagers face different risks when using social network sites (SNSs). Therefore, a variety of educational packages have been developed to teach children about these risks at school. However, there is no evaluation available of these packages. In this study five existing Flemish educational packages about the risks on SNSs are investigated using two theoretical evaluation frameworks based on the risks described in previous literature and principles of effective evidence-based prevention campaigns. Furthermore, a focus group has been organized, to study how the packages are received by educational stakeholders and what these stakeholders consider as important characteristics of good materials. Future challenges are revealed, both for developers and researchers.

Introduction

Children and adolescents are one of the main user groups of social network sites (SNSs). For instance, in July 2012 33% of the Facebook users in the US, 35% of their users in Australia, 47% of their users in Brazil and 38% of their users in Belgium were under 24 years old (checkfacebook.com). Moreover, recent studies show that in Flanders 87% of the Flemish teenagers have a profile on a SNS (Paulussen, Courtois, Mechant, & Verdegem, 2010). Since SNSs are based on sharing personal information, privacy- and security issues are inherent in using SNSs. How can we protect young people from the risks they are facing when using SNSs?

Education has been put forward as a solution by many authors working on the topic (e.g., Marwick, Murgia-Diaz, & Palfrey, 2010; Patchin & Hinduja, 2010). A variety of educational packages has been developed in Europe (for an extensive overview, see Insafe, 2014), but an extensive search in different academic databases showed that there are no reports of any evaluation. Therefore, as a first step to counter this shortcoming, a selection of Flemish packages aimed at the use in a school setting is evaluated theoretically in this state of the art.

The following research questions were put forth: (1) Do available educational packages tackle all the risks on SNSs, (2) are these packages meeting the conditions of effective prevention campaigns?, (3) how are they perceived by educational stakeholders?, (4) which criteria are considered important by educational stakeholders? and (5) how should an educational package be implemented in the classroom? To answer these research questions, two studies have been conducted. The first study adapts two theoretical evaluation frameworks, one about the risks on SNSs and one about the conditions of effective prevention campaigns, to evaluate the content and program characteristics of the selected materials (RQ1 and RQ2). In the second study, a

focus group was organized with educational stakeholders, to investigate the reception of the packages and the characteristics these stakeholders consider important in educational materials (RQ3, RQ4 and RQ5).

Study 1: A theoretical evaluation of existing educational packages

Method

First, two theoretical evaluation frameworks have been selected based on an extended literature study. Second, all Flemish packages about the safe use of SNSs that were developed to use in a school setting (e.g., no websites, parental guides,..), and that were available to the researchers at the time of the study, were selected to be evaluated. Finally, the first two research questions were answered, by analyzing all the materials and screening them systematically for the elements that are important following the evaluation framework.

Evaluation Framework

To counter the lack of evaluation, two evaluation frameworks were used to conduct a theoretical evaluation. The first framework was used to evaluate the content of the packages, and describes the different risks that teenagers might face when using SNSs. The second framework was used to evaluate the format of the prevention program, and describes general principles of effective prevention campaigns.

An evaluation framework describing the risks on SNSs

To answer the first research question, the exhaustive overview of Internet risks made by De Moor and colleagues (2008) is used to find out which risks the packages tackle (see Figure 1). This overview is made based on a literature study and interviews with teenagers, parents and teachers (Walrave, Lenaerts, & De Moor, 2009).

Although this overview is made for Internet use in general, it can be fully applied on the use of SNSs as well. There are three different categories of risks. The first one describes the content risks. This includes encountering provocative or wrong content on SNSs. Hate-messages are a typical example of provocative content teenagers might come across. The wrong information that might appear on SNSs can be intentionally, such as gossip posted by other users, or unintentionally. The latter can happen when someone posts a joke that can be misunderstood as real information (e.g., satirical journals like The Onion). The second category of risks includes contact risks. Next to instant messaging, SNSs are the most popular media used for cyberbullying (Livingstone, Haddon, Görzig, & Olafsson, 2011). Additionally, they can also be used for sexual solicitation, by sending sexual messages (Livingstone et al., 2011). The possibility to obtain contact information by surfing on SNSs, also increases the risk of offline contact risks. Moreover, users in general and teenagers in particular face privacy risks, since they post a lot of personal

and sometimes risky information online (Livingstone et al., 2011). Additionally, 29% of the teens sustain a public profile or do not know about their privacy settings and 28% opt for partially private settings so that friends-of-friends can see their page (Livingstone et al., 2011). While friends-of-friends may sound reasonably familiar, these people are nevertheless mostly strangers. The third category of risks contains the commercial risks. These include the commercial misuse of personal data. Information can be shared with third companies via applications, and user behavior can be tracked in order to provide targeted advertisements and social advertisement (Debatin, Lovejoy, Horn, & Hughes, 2009). In the evaluation of the existing educational packages, it is investigated which of these risks are being tackled.
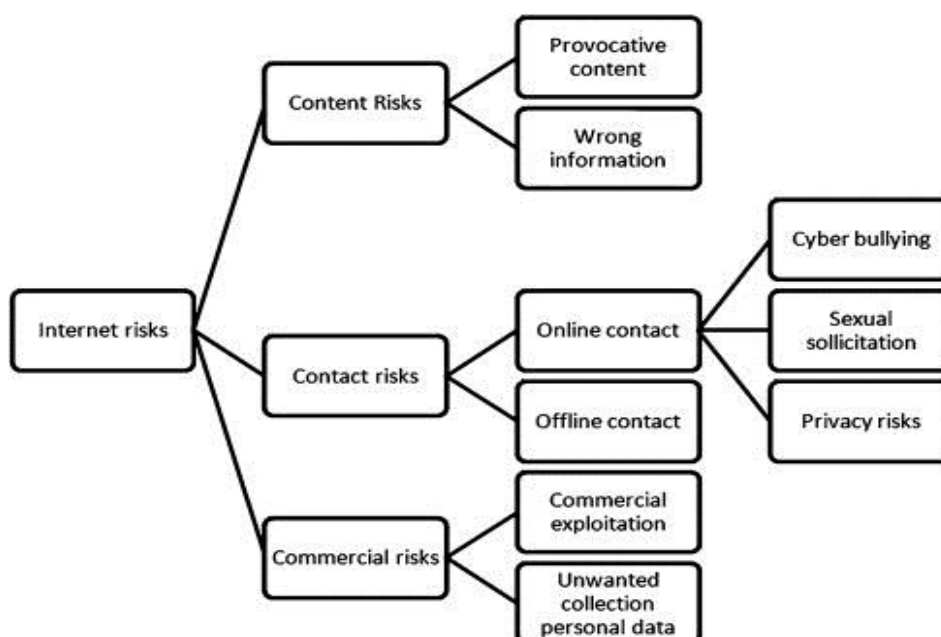

Figure 1. Risks teenagers face when using SNSs (De Moor et al., 2008).

An evaluation framework describing principles of effective prevention campaigns

To answer the second research question, a theoretical evaluation framework described by Nation and colleagues (2003) was used. These authors used a review-of-reviews approach to identify general principles of effective prevention campaigns that transcend specific content areas, this is characteristics of campaigns that show to be beneficial in helping youth to avoid numerous problems. Based on 35 reviews of studies of prevention campaigns in four different topics (substance abuse, risky sexual behavior, school failure and juvenile delinquency and violence) they defined nine principles, divided over three categories:

Principles related to program characteristics

To be effective, prevention programs need to:

(1) be comprehensive. Therefore, multiple interventions, in different settings (combined parent, peer and school interventions) support positive outcomes.

(2) integrate varied teaching methods. These need to have an active, skills-based component. The methods should not rely too much on knowledge transfer, information, or group discussions.

(3) be sufficiently dosed. The intervention needs to be intense, measured as the quantity and quality of the contact hours. A follow-up or booster session might be necessary to assure long term effects.

(4) be theory driven. It should be based on etiological theories (focus on the cause of the problem) and intervention theories (focus on the best method to decrease risks).

(5) encourage positive relationships. Peer influences and the impact of significant others (e.g., teachers, community members) need to be taken into account. There should be special attention for the relationship between the parents and the child.

Principles related to matching the program with the target population

To be effective, prevention programs need to be:

(6) appropriately timed. By trying to have an optimal impact, interventions should be implemented early enough (before the onset of unwanted behavior), but not too early (so that positive effects are not washed out before onset). They should be adapted to the intellectual, cognitive and social development of the participants.

(7) socio-culturally relevant. They need to take into account the community norms, cultural beliefs and practices. The program must also address the needs of the target group.

Principles related to implementation and evaluation of prevention programs

To be effective, prevention programs need to have:

(8) an outcome evaluation. The effectiveness of the program needs to be verified.

(9) well-trained staff. Staff must be sensitive and competent. They must get sufficient training, support and supervision.

Most of these principles were already (independently) described by Luna and Finkelhor (1998), relying on different studies with even broader topics. This confirms that these are consistent characteristics of effective prevention programs that go beyond content. We might therefore conclude that these characteristics need to be part of any prevention program that tries to educate teenagers about privacy and security issues in SNSs. In the following evaluation of existing educational materials, it is investigated whether these conditions are met.

Selected Educational Materials

A first package that was selected was *Play and learn: being online.* It was developed by European Schoolnet, as part of the Insafe project. It is aimed at children in primary school, aged four to eight years. The package exists in 13 different languages. It is a small workbook, with age-appropriate pictures containing different exercises for children, regarding different aspects

of being online (not only SNSs). A guide for teachers and parents is available as well. The package aims to make privacy and modern technology discussable between parents/teachers and children.

A second package, *Kids in Cyberland*, was developed by Sensoa vzw and Clicksafe-Childfocus, with support of the Flemish government and the European Union. It is aimed at Flemish children in primary school aged 10 to 12 years. It is a text-based package, containing images of two children, who are appearing in different exercises. It contains a didactical marker, guidance for teachers, instructional materials (games, postulations, crosswords, online quiz, examples, etc.), background information and a wordlist. There are different teaching methods described for different aspects of Internet safety in three main themes: "Who am I on the Internet" (SNSs), "Me and the other on Internet" (mostly chat) and "Surfing on the Internet". This package aims to start up conversations about experiences and risks on the Internet between children and adults. There is a focus on sexuality in different parts of the package, since relationships and sexuality are the main concern of the developers (Sensoa vzw).

The third package, *Finding myself in the 21st century*, has been developed by the Flemish government, campus De Nayer and KHLeuven. It is aimed at Flemish teenagers in secondary education. The package contains attractive posters, a didactical marker and learning materials (on paper and on computer). It consists out of three different packages: 'Faceflap', in which pupils make an offline paper profile, 'Ooo my photo' in which pupils adapt pictures of peers, and 'I am with many', based on a digital tool. These three packages aim different age groups: "Faceflap": 11 to 16 years, "Ooo my photo": 11 to 14 years and "I am with many": 15 to 18 years.

Think before you post was the fourth selected package, developed by Childfocus-Clicksafe, as part of Safer Internet Day 2010. It contains a detailed didactical marker, instructional materials (workbook with examples, exercises, pictures, schemas, etc.) and a little bit of background information. The package covers three main themes: 1) "anonymity, personal, private, public" 2) "online identities" and 3) "it can go wrong" (risks), which are all tackling different aspects of online safety (broader than SNSs). The target population is not specified, but generally described as "children and adolescents".

The final package that was selected, *Connected*, was developed by Sensoa vzw and Clicksafe-Childfocus with support of the Flemish government and the European Union. It contains a didactical marker, guidance for teachers, instructional materials (games, postulations, crosswords, online quiz, examples,..), background information and a wordlist. The materials are text-based and contain no images. It seems to be an extension of Kids in Cyberland, focusing on different aspects of safe Internet use. There is again a clear focus on sexuality in different parts of the package. There are a lot of themes, but there is no clear structure. The package is aimed at Flemish teenagers in secondary school (age not specified).

Results

In what follows, the two theoretical frameworks described above are used to evaluate these five Flemish educational packages. By conducting this evaluation, the two first research questions that were put forth are answered.

RQ1: Are educational packages tackling all the risks of SNSs?

A summary of the content evaluation based on the risks described by De Moor and colleagues (2008) can be found in Table 1. As can be seen, all packages tackle wrong information (most often adapted pictures and a focus on teaching skills to find reliable information), cyberbullying and privacy risks. The last one covers a broad range of privacy risks, focusing on different aspects such as the difference between public and private, passwords, what kind of information or pictures can be put on a profile, who to add as friends, online identities and the absence of contexts on SNSs.

As can be seen in Table 1, it is striking that only one package tackles commercial risks. Provocative content, sexual solicitation and offline risks are also not tackled in all packages. As a conclusion to our first research question, we can therefore state that only one of all packages tackled all the risks, two of the packages are doing well with six of the seven risks tackled, but two packages only tackle three of the seven risks described in the theoretical framework of De Moor and colleagues (2008). Moreover, it must be noted that most packages focus on the Internet in general, and not only on SNSs, thereby sometimes overlooking some characteristics that are typical for SNSs, such as hate groups and the use of privacy-settings.

Table 1

Presence of the risks that are tackled, following De Moor and colleagues (2008) for all the selected educational packages

			Play and learn: being online	Kids in cyberland	Finding myself in the 21st Century	Think before you post	Connected	How many packages tackle this risk? (max=5)
Content risks		Provocative content	-	+	-	+	+	3
		Wrong information	+	+	+	+	+	5
Contact risks	Online	Cyberbullying	+	+	+	+	+	5
		Sexual solicitation	-	+	-	+	+	3
		Privacy risks	+	+	+	+	+	5
	Offline		-	+	-	+	+	3
Commercial risks			-	-	-	+	-	1
	How many risks are tackled? (max=7)		3	6	3	7	6	

Table 2

Presence of the characteristics of good prevention programs, as described by Nation et al. (2003) for all the selected educational packages, '+'= yes, '-' = no, '+/-' = room for improvement, '?' = not observed

		Play and learn: being online	Kids in cyberland	Finding myself in the 21st Century	Think before you post	Connected	How many packages meet this condition? (max=5)
Program characteristics	Comprehensive	+	+	+/-	+/-	+/-	2
	Varied teaching methods	+	+	+	+	+	5
	Sufficient dosage	+	+	+	+	+	5
	Theory Driven	?	+/-	+/-	+/-	+/-	0
Matching target population	Positive relationships	+	+	-	+	-	3
	Appropriately timed	+	+	+	+/-	?	3
	Socio-culturally relevant	+/-	+	+/-	+/-	+/-	1
Implementation and evaluation	Outcome evaluation	+/-	?	+/-	?	?	0
	Well-trained staff	+/-	+	+	+/-	+/-	2
	How many conditions are met? (max=9)	6.5	7.5	6	5.5	4	

RQ2: Do available educational packages about the risks on SNSs meet the conditions of effective prevention campaigns?

A summary of the results of the evaluation of the format and design characteristics of the selected educational packages can be found in Table 2. All conditions that were clearly met got a '+', all conditions that were not met a '-'. When the condition was somehow met, but there is still room for improvement, the characteristic is marked with '+/-'. When there was no way to observe the given characteristic, a '?' is put in Table 2.

As can be seen, all packages use varied teaching methods and are sufficiently dosed. Most of the packages are also comprehensive (at least to some extent), appropriately timed (when ages of the target group are indicated), and provide training or information for teachers to ascertain a well-trained staff. Some packages had special attention for positive relationships, for example by encouraging children to have conversations with their parents using homework tasks, or by integrating peer exercises. Only one package showed to have attention for socio-culturally relevant examples (such as a Belgian SNS, i.e, Netlog). The other packages did not show irrelevant characteristics with regard to the socio-cultural context, but there were no indications that there was given attention to this aspect during development.

By inspecting the overall score of every package on this evaluation in Table 2, it can be stated that the majority of the packages meet most of the conditions of effective prevention campaigns described by Nation and colleagues (2003). It is however striking that no packages are clearly theory-driven. Some packages have some references in the teacher manual or in the reports about the materials (e.g., Cannaerts 2011), which might indicate that they are based on etiological theories about risks on SNSs, but none of them seemed to have taken prevention theories into account. Moreover, none of the packages had a clear outcome evaluation. While there were indications of limited evaluations of some of the packages (e.g., general questions on a website), communication with all the developers pointed out that the lack of outcome evaluation was mostly due to a lack of funding and expertise.

Study 2: Focus group

In addition to the theoretical evaluation described above, a focus group was organized with seven educational stakeholders. Teachers from secondary education, someone from schools advisory service and a developer of educational materials were gathered to discuss some topics with regard to the criteria that educational packages about SNSs should meet, to maximize the chance of dissemination and effectiveness. The goal of the focus group was to gain qualitative information to obtain an answer to the following research questions: 3) How do teachers feel about the existing educational packages, 4) What criteria of educational packages are experienced as important? and 5) How should an educational package be implemented?

Method

To answer the third research question, the existing educational packages described above were given to the attendants of the focus group. They were given some time to go through all the packages and to fill in a short questionnaire about the usefulness (amount of detail, extra work for teachers,..) and the attractiveness of the packages, since teachers report that these characteristics are important for effective dissemination (Cannaerts, 2011). These aspects were measured in three items on a 7-point Likert scale (e.g., I find this an attractive package. 1= totally disagree, 7= totally agree). The final attractiveness and usefulness were indicated by the mean score of these items (Chronbach's α= .93 and .90 respectively). Afterwards, they were asked to vote for the package they liked the most, with an electronic voting system. Using the output of this voting, they were asked to give more feedback about the packages.

With regard to the fourth research question, the attendees of the focus group were given small cards in two different colors: red and green. They were asked to write down positive characteristics of educational materials on the green cards and negative characteristics on the red cards. Afterwards, all cards were pinned on a notice board in front of the room, and all suggestions were discussed. Finally, the criteria that were derived from our literature study (Nation et al., 2003) were summed up, and attendees were asked to give feedback on these criteria: to what extent did they agree and to what extent did they think the criteria were achievable?

To answer the last research question, attendees were given two dilemmas. First, would they prefer that lessons about safe use of SNSs were given in one course, several courses, or rather a theme day or week? Second, would they prefer that a regular teacher gave these lessons, or that an expert would provide this information?

Results

RQ3: How do teachers feel about the existing educational packages?

The mean ratings of attractiveness and usefulness that were calculated out of the short questionnaire given to the attendees of the focus group are listed in Table 3. As can be seen, Think before you post and Play and learn are rated highest, both for usefulness and for attractiveness. The same pattern could be found in the voting for the best package: most people voted for Play and learn and Think before you post.

Out of the extended feedback, we summarized the most important remarks:

- The explanation of the packages needs to be short. You should be able to start with it right away. An extended package with lots of text scares teachers away. "Play and learn, being online", is preferred for this reason, just as "Think before you post", which is easy to implement and includes constructive task assignments. These are also seen as attractive packages.
- It is put forth that Kids in Cyberland is not always age-appropriate. Moreover, there should be a distinction in packages between different education forms, with regard to the instruction (not with regard to the content or goals).
- Learning goals should be mentioned.

RQ4: What criteria of educational packages are experienced as important?

Teachers report the following positive characteristics of packages:

- Age appropriate, appropriate difficulty, close to youngsters all-day experiences
- Attractive, colorful, funny, with humor
- Short and powerful, not time consuming → selective information
- Interactive, varied teaching methods (movies, games, pictures,..), practice-based, using real-life examples
- A good balance between theory and practice
- Manual for teachers (solutions + extra information)

Regarding the criteria of Nation and colleagues (2003), teachers agree with most of the principles. However, they pointed at some practical problems on how to combine a comprehensive and sufficiently dosed package with their concern of time-consuming packages. They emphasized the fact that the package should be short and to the point. Information should be selected in accordance with teenagers' interests and their environment. The possibility of different short lessons for different age groups with a shift in

Table 3

Ratings of attractiveness and usefulness of the different educational packages by educational stakeholders

	Attractiveness	Usefulness
Play and Learn	5.67	5.50
Kids in Cyberland	4.00	4.67
Finding myself in the 21st century	3.28	4.13
Think before you post	5.28	5.89
Connected	3.17	4.94

focus has been raised, just as the possibility of a 'standard' package that can be extended with extra exercises.

RQ5: How should an educational package be implemented in the classroom?

Teachers prefer a package of one hour, in one course. They do not like the idea of a theme week or day, since there already exist numerous of these extensive projects. Moreover, this format requires that teachers put lot of effort into the project. The attending stakeholders reported that most often, only a few teachers are motivated to do this and these teachers need to motivate all the others.

Although the input of an expert is seen as valuable, teachers prefer to get a training themselves, so that they become 'experts' themselves. This way they can answer their students' questions even after the class is over. Moreover, the teacher knows his/her pupils best, and can become a trust person for those in need.

Gaps and future challenges

In Flanders, some attractive and ready to use educational packages about safety on Internet and SNSs do already exist, as was judged by educational stakeholders. However, during the theoretical evaluation conducted in our first study, some gaps were exposed. As an answer to our first research question, it was found that not all risks are tackled in most of the packages. Especially commercial risks are often overlooked. Moreover, most packages are about safety on the Internet in general, not only on SNSs. While this is not problematic per se, often a lot of risks typical for SNSs are not tackled (e.g., the risks discussed regarding the overview of De Moor et al. (2008)). With regard to SNSs, mainly privacy risks and wrong information (adapted pictures) are tackled, while the other risks are tackled in other contexts. This might cause a lack of awareness of these risks while using SNSs. Moreover, some typical aspects of SNSs are often overlooked because of the focus on pictures and contact information, such as social advertising,

the impact of hate-messages or joining hate-groups, the sale of personal data to third companies and the risks of identity-shaping content like pictures or messages about alcohol abuse, negative attitudes toward school or superiors,... A more comprehensive approach, concerning the different risks, is necessary.

As an answer to our second research question, it was found that while most packages already meet some criteria of Nation et al. (2003), there is often a lack of outcome evaluation and a theoretical base of the program. Future research should focus on the development of a comprehensive package with regard to the different risks in SNSs, that should have a decent theoretical base and that will be empirically evaluated.

Moreover, in our second study it was found that while developing these educational materials, the remarks of stakeholders in the educational field need to be taken into account. Their concerns might somewhat compromise the way we can take all the mentioned principles of our theoretical framework into account (e.g., their concerns about time-consuming packages contradicts the principle of sufficiently dosed packages), but they help to ensure that materials will be disseminated. Therefore, a good balance needs to be found, so that the given criteria and design principles are met as much as possible.

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Educational packages downloadable from:

- Spelend leren: Online zijn. http://www.saferInternet.org/web/guest/activity-book
- Kids in Cyberland. http://www.clicksafe.be/leerkrachten/nl/materiaal/de-juiste-click/
- Op zoek naar mezelf in de 21ste eeuw. www.opzoeknaarmezelf.be
- Think before you post: http://www.clicksafe.be/leerkrachten/nl/materiaal/lespakket-privacy/
- Connected: http://www.clicksafe.be/leerkrachten/nl/materiaal/connected/

4 Exploring the usefulness of school education about risks on social network sites: a survey study

This chapter is based on:

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Exploring the Usefulness of School Education About Risks on Social Network Sites: A Survey Study. *The Journal of Media Literacy Education*, *5*(1), 285–294.

Chapter 4

Exploring the usefulness of school education about risks on social network sites: a survey study

Abstract

The growing popularity of social network sites (SNSs) is causing concerns about privacy and security, especially with teenagers, since they show various forms of unsafe behavior on SNSs (e.g., (Lenhart & Madden, 2007). It has been put forth by researchers, teachers, parents, and teenagers that school is ideally placed to educate teens about risks on SNSs and to teach youngsters how to use SNSs safely. Privacy attitudes also need to be taken into account if we want to decrease the amount of unsafe behavior. However, there is a lack of research that focuses on the role and impact of school education on privacy attitudes or actual safe behavior on SNSs. To counter this shortcoming, a survey study was set up with 638 pupils exploring teenagers' attitudes toward privacy on SNSs. The first question was: Do they care about their privacy? Next to that, the extent to which they show unsafe behavior on SNSs was questioned. Finally, the impact that school education has on both privacy care and the safety of teenagers' behavior on SNSs was studied. It was found that teenagers do not care much for their privacy, and that a lack of privacy care leads to unsafe behavior on SNSs. However, school education has a positive impact on privacy care and by raising privacy care it also has an indirect positive impact on the safety of pupils' behavior. Our results suggest therefore that more efforts for school education about safer use of SNSs are important, especially since the attention for the topic in schools is found to be still extremely limited and not organized in the curriculum. Practical implications are discussed.

Introduction

We are witnessing the rapid growth of a new generation of participatory and collaborative network technologies that provide individuals with a platform for sophisticated online social interaction. Social network sites (SNSs) today have hundreds of millions of users and are transforming our social and professional interactions. According to a recent study, 73% of the European 13 to 14-year-olds and 82% of the European 15 to 16-year-olds have a profile on a SNSs, containing personal information (Livingstone, Haddon, Görzig, & Olafsson, 2011). This causes a growing concern about security and privacy issues in social networks, particularly with teenagers (De Moor et al., 2008).

Unsafe behavior on social network sites

Although a clear distinction should be made between the risks teenagers face and the harm they experience (Livingstone et al., 2011), research has indicated that at least some behaviors on SNSs, such as providing personal information, are associated with negative experiences (Mcgivern & Noret, 2011). In literature, different behaviors of teenagers on SNSs are therefore described as unsafe. Most frequently there is a focus on posting risky information on profiles, which has been defined as personal information allowing the viewer of the profile to identify and contact the profile owner (Livingstone et al., 2011). Lenhart and Madden (2007) found in their survey research that American teens put a variety of information on their profile, but the most common items are their first names (82%) and pictures of themselves (79%). In addition, 66% include pictures of friends, 61% include the name of their cities or towns, and 29% post their last names and include videos. Paulussen, Courtois, Mechant, and Verdegem (2010) found comparable results in Belgium, except the fact that they found a higher amount of posted videos (37%) and last names (46%). Possible unintended consequences of revealing this kind of information include damaged reputation, rumors and gossip, cyberbullying, harassment or stalking, use of personal data by third parties like advertisers, hacking, identity-theft, or the use of the information by superiors like teachers or potential employers (Debatin, Lovejoy, Horn, & Hughes, 2009).

Next to posting a vast amount of personal information on their SNS profile, some teenagers also show other *risky behaviors,* as have been described in previous research, such as password sharing (Lenhart, Purcell, Smith, & Zickuhr, 2010; Sharples, Graber, Harrison, & Logan, 2009), accepting strangers as friends on a SNS thereby often allowing these strangers full access to their profile and personal information (Debatin et al., 2009; Mcgivern & Noret, 2011), not reading the privacy policy (Jones & Soltren, 2005; Marwick, Murgia-Diaz, & Palfrey, 2010), or not using their privacy settings (Debatin et al., 2009; Livingstone et al., 2011). Moreover, since it is found that users post a significant number of pictures of other people on their profiles, for example of friends and family (Hum et al., 2011; Nosko, Wood, & Molema, 2010), it might be questioned if permission was obtained to post these images. Otherwise, the right of image (e.g., in European countries like Belgium, Germany, and Netherlands; Dierickx, 2005) or the privacy rights (e.g., in the United States) of the person depicted might be invaded.

All these risks might be threatening, since research indicates that exposure to online risks causes harm and negative experiences in a significant amount of cases (Livingstone et al. 2011; Mcgivern and Noret 2011). Furthermore, some theories predict that young teens are more impatient, and have difficulties to resist social and emotional influences while remaining focused on the long-term risks and future consequences of their decisions (Albert & Steinberg, 2011; C. C. Lewis, 1981). Additionally, it was found that they have a harder time controlling their impulses and have higher thrill-seeking and disinhibition scores than adults (Cauffman & Steinberg, 2000). This could increase risk-taking by teens (Gruber, 2001), especially since SNSs are used to construct an online identity (Madden and Smith 2010; Zhao et al. 2008). While posting personal or revealing pictures and interests helps in building one's identity (Hum et al.

2011), it might also jeopardize teenagers' privacy. The process of personal and social identity construction has always existed with teenagers, but a SNS gives it a new dimension. The profile pages used to build an identity are often available for more people than just the peers they were built for, thereby complicating the process of privacy protection.

Most research that reports on individual differences in risky behavior with regard to age or gender focuses on the type and the amount of information that young people post on their SNSs, and the way they change their privacy settings. Lenhart & Madden (2007) found that older teenagers (15 to 17 years old) tend to post more pictures and other personal information on their profile, but they are not more likely to adopt more stringent privacy settings (Livingstone et al., 2011). It has also been found that girls post more pictures, while boys give more contact information (Lenhart & Madden, 2007). Peluchette and Karl (2008) also found in an American survey study that boys shared significantly more self-promoting and risky pictures or comments (involving sex or alcohol), while girls were more likely to post romantic or adorable pictures and information. Moreover, girls reported more often that they had changed their privacy settings than boys (Lewis, Kaufman, & Christakis, 2008; Livingstone et al., 2011). These findings are in line with an evolutionary theory that states that due to sexual selection pressure, men are prone to be more risk-taking while women are more cautious (Schmitt, Realo, Voracek, & Allik, 2008).

Additionally, it was found that boys and girls are equally unfamiliar with the privacy policies (Jones & Soltren, 2005). With regard to the other risky behaviors that are regularly described in literature (cf. supra), no studies about individual differences with regard to age or gender could be found. Also, only a limited amount of studies could be found that investigated differences related to users being enrolled in different education forms (vocational, technical, or general education). Vandoninck, d' Haenens, Cock, & Donoso (2011) found that there are no differences in sharing general descriptive information, but pupils enrolled in vocational education and technical education share more contact information than those enrolled in general education. To counter the gaps in literature, a survey study was set up to investigate the amount of unsafe behavior with teenagers and individual differences that can be found with regard to age, gender, and education form.

Privacy Care

Since it has been found that risky behaviors are related to negative experiences (Mcgivern & Noret, 2011), it would be desirable to decrease the amount of these behaviors. Therefore, it is important to take into account the antecedents of risky behavior. Different theories predict that attitudes precede behavior. The transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992) states that a contemplation phase, in which the problem is recognized, precedes the preparation phase and action phase, in which behavior is changed. The same prediction comes forth out of the theory of planned behavior (Ajzen, 1991), which states that attitudinal beliefs, together with subjective norms and perceived behavioral control, predict behavioral intentions and so behavior change. Meta-analytic reviews show that both theories

have been confirmed in a lot of empirical studies (Armitage & Conner, 2001; Prochaska et al., 1994).

With regard to unsafe behavior on SNSs, we might therefore state that teenagers' attitudes toward their privacy are important, that is that teenagers recognize the problem and care about their privacy in the first place. Mark Zuckerberg, founder of the currently most popular SNS Facebook (Hampton, Goulet, Rainie, & Purcell, 2011), stated that they do not care, but this has been criticized (Kirkpatrick, 2010). Empirical research obtains mixed results. Depending on the exact measure of privacy care, the age of the respondents, and other methodological differences, some studies found that teenagers care about their privacy, while others found the opposite. Boyd and Hargittai (2010) found, for example, that although young people post various types of content on their Facebook profiles, most teenagers reported to have changed their privacy settings at least to some extent. They conclude that young people are not indifferent about their privacy. However, other studies pointed out that a lot of adolescents do not change their privacy settings. Debatin and colleagues (2009) found that still 31% of their respondents did not change their privacy settings. This is in line with Livingstone and colleagues (2011), who found in their survey study that 29% of European teenagers sustain a public profile or do not know about their privacy settings. Moreover, 28% opt for partially private settings so that, at most, friends-of-friends can see their pages. While friends-of-friends may give the illusion of closeness, these people are, nevertheless, mostly strangers. However, this lack of strict and effective use of privacy settings does not necessarily mean that young people do not care about their privacy. That is, this unsafe behavior might, for example, be caused by a lack of technical knowledge, peer pressure, or the unawareness of the true visibility of their profiles. It might be hypothesized that the relationship between privacy care and the use of privacy settings, or any other (un)safe behavior on SNSs, is more complex. Only a direct measure of privacy care and unsafe behavior would therefore be able to point out whether teenagers care about their privacy and what influence this has on their behavior. The empirical research using self-reported measures of privacy care shows moderate to low levels of online privacy care (e.g., Acquisti & Gross, 2006; Dinev & Hart, 2004; Fogel & Nehmad, 2009). It was also found that boys care even less about their privacy compared to girls (Fogel & Nehmad, 2009; Hoy and Milne 2010). Again, this can be explained by evolutionary theories, stating that girls have developed to be more cautious (Schmitt et al., 2008). Moreover, they consistently score higher on the personality trait neuroticism, indicating more negative feelings such as fear and concern (Chapman, Duberstein, Sörensen, & Lyness, 2007).

No studies could be found that focused on age differences between teenagers or differences between teenagers enrolled in a different education form. Therefore, in our survey research, we investigated if low levels of privacy care could be confirmed, and if there were any individual differences with regard to age, gender, and education form.

Furthermore, empirical research studying the relationship between privacy care and behavior on SNSs obtains mixed results. Milne and Culnan (2004) found in an online survey study that privacy concern is positively related to the reasons to read online privacy policies. Utz

and Kramer (2009) also found that more privacy care predicts more restrictive privacy settings. However, Dwyer, Hiltz and Passerini (2007) conducted three survey studies and found that privacy concern only relates to information sharing for one of their items: their instant messenger screen name. Acquisti and Gross (2006) found in this respect that there was little or no relationship between participants' reported privacy attitudes and their likelihood of providing certain information. Brown and Muchira (2004) also found mixed results in their survey study about the relationship between online privacy attitudes and behavior. While all these studies take into account one particular aspect of unsafe behavior, which might explain the differences in findings, it might be interesting to study the impact of privacy care on different forms of unsafe behavior. In the end, it is important that teenagers behave safely with respect to all these different aspects. Therefore, in our survey research we also investigated the impact of privacy care on unsafe behavior on SNSs in general.

School Education

To obtain safer behavior with teenagers, many authors emphasized the role of school to educate teens about online risks (Livingstone & Haddon, 2009; Marwick et al., 2010). Also, parents and young people report that they consider the school as an important place to receive online safety information (Safer Internet Programme, 2009). Online safety has been formally included in school curricula in many European countries (Safer Internet Programme, 2009), as part of a broader media literacy program. Media literacy has been defined by (Livingstone, 2003) as "the ability to access, analyze, evaluate and create messages across a variety of contexts" (p3). As Livingstone (2004) already mentioned, teens are better at accessing and finding information online than they are at avoiding risks posed to them by the Internet. Therefore, school education might still be important.

However, it has been found that the implementation of the topic of online safety is inconsistent (Safer Internet Programme, 2009). Previous survey studies with teachers in England indicate that 42% of the teachers never lecture about online safety, and only 11% reported to do so frequently. The same survey research also points out that SNSs are often blocked in schools. While claiming to take responsibility by preventing teenagers to face risks on SNSs during school time, schools fail this way to teach children essential skills of managing their online identity. Blocking SNSs in school often even encourages teenagers to subvert filters or restrictions (Sharples et al., 2009).

Additionally, despite the fact that a variety of educational packages about safety and security in SNSs have been developed (for an overview, see Insafe, 2014), there has not been any research on whether schools use these packages and none of them have been empirically evaluated (Safer Internet Programme, 2009; Vanderhoven, Schellens, & Valcke, 2014). There is a lack of consistent evaluation of any educational efforts in this field, while the impact of education in online security problems is hotly debated. Although positive effects have been found in some domains of Internet security (Kumaraguru, Sheng, Acquisti, Cranor, & Hong, 2010; Moreno et al., 2009), other studies show that (primary) school-based measures do not influence the online

safety of children (Valcke, Schellens, Van Keer, & Gerarts, 2007). In media literacy research, the few quantitative intervention studies in classroom settings typically find that media literacy education increases knowledge about the specific topic of the course (Martens, 2010). However, while media literacy programs often aim to change attitudes and behavior, on top of a gain in knowledge, attitudes and behavior are commonly not measured. The few empirical studies about media literacy education that did take into account these measures, indicate that attitudinal and behavioral changes are much harder to obtain (Cantor & Wilson, 2003). Indeed, most of this research does not find any impact on attitudes or behavior (Duran, Yousman, Walsh, & Longshore, 2008; Steinke et al., 2007).

Since, as stated earlier, privacy care might be a precedent of (un)safe behavior, it is interesting to verify the impact on attitudes as well. To counter these shortcomings, in the survey study that was set up, the impact of efforts that have been done by secondary schools to raise the awareness on safe use of SNSs both on privacy care and on the behavior of their pupils was determined.

Research Questions

A survey research was conducted to study privacy care by teenagers, their (un)safe behavior on SNS, and the impact of school education. Thereby, the following research questions were put forward:

(1) Do teenagers care about privacy on SNSs in general, and are there any individual differences with regard to gender, age and education form?
(2) Do teenagers show unsafe behavior on SNSs in general, and are there any individual differences with regard to gender, age and education form?
(3) Does raising awareness in school education have a positive impact on privacy care and/or the safety of teenagers' behavior on SNSs?

Survey Study

Participants

In total, 48 classes out of 26 schools in Flanders (Belgium) were randomly selected. This way, the survey was distributed among 638 pupils between 14 and 19 years old (mean age = 16.75), with 26% boys and 74% girls. In all, 25% were enrolled in technical education (TSO), 16% in vocational education (BSO), and 59% were enrolled in general education (ASO). Four percent of the students had no profile on a social network. These students were excluded from further analyses. Of the remaining participants, 97% had a Facebook profile and 34% had a profile on a Belgian SNS, that is Netlog. Those who had a Facebook profile indicated to use this more than other profiles they had.

Measures

To answer the different research questions, different constructs were measured. Next to age and education form (vocational, technical, or general education), it was asked whether these teens have a social network profile and which one they used most.

In addition, we measured the teenagers' care about privacy on SNSs (*privacy care*) using an adapted scale of (Acquisti & Gross, 2006) consisting of six items on a 7-point Likert scale, for example "Are you concerned about the kind of personal information you are revealing to others through Facebook/Netlog/…", "Are you concerned about who can access the information you publish through Facebook/Netlog" (1= not concerned, 7= very concerned). The internal consistency of this scale was satisfactory, Cronbach's α= .88. Moreover, in accordance with Valcke et al. (2011), an *unsafe behavior-index* was calculated based on the number of people with whom they share their password, the amount of personal information they put on their profile page, the amount of pictures of other people they posted online (without asking), the extent to which they have accepted strangers to be their friends, whether they have read the privacy policy of the social network, and the extent to which they have changed their privacy settings (negatively scored). The index gives an indication of how safely the pupil acts on SNSs. The index has a minimum score of 0 (very safe behavior) and a maximum score of 6 (very unsafe behavior).

We also measured the attention the school devotes to the topic (*school attention*). This scale consisted of five items on a 7-point Likert scale. The questions used were, for example, "Has anyone in school ever told you about privacy on social network sites," and "Have you ever had any lessons/projects at school about privacy on social network sites?" (Cronbach's α= .71).

Results

RQ 1: Do teenagers care about privacy on SNSs?

The mean score on the direct measure of privacy care was lower than the neutral 4 on a 7-point Likert scale (M= 3.67, SD= 1.31). Therefore we might conclude that, in general, pupils do not care much about their privacy. To find out variations between teenagers, we checked for differences regarding age, gender, and education form. An ANCOVA was performed, with privacy care as a dependent variable, gender and education form as a fixed factor, and age as a covariate. The results of this analysis can be found in Table 1. It was found that girls care more for their privacy than boys. Moreover, the older the teenagers are, the more they care about their privacy. No differences were found with regard to their education form.

Table 1

Results of the ANCOVA-analysis on Privacy care and Unsafe Behavior. Means are given for all categories, standard deviation is given between brackets.

| | Gender | | | Age | | Education form | | | |
	Boys	Girls	F(df1,df2)	B	F(df1,df2)	ASO	BSO	TSO	F(df1,df2)
Privacy care	3.38 (1.44)	3.78 (1.25)	$F(1,590)$ = 4.78*	.09	$F(1,590)$ = 4.94*	3.64 (1.26)	3.66 (1.41)	3.75 (1.37)	$F(2,590)$ =0.16
Unsafe behavior	2.92 (1.06)	2.88 (.95)	$F(1,562)$ = 2.55	-.09	$F(1,562)$ = 8.18*	2.96 (.92)	2.63 (1.18)	2.87 (.97)	$F(2,562)$ =0.00

*=p<.05

RQ 2: Do teenagers show unsafe behavior on SNSs?

The general mean score on the unsafe behavior-index is 2.89 on a 6-point scale (SD= 0.98). This is not very high, but it is not negligible. Again, an ANCOVA was performed to find variations between teenagers of different age, education form, and gender. Results of this analysis are shown in Table 1. It was found that older teenagers show less unsafe behavior on SNSs than younger teenagers. No differences were found with regard to gender or education form.

To find out if there is a direct impact of privacy care on the amount of unsafe behavior, as is predicted by several theories (cf. section Unsafe Behavior on SNS), privacy care was added to the model as a covariate. It was found that teenagers who care more for their privacy show less unsafe behavior ($F(1,555)$= 54.51, p< .001).

RQ 3: Does raising awareness in school education have a positive impact on privacy care and/or the safety of teenagers' behavior on SNSs?

To find an answer to the third research question, we first checked the current situation with regard to school education. The mean score on *school attention*, the scale that measures the amount of attention spent on privacy issues on SNSs, is 2.45 (SD= 1.40), which is rather low. Moreover, 98.7% of pupils reported never to have heard of any package about the topic. Some students stated: "*the teacher is telling about it sometimes,*" or "*I've heard of it once in school,*" indicating occasional, disorganized attention.

Secondly, a regression analysis was conducted, to find out if school education has an impact on privacy care. It was found that the amount of school attention is a significant predictor of the amount of privacy care: the more attention they give to the topic in school, the more their pupils care about online privacy (β= .15, $t(582)$= 3.76, p< .001). However, it was found that there was no direct impact of school education on the unsafe behavior index (β= -.05, $t(554)$= -1.24, p> .05).
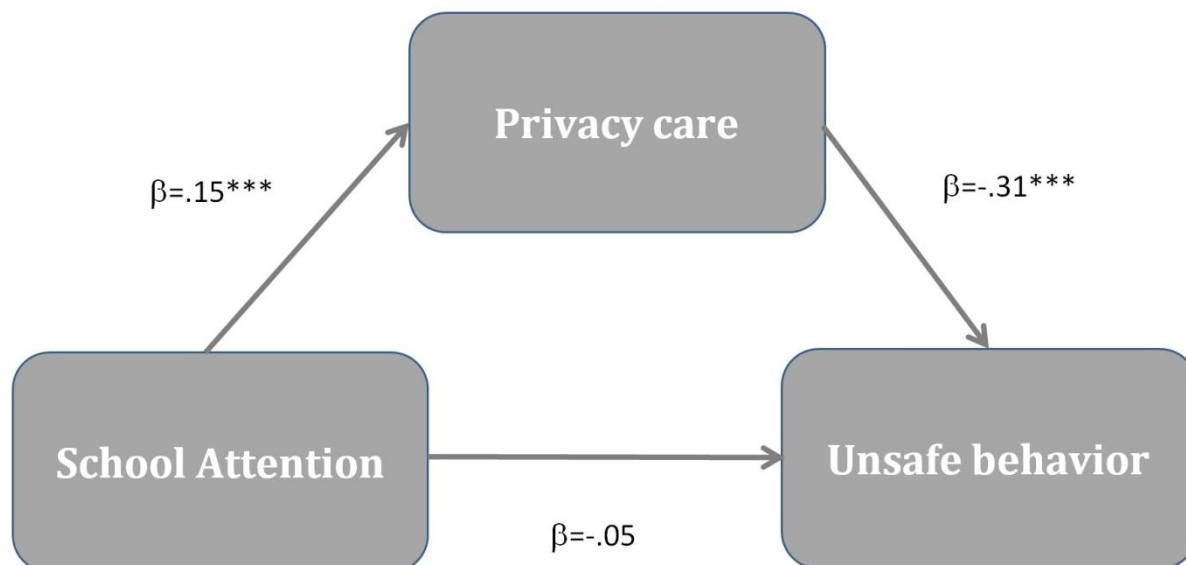
Figure 1. Representation of the direct and indirect effect of school attention on unsafe behavior. *** indicates significance (*p*<.001).

Still, the finding that school attention has a positive impact on privacy care, combined with the finding that privacy care has a positive influence on teenagers' safe SNS behavior (cf. RQ 2) shows an indirect effect of school attention on unsafe behavior through privacy care (see Figure 1). The significance of this indirect effect can be verified with a bootstrapping method[1] (Hayes, 2009). The indirect effect of school attention on unsafe behavior through privacy care is found to be significantly different from zero, by a 95% bias-corrected bootstrap confidence interval based on five thousand bootstrap samples (-.058 to -.015, with a point estimate of -.034). These results are consistent with the claim that attention in schools for the topic of privacy and security on SNSs increases privacy care, which in turn lowers unsafe behavior.

Conclusion and Discussion

In agreement with previous research (e.g., Acquisti & Gross, 2006), rather low levels for privacy care on SNSs were found. Especially younger teenagers and boys are not concerned about privacy issues on SNS. As could be expected out of the transtheoretical model of behavior change (Prochaska et al., 1992) and the theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975), it was found that this care about privacy has a significant influence on the safety of the behavior of these teenagers online. Most teenagers, younger teenagers in particular, show a

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[1] Bootstrapping generates an empirical representation of the sampling distribution of the indirect effect. The obtained sample (n=611) is seen as a mini-version of the population, and is used to resample 5000 different bootstrap-samples (n=611), sampled with replacement to allow a person to be drawn more than once in the newly created sample. The indirect effect is estimated for all of these generated samples, thereby constructing an empirical approximation of the sampling distribution of the indirect effect when taking a sample of 611 from the original population. Confidence intervals are based on this distribution.

non-negligible amount of unsafe behavior on SNSs. The differences between pupils of a different gender, which could be found in previous literature, were not found in this research. Moreover, it is often found that older teenagers post more (risky) information (Lenhart & Madden, 2007), which seems to contradict our finding that younger kids show more unsafe behavior. Both results can possibly be explained by the calculation of the unsafe behavior index, which included different forms of unsafe behavior, rather than focusing on only one form, such as posting information.

Our findings with regard to privacy care and unsafe behavior on SNSs seem to indicate that raising the awareness and the care about privacy with teens might be helpful. As mentioned above, schools are ideally placed to organize these types of campaigns and lessons. While previous media literacy research finds limited or no effects of education on the safety of online attitudes and behavior (Martens, 2010); Valcke et al. 2007), it was found in our study that school education has a positive impact on privacy care, and through privacy care on the students' behavior on SNSs. Yet, it was also found that there is little attention in schools for raising the awareness of privacy and security issues on SNSs. Moreover, if there is somehow attention for the topic, it is not integrated in the curriculum or in a course, but rather incidental. This means that schools are not making much effort with regard to the problem of unsafe social network behavior in general. These findings are in line with previous indications out of focus groups (Safer Internet Programme, 2009) and surveys with teachers (Sharples et al., 2009) and show no tendencies of improvement. Therefore, extra efforts need to be made for dissemination of educational materials. Further research is also needed as to know why packages are not used, for example by exploring the needs and preferences of teachers.

Our results also suggest that education about this topic would be most appropriate in classes with young teenagers, as they show most unsafe behavior. Taking into account the minimum age of most SNSs, and the recommendations of Safer Internet Programme (2009), education would be most appropriate between the ages of thirteen and fourteen years old. There were, however, no differences between pupils enrolled in different education forms. Since the mean score on the unsafe behavior-index is non-negligible, education seems appropriate in all kinds of education forms.

However, a few pitfalls should be avoided while interpreting these results and their implications. First of all, although our results about the effects of education seem promising, indicating that encouraging schools to make an effort might be worthwhile, caution is recommended with regard to the thin line between increasing privacy care and inducing fear. Empirical research of different forms of prevention campaigns has shown that fear induction is a counterproductive strategy to prevent unsafe behavior (Luna & Finkelhor, 1998). It is therefore necessary to emphasize positive aspects of SNS, while informing teenagers about the possible risks. Indeed, recent theories about media literacy education emphasize a skills-based approach (access, analyze, evaluate, and create messages), since children's online skills have a direct influence on their online opportunities and risks (Livingstone, Bober, & Helsper, 2005). This

way, teenagers can make informed decisions, without avoiding the opportunities SNSs can offer (Raacke & Bonds-Raacke, 2008).

Second, the theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975) predicts that next to attitudes, the opinion of significant others (which they call *social norm*) also has an important impact on one's behavior. Next to the teacher, who has been considered in our research, parents and peers are also important others in the life of adolescents. Considering the opportunities SNSs offer when sharing information with peers, risky behavior might be socially desirable. Therefore, peers might negatively influence attitudes and prevent behavioral change. On the other hand, it has been found that parents might have a positive influence on children's attitudes and behavior (Kirwil, 2009; Moscardelli & Liston-Heyes, 2011). Further research should point out the optimal way to combine all these impacts to ensure safer behavior on SNSs of teenagers.

Third, the results of this study with regard to the effectiveness of school attention on the topic of safe use of SNSs need to be interpreted with caution, since the amount of given attention to the topic of safe use of SNSs in schools is low. This might also explain why no direct effect of school attention on pupils' behavior could be found. A more direct measure of the effectiveness of educational packages on this topic can bring more insight in the effects on the attitudes, knowledge, and behavior of teenagers. Therefore, intervention studies in authentic classrooms are needed.

To conclude, it can be summarized that awareness raising educational packages for young pupils in all types of education forms are appropriate. Schools should be encouraged to pay attention for the problem of privacy and social networks, since raising the awareness and privacy care might lead to safer online behavior. More research is needed to be certain about the effectiveness of education on the topic of safe use of SNSs and to define the criteria that are important for teachers to use educational materials on the topic.

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PART 2

Development and evaluation of solutions

PART 2:

Development and evaluation of solutions

The results described the first part of this dissertation can be shortly summarized with regard to their importance for the second part which focuses on the development, evaluation and revisions of new materials. It was found that teenagers face a significant amount of risks when using social network sites (SNSs). Moreover, the focus group interviews showed that cyberbullying and privacy risks are the most encountered risks by teachers. Furthermore, it was shown that attention for the topic in schools might be effective to lower unsafe behavior. However, a state-of-the-art shows that existing materials reveal significant gaps. Teachers also report that materials need to be short and attractive. Based on these results, it was concluded that new materials needed to be developed and evaluated in the next step of the research.

These new materials are not only based on the results described in part 1, but also on the design principles that were put forth when finalizing the first phase of the design-based research. The proposed framework contains design principles out of general prevention research, and out of instructional science research. In a review of reviews, Nation et al. (2003) identified nine general principles of effective prevention campaigns that transcend specific content areas. Important program characteristics are that it needs to be comprehensive, integrate varied teaching methods, be sufficiently dosed, be theory driven and encourage positive relationships. Furthermore, the program needs to be matched with the target audience, this is it should be appropriately timed and socio-culturally relevant. Thirdly, the implementation and evaluation of the program are important as well. Therefore, a well-trained staff and an outcome evaluation are necessary (see Chapter 3 for more details).

The specific instructional guidelines drawn from the field of learning science are based on the dominant theory of the last decades: constructivism (Gordon, 2008). Following this theory, the following principles were put forth: active learning (Duffy & Cunningham, 1996), situated learning (realistic and authentic settings, Snowman, McCown, & Biehler, 2008), multiple perspectives (Kafai & Resnick, 1996) and collaborative learning (Duffy & Cunningham, 1996). More details about the implementation of these principles can be found in Chapter 5.

Finally, theories about behavioral change are taken into account, as the goal of our intervention is not only to raise awareness, but also to decrease unsafe attitudes and behavior. Different theories predict that attitudes precede behavior. The transtheoretical model of behavior change (Prochaska, DiClemente, and Norcross 1992) states that a contemplation phase, in which the problem is recognized, precedes the preparation phase and action phase, in which behavior is changed. The same prediction arises from theory of planned behavior (Ajzen 1991), which states that attitudinal beliefs, together with subjective norms and perceived behavioral control, predict behavioral intentions and so behavior change. Meta-analytic reviews show that both theories have been confirmed in numerous empirical studies (Armitage and Conner 2001; Prochaska et al. 1994).

As stated, the second part of this dissertation focuses on the development and evaluation of interventions. First, a detailed design was created and explicit goals about the outcome of these materials were put forward (described in Chapter 5). After their initial development, the materials were implemented in authentic classroom settings in secondary education, and the impact of the materials on the awareness, attitudes and behavior of the pupils that were involved during the intervention was measured. Based on the results, materials were refined. These revised materials were implemented again. In total, there were five iterations of development, evaluation and refinement, that are described subsequently in Chapters 5, 6, 7, 8 and 9.

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5 Educating teens about the risks on social network sites: useful or pointless? An intervention study in secondary education

This chapter is based on:

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Chapter 5

Educating teens about the risks on social network sites: useful or pointless? An intervention study in secondary education

Abstract

The growing popularity of social network sites (SNSs) is causing concerns about privacy and security, especially with regard to teenagers since they show various forms of unsafe behavior on SNSs. Media literacy emerges as a priority, and researchers, teachers, parents and teenagers all point toward the responsibility of the school to educate teens about risks on SNSs and to teach youngsters how to use SNS safely. However, existing educational materials are not theoretically grounded, do not tackle all the specific risks that teenagers might encounter on SNSs and lack rigorous outcome evaluations. Additionally, general media education research indicates that although changes in knowledge are often obtained, changes in attitudes and behavior are much more difficult to achieve. Therefore, new educational packages have been developed – taking into account instructional design principles- and a quasi-experimental intervention study was set up to find out whether these materials are effective in changing the awareness, attitudes or the behavior of teenagers on SNSs. It was found that all three courses obtained their goal in raising the awareness of the risks tackled in this course. However, no impact was found on attitudes toward the risks, and only a limited impact was found on teenagers' behavior concerning these risks. Implications are discussed.

Introduction

Almost everywhere around the world, teenagers form one of the main user groups of social network sites (SNSs). For instance, in July 2012, about one third of the Facebook users in the US, Australia, Brazil and Belgium were under 24 years old (checkfacebook.com). The new generation of participatory network technologies provides individuals with a platform for sophisticated online interaction. Active participation of media audiences has become a core characteristic of the 21st century and therefore the meaning of media literacy has evolved. While it traditionally referred to the ability to analyze and appreciate literature, the focus has been enlarged, and now this also includes interactive exploration of the Internet and the critical use of social media and SNSs. Livingstone (2004a) therefore describes media literacy in terms of four skills, as the ability to access, analyse, evaluate and create messages across a variety of contexts. It has been found that while children are good at accessing and finding things on the Internet, they are not as good in avoiding some of the risks posed to them by the Internet (Livingstone, 2004b).

Risks on social network sites

The categories of risks teenagers face on a SNS, are broadly the same as those they face on the Internet in general, summarized by De Moor and colleagues (2008). There are three different categories of risks. The first one describes the content risks. A typical example of provocative content teenagers might come across on SNSs are hate-messages. These messages can be quite direct, like in an aggressive status-update or post on someone's wall, but they can also be indirect, for example by joining hate groups. Teenagers also need to develop critical skills, to judge the reliability of information. The wrong information that might appear on SNSs can be intentional, such as gossip posted by other users, or unintentional. The latter can happen when someone posts a joke that can be misunderstood as real information. Typical examples are articles out of satirical journals, posted on a SNS wall.

The second category of risks includes contact risks, that is risks that find their source in the fact that SNSs can be used to communicate and have contact with others (Lange, 2007). Next to instant messaging, SNSs are the most popular media used for cyberbullying (Livingstone, Haddon, Görzig & Olafsson., 2011), by using the chat-function, by posting hurtful messages on one's profile or by starting hateful group pages. Additionally, they can also be used for sexual solicitation, as is seen in the process of grooming, where an adult with sexual intentions manages to establish a relationship with a minor by using the Internet (Choo, 2009). Moreover, users face privacy risks, since they post a lot of personal information online (Almansa, Fonseca & Castillo, 2013; Livingstone et al., 2011). Additionally, 29% of the teens sustain a public profile or do not know about their privacy settings and 28% opt for partially private settings so that friends-of-friends can see their page (Livingstone et al., 2011).

The third category of risks contains the commercial risks. These include the commercial misuse of personal data. Information can be shared with third companies via applications, and user behavior can be tracked in order to provide targeted advertisements and social advertisement (Debatin, Lovejoy, Horn & Hughes, 2009).

All these risks form a threat, since research indicates that exposure to online risks causes harm and negative experiences in a significant amount of cases (Livingstone et al., 2011; Mcgivern & Noret, 2011). Internet harassment is seen as a significant public health issue, with aggressors facing multiple psychosocial challenges including poor parent-child relationships, substance use, and delinquency (Ybarra & Mitchell, 2004). Furthermore, some theories predict that young teenagers are less likely to recognize the risks and future consequences of their decisions (Lewis, 1981). Additionally, it was found that they have a harder time controlling their impulses and have higher thrill seeking and disinhibition scores than adults (Cauffman & Steinberg, 2000). This could increase risk taking by teens (Gruber, 2001), especially since posting pictures and interests helps in building and revealing one's identity (Hum et al., 2011; Lange, 2007; Liu, 2007).

The role of school education

Many authors emphasized the role of school education in raising awareness of these online risks (Patchin & Hinduja, 2010; Tejedor & Pulido, 2012). Schools appear to be ideally placed for online safety education, since they reach almost all the teenagers at the same time (Safer Internet Programme, 2009), making positive peer influences possible (Christofides, Muise & Desmarais, 2012). However, while the topic of online safety has been formally included in school curricula, the implementation is inconsistent (Safer Internet Programme, 2009) and although a variety of educational packages about safety on SNSs has been developed (e.g., Insafe, 2014), most of the packages focus on Internet safety in general, and therefore lack focus on some of the specific risks that accompany the use of SNSs (e.g., social advertising, impact of hate-messages and selling of personal data to third companies). The packages that focus on risks on SNSs, do not tackle all of the above mentioned categories of risks, but often focus on privacy risks, cyberbullying or 'wrong information' (Del Rey, Casas & Ortega, 2012; Vanderhoven, Schellens & Valcke, 2014). Additionally, there often is no theoretical base for the materials, nor any outcome evaluation (Mishna, Cook, Saini, Wu & MacFadden, 2010; Vanderhoven et al., 2014). Indeed, very few studies are set up to evaluate the impact of online safety programs, making use of a control group and and a quantitative data collection approach (Del Rey, Casas & Ortega, 2012).

It should be noted that quantitative intervention studies in the field of general media literacy education typically only find that interventions increase knowledge about the specific topic of the course (Martens, 2010; Mishna & al., 2010), while media literacy programs often aim to change attitudes and behavior as well. Nevertheless, attitudes and behavior are commonly not measured and if measured, changes are often not found (Cantor & Wilson, 2003; Duran et al., 2008; Mishna et al., 2010).

Still, when it comes to education about the risks on SNSs, one should look beyond mere cognitive learning. Raising awareness of the risks on SNSs is a first goal, but it would be most desirable to obtain a decrease of risky behavior as well. The transtheoretical model of behavior change (Prochaska, DiClemente & Norcross, 1992) states in this context that there are five stages in behavioral change. The first stage is the precontemplation stage, where individuals are unaware or underaware of the problem. A second stage is a contemplation stage, in which people recognize that a problem exists. The third stage is a preparation phase, in which action (stage four) is prepared. Finally, when the action is maintained, people arrive in the fifth and last stage. Considering this model, if we want to change the behavior of teenagers whose online behavior is unsafe, we first need to make sure that they are in a contemplation stage (i.e., that they recognize the problem). We might state that this 'recognition' contains a logic-based aspect (awareness of the problem) and an emotional-based aspect (care about the problem). Therefore, educational materials with regard to teenagers safety on SNSs actually are aiming at raising awareness of risks on SNSs, raising care about the risks on SNSs and finally on making their behavior safer on SNSs.

Purpose of the current study

As mentioned above, the existing materials about online safety do not tackle all the categories of risks. Moreover, they do not focus on specific risks that are typical for the use of SNSs. Therefore, new packages were developed covering all categories of risks and taking into account some instructional design principles. The goal of these packages was not only that teenagers would be more aware of the risks, but also that they would care about them and that they would behave more carefully on SNSs after following the course.

To verify whether these goals were obtained, a quasi-experimental study was set up in which these packages were implemented and evaluated in authentic classroom settings. In contrast to some previous intervention research where researchers were actively involved in the intervention (Del Rey et al., 2012), teachers were responsible for guiding the intervention to assure external validity. The following research question was put forth: does an intervention about content, contact or commercial risks have an impact on the awareness, attitudes and/or behavior of teenagers with regard to these risks?

Material and methods

The design of educational packages

Three packages were developed: one about content risks, one about contact risks and one about commercial risks. The exercises in the courses are a selection of exercises used in existing materials (Insafe, 2014), narrowing the course to one hour to satisfy the need of teachers to limit the duration of the lessons and the work load (Vanderhoven et al., 2014). Some exercises were adjusted through small changes to assure complete coverage of the different risks and to satisfy some instructional design principles drawn from constructivism, which is currently the leading theory in the field of learning sciences (Duffy & Cunningham, 1996). Figure 1 shows how these principles are integrated in the course.

Every package consisted of a syllabus for the pupils and a manual for the teacher. This manual contained background information and described in detail the learning goals and the steps of the course:
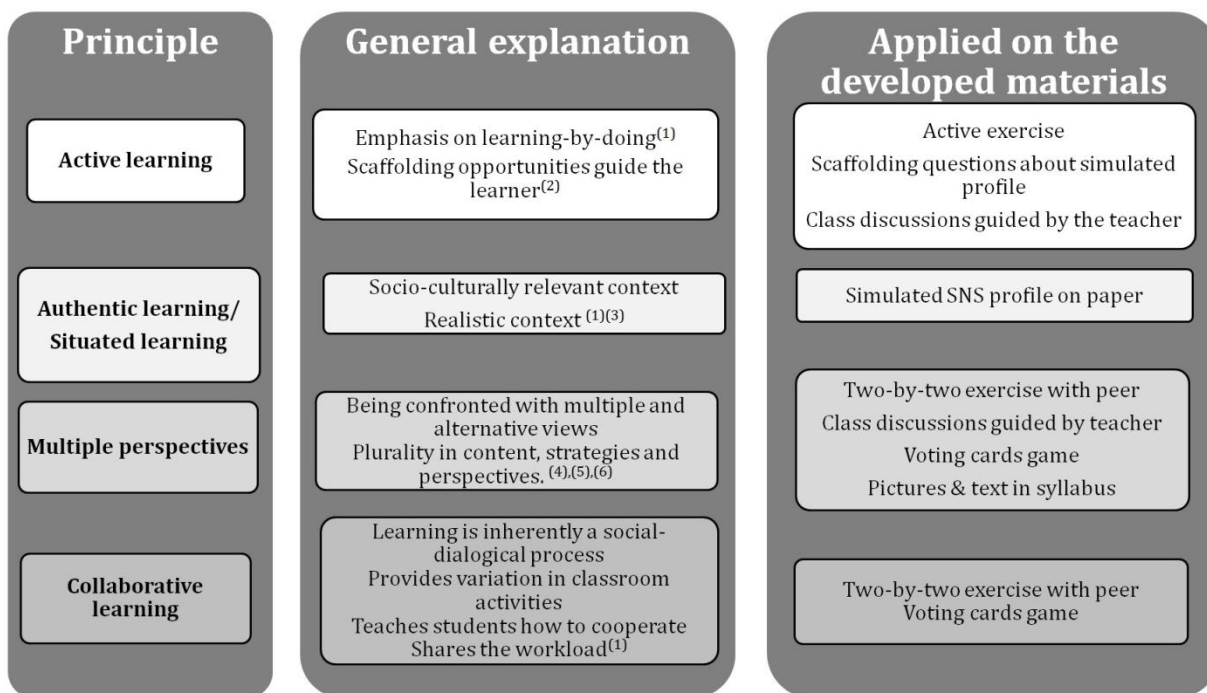
Figure 1. Instructional design principles derived from constructivism and how they are applied in the developed materials.

[1] Duffy & Cunningham (1996), [2] Wood, Bruner & Ross (1976), [3] Snowman et al. (2008), [4] Kafai & Resnick (1996), [5] Mayer & Anderson (1992), [6] Rittle-Johnson & Koedinger (2002).

(1) Introduction. The subject is introduced to the pupils by the teacher, using the summary of risks (De Moor et al., 2008).

(2) Two-by-two exercise. Students receive a simulated 'worst-case scenario' SNS profile on paper and have to fill in questions about the profile together with a peer. The questions were different for the three different packages, scaffolding the pupils toward the different existing risks on the profile. As an example, the course about contact risks contained a question "Do you see any signs of bullying, offensive comments or hurtful information? Where?" Different aspects of the profile could be mentioned as an answer to this question, such as the fact that the person joined a group «I hate my math-teacher" and there is a status-update stating "Haha, Caroline made a fool out of herself today, again. She's such a loser".

(3) Class discussion. Answers of the exercise are discussed, guided by the teacher.

(4) Voting cards. Different statements with regard to the specific content of the course are given, such as "Companies cannot gather my personal information using my profile on a SNS" in the course about commercial risks. Students agree or disagree using green and red cards. Answers are discussed guided by the teacher.

(5) Theory. Some real-life examples are discussed. All the necessary information is summarized.

A quasi-experimental evaluation study

Design and Participants

A pretest – posttest design was used, with one control condition and three experimental conditions, as depicted in Figure 2. A total of 123 classes participated in the study, involving 2071 pupils between 11 and 19 years old (M=15.06, SD=1.87).

Procedure

To assure external validity, an authentic class situation with the regular teacher giving the lesson - using the detailed instructions in the manual for teachers and the syllabus for students- was necessary. Therefore, only after teachers agreed to cooperate in the research were students given the link to the online pretest. Approximately one week after they filled in the first survey, the course was given in the experimental conditions. Every class participated in one course about one subject. After they followed the course, pupils received the link to the posttest. Pupils in the control condition did not follow any course, but they received the link to the posttest at the same time as the pupils in the experimental conditions.
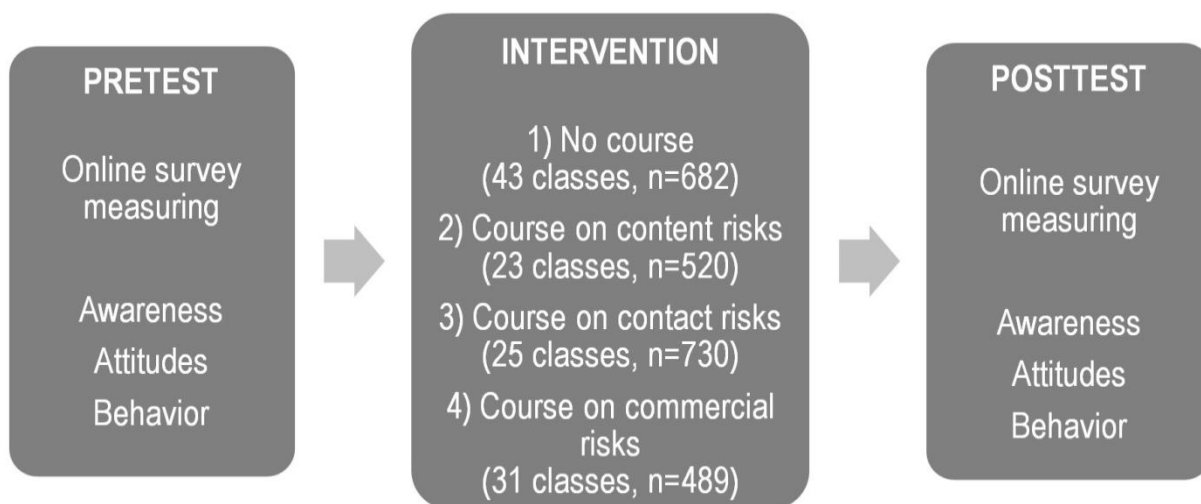
PRETEST

Online survey measuring

Awareness
Attitudes
Behavior

INTERVENTION

1) No course
(43 classes, n=682)
2) Course on content risks
(23 classes, n=520)
3) Course on contact risks
(25 classes, n=730)
4) Course on commercial risks
(31 classes, n=489)

POSTTEST

Online survey measuring

Awareness
Attitudes
Behavior

Figure 2. Pretest - posttest design with four conditions.

Table 1

Different dependent variables with meaning. Constructs are mean scores of different items. Chronbach's α indicates reliability of the construct.

Variable	Items	Cronbach's α	Example item	Meaning
Awareness content	4	.63	While I'm surfing on a SNS, I might encounter information that might shock me.	Awareness of the existence of different risks. (1=low awareness, 7= high awareness).
Awareness contact	6	.78	With sexy pictures or messages people might think you have sexual intentions.	
Awareness commercial	4	.75	Companies use SNS for target advertising.	
Attitude content	4	.81	How concerned are you that you might encounter information on SNSs that might shock you?	Care about different risks (1= low concern, 7= high concern)
Attitude contact	6	.77	How concerned are you that someone might approach you on SNSs with sexual intentions?	
Attitude commercial	4	.76	How concerned are you that companies would use your name in an ad?	
Behavior content	6	.74	I do not place any information on my profile page that might be shocking for someone else.	Behavior on SNSs: reflection, acting, reporting (1= unsafe behavior, 7= safe behavior)
Behavior contact	10	.83	I use my SNS to gossip.	
Behavior commercial	4	.60	I changed my account settings so that companies cannot use my name in ads.	

Measures

The pre- and posttest survey measured nine dependent variables: awareness, attitudes and behavior toward content, contact and commercial risks. These scales were conceptually based on the summary of risks as described by De Moor and collegues (2008). If available, operationalizations of different risks were based on existing surveys (Hoy & Milne, 2010; Vanderhoven, Schellens & Valcke, 2013). In Table 1 all variables are shown with their meaning and Cronbach's alpha indicating the reliability of the scale. Additionally, a direct binary measure of behavioral change was conducted by the question "Did you change anything on your profile since the previous questionnaire?". If answered affirmatively, an open question about what they changed exactly gave us more qualitative insight into the type of behavioral change.

Analysis

Since our data has a hierarchical structure, Multilevel Modeling (MLM) with a two-level structure was used: pupils (level 1) are nested within classes (level 2). MLM also allows us to differentiate between the variance in posttest scores on classroom-level (caused by specific classroom characteristics, such as teaching style) and on individual level (independent of classroom differences). This is important given the implementation in authentic classroom settings, with the regular teacher giving the course.

Because a multiple testing correction was appropriate in this MLM (Bender & Lange, 2001) a Bonferroni-correction was applied to the significance level $\alpha=0.05$, resulting in a conservative significance of effects at the level $\alpha=0.006$.

For every dependent variable, we tested a model with pretest scores as a covariate and the intervention as a predictor (with the control condition as a reference category). Therefore, estimates of the courses (as represented in Table 2) give the difference in posttest-score on the dependent variable for pupils who followed this specific course compared to those who did not follow a course, when controlled for pretest scores. χ^2-tests indicate whether the model is significantly better than a model without predictor.

Results

The results of the MLM are shown in Table 2 and discussed below. More detailed statistics can be found in Appendix A and B.

Awareness

A significant between-class variance could be observed for all three awareness variables on the posttest scores ($\sigma^2_{u0,}$ on average 13% of the total variance), indicating that the multilevel approach is needed.

Second, the results show that the intervention is a significant predictor of all three awareness-variables. Indeed, a positive impact of the given courses on awareness can be observed: a course on content risks or contact risks has positive effects on the awareness of both those risks and a course on commercial risks has a strong positive influence on the awareness of commercial risks. Moreover, no significant between-class variance is left, indicating that the initial between-class variance can be fully explained by the condition that classes were assigned to. This also implies that there are no important other predictors left of the posttest scores on class-level, such as teaching style, or differences in what has been said during class discussions.

The cross-effects between the course on content risks and the course on contact risks on the awareness of contact and content risks respectively, can be explained by the overlap in the courses and the risks. For example, cyberbullying and sexual solicitation can be seen as 'shocking', and therefore be categorized under contact as well as under content risks. However, commercial risks are totally different from the other two categories, and therefore knowledge about these risks can only be influenced by teaching about these risks in particular, as is reflected in our results.

Attitudes

Considering the measured attitudes, again a between-class variance was observed on the three different posttest scores (on average 16% of the total variance), indicating the need for a multilevel approach. Yet, there seems to be no impact of the courses on pupils' attitudes

whatsoever (non-significant model tests). However, the mean scores over conditions, when controlling for pretest-scores, are moderate (ranging from 4.79 to 5.23 on a 7-point Likert scale). This indicates that teenagers do care about the risks at least to some extent, independently of the courses, so that a change in behavior might still be possible.

Behavior

Once again, significant between-class variance on all three behavioral variables (on average 12% of the total variance) shows that there were important differences between classes, and that a multi-level approach is required. With regard to pupils' behavior, the course on contact risks has a positive impact on teenagers' behavior concerning content risks and the course on content risks has a positive impact on teenagers' behavior concerning contact risks. Although there is a lack of significant direct effects, it should be noted that the direct effect of the course on content risks on behavior with regard to content risks is marginally significant (p=.007). Furthermore, as stated in section 3.1, the overlap between the courses on content and contact risks can result in cross-content effects on the different risks. There seems to be no impact of the courses on pupils' behavior with regard to commercial risks. These results indicate that the given courses do not fully obtain the goal of changing behavior.

Nevertheless, if we analyze the answers to the question whether they changed anything on their profile (a more direct but also more specific measure of behavior), we do find some differences. In the control group, 7% of the pupils indicated having changed something on their profile, implying that even a survey encouraged some teenagers to check and change their profile. However, of those who followed a course, significantly more pupils changed something (16%, χ^2=18.30, p<.001). Answers to the open question of what exactly they changed give us more insight in this information. The results of the content-analysis of these open questions can be found in Table 3. As can be expected, when pupils had a course on content risks, they mainly change privacy-settings and the content of their profile (pictures, interests, personal information). When they followed a course on contact risks, they mostly change their privacy-settings and their personal information (including contact information). Participants of the course on commercial risks mostly changed their privacy-settings and their account-settings, protecting themselves against commercial risks. These results indicate that all courses - including the course on commercial risks- had an impact on the behavior of a significant amount of teenagers. Still, it should be noted that a lot of teenagers who did receive a course, reported that they did not change anything.

Table 2

Multilevel parameter estimates for the two-level analyses of students' post-intervention awareness and attitudes about different risks on SNSs.

	Awareness			Attitude			Behavior		
	Content	Contact	Commercial	Content	Contact	Commercial	Content	Contact	Commercial
Fixed									
Intercept	4.92(0.05)	4.57(0.06)	4.24(0.08)	4.71(0.05)	4.98(0.05)	5.22 (0.06)	4.80(0.05)	5.16 (0.05)	4.69 (0.07)
Pretest - mean	0.60***(0.03)	0.60***(0.03)	0.51***(0.03)	0.71***(0.02)	0.67***(0.03)	0.65***(0.03)	0.62***(0.03)	0.72***(0.03)	0.59***(0.03)
Course on content risks	0.36*** (0.08)	0.33*** (0.08)	0.19(0.12)	0.16* (0.07)	0.14 (0.08)	0.11(0.10)	0.23* (0.08)	0.24** (0.08)	0.16(0.10)
Course on contact risks	0.26** (0.09)	0.29** (0.09)	0.10(0.13)	0.20* (0.08)	0.17 (0.09)	0.04(0.11)	0.27** (0.09)	0.17 (0.09)	0.31*(0.11)
Course on commercial risks	0.08 (0.07)	0.17* (0.08)	0.63***(0.11)	0.04 (0.07)	-0.03 (0.08)	-0.10(0.10)	-0.03 (0.08)	-0.00 (0.08)	0.00(0.10)
Random									
Level 2 - Class									
σ^2_{u0}	0.03*(0.01)	0.03*(0.01)	0.06*(0.03)	0.03*(0.01)	0.04**(0.01)	0.05**(0.02)	0.03**(0.01)	0.03 (0.01)	0.04 (0.02)
Level 1 – Pupil									
σ^2_{e0}	0.53(0.02)	0.60***(0.03)	0.94***(0.05)	0.54*** (0.02)	0.44***(0.02)	0.72***(0.04)	0.50*** (0.02)	0.40***(0.02)	0.66***(0.04)
Model fit									
χ^2 (df)	24.58(3)***	17.00(3)***	29.61(3)***	8.15(3)*	7.75(3)	4.57(3)	17.71(3)***	11.76 (3)*	9.51(3)*

Note. Standard errors are in parentheses. * $p<.05$ ** $p<.006$ *** $p<.001$

Table 3

Percentages of pupils that reported to have changed anything on their profile, enriched with information about what this subgroup changed

Condition	Total group	Subgroup of pupils who changed something							
	Changed something	Privacy-settings	Account-settings with regard to commercial risks	Personal information	Pictures/videos/interests	Password	Cyberbullying	Report button	other
Control (no course)	7%	56%	0%	24%	16%	8%	0%	0%	0%
Course on content risks	12%*	57%	2%	11%	20%	2%	0%	0%	7%
Course on contact risks	17%**	75%	0%	14%	3%	0%	6%	3%	3%
Course on commercial risks	19%**	55%	22%	9%	2%	5%	0%	0%	11%

Note. * indicates significant difference in total change compared to control group. * $p<.05$ ** $p<.001$

Discussion and conclusion

It was found that all three newly developed courses obtained their goal in raising awareness of the risks tackled in this course. However, no impact was found on attitudes toward the risks, and only a limited impact was found on teenagers' behavior concerning these risks.

The lack of consistent impact on attitudes and behavior is an observation regularly found in general media education (Duran et al., 2008). In this particular case, there are several possible explanations. First of all, the given courses were short-term interventions, in the form of a one-hour class. The courses were organized this way to limit the workload of teachers, who reported not having a lot of time to spend on the topic (Vanderhoven et al., 2014). Although it was found that even short-term interventions can change online behavior with adolescents of 18 to 20 years old (Moreno & al., 2009), a more long term intervention might be needed to observe behavior changes with younger teenagers. Indeed, research in the field of prevention shows that campaigns need to be appropriately weighted to be effective (Nation et al., 2003). Therefore, additional lessons might be needed to observe a stronger change in behavior.

Second, it might be possible that attitudes and behavior need more time to change, independently of the duration of the course. In this case, it is not that raising awareness is not enough to change behavior, but that this process takes a longer time to be observed. The posttest was conducted approximately one week after the course. Maybe changes in attitudes and behavior could only be revealed later in time. Further research including retention tests should point this out.

Third, it is interesting to look at different theories about behavior, such as the theory of planned behavior (Ajzen, 1991). Following this theory, behavior is predicted by the attitudes toward this behavior, the social norm and perceived behavior control. One of the predictions of this theory is that the opinion of significant others has an important impact on one's behavior. Because of peer pressure, important instructional strategies to increase knowledge such as collaborative learning might be counterproductive in changing behavior. The same reasoning might be applicable on the other instructional design principles that were taken into account when developing the materials. These principles might only lead to better knowledge-construction, which is often the most important outcome of classroom teaching, and might not be adequate to change behavior. Despite the lack of impact on attitudes, and the limited impact on behavior, our findings show that education about the risks on SNSs is not pointless. The materials developed can be used in practice to raise the awareness of the risks among teenagers in secondary schools. Considering the transtheoretical model of behavior change (Prochaska et al., 1992), this is a first step to behavioral change, by helping to get out of the precontemplation phase, into a contemplation phase, in which people recognize that a problem exists.

However, our findings also reveal the importance of evaluation, as it is found that there was no impact of our materials on attitudes and only a limited impact on behavior just yet. Outcome evaluation has been pointed out to be an important factor in effective prevention strategies (Nation et al., 2003), but is also lacking in most educational packages about online safety (Mishna et al., 2010; Vanderhoven et al., 2014). Therefore, it is not clear whether these packages have an impact, and if this impact extents to attitudes and behavior.

With regard to the risks on SNSs, more research is needed to find the critical factors to change unsafe behavior and to develop materials that can obtain all the goals that were set out. Ideally, this research will follow a design-based approach, that is starting from the practical problems observed (e.g. unsafe behavior), and using iterative cycles of testing of solutions in practice (Phillips, McNaught & Kennedy, 2012). Through the refinement of problems, solutions and methods, design principles can be developed that can guarantee that on top of a knowledge gain, behavior will be safer as well.

Despite the invaluable contribution of this impact evaluation study, some limitations need to be taken into account. First of all, there was a lack of valid and reliable research instruments to measure media learning outcomes (Martens, 2010), and especially the outcome variables we were interested in. Therefore, a questionnaire was constructed based on the categories of risks described by De Moor et al. (2008) and the obtained goals of our developed materials (change in awareness, attitudes and behavior). Although reliability scales were satisfactory, it is difficult to ensure internal validity. Moreover, all questionnaires are susceptible to social desirability, especially in a pretest–posttest design (Phillips & Clancy, 1972). However, since we found differences in some variables but not in others, there is no reason to believe that social desirability had an important influence on the reliability of our responses. Still, more specific research about reliable and valid instruments in this field should be conducted.

Finally, this study only focused on an immediate, and thus short-term impact. This is in line with previous media literacy research, but it has important consequences for the interpretation of the results. Given the raising importance of sustainable learning, future research using a longitudinal approach might be interesting not only because, as stated above, it might reveal stronger effects on attitudes and behavior, but also to ensure that the impact on awareness is persistent over time.

As a conclusion we can state that the newly developed educational packages are effective in raising awareness of risks on SNSs, but more research is needed to find out the critical factors to change attitudes and behavior. Since this is a desirable goal of teaching children how to act on SNSs, our results are a clear indication of the importance of empirical research to evaluate educational materials.

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Appendix A. Multilevel parameter estimates for the two-level analyses of students' post-intervention awareness and attitudes about different risks on SNSs.

	Awareness_content			Awareness_contact			Awareness_commercial		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Fixed									
Intercept	5.08(0.04)	5.08 (0.03)	4.92(0.05)	4.72 (0.05)	4.75 (0.03)	4.57(0.06)	4.41 (0.06)	4.46 (0.05)	4.24(0.08)
Pretest - mean		0.60***(0.03)	0.60***(0.03)		0.60***(0.03)	0.60***(0.03)		0.51***(0.03)	0.51***(0.03)
Course on content risks			0.36***(0.08)			0.33***(0.08)			0.19(0.12)
Course on contact risks			0.26**(0.09)			0.29**(0.09)			0.10(0.13)
Course on commercial risks			0.08 (0.07)			0.17*(0.08)			0.63***(0.11)
Random									
Level 2 - Class									
σ^2_{u0}	0.09***(0.02)	0.05***(0.01)	0.03*(0.01)	0.15***(0.03)	0.05**(0.02)	0.03*(0.01)	0.21***(0.05)	0.13***(0.04)	0.06*(0.03)
Level 1 – Pupil									
σ^2_{e0}	0.74***(0.03)	0.53***(0.02)	0.53(0.02)	0.89***(0.04)	0.60***(0.03)	0.60***(0.03)	1.22***(0.06)	0.94***(0.05)	0.94***(0.05)
Model fit									
Deviance	3290.81	2579.81	2555.23	3057.47	2214.69	2197.69	3239.48	2416.32	2386.71
χ^2 (df)		711.00(1)***	24.58(3)***		842.78(1)***	17.00(3)***		823.16(1)***	29.61(3)***
N (classes)	113	113	113	113	112	112	112	110	110
N (pupils)	1260	1139	1139	1088	928	928	1035	844	844

	Attitude_content			Attitude_contact			Attitude_commercial		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Fixed									
Intercept	4.81(0.05)	4.79 (0.03)	4.71(0.05)	5.03 (0.05)	5.04 (0.03)	4.98(0.05)	5.22 (0.05)	5.23 (0.04)	5.22 (0.06)
Pretest - mean		0.70***(0.02)	0.71***(0.02)		0.67***(0.03)	0.67***(0.03)		0.65***(0.03)	0.65**(0.03)
Course on content risks			0.16*(0.07)			0.14 (0.08)			0.11(0.10)
Course on contact risks			0.20*(0.08)			0.17 (0.09)			0.04(0.11)
Course on commercial risks			0.04 (0.07)			-0.03 (0.08)			-0.10(0.10)
Random									
Level 2 - Class									
σ^2_{u0}	0.22***(0.04)	0.03**(0.01)	0.03*(0.01)	0.16***(0.03)	0.04**(0.01)	0.04**(0.01)	0.18***(0.04)	0.06**(0.02)	0.05**(0.02)
Level 1 – Pupil									
σ^2_{e0}	1.01***(0.04)	0.54***(0.02)	0.54***(0.02)	0.78***(0.04)	0.44***(0.02)	0.44***(0.02)	1.18***(0.05)	0.72***(0.03)	0.72***(0.04)
Model fit									
Deviance	3778.59	2630.14	2621.99	2947.92	1942.120	1934.37	3702.34	2593.70	2589.13
χ^2 (df)		1148.45(1)***	8.15(3)*		1005.8(1)***	7.75(3)		1108.64(1)***	4.57(3)
N (classes)	113	113	113	113	110	110	113	111	111
N (pupils)	1283	1159	1159	1096	930	930	1201	1012	1012

Note. Standard errors are in parentheses. * $p<.05$ ** $p<.006$ *** $p<.001$

Appendix B. Multilevel parameter estimates for the three-level analyses of students' behavior with respect to different risks on SNSs.

	Behavior_content			Behavior_contact			Behavior_commercial		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
Fixed									
Intercept	4.91(0.04)	4.90 (0.03)	4.80(0.05)	5.28 (0.05)	5.25 (0.03)	5.16 (0.05)	4.81 (0.05)	4.78 (0.04)	4.69 (0.07)
Pretest - mean		0.61***(0.03)	0.62***(0.03)		0.72***(0.03)	0.72***(0.03)		0.59***(0.03)	0.59***(0.03)
Course on content risks			0.23*(0.08)			0.24**(0.08)			0.16(0.10)
Course on contact risks			0.27**(0.09)			0.17 (0.09)			0.31*(0.11)
Course on commercial risks			-0.03 (0.08)			-0.00 (0.08)			0.00(0.10)
Random									
Level 2 - Class									
σ^2_{u0}	0.10***(0.03)	0.04***(0.01)	0.03**(0.01)	0.13***(0.03)	0.03*(0.01)	0.03 (0.01)	0.10***(0.03)	0.05*(0.02)	0.04 (0.02)
Level 1 – Pupil									
σ^2_{e0}	0.77***(0.03)	0.50***(0.02)	0.50***(0.02)	0.69***(0.04)	0.40***(0.02)	0.40***(0.02)	1.00***(0.05)	0.66***(0.04)	0.66***(0.04)
Model fit									
Deviance	2994.90	2096.52	2078.81	2279.71	1335.88	1324.12	2607.13	1654.27	1644.76
χ^2 (df)		898.38(1)***	17.71(3)***		943.83(1)***	11.76 (3)*		952.86(1)***	9.51(3)*
N (classes)	113	113	113	110	107	107	112	110	110
N (pupils)	1130	959	959	886	671	671	896	667	667

Note. Standard errors are in parentheses. * $p<.05$ ** $p<.006$ *** $p<.001$

6 Changing unsafe behavior on social network sites: collaborative learning vs. individual reflection

This chapter is based on:

Chapter 6

Changing unsafe behavior on social network sites: collaborative learning vs. individual reflection

Abstract

Because of the emerging popularity of social network sites (SNSs) among teenagers, adults' concerns about privacy and security are increasing. School education has been put forth as a possible solution (Livingstone, Haddon, Görzig, & Olafsson, 2011). However, although safety interventions regularly have an impact on knowledge and awareness, an immediate impact on attitudes and behavior is often lacking in media education interventions (Martens, 2010). A possible reason for this lack of impact on attitudes and behavior is that interventions are often developed following instructional design principles from recent educational theories, such as collaborative learning (Duffy & Cunningham, 1996). These principles might only lead to better knowledge-construction, and might not be adequate to change reputation related behavior -such as those related to risks on SNSs. Following the theory of planned behavior (Ajzen, 1991) and theories about peer pressure during adolescence (Sumter, Bokhorst, Steinberg, & Westenberg, 2009), it has been hypothesized that interventions with an emphasis on collaborative learning might be less effective in changing attitudes and behavior than interventions with an emphasis on individual reflection. To test this hypothesis, a quasi- experimental intervention study, implementing two different interventions in a real-life classroom setting using a pretest-posttest design, was set up. It was found that both a course with collaborative learning and a course with individual reflection obtained their goal in raising the awareness of contact risks on SNSs. However, only a course with an emphasis on individual reflection had a consistent impact on attitudes and behavior. Implications of these results are discussed.

Introduction

Children and adolescents are one of the main user groups of social network sites (SNSs). For instance, in July 2012 33% of the Facebook users in the US, 35% of their users in Australia, 47% of their users in Brazil and 38% of their users in Belgium were under 24 years old (checkfacebook.com). Concerns about the privacy and security of these youngsters are growing, since SNSs are based on providing personal information to connect and communicate with others. Media education at school has been put forth as a possible solution (Livingstone & Haddon, 2009). However, it was found that courses about online safety in secondary education are effective in increasing awareness of these risks, but they do not change the attitudes with regard to these risks, and they only have a limited impact on teenagers' behavior (Vanderhoven, Schellens, & Valcke, 2014a). The study described in this chapter, explores the possibilities to improve educational materials about risks on SNSs, in a way that they have more immediate impact on unsafe attitudes and behavior.

Theoretical framework

Risks on social network sites

As stated, SNSs are based on providing and sharing personal information. Therefore, children face different kinds of risks while using SNSs. One of the categories of risks teenagers face while using SNSs, are contact risks (De Moor et al., 2008). These are risks that find their source in the fact that one of the most important features of SNSs is the possibility to communicate and have contact with others. Examples of contact risks are cyberbullying, sexual solicitation and all kinds of privacy risks (De Moor et al., 2008). Indeed, next to instant messaging, SNSs are the most popular media used for cyberbullying (Livingstone et al., 2011). Additionally, they can also be used for sexual solicitation, as is seen in the process of grooming, where an adult with sexual intentions manages to establish a relationship with a minor by using the Internet (Choo, 2009). The possibility to obtain contact information by surfing on SNSs, also increases the risk of offline sexual solicitation. Moreover, teenagers face privacy risks, since they post a lot of personal and sometimes risky information online (Livingstone et al., 2011). Additionally, 29% of the teens sustain a public profile or do not know about their privacy settings and 28% opt for partially private settings so that friends-of-friends can see their page (Livingstone et al., 2011). While friends-of-friends may sound reasonable familiar, these people are nevertheless mostly strangers.

Although a lot of teenagers develop resilience to cope with these online risks (Vandoninck, d' Haenens, & Segers, 2012), exposure still causes harm and negative experiences in a significant amount of cases (Livingstone et al, 2011; Mcgivern & Noret, 2011). Unintended consequences of revealing too much personal information include damaged reputation, rumours and gossip, harassment or stalking, hacking, identity-theft and the use of personal data or information by third parties such as advertisers or superiors, teachers or the potential employer (Debatin, Lovejoy, Horn, & Hughes, 2009; Livingstone & Brake, 2010).

Furthermore, some theories predict that young teens are more impatient, and are less likely to recognize the risks and future consequences of their decisions (Lewis, 1981). Additionally, it was found that they have a harder time controlling their impulses and have higher thrill seeking and disinhibition scores than adults (Cauffman & Steinberg, 2000). This could increase risk taking by teens (Gruber, 2001), especially since SNSs are used to construct an online identity (Madden & Smith, 2010; Zhao et al., 2008), and posting pictures and interests helps in building and revealing one's identity (Hum et al, 2011). The process of personal and social identity construction is inherently linked to the development of teenagers, but SNSs give it a new dimension. The profile pages used to build an identity are often available for more people than just the peers they were built for, thereby complicating the process of privacy protection.

The role of school education

Because of all these risks teenagers face while using SNSs, many authors emphasized the role of school education in raising awareness of these online risks (Livingstone & Haddon, 2009; Marwick, Murgia-Diaz, & Palfrey, 2010; Patchin & Hinduja, 2010). Also, parents and young people report that they consider the school as an important place to receive online safety information (Safer Internet Programme 2009). This is in line with the general believe that schools have a broad educational agenda, including the enhancement of pupils' character, health and civic engagement (Greenberg et al., 2003). School education needs to enable pupils to participate fully in public life (Cazden, Cope, Fairclough, Gee, et al, 1996). In the 21st century, this means that teaching media literacy at school is a necessity. While traditionally, media literacy referred to the ability to analyze and appreciate literature, the focus has been enlarged and for some time now, it is also including skills with regard to computers (Brown, 1998). With the rise of web 2.0, this covers not only interactive exploration of the Internet, but also the critical use of social media and social network sites. Livingstone (2004a) therefore describes media literacy in terms of four skills, this is as the ability to access, analyse, evaluate and create messages across a variety of contexts. It appears that teens are better at accessing and finding information online than they are at avoiding risks posed to them by the Internet (Livingstone, 2004b). Therefore, a focus on this aspect during any form of media literacy education is invaluable.

However, although the topic of online safety has been formally included in school curricula in many European countries, the implementation is inconsistent (Safer Internet Programme, 2009; Vanderhoven, Schellens, & Valcke, 2013). Previous survey-studies with teachers in England indicate that 42% of the teachers never lectures about online safety, and only 11% reported to do so frequently (Sharples, Graber, Harrison, & Logan, 2009). Additionally, despite the fact that a variety of educational packages about safety and security in SNSs has been developed (for an overview see Insafe, 2014)), there is a lack of consistent evaluation of any educational efforts in this field (Safer Internet Programme, 2009). This causes uncertainty about the effectiveness of these initiatives. This is, it is not known whether these materials obtain their goal, which is often to raise awareness of risks, but also to change attitudes and unsafe behavior (Martens, 2010).

The few evaluation studies that could be found, delivered promising results. A survey study in secondary education showed that while there was no direct impact of attention in school for the topic of safe use of SNSs on pupils' behavior, school efforts did have an indirect impact on unsafe behavior by raising privacy care (Vanderhoven et al., 2013). Moreover, a recent intervention study found that courses about the risks on SNSs in secondary education are immediately effective in increasing awareness of these risks (Vanderhoven et al., 2014a). However, the same study revealed that these courses are not effective in changing the attitudes with regard to these risks, and they only have a limited impact on teenagers' behavior immediately after the intervention. This is in line with other studies showing that (primary) school-based measures do not immediately influence the online safety behavior of children (Valcke, Schellens, Van Keer, & Gerarts, 2007).

This lack of impact on actual behavior can also be found in the more general research field of media education and media literacy education (Martens, 2010). While research about online safety education in particular is rather scarce, more research has been done in the field of media literacy education. In this field, quantitative intervention studies in classroom settings typically find that media literacy education increases knowledge about the specific topic of the course, but attitudes and behavior are commonly not measured (Martens, 2010). Empirical research about media literacy education that did take into account these measures, indicates that attitudinal and behavioral changes are much harder to obtain (Cantor & Wilson, 2003), and often not found immediately after the intervention (Duran et al., 2008; Steinke et al., 2007).

As can be concluded, media literacy curricula as well as online safety interventions appear to have more immediate success in changing knowledge, than in changing attitudes or behavior (Austin, Pinkleton, Hust, & Cohen, 2005; Vanderhoven et al., 2014a). This is a striking verdict, considering that changing (unsafe) behavior as soon as possible is one of the primary goals of most developed educational materials (Martens, 2010). Therefore, a short-term impact is very valuable.

Changing behavior

Because education about the risks on SNSs is aimed at changing risky behavior, one should look beyond mere cognitive learning. The transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992) states in this context that a contemplation phase, in which people recognize that a problem exists, precedes the preparation phase and action phase, in which behavior is changed. Considering this model, if we want to change behavior of teenagers who behave unsafe online, we first need to make sure that they are in a contemplation stage, that is that they recognize the problem. We might state that this 'recognition' contains a logic-based aspect (awareness of the problem) and an emotional-based aspect (care about the problem). Indeed, one can state that children or adolescents who do not know about the risks on SNSs are in a precontemplation stage. Moreover, those who know about the risks, but do not recognize them as a problem as they do not care about the risks, are in a precontemplation stage as well. Therefore, a first goal of any educational material needs to be to change awareness of and care about the risks.

Further, it seems necessary to change existing interventions in a way that they have more chance to obtain their final goal of changing behavior. While investigating how interventions should be changed, it is important to have a look at the precedents of behavior. The Theory of Planned Behavior (Ajzen, 1991) states that attitudinal beliefs, subjective norms and perceived behavioral control predict behavioral intentions, which in turn predict behavior. Meta-analytic reviews show that this theory has been confirmed in many empirical studies (Armitage & Conner, 2001). With regard to safe behavior on SNSs, this means that teenagers need to believe that the safe behavior is the good thing to do, that their significant others think so as well, and that they believe that they are able to behave safe on SNSs.

Considering their significant others, it has been found that teenagers are particularly sensitive to peer pressure, and resistance to peer influence only increases when getting older (Sumter et al., 2009). Therefore, it does not come as a surprise that peer pressure is a major motivator for revealing information online (De Souza & Dick, 2009). It has been found that peers have a significant impact on different forms of decision-making of teenagers online (Heirman & Walrave, 2012; Marwick et al., 2010). We might therefore hypothesize that during adolescence, the opinion of significant others (=social norm), and mainly of their peers, has a particularly important role in teenagers' decision-making online.

Because of the opportunities SNSs offer when sharing information - e.g. communicating (Pruulmann-Vengerfeldt & Runnel, 2012) and creating an online identity (Hum et al., 2011; Madden & Smith, 2010)- risky behavior might be desirable between peers. Interventions that are aimed at changing unsafe behavior, need to take this into account. It might be hypothesized that this knowledge can be integrated in the development of school interventions by: 1) trying to decrease the social desirability of unsafe behavior with teenagers and their peers as well and 2) lowering the impact of the opinion of teenagers' peers on their behavior, at least during the intervention. The first is part of most classroom interventions, by influencing all peers at once (i.e., all peers in class, it is more difficult to reach external peers). The latter can be integrated in any intervention, by increasing the time for individual reflection during the intervention and by decreasing the 'peer time' in which pupils can be influenced by their classmates.

However, since recent educational theories (e.g. constructivism) emphasize the importance of collaborative and active learning (Duffy & Cunningham, 1996), these didactical principles have been part of many safety interventions (e.g., Insafe, 2014). Therefore, the possibility that peers negatively influence their classmates' attitudes and thereby prevent behavioral change is rather high. One might hypothesize that when there are more opportunities during the intervention for individual reflection, immediate attitudinal and behavioral changes might be more plausible. However, no research could be found that explores the immediate impact of interventions with collaborative learning versus interventions with an emphasis on individual reflection on reputation-related behavior such as using SNSs. To counter this short-coming, a quasi-experimental intervention study has been set up, to find out whether there is indeed a different short-term impact of a course about contact risks on SNSs with an emphasis on individual reflection rather than an emphasis on collaborative learning.

Method

Participants

In total 1564 pupils out of 115 secondary school classes filled in the surveys. The answers on pre- en posttest were screened for unreliable answers, such as no variance in item-answering. Unreliable cases were deleted, as were 2 classes in which implementation of the materials did not happen correctly, leaving the data of 1497 pupils between 11 and 19 years old (M=14.90, SD=1.88) that were used for analysis. However, 63 only responded to the posttest and 460 only responded to the pretest. This large dropout was probably due to the long and time consuming questionnaire. Several teachers reported not to have time to let their pupils fill in the posttest questionnaire. Yet, there was no significant difference in pretest-scores between the group who filled in both surveys and those who filled in only one survey ($F(9,595)=1.49$, $p=.15$), indicating that both groups were drawn from the same population with regard to the dependent variables.

Design

A pretest-posttest design was used, with three different conditions, as depicted in Figure 1. In one condition, a lesson was given with an emphasis on collaborative learning. In another condition, the given lesson had more emphasis on individual reflection. Apart from this, both lessons were similar. These two conditions were compared to a third, control condition where no lesson was given. The interventions are further explained in Table 1.
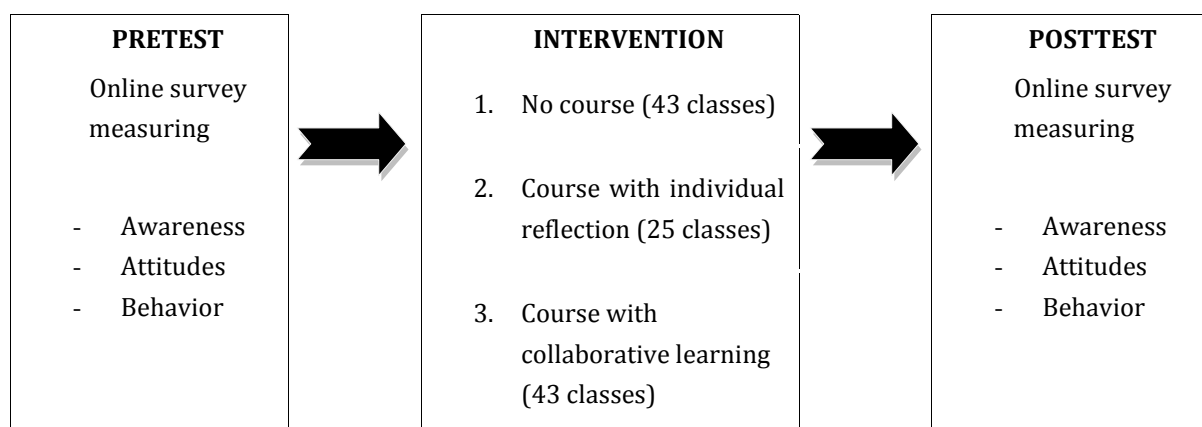
PRETEST	**INTERVENTION**	**POSTTEST**
Online survey measuring	1. No course (43 classes)	Online survey measuring
- Awareness	2. Course with individual reflection (25 classes)	- Awareness
- Attitudes		- Attitudes
- Behavior	3. Course with collaborative learning (43 classes)	- Behavior

Figure1. Pretest-posttest design with three conditions.

Table 1

Description of the different phases of the interventions in the three conditions of the study

	Condition with collaborative learning	Condition with individual reflection	Control condition
Phase 1: Introduction	The subject is introduced to the pupils		
Phase 2: simulated profile	Students receive a simulated SNS profile on paper and have to fill in questions about the profile <u>together with a peer</u>.	Students receive a simulated SNS profile on paper and have to fill in questions <u>alone.</u>	No lesson
Phase 3: class discussion	Answers of the exercise are discussed, guided by the teacher.		
Phase 4: voting game	Different statements with regard to the specific content of the course are given. Students <u>show their peers</u> whether they agree or not by raising green and red cards. Answers are discussed guided by the teacher.	Different statements with regard to the specific content of the course are given. Students <u>write down individually</u> whether they agree or not. Afterwards, answers are discussed guided by the teacher.	
Phase 5: Theory	Some real-life examples are discussed. All the necessary information is summarized.		

Procedure

To assure external validity, an authentic class situation with the regular teacher giving the lesson was necessary. Therefore, only when teachers accepted to cooperate in the research, pupils were given the link to an online survey. The teacher manual and the syllabus for students were distributed over all teachers that were willing to participate. Approximately one week after pupils filled in the first survey, the course was given in the experimental conditions. Every class participated in one course. The manual for teachers described in detail how the teacher should give the lesson (i.e. step by step instructions for the progress of the course). Two independent observers verified if the lesson was indeed given as instructed, with special attention for the emphasis on collaborative learning vs. individual reflection. After they followed the course, pupils received the link to the second online survey. Pupils in the control condition did not receive any course, but they did get the link to the second online survey at the same time as did the pupils out of the experimental conditions.

Measures

Before and after the intervention pupils' awareness, attitudes and behavior toward contact risks on SNSs were measured. Therefore, a pre- and posttest was developed based on the contact risks as described by De Moor et al. (2008). Three different scales were developed, one for awareness, one for attitudes and one for behavior, all built on the base of the means of six or more items. They all had a satisfactory reliability as measured by Cronbach's alpha (see Table 2). While the behavioral scale measures a broad set of behaviors, including reflection before posting, acting safe (e.g. using privacy-settings, not posting risky information), and reporting (e.g. cyberbullying), a direct binary measure of behavioral change was conducted by the question 'Did you change anything on your profile since the first questionnaire?'. If the latter was answered affirmatively, an open question about what they changed exactly gave us more qualitative insight in the type of behavioral change.

Table 2
Dependent variables with an indication of reliability and an example item

Variable	Items	Cronbach'sα	Example item	Meaning
Awareness	6	.78	With sexy pictures or messages people might think you have sexual intentions.	1=low awareness, 7= high awareness
Attitude	6	.77	How concerned are you that someone might approach you on SNSs with sexual intentions?	1= low concern, 7= high concern
Behavior	10	.83	I use my SNS to gossip.	1= unsafe behavior, 7= safe behavior

Results

Analysis

Since our data clearly have a hierarchical structure, that is pupils in classes, the obtained data from pupils out of the same class might be dependent, and might so break the assumptions of simple regression analysis. In this respect multilevel modeling is suggested as an alternative and adequate statistical approach. Consequently, a two-level structure is used: pupils (level 1) are nested within classes (level 2).

Moreover, since the effect of a course on three different dependent variables has to be verified, multiple models need to be tested. Therefore, a multiple testing correction is appropriate. In all analysis, a Bonferroni-correction was applied to the significance level $\alpha=0.05$, resulting in a significance of effects at the level $\alpha=0.02$. This correction results in a conservative significance level, ensuring that observed significant effects are reflecting a real existing impact of the given courses.

Three different models were tested consecutively, with respectively the measured awareness, attitudes and behavior in the posttest as dependent variables. For every dependent variable, a nulmodel was built in which the intercept β_0 represents the mean posttest-score over conditions. Second, we controlled for pretest score, by adding it as a covariate to the model. The resulting model (Model 1) shows the impact of the pretest score on the posttest score. Finally and most interestingly, the main effect of the intervention was added, with the control condition as a reference category (Model 2). Therefore, estimates of the courses give the difference in posttest-score on the dependent variable for pupils who followed this specific course compared to those who did not follow a course, when controlled for pretestscores. Only the results of this last model will be discussed.

Furthermore, the answers to the open question (what did you change on your profile since the last survey?) were divided over different categories, depending on the nature of the reported change.

Results

The results of the quantitative multilevel analysis can be found in Table 3. It was found that both the course with individual reflection and the course with collaborative learning had a positive impact on awareness of contact risks, as compared to the control condition ($\chi^2(1)=8.91$, $p<.02$ and $\chi^2(1)=7.24$, $p<.02$ respectively). However, with regard to teenagers' attitudes and behavior, a change could only be observed when the course gave the opportunity of individual reflection as compared to the control group ($\chi^2(1)=9.91$, $p<.02$ for attitudes, and $\chi^2(1)=5.67$, $p<.02$. for behavior). The course with an emphasis on collaborative learning did not have any different impact compared to the control group on attitudes ($\chi^2(1)=3.09$, $p>.02$) nor behavior ($\chi^2(1)=2.69$, $p>.02$).

Table 3
Multilevel parameter estimates for the two-level analyses of pupils' post-intervention awareness, attitudes and behavior

	Awareness	Attitudes	Behavior
Fixed			
Intercept	4.54(0.06)	4.96(0.06)	5.16 (0.06)
Pretest	0.61***(0.03)	0.62***(0.03)	0.67***(0.04)
Course with individual reflection	0.23** (0.09)	0.27** (0.09)	0.21** (0.09)
Course with cooperative learning	0.29** (0.10)	0.17 (0.10)	0.17(0.10)
Random			
Level 2 - Class			
σ^2_{u0}	0.03(0.02)	0.05**(0.02)	0.05*(0.02)
Level 1 – Pupil			
σ^2_{e0}	0.68***(0.04)	0.44***(0.03)	0.38***(0.03)

Note. Standard errors are in parentheses. * $p<.05$ ** $p<.02$ *** $p<.001$

However, the results of the answers to the binary question whether pupils changed anything on their profile since the last survey, show that both courses have some influence on the behavior of teenagers (Table 4). Indeed, no significant difference could be found between both groups in the amount of pupils who changed something ($\chi^2(1)=2.54$, $p=.11$), while both groups differed significantly from the control group ($\chi^2(1)=15.60$, $p<.001$ for collaborative learning and $\chi^2(1)=6.70$, $p<.01$ for individual reflection). In Table 4, it can be seen that most pupils who reported to have changed anything, mostly changed their privacy settings, or adapted the personal information on their profile page.

Table 4
The results of the qualitative analysis

Condition	Changed something	Privacy-settings	Account-settings with regard to commercial risks	Personal information	Pictures/videos/ interests	Password	Cyberbullying	Report button	other
Control (no course)	7%	56%	0%	24%	16%	8%	0%	0%	0%
Course with collaborative learning	17%**	75%	0%	14%	3%	0%	6%	3%	3%
Course with individual reflection	13%**	57%	0%	32%	5%	2%	0%	0%	2%

Note. ** $p<.01$

Discussion

In previous literature, school education has been put forth as an important factor to protect children against the possible risks they face when using SNSs (Livingstone et al., 2011; Marwick et al., 2010; Patchin & Hinduja, 2010). However, although safety interventions regularly have an impact on knowledge and awareness (Martens, 2010; Mishna, Cook, Saini, Wu, & MacFadden, 2010), an immediate impact on attitudes and behavior is often lacking in general media education interventions (e.g., Duran et al., 2008) and Internet safety interventions in particular (Vanderhoven et al., 2014a). A possible reason for this lack of impact on attitudes and behavior is that interventions are often developed following instructional design principles from recent educational theories (e.g., constructivism), such as collaborative learning (Duffy & Cunningham, 1996). These principles might only lead to better knowledge-construction, which is often the most important outcome of classroom teaching. However, to change reputation related behavior -such as those related to risks on SNSs- some of these instructional design principles might not be adequate. It has been hypothesized, following the theory of planned behavior (Ajzen, 1991) and theories about peer pressure during adolescence (e.g., Sumter et al., 2009), that the opinion of peers during classroom interventions might have a negative impact on their attitudes and might prevent behavioral change. Therefore, interventions with an emphasis on collaborative learning would be less effective than interventions with an emphasis on individual reflection. To test this hypothesis, a quasi- experimental intervention study was set up. It was found that both a course with collaborative learning and a course with individual reflection obtained their goal in raising the awareness of contact risks on SNSs. However, as was hypothesized, only a course with an emphasis on individual reflection had a consistent impact on attitudes and behavior. Still, while the course with collaborative learning did not have an impact on the quantitative scales, pupils in this condition reported significantly more to have changed something on their profile than pupils in the control condition (see Table 4). This difference can be explained by the fact that the quantitative scales measured a broader range of behavior instead of just 'changing something (anything) on your profile'. For example, the quantitative scale also included behaviors such as reflection before posting and reporting information (e.g., cyberbullying). This way, a mean was calculated for safe behavior in general, rather than counting every change a teenager may have made. It can be concluded that the intervention with room for individual reflection rather than collaborative learning, is more consistent with regard to obtaining this goal of changing attitudes and behavior in general.

Our findings have several implications for practice and for further research. First of all, they show that education about the risks on SNSs is not pointless, but the format and implementation should be a well-advised choice. Too often a lot of money and time are spent for materials that are developed without any theoretical or empirical base, and without any empirical evaluation afterwards (Vanderhoven, Schellens, & Valcke, 2014b). Our results show that empirical research to define critical aspects for development and implementation are invaluable, just as is empirical evaluation to define the impact of safety interventions. The latter is in agreement with previous research about prevention research in general (Nation et al., 2003).

Second, the results of this research give a first insight in one of the critical aspects that influence the amount of impact of a safety intervention on the awareness, attitudes and behavior of teenagers with regard to existing risks on SNSs. As could be expected out of the theory of planned behavior, the opinion of significant others has an important influence on teenagers' behavior. The results of this study give empirical evidence that this should be taken into account when developing educational materials about the safe use of SNSs, by increasing the possibilities of individual reflection and decreasing moments of collaborative learning. The materials developed can therefore be used in practice to raise the awareness of the risks and to change negative attitudes and unsafe behavior with teenagers in secondary schools.

Third, it seems plausible that the same reasoning may apply to interventions about other reputation-related behavior where peers might negatively influence each other, in some form of peer pressure. This might be the case for different typical prevention interventions, focusing on behaviors such as drug abuse, smoking and aggressive behavior. Further research should point this out.

Finally, further research should also focus on other critical factors that have a positive influence on the effectiveness of educational materials about the risks on SNSs. Indeed, in this study, we focused on peers as important significant others of teenagers. However, parents also have an important role in the life of adolescents. Therefore, involving parents in interventions might have a positive impact on their effectiveness. Following the theory of planned behavior (Ajzen, 1991), other aspects can be put forth that might have a positive impact as well, such as influencing their perceived behavioral control (e.g., increasing their confidence in using privacy-settings). Ideally, further research will follow a design-based approach, starting from the practical problems observed (e.g., unsafe behavior), and using iterative cycles of testing of solutions in practice. By refinement of problems, solutions and methods, design principles can be developed that can guarantee that next to a knowledge gain, behavior will be safer as well (Phillips, McNaught, & Kennedy, 2012).

Despite the invaluable contribution of this impact evaluation study, some limitations need to be taken into account. First of all, the given courses were short interventions, in the form of a one-hour class. A longer intervention might be beneficial to have a stronger impact. Indeed, research in the field of prevention shows that campaigns need to be sufficiently dosed to be effective (Nation et al., 2003). However, it was chosen to develop short interventions to limit the workload of teachers, who reported not to have much time to spend on this cross-curricular topic (Vanderhoven et al., 2014b).

As a consequence of this decision, the course is focusing on teenagers in general, regardless of individual characteristics, such as gender, age or the amount of online activities. It has been found however that some children are significantly less likely than others to be able to respond adequately when exposed to online risks. Moreover, children reporting more psychological difficulties and a low self-efficacy are often more upset by the risks they encounter (Vandoninck et al., 2012). Therefore, it would be interesting to take these individual differences into account

in future research, in order to know what kind of impact the intervention has on these 'vulnerable' teenagers.

Second, based on previous research, it was hypothesized that peers might have a negative influence on each other with regard to risk behavior (De Souza & Dick, 2009; Heirman & Walrave, 2012; Marwick et al., 2010). Therefore, collaborative learning activities were substituted by exercises with time for individual reflection. However, this way a possible positive influence of peers was excluded as well. One can argue that individual reflection and collaborative learning are not mutual exclusive and that both can be combined in one intervention. For example, by starting with an exercise with much attention for individual reflection and afterwards trying to increase the positive impact peers might have on each other, by integrating forms of collaborative learning in the intervention, the positive impact of individual reflection, and the possible positive impact of collaborative learning might be combined. However, an intervention combining both didactical principles would take more time. For the same reason as described above (i.e., the teachers' time constraints), it was chosen to keep the intervention as short as possible. Still, future research could point out the added value of extending the course by integrating a focus on the possible positive influence of peers.

Finally, this study only focused on an immediate, and thus short-term impact. This is in line with previous media literacy research (Martens, 2010), but it has important consequences for the interpretation of the results. For example, it might be reasonable that the intervention with collaborative learning had a delayed impact on attitudes and behavior, so that this impact was not observable in the posttest scores that were measured immediately after the intervention. Of course, although in our study no conclusions could be drawn about long-term effects, the finding that an intervention with more time for individual reflection has the potential to attain an immediate impact on attitudes and behavior is very valuable. It surely is desirable that the impact of interventions about risks on SNSs is observable as soon as possible. Still, given the raising importance of sustainable learning, future research using a longitudinal approach might be interesting, not only to find out if an intervention with collaborative learning has a delayed impact but also to find out whether the impact of the intervention with individual reflection is persistent over time.

As a conclusion, it can be stated that while collaborative learning is described as an important instructional strategy to increase knowledge (Duffy & Cunningham, 1996), it is less effective in immediately changing reputation-related behavior. This has important implications for prevention-strategies, especially with regard to changing unsafe SNS behavior. Courses in secondary education should give the possibility of individual reflection, if they want to attain an immediate change in attitudes and behavior. Since this is a desirable goal of teaching children how to act on SNSs, our results are a clear indication of the importance of empirical research to evaluate educational materials and to define critical implementation formats. For now, we can conclude that in this particular case, a problem shared is not a problem halved.

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7 | How authentic should a learning context be? Using real and simulated profiles in an intervention about safety on social network sites

This chapter is based on:

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Chapter 7

How authentic should a learning context be? Using real and simulated profiles in an intervention about safety on social network sites

Abstract

With the rise of social network sites (SNSs), there is an increasing need for safety education within the current cyber society. To this end, a variety of educational materials have been developed to prepare children to be vigilant when interacting on such sites. However, little is known about the critical design aspects necessary to make these materials effective. In this study, we build on the results of two previous studies, in which we found that general instructional principles drawn from constructivism, such as collaborative learning, are not always appropriate to teach children how to behave safely online. This study therefore focuses on the importance of authentic learning and active learning as critical design features. A quasi-experimental study was conducted in secondary schools in order to compare the impact of two classroom interventions about the risks on SNSs. As part of the intervention, students were presented scaffolds toward different risks related to a SNS profile through a series of questions. In the control condition, these questions concerned a simulated SNS profile on paper containing signs of many risks. In the experimental condition, students had to answer the same questions about their own SNS profile on a computer. It was hypothesized that the simulated profile would not be experienced as realistic, and that students would have difficulties identifying with it. On the other hand, teenagers were expected to be able to recognize more risks on the simulated 'worst-case scenario' profile than on their own profile, which would facilitate the scaffolding process in the control condition. The results of the study mostly confirmed these hypotheses. Furthermore, the question arose whether the intervention based on the own realistic profile was educationally more valuable than the intervention based on the simulated profile, but no such added value was found. On the contrary, the scaffolding questions about the simulated profile were found to be more effective in teaching the teenagers about the different categories of risks that were tackled. Based on these findings, the importance of an authentic setting is put into perspective. Within in the context of the classroom intervention to promote safety on social networking sites, the exercise based on the simulated SNS profile is put forward as the more effective teaching strategy.

Introduction

Researchers, parents, teachers and teenagers agree that media literacy education is increasingly important in this 21st century, when participatory and collaborative network technologies such as social network sites (SNSs) are dominantly present (Livingstone, 2004a; Safer Internet Programme, 2009). Since children have been found not to be competent in

avoiding some of the risks posed to them by the Internet (Livingstone, 2004b), education on cyber security and e-safety seems particularly essential. Examples of risks that teenagers might come across when using popular SNSs are cyberbullying, sexual solicitation and privacy risks (De Moor et al., 2008). School education about these risks is proposed as a solution in order to empower minors to deal with such online dangers (Livingstone & Haddon, 2009; Marwick, Murgia-Diaz, & Palfrey, 2010; Tejedor & Pulido, 2012).

To this end, a vast array of educational materials has been developed to raise awareness and to change unsafe behavior (e.g., Insafe, 2014). However, only few of these packages have been evaluated so far (Mishna, Cook, Saini, Wu, & MacFadden, 2010; Vanderhoven, Schellens, & Valcke, 2014a), and there has been only limited attention for the critical aspects of effective materials. Research about prevention campaigns in different subjects, such as drug abuse and aggressive behavior, nevertheless, shows that it is important not to rush the development of materials, but to develop materials around strategies that are known to be effective (Jones, 2010; Nation et al., 2003).

It is for these reasons that we developed a new intervention with educational materials for teenagers in secondary education based on specific instructional design principles drawn from constructivism (Vanderhoven, Schellens, & Valcke, 2014b). In the following, we describe these learning principles and how they were applied in this initial developed intervention. We then describe the results of two preceding evaluation studies that tested the impact of these initial interventions on the awareness and behavior of the students. Based on the results, three hypotheses were formulated concerning the learning principles of authentic learning and active learning. We explain why and how we adapted the classroom intervention on the base of these hypotheses. Finally, we clarify the goal of the current study: establishing whether the adapted intervention has more educational value than the initial developed intervention.

Learning principles

As stated, the intervention that we initially developed was based on instructional design principles drawn from constructivism (Vanderhoven et al., 2014b). As the dominant theory of the last decades in the field of learning science, constructivism mainly implies that learning is an active process, in which the learners actively construct their knowledge (Duffy & Cunningham, 1996). This knowledge cannot be transferred from one person to another just by lecturing. Therefore, some basic learning principles are introduced for the development of educational materials to maximize the chances of successful learning (Karagiorgi & Symeou, 2005). In the initially developed educational materials, we particularly took into account the principles of collaborative learning, situated learning and active learning (Vanderhoven et al., 2014b).

The first principle, collaborative learning, is based on the fact that, for constructivists, learning is inherently a social-dialogical process. Working together helps in sharing and developing multiple viewpoints. As Duffy and Cunningham (1996) stated, collaborative learning provides variation in classroom activities, and teaches students how to work together and share the workload. For this reason, we added a two-by-two exercise to the intervention in which

students had to cooperate to answer different questions about a simulated SNS profile, hence ensuring collaborative learning.

Secondly, we took into account the principle of situated learning. Learning is more likely to be meaningful if it is embedded in a realistic context (Duffy & Cunningham, 1996; Snowman, McCown, & Biehler, 2008). This is also called authentic learning: learning should take place in a socio-culturally relevant context that maintains the complexity of the authentic context (Karagiorgi & Symeou, 2005). To ensure situated learning during our intervention, we made the simulated profile described above as realistic as possible. The design of the profile mimicked that of popular SNSs, containing different similar parts such as a user name, personal information, interests, relationship status, *likes*, ads and status updates.

The third principle is that of active learning, or, in other words, learning by doing: knowledge and skills are acquired better when they are actively practiced. Learners need to develop effective ways to resolve problematic situations (Duffy & Cunningham, 1996). Technology and teachers can help to obtain this active learning by providing scaffolding opportunities. Scaffolds guide the learners from what they already know to what needs to be known (Wood, Bruner, & Ross, 1976). This principle was applied in the materials by alternating a number of instructional strategies with different levels of activity and participation. These specific didactical strategies, such as a voting card game, ensure the active participation of the students. Moreover, the simulated SNS profile described above contained all kinds of possible risks (e.g., a sexy profile picture, gossip, posts with contact information). Instead of just stating this information, the exercise was set up in such a way to guide the students toward these existing risks through scaffolding questions. These questions are summarized in Table 1, together with examples of possible answers.

Evaluating learning principles in e-safety interventions

With the developed intervention, the aim was to raise awareness of the risks on SNSs, and to change unsafe attitudes and behavior. To establish whether the principles behind the development of this intervention can effectively obtain this goal, a number of evaluation studies were conducted. A first evaluation of the developed materials showed that the initial design principles described above were not necessarily effective in educating about the risks on SNSs. Although the intervention did affect risk awareness, the impact on unsafe behavior was found to be limited (Vanderhoven et al., 2014b). On the basis of the results of a second study, time for individual reflection, rather than collaborative learning, appeared to be a critical aspect of effective educational materials if the aim is both raising awareness and changing unsafe behavior on SNSs (Vanderhoven, Schellens, & Valcke, 2014c). Indeed, although collaborative learning is put forth by constructivists as an important instructional strategy to increase knowledge (Duffy & Cunningham, 1996), it was found to be less effective in changing unsafe behavior on SNSs. Therefore, the intervention was adapted so that the two-by-two exercise with

Table 1

Scaffolding questions in the exercise with the simulated profile (Vanderhoven et al., 2014b)

Scaffolding question	Examples of possible answers (information that can be found on the simulated SNS profile)
Do you see any signs of bullying, mean statements or hurtful information? If so, where?	Yes. the owner of the profile joined the group " I hate my math teacher" In the personal information, it says "I hate fat people".
Are there any signs of gossip? If so, where?	Yes. There is a status update stating "Haha, Caroline made a fool out of herself today, again. She's such a loser."
Are there sexually loaded pictures or is there sexually loaded information on the profile? If so, where?	The profile picture can be considered as sexy by some. Her profile name is Sexy_Julie
Do you think this girl could be approached with unwanted, sexual messages? Why (not)?	Yes. She reveals contact information such as her address and email address, and states that she is 'looking for a relationship', together with the sexually loaded information above.
Do you see any personal and/or contact information on the profile? What kind of information?	Harmless information such as the color of her hair and eyes, and possibly risky information, such as her address, email address, date of birth, name and surname, mobile number.
Do you think that this profile can only be seen by people the girl wants the profile to be seen by? Or might it be visible for strangers, acquaintances or even teachers or parents? Why? Do you think this is harmful?	It is not clear whether Julie uses her privacy settings. However, she has 1263 'friends' on her social network site. Therefore, it is quite likely that strangers can also see her information.
If you have a profile yourself: do you have the same kinds of information on your profile? What would you do and what not?	Dependent on the student.

the simulated profile had to be completed individually, leaving more time for individual reflection.

The results of these first two studies indicate that the initial instructional principles drawn from constructivism are not necessarily appropriate to raise awareness and change unsafe behavior. Additional research might point out that, next to collaborative learning, other instructional design principles that were taken into account in these materials might be inefficient as well. To verify this, this study focuses on the importance of the principles of active learning and authentic learning in the context of education about risks on SNSs. As stated, these principles were embedded in the initially developed materials (Vanderhoven et al., 2014b), by including an exercise with scaffolding questions about a simulated SNS profile that mimicked a

real profile. The simulated profile reflects an authentic SNS context, and the scaffolding questions elicit active learning.

However, it can be argued that this exercise does not satisfy the requirements of an authentic context for two reasons. Firstly, no technology is involved. The simulated profile is provided on paper, not on a computer, thus decreasing the complexity of the real context and its authenticity. Secondly, the profile contains so many risks (since it is a 'worst-case scenario') that it might appear unrealistic. Because SNS profiles are an important place for teenagers to construct an online identity (Madden & Smith, 2010; Zhao, Grasmuck, & Martin, 2008), it might be crucial that students can identify with the simulated profile, in order to establish an authentic setting.

Decreasing the number of risks on the profile or adding more harmless information would make the profile more realistic and thus more authentic. On the other hand, the 'worst-case scenario' profile was chosen to facilitate scaffolding toward all the categories of risk. If fewer risks were present on the profile, this would make it harder to guide the students toward these risks. Therefore, if the profile were more realistic, it might be more difficult to evoke active learning by scaffolding toward all the different risks. Moreover, the simulated profile on paper has various practical advantages, as it can be given in all classes and to all students without the need of technology, and it creates a controlled situation that is easier to implement by the teacher. Given these advantages of the simulated profile and the possible disadvantages of using a more realistic profile, the question arose whether an intervention using an exercise with a more realistic profile would be more effective in changing unsafe behavior.

The current study

The current study verifies whether establishing a 'more authentic' educational context has an added value, more specifically over the exercise with the simulated profile on paper used in the initial intervention about safety on SNSs. For this purpose, we developed a similar intervention in which the exercise with the profile had to be completed by the students using their own, real profile on a computer. By using technology and a profile that reflects the students' online identity, a more authentic context is created. Except for this adaptation, the intervention was exactly the same as the previous one. Both interventions were implemented in secondary school classes. As a starting point, we developed three hypotheses:

H1)   The simulated profile is not experienced as realistic.
H2)   Students have difficulties identifying with the simulated profile.
H3)   Teenagers recognize more risks on the simulated profile than on their own profile.

On the basis of these assumptions, we then formulated the following research question: Is it educationally more valuable to work with an existing, authentic context or to create a simulated context when teaching about safety on SNSs?

Method

Design & Participants

In order to answer this research question, we set up two interventions with the aim of reducing the risks on SNSs for secondary education students. In both interventions, scaffolding strategies were used to draw the students' attention to the risks on SNSs through questions about a SNS profile. A pretest- posttest design was used with one control condition, in which the exercise is completed with a simulated profile, and one experimental condition, in which the exercise is done with the students' own SNS profile. These conditions are described in Table 2, with regard to the didactic principles used, the assumptions made, and the (dis)advantages related to the respective conditions.

A total of 18 secondary school classes participated in the study, comprising 80 students between 13 and 19 years old (M=15.64, SD=1.23). Of these students, 56% were girls, and 44% were boys. Both the control group and the experimental group consisted of 40 students.

Table 2

Comparison between the two conditions of the study, with regard to the didactical principles used, the hypotheses proposed and the advantages related to the respective conditions

	Control condition	Experimental condition
Didactical principles		
Authentic setting	simulated SNS profile [1]	own SNS profile
Active learning	scaffolding questions: all risks available on the profile	scaffolding questions: no control over available risks
Hypotheses		
Realistic?	No	Yes
Can they identify?	No	Yes
Number of risks	Worst-case scenario: many	Depending on owner of the profile
Advantages		
Implementation	Easy to implement: controlled	More difficult to implement: variation
Technology	Not necessary	Necessary

[1]Evidence-based materials described by Vanderhoven et al. (20104c)

Measurements

A mixed-methods approach was used to obtain both quantitative and qualitative data from students in a pre- and posttest online survey.

Quantitative data

The online survey was developed to gather different kinds of information from the participating students. First of all, some general data were collected, such as their gender and age, whether they had a profile on an SNS, and which SNS they used most. Furthermore, to measure the amount of risky information found on the profile during the exercise, a scale was developed, consisting of four items on a 7-point Likert scale (e.g.,"I believe that there was a lot of risky information on the profile", 1= totally disagree, 7= totally agree, Cronbach's α=.88). The students who received the simulated profile were also asked whether they could identify with this profile in three items on a 7-point Likert scale (e.g., "I can imagine having a profile like the profile of Sexy Julie", 1= totally disagree, 7= totally agree, Cronbach's α=.92), and whether they found the profile realistic, again in three items ("The profile of Sexy Julie is a typical profile you find online", "My friends could have a profile such as the profile of Sexy Julie", and "The profile of Sexy Julie is an exaggeration"). Since the internal consistency of these last three items appeared to be low (Cronbach's α=.24), they are considered separately in the discussion of the results.

Finally, the effectiveness of the intervention was measured using several additional scales. To value the students' awareness of risks on SNSs, we developed a scale consisting of six items about different risks on SNSs (De Moor et al., 2008), such as "Some information on SNSs such as pictures, videos, comments is mean and offensive." (1= totally disagree, 7= totally agree, Cronbach's α=.74). Moreover, to assess their attitudes toward different kinds of behavior on SNSs and their actual behavior, a number of subscales were devised following the manual of Fishbein and Ajzen (2009). Based on the summary of contact risks by De Moor et al. (2008), unsafe behavior on SNSs was operationalized by five particular types of behavior: posting personal information, posting sexual information, cyberbullying, not using privacy settings and not reflecting before posting/doing something on SNSs. The attitudes toward these behaviors and the behaviors themselves were measured for every type of behavior, using three items on a 7-point Likert scale (1= safe, 7=unsafe; Chronbach's α>.78 for all scales). Subsequently, two scales were calculated based on the mean score on the five subscales, to indicate the general attitudes toward unsafe behavior and the general unsafe behavior, respectively.

Qualitative data from students

To assess the effectiveness of the intervention, the posttest survey also contained an open question, which directly asked what students had learned during the intervention.

Procedure

Before starting with the intervention, we asked the teachers if they wanted to cooperate. To assure external validity, the intervention required a regular classroom setting with the teacher teaching the students, using the manual with detailed instructions for teachers and the syllabus for the students. When the teachers consented to cooperate in the research, their students were given the link to an online survey. Approximately one week after they had filled out the first survey, they received a homework task containing the SNS profile exercise. This exercise was given as homework to facilitate the technological requirements of the experimental condition (for which a computer was necessary to complete the exercise). The homework task was afterwards discussed during a classroom session. In both conditions, the classroom discussion was extended with an in-class voting game with statements and a summary of theory about risks on SNSs, resulting in a one hour classroom session (Vanderhoven et al., 2014c). After this session, students were provided with the link to the second online survey. The complete research procedure is depicted in Figure 1.
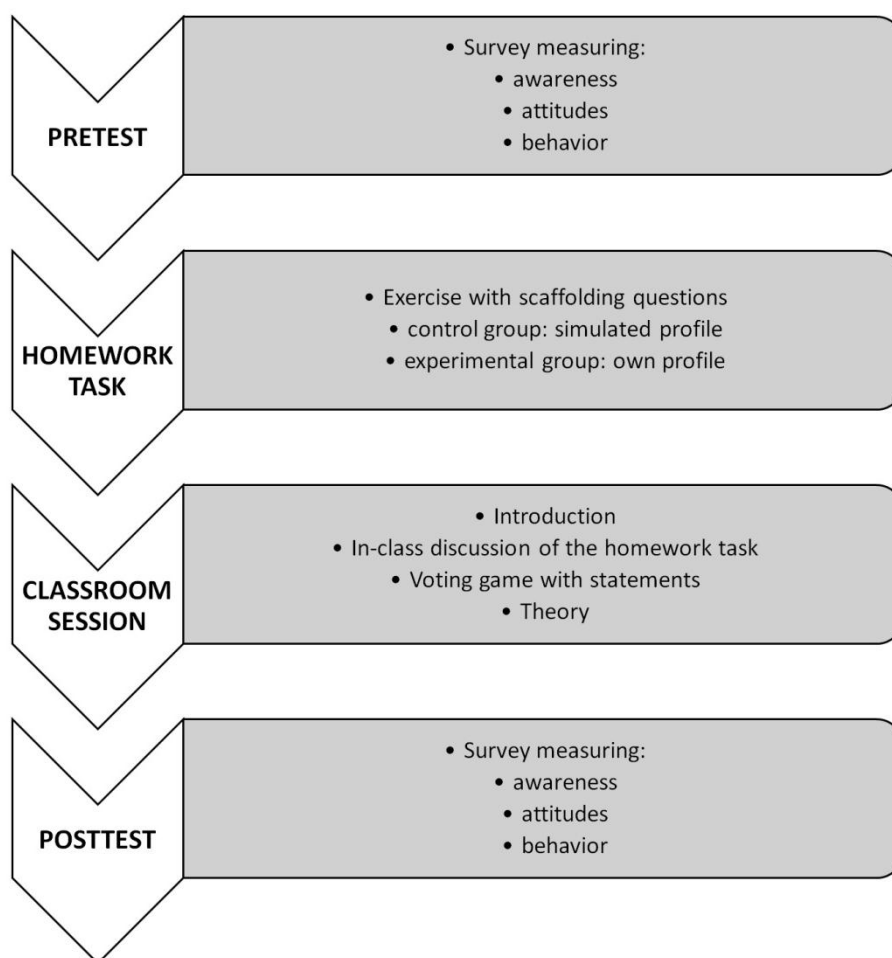
Figure 1. Description of the research procedure.

Analysis

Firstly, in order to establish whether there was a difference in impact between the two conditions, three ANCOVAs were consecutively executed with as a dependent variable the posttest scores on awareness, the posttest attitudes, and the posttest behavior, respectively. In all ANCOVAs, the corresponding pretest score was added as a covariate, to control for individual differences in the pretest. Furthermore, the kind of exercise (condition: control or experimental) was added as a predictor in the analysis, to establish whether there was a difference in impact between the two interventions. Since a multiple testing correction is appropriate (Bender & Lange, 2001), a Bonferroni correction was applied to the significance level α=0.05 in all quantitative analyses, resulting in a conservative significance of effects at the level α=0.02.

Secondly, the answers to the open question were coded binary: 1 if students reported to have learned something (anything that could have been learned during the intervention), 0 if they reported not to have learned anything. A χ^2-test indicated whether more students reported to have learned something in the condition with the own profile compared to the condition with the simulated profile.

Finally, the answers to the open question with regard to what students had learned during the intervention were screened for the three main categories of contact risks (De Moor et al., 2008): cyberbullying, sexual solicitation and privacy risks. To this end, three binary variables were created, one for each category. If the students indicated that they had learned something about a certain category of risk, the corresponding variable was coded as 1. If they did not mention this category of risk in the open answer, the variable was coded as 0. For every variable, a χ^2-test showed whether there was a difference between the conditions in the number of students reporting to have learned about this category of risk.

Results

Testing the hypotheses

Once all the data was gathered, the three hypotheses that were put forth were first tested:

H1)   *The simulated profile is not experienced as realistic.*

With regard to the first assumption, students reported that the simulated profile was exaggerated (M=5.66, SD=1.72), and that their friends would not have similar profiles (M=2.55, SD=1.57). However, the rather neutral score on the item "The profile of Sexy Julie is a typical profile you find online" (M=4.59, SD=1.65) indicates that the profile is not completely unrealistic.

H2)   *Students have difficulties identifying with the simulated profile.*

As a confirmation of the second assumption, students were found to have difficulties identifying with the simulated profile of Sexy Julie, which can be demonstrated by the low mean score on the identification scale (M=1.63, SD=1.10).

H3)   *Teenagers find more risks on the simulated profile than on their own profile.*

An independent sample t-test showed that teenagers indeed recognized more risks on the profile of Sexy Julie than on their own profile ($t(74)=-6.28$, $p<.001$). Therefore, the third assumption can be confirmed as well.

Answering the research question

The results of this study confirmed not only that teenagers could not identify with the simulated profile – which might indicate the lack of a proper authentic setting-, but also that more risks could be recognized on this profile compared with their own profile, thus facilitating active learning with scaffolding questions. It is therefore interesting to analyze whether there was a difference in impact between the control and the experimental condition in this study.

Quantitative analysis

As mentioned above, three ANCOVAs were performed with awareness, attitudes and behavior as the respective dependent variables. There was no difference in impact between the two conditions when controlled for pretest scores, not for awareness ($F(1,77)=.12$, $p=.73$), attitudes ($F(1,72)=.001$, $p=.97$) or behavior ($F(1,72)=.38$, $p=.54$).

Qualitative analysis

Firstly, the binary-coded question whether students had learned something (yes/no) was analyzed. It was found that in both conditions, the same number of students reported to have learned something, as there was no statistically significant difference between the conditions (see Table 3). Secondly, we verified whether different categories of risks were mentioned by the students. While the same number of references to cyberbullying and privacy risks was made, there were more references to the risk of sexual solicitation in the control condition (e.g., "It is important not to post sexual information on your profile, because this may lead to sexual solicitation"). Statistical results are shown in Table 3.

Table 3

Comparison between the two conditions with regard to the open question "What did you learn during the course?", χ^2- tests indicate the significance of the difference

	Control condition	Experimental condition	$\chi^2(1)$
Students who reported to have learned something.	85,7%	76,9%	.93
What did you learn something about?			
cyberbullying	14,3%	17,9%	.18
sexual solicitation	17,1%	2,6%	4.58[*]
privacy risks	40%	43,6%	.10

Note: *= *p<.05*

Discussion & Conclusion

Since there is a widespread consensus among researches, parents and teenagers that school is an important place to learn about online safety (Safer Internet Programme, 2009; Tejedor & Pulido, 2012), different educational materials have been developed on this topic (e.g., Insafe, 2014). Previous research has shown that more research is required about the impact of these materials (Vanderhoven et al., 2014a). More specifically, given that general didactical principles drawn from the field of constructivism were found to be ineffective for education on online safety (Vanderhoven et al., 2014c), more research is necessary to develop specific design principles for effective education about the risks on SNSs. To this end, this study tested the importance of two didactical principles, namely situated learning and active learning.

The results of the study confirmed our assumption that the simulated profile used in our initial materials was not sufficient to generate an authentic context, because students cannot identify with it. Additionally, the results also support the hypothesis that students would find more risks on the simulated profile of Sexy Julie, which facilitates the process of active learning through scaffolding strategies. Given the advantages of the simulated profile (i.e, better scaffolding opportunities, less technology needed and easier to implement), the question arose whether making the context more authentic by using the students' own profile was educationally more valuable than using the 'worst-case scenario' simulated profile. The quantitative results of this study showed that there was no difference in impact between the two conditions, and therefore that there was no added value in making the context more authentic. The qualitative results even showed that in the control condition more students reported to have learned something about sexual solicitation, one of the contact risks tackled in the intervention. There was no difference in the number of students that reported to have learned something about the other two risks (privacy risks and cyberbullying).

These results indicate that the number and the kind of risks that were available on the profile of Sexy Julie helped to scaffold toward all the different risks. This scaffolding seemed to have been more difficult when the students had to work with their own profile, as it seemed to be challenging for students to discover risks on their own profile. For example, while students found the simulated profile not entirely unrealistic, they reported that they could not have such a profile themselves, nor could they imagine that their friends had similar profiles. This means that students are not able to recognize the risks in their own profiles and perceive these risks as remote from their personal lives. This is in line with previous research, which found a "third person effect", meaning that people perceive less risks to themselves than to others (Debatin, Lovejoy, Horn, & Hughes, 2009). People often state that the information other persons reveal creates risks to them, but they are less concerned about the risks they create to themselves (Acquisti & Gross, 2006). To raise awareness and to start a classroom discussion, it is therefore necessary to provide examples, and to explain to teenagers that these risks exist (e.g., by using scaffolding questions). This seems to be beneficial, even within a less authentic context. However, future research should establish whether this "third person effect" still exists after classroom conversations about all the risks, and whether more efforts are necessary to help the students to transfer the acquired knowledge to their own lives.

In addition, these results have important practical implications. As stated above, the simulated profile has significant practical advantages. Setting up courses that involve technology remains challenging in some schools. Many teachers and developers will therefore be happy to know that courses that simulate digital contexts on paper are just as effective, or, in some cases, even more effective, than courses in which the real authentic digital context is implemented. Moreover, since the simulated profile is the same for all the students in the classroom, it is easier for the teacher to discuss the results of the exercise in class afterwards. The teacher manual developed to guide the intervention with the simulated profile contains suggestions of possible answers to the scaffolding questions. In contrast, teachers need to be more flexible when using real SNS profiles.

Finally, this research also has implications for further research. It emphasizes the importance of studying different kinds of interventions, aiming to identify critical design principles for the development of media literacy interventions. Such principles will make it easier for developers, teachers and practitioners to create effective educational materials about the risks on SNSs. Ideally, future research should follow a design-based approach, starting from the practical problems observed (e.g., unsafe behavior), and using iterative cycles of testing of solutions in practice (Phillips, McNaught, & Kennedy, 2012). By refinement of problems, solutions and methods, more design principles can be developed that can guarantee a positive impact on teenagers' awareness, attitudes and behavior.

As a conclusion, it can be stated that there is no added value to creating a more authentic educational context when informing students about the risks of SNSs. However, it is important to scaffold the students toward all the types of risks to be tackled. For this reason, using a simulated profile is the preferable option for this purpose.

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8 | Involving parents in school programs about safety on social network sites

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Chapter 8
Involving parents in school programs about safety on social network sites

Abstract

Social network sites (SNSs) such as Facebook offer a lot of opportunities, but teenagers are often not aware of the possible negative consequences of posting personal, sexual, or offensive information. Therefore, schools and parents have an important role in educating kids about the risks on SNSs. In this quasi-experimental study, the impact of a school intervention with parental involvement on pupils' awareness, their attitudes, intentions and behavior on SNSs is measured. Quantitative and qualitative results give an answer to the two research questions that were put forth: (1) is an intervention involving parents effective to teach teenagers how to use SNSs safely? And (2) is organizing an information evening an effective way to involve parents in school programs? Implications are discussed.

Introduction

Children and adolescents are one of the main user groups of social network sites (SNSs). Because of the emerging popularity of SNSs among young people, adults' concerns about privacy and security are increasing. Indeed, children face different sorts of risks since SNSs are based on providing personal information to connect and communicate with others. Unintended consequences of revealing too much personal information include damaged reputation, rumours and gossip, harassment or stalking, hacking, identity-theft and the use of personal data or information by third parties such as advertisers or superiors, teachers or the potential employer (Debatin, Lovejoy, Horn, & Hughes, 2009; Livingstone & Brake, 2010).

One of the categories of risks teenagers face while using SNSs, are contact risks. Examples of contact risks are cyberbullying, sexual solicitation and all kinds of privacy risks (De Moor et al., 2008). Indeed, next to instant messaging, SNSs are the most popular media used for cyberbullying (Livingstone, Haddon, Görzig, & Olafsson, 2011). Additionally, they can also be used to send sexual messages (Livingstone et al., 2011). The possibility to obtain contact information by surfing on SNSs, also increases the risk of offline sexual solicitation. Moreover, users in general and teenagers in particular face privacy risks, since they post a lot of personal and sometimes risky information online (Livingstone et al., 2011). Additionally, 29% of the teens sustain a public profile or do not know about their privacy settings and 28% opt for partially private settings so that friends-of-friends can see their page (Livingstone et al., 2011). While friends-of-friends may sound reasonable familiar, these people are nevertheless mostly strangers. Moreover, research indicates that exposure to online risks causes harm and negative experiences in a significant amount of cases (Livingstone et al., 2011; Mcgivern & Noret, 2011).

To counter these risks teenagers need to develop new skills. Media education at school has been put forth as a possible solution (Livingstone & Haddon, 2009; Marwick, Murgia-Diaz, & Palfrey, 2010; Patchin & Hinduja, 2010). However, although the topic of online safety has been formally included in school curricula in many European countries, the implementation is inconsistent (Safer Internet Programme, 2009). Previous survey-studies with teachers in England indicate that 42% of the teachers never lectures about online safety, and only 11% reported to do so frequently (Sharples, Graber, Harrison, & Logan, 2009).

Additionally, despite the fact that a variety of educational packages about safety and security in SNSs have been developed (for an overview see Insafe, 2014), there is a lack of consistent evaluation of the educational efforts in this field (Safer Internet Programme, 2009). This causes uncertainty about the effectiveness of these initiatives. However, the few existing evaluation studies delivered promising results. A survey study in secondary education showed that while there was no direct impact of attention in school for the topic of safe use of SNSs on pupils' behavior, school efforts did have an indirect impact on unsafe behavior by raising privacy care (Vanderhoven, Schellens, & Valcke, 2013). Moreover, a recent intervention study found that courses about the risks on SNSs in secondary education are effective in increasing awareness of these risks (Vanderhoven, Schellens, & Valcke, 2014a). However, the same study revealed that these courses are not effective in changing the attitudes with regard to these risks, and they only have a limited impact on teenagers' behavior. This is in line with other studies showing that (primary) school-based measures, such as classroom discussions, do not influence the online safety behavior of children (Valcke, Schellens, Van Keer, & Gerarts, 2007).

Therefore, more research is needed to find the critical factors to change unsafe behavior and to develop materials that can obtain all goals that were put forth. By refinement of problems, solutions and methods, design principles can be developed that can guarantee that next to an increase in awareness, behavior will be safer as well. The theory of planned behavior (Ajzen, 1991) states that behavior is determined by the intention to execute this behavior, which is in turn determined by the social norm -described as the social pressure people experience to behave in a particular way-, the perceived behavioral control and the attitudes toward the behavior. Following this theory and the fact that teenagers are particularly sensitive to peer pressure (Sumter, Bokhorst, Steinberg, & Westenberg, 2009), Vanderhoven, Schellens, and Valcke (2014b) hypothesized that the 'social norm' might have an important impact on pupils' behavior. Because of the opportunities SNSs offer when sharing information - e.g., communicating (Pruulmann-Vengerfeldt & Runnel, 2012) and creating an online identity (Hum et al., 2011; Madden & Smith, 2010)- risky behavior might be stimulated between peers and peer pressure might prevent behavioral change after the intervention. Vanderhoven et al. (2014b) found indeed that when there is more time for individual reflection about the risks on SNSs during the intervention, and less collaborative learning – where peer influences might have an important impact-, the intervention is more effective in changing unsafe SNS behavior.

In the light of these results, it is interesting to note that next to peers, parents have an important role in the life of adolescents. Parents are often thought to be primary responsible for

the moral socialization of the child (Maccoby, 2007) and are seen as important actors in the education about online risks (Marwick et al., 2010; Pasquier et al., 2012; Safer Internet Programme, 2009). Moreover, encouraging positive relationships between parents and children is found to be an important characteristic of effective prevention campaigns (Nation et al., 2003), and collaboration between parents and teachers is seen as a necessary criterion for effective media literacy education (Brown, 1998). Therefore, while peer pressure negatively influenced the effectiveness of the intervention, parental involvement in school interventions might have a positive influence on the effectiveness of the intervention.

According to Berkowitz and Bier (2005), there are three main ways that a school can involve parents. First, the school can consider parents as information recipients, by only informing parents about, for example, school events and school products. This is the least active way, and considered the least effective. Second, the school can involve parents as partners, recognizing the parallels between parenting and teaching and thereby promoting the positive development of youth. Third, parents can be involved as clients, and the school can be a resource for the parents by organizing trainings in the topics of interest. Following the rapid development of SNSs, it is found that many parents lack the skills to guide and support their children's Internet use (Livingstone & Bober, 2004). Therefore, training in Internet related skills and literacy is necessary not only for teenagers but also for parents. For this reason, the materials developed and tested by Vanderhoven et al. (2014b) were extended with an information evening for parents, thereby involving the parents in the intervention as clients.

In the current study, two research questions were put forth: (1) Is an intervention involving parents effective to teach teenagers how to use SNSs safely, that is to raise awareness and change unsafe attitudes, intentions and behavior? and (2) Is organizing an information evening an effective way to involve parents as clients in school programs, that is are parents involved and do they gain skills and literacy?

Method

Design

A quasi-experimental intervention study was set up. Using a pretest-posttest survey design the impact of an intervention with parental involvement on the awareness of risks and the attitudes, intentions and the behavior of teenagers on SNSs has been measured. The design is depicted in Figure 1.
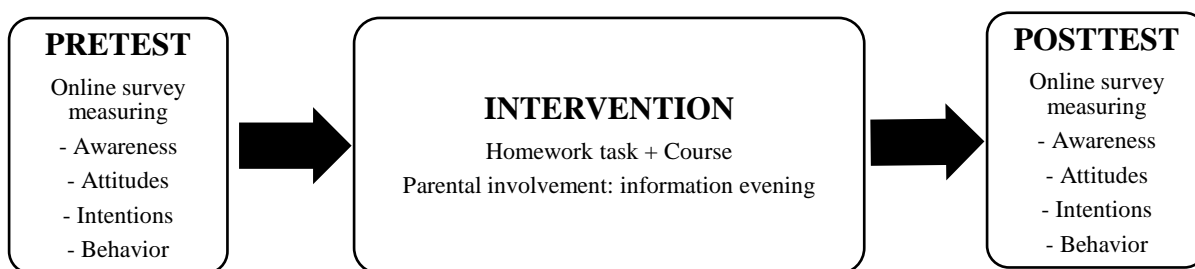
Figure 1. Pretest-posttest design with an intervention with parental involvement.

Intervention

The materials are based on those developed by Vanderhoven et al. (2014b), with a focus on contact risks on SNSs. For practical reasons, a part of the course was given as a homework task. The materials consisted of a syllabus for each pupil and a teacher manual. Furthermore, the intervention was extended with an information evening for parents, based on existing information evenings organised by Childfocus-Clicksafe (a Flemish organisation working on e-safety). This information evening was given by two of the authors. A powerpoint-presentation was used, focusing on different topics. A definition of SNSs was given, and examples of the currently most used SNSs were shown. Opportunities and risks on SNSs were discussed, with concrete examples. Next, tips and tricks for the parents on how to support their children on SNSs were given. The goal of the information evening was not to give an all-in-one solution, but to give some specific tips, such as "make a profile on a SNS yourself, so you know how it works and what it means". Practical guidelines to fulfill these tips were given, for example with screen shots of popular SNSs. Furthermore, to involve the parents actively during the evening, an electronic voting system was used. This way, parents could give their opinion about different statements anonymously, which could start a group discussion. Finally, there was room for individual questions. Table 1 gives an overview of the exact content and structure of the intervention.

Table 1

The content en structure of the intervention

Structure	Content
Homework task	Pupils answer questions about a simulated SNS profile. These questions scaffold them toward different risks (cyberbullying, sexual solicitation and privacy risks).
Course	
Introduction	The teacher introduces the topic.
Discussion of the homework task	Based on the answers of the pupils to the scaffolding questions and the answers given in the teacher manual, the teacher leads the discussion in class.
Individual voting game	Pupils write down individually whether they agree or disagree with five given statements. Afterwards, answers are discussed in class.
Examples and theory	Some real-life examples are discussed. All the necessary information is summarized.
Information evening for parents	The parents receive information about the risks and opportunities of SNSs and tips and tricks about how to support their children on SNSs in an interactive information session.

Procedure

First, teachers were informed about the research and were asked for their willingness to cooperate. To assure external validity, an authentic class situation with the regular teacher giving the lesson was necessary. When teachers accepted to cooperate, parents were informed about the research and were asked for their permission to participate and to let their children participate in the study.

Second, teachers received all the necessary materials: syllabuses for the students, a teacher manual, invitations to the information evening for the parents, and the link to the first survey that needed to be completed by the pupils. Approximately two weeks after they filled in the first survey, pupils had to prepare for the course by doing a homework task. Afterwards, the course was given in class by the teacher, following the strict protocol that was described in the teacher manual. In the same period, the information evening was organized for the parents. Approximately two weeks after the course and the information evening, the pupils filled in the second online survey.

Finally, teachers received a printed version of the book "Privacy on social network sites: A manual for teachers", developed by the SPION-project, as a reward for their participation.

Participants & Setting

In total, 14 classes out of 3 secondary schools participated in the study. The parents of the 307 pupils in these classes were invited for the information evening. The mean age of those who filled in the pre- and posttest (n=146) was 12.92 (SD=0.61), 51% were girls. Although the mean age was below the minimum age of most SNSs (=13 years old), 84% of them indicated to have a profile on a SNS and 91% of those who had a profile indicated to use Facebook.

Only 50 parents showed up at one of the three information evenings that were organized. Most of them were mothers (64%). Of the 46 pupils of whom (one of) the parents showed up, only 19 filled in both pre- and posttest (7 girls, 12 boys). Their mean age was 13.11 (SD=0.32). Of this subgroup, 18 pupils indicated to have a profile on a SNS, 16 of them indicated to use Facebook most.

Measures

A mixed-methods approach was used, gathering both quantitative data from pupils and parents and qualitative data from pupils, parents and teachers.

Quantitative data from pupils

An online survey was developed to gather different kinds of information from the participating pupils. First of all, some general questions were asked such as their gender and age, whether they had a profile on a SNS, and which SNS they used most. Furthermore, some scales were developed, to measure the effectiveness of the intervention. To measure pupils' awareness of risks on SNSs, a scale was developed existing out of six items about different risks on SNSs (De Moor et al., 2008), such as "Some information on SNSs such as pictures, videos, comments,.. is mean and offensive." (1= totally disagree, 7= totally agree, Cronbach's α=.75). To measure their attitudes toward different behavior on SNSs, their intentions to set particular behaviors on SNSs and their actual behavior, different scales were developed, following the manual of Fishbein and Ajzen (2009) to construct a theory of planned behavior questionnaire. Based on the summary of contact risks of De Moor et al. (2008), unsafe behavior on SNSs was operationalized by five particular behaviors: posting personal information, posting sexual information, cyberbullying, not using privacy settings and not reflecting before posting/doing something on a SNS. For every behavior the attitudes toward this behavior, the intention to set this behavior and the behavior itself was measured using three or more items on a 7-point Likert scale (1= safe, 7=unsafe; Chronbach's α>.93 for all scales). Subsequently, three sumscores were calculated to indicate respectively general attitudes toward unsafe behavior, general intention to set unsafe behavior, and general unsafe behavior (min=5, max=35).

Qualitative data from pupils

To measure the effectiveness of the intervention, the posttest survey also contained three open questions, that directly asked what pupils had learned in the course, if they had changed something on their profile (and what), and if they behaved differently on their SNS (and how). As a measure of involvement of the parents, pupils were also asked whether they knew if their parents went to an information evening, and how much (and what) their parents had told them about what they had learned during this information evening. Answers to these questions were coded and divided into different categories based on their content.

Quantitative and qualitative data from parents

To gather information about the involvement of the parents during the intervention, and about their skills and literacy, quantitative and qualitative data were obtained from the parents as well. During the information evenings, response technology was used to gather information about the parents opinions on their children's SNS use. Different statements and questions were presented (e.g., "Does your child have a profile on a SNS?", 1= yes, 2= no, 3= I don't know). Attending parents needed to vote anonymously for the answer they preferred, using response technology. Answers to the questions were used to guide the discussion during the information evening and to inform us about the parents' knowledge of their children's SNS use, of the amount of personal information their children post online, how they act with regard to their children's SNS use, etc. After the presentation some parents were asked how they felt about the given information evening and whether they felt that they had gained skills and literacy.

Qualitative data from teachers

After the information evening, the attending teachers were asked a few questions about their opinion on the evening, on the attendants, etc.

Results

RQ1: Is an intervention involving parents effective to teach teenagers how to use SNSs safely?

Quantitative analysis

To verify whether the intervention had an impact on the awareness, attitudes, intention or behavior of the pupils with regard to the risks on SNSs, a multivariate repeated measures analysis was conducted, with the time of measurement as a within-subject variable and the awareness-, attitude-, intention- and behavior- scale as dependent variables. No impact of the

Table 2

Means of all dependent variables, together with the results of the univariate repeated measures

	Mean Pretest (SD)	Mean Posttest (SD)	$F(1,15)$	p-value
Awareness	4.02	4.63	3.64	.08
Attitudes toward unsafe behavior	10.75	10.94	0.05	.82
Intention to behave unsafely	13.48	13.35	0.04	.85
Unsafe behavior	11.38	11.75	0.45	.52

intervention could be found (Wilks' Λ = 0.72, $F(4,12)$ = 1.14, p =.38). The means of the different scales are reported in Table 2, together with univariate statistics.

Qualitative analysis

Because of the - after drop-out- small sample size, qualitative data might give more insight into the impact of the intervention compared to the quantitative analyses. With regard to awareness, the answers to the question "What did you learn during the course" were organized into different categories. Of the 17 pupils that answered the question, almost everybody reported to have learned something. One person answered rather vague, this is "that you should behave safe on SNSs". All others referred to a specific risk or behavior: two referred to cyberbullying (e.g., *"that there is a lot of cyberbullying on SNSs"*), six referred to the risk of posting too much personal information (e.g., *"that you shouldn't post too much personal pictures on Facebook"*), two referred to sexual solicitation (e.g., "*that wrong people may use SNSs, such as pedophiles"*) and three referred to the use of privacy settings (e.g., "*that you should change some settings on your profile"*). We can conclude that for 63% of the pupils, the awareness of at least one risk on SNSs has increased.

With regard to the impact of the intervention on their behavior, two questions were asked: whether they changed something on their profile and whether they changed their behavior since filling in the previous questionnaire. None of the 19 pupils reported to have changed anything on their profile, nor did they report to have changed their behavior.

RQ2: Is organizing an information evening an effective way to involve parents in school programs?

Quantitative analysis

While the parents of 307 pupils were invited, only 50 parents showed up. This limited attendance is an indication that organizing an information evening is not the best way to involve parents. However, to know whether the information evening was effective in increasing skills and literacy with the parents that did attend, answers to the statements and questions during the information evening were analyzed.

At the start of the intervention, it appeared that parents were already aware of their children's use of SNSs: 89% reported that their children had a profile, no one reported not to know whether their children had a profile. However, 54% of the parents reported that they only know that their children have a profile on a SNS, but that they are ignorant about SNSs in general and their children's specific use of SNSs. A lot of the parents (37%) reported to have no idea of the amount of personal information that their children post online. Some of the parents (4%) even reported that they have never talked about it with their children, since they are ignorant about SNSs. For this group of parents, giving information during an information evening might be a good way to involve them in the education of their children with regard to risks on SNSs.

Qualitative analysis

Because of the limited amount of attending parents, it is interesting to have an idea of the specific characteristics of the parents that did attend, and of the schools where more parents showed up. Most of the attending parents were mothers (64%), and parents of pupils that studied classical languages (Latin). The school board and teachers of one of the participating schools reported that information evenings typically attract parents that are highly educated. Furthermore, while the same amount of parents was invited in all three schools, 50% of the attending parents came to the information evening in one particular school. This school has put a lot of effort in the information evening and was clearly more used to organizing such an event, as was observed by the attendance of more teachers and the school board, the fact that these teachers knew all of the parents' names, and the organization of a small reception afterwards.

Considering the effectiveness of the involvement of the parents that were attending, different teachers as well as parents reported repeatedly that the information given was interesting and that they learned a lot about how SNSs work, what the risks and opportunities are, about some practical aspects (e.g., changing privacy settings) and about how to support their children. Moreover, 14 of the 17 pupils whose parents attended the information evening and filled in the questionnaire, reported to know that their parents went to the information evening. Nine of them reported that their parents gave them a considering amount of information, five reported that their parents told them nothing or almost nothing about what they had learned during the

information evening. If parents told their children something, most pupils reported that these conversations contained warnings, stating that their children needed to be careful with what they post on SNSs (five cases, e.g., "*that you should be careful when posting pictures*"). Two of the pupils were given clear instructions on what they were allowed to do (e.g., "*they told me what I could post and what I couldn't post")* and two of the pupils were given more practical information (e.g., "*how I can protect my profile*").

Conclusion & Discussion

In this quasi-experimental research, it was studied (1) whether an intervention involving parents is effective to teach teenagers how to use SNSs safely, that is, to raise awareness and to change unsafe attitudes, intentions and behavior and (2) whether organizing an information evening is effective to involve parents as clients in school programs, that is to involve them and to increase skills and literacy.

Although quantitative results did not show any impact of the intervention, qualitative results indicate an important impact on awareness of contact risks on SNSs. However, no impact on behavior could be found. This is in line with previous media literacy education research, where it is found that it is much harder to obtain behavioral change than it is to find an increase in awareness or knowledge (Martens, 2010; Vanderhoven et al., 2014a). Furthermore, the small sample size in this study might prevent the observation of any significant impact.

Considering the second research question, the results of our study show that the information evening was effective in increasing skills and literacy with parents. Moreover, most parents that attended the information evening, gave their children some information afterwards about the risks on SNSs and how to behave more safely. Therefore, we can conclude that involving parents is effective at least to some extent. It should be noted however that only 15% of the invited parents attended the information evening. This indicates that simply organizing information evenings might not be the best way to involve all parents. Although the attending parents were satisfied with the information, and indicated to have learned a lot, there is no way to know the awareness, the Internet literacy and skills of those parents who did not attend the evening. Analyzing the characteristics of the attending parents points to one of the main challenges of increasing parental involvement, this is involving all the parents and not only those parents who are already involved (Reynolds, 2005). Future research should focus on methods to attract more parents to information evenings (e.g., organizing child care, better invitations or reminders; Rosenthal & Sawyers, 1996), or on different methods to involve parents. As stated by Berkowitz & Bier (2005), involving parents as a client by giving workshops or information is not the only way to involve parents. They also discuss the possibility to involve parents as partners in education. This active approach might be better suited to reach all parents, and might have a more positive impact on teenagers' behavior on SNSs.

As a conclusion, we can state that while involving parents in school programs might be effective, organizing information evenings for parents seems not to be sufficient. This is an important conclusion, since a lot of institutions (e.g., Insafe) spend a lot of money to organize

these kind of information sessions. More effective methods to involve parents should be investigated.

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9 | Decreasing risky behavior on social network sites: the impact of parental involvement in secondary education

Chapter 9

Decreasing risky behavior on social network sites: the impact of parental involvement in secondary education

Abstract

Research has shown that teenagers face a significant number of risks when using the increasingly popular social network sites (SNSs). A focus on prevention and intervention efforts to raise awareness of these risks and to change risky behavior (so-called e-safety interventions) is essential to guarantee the wellbeing of these minors. However, several studies have revealed that while school interventions often affect awareness, they only have a limited impact on pupils' unsafe behavior. Following the theory of planned behavior (Ajzen, 1991) and theories about parental involvement (Berkowitz & Bier, 2005; Nation et al., 2003), we hypothesized that involving parents in an e-safety intervention could positively influence pupils' intentions and behavior. In a quasi-experimental study with pre- and posttest measures involving 207 pupils in secondary education, we compared the impact of an intervention without parental involvement with that of an intervention with active parental involvement by means of a homework task. We found that while parental involvement was not necessary to improve the impact on risk awareness, it was beneficial to change the intentions to engage in certain unsafe behavior, such as posting personal and sexual information on the profile page of the SNS, and to reduce problematic behavior that already existed. Moreover, this beneficial impact was particularly evident for boys. These findings have important implications for prevention researchers, prevention developers, teachers, and financing institutes, as they guide us toward more effective prevention campaigns with regard to children's online safety.

Introduction

Risks on social network sites

It is quite impossible to imagine modern society without the Internet. The emerging popularity of social media and social network sites (SNSs) broadens the range of communication tools used by children and adolescents. However, the opportunities that these tools offer, such as identity formation (Hum et al., 2011; Madden & Smith, 2010) and communication (Pruulmann-Vengerfeldt & Runnel, 2012), cannot be separated from concerns about the security of these young users. In a previous study, we summarized the risks that minors face on SNSs based on a description of Internet risks by De Moor et al. (2008). We divided these risks (De Moor et al., 2008) into three categories: content risks, contact risks and commercial risks (Vanderhoven, Schellens, & Valcke, 2014a). Research indicated that adults are most concerned about the contact risks children face (Vanderhoven, Schellens, & Valcke, 2014a). These risks include cyberbullying, sexual solicitation and privacy risks (De Moor et al., 2008). SNSs are one of the

most common used media for cyberbullying (Livingstone, Haddon, Görzig, & Olafsson, 2011). Children on SNSs are more likely to be bullied and are more susceptible to harassment such as the spreading of rumours (Lenhart, 2007). Additionally, SNSs can be used to send sexual messages (Livingstone et al., 2011), and especially girls report to have had unwanted online contact that made them scared or uncomfortable (Smith, 2007). Finally, teenagers also face privacy risks since they post much personal and sometimes risky information online, while more than half of them do not change their privacy settings so that only friends can see their page (Livingstone et al., 2011).

The risks described above may pose a serious threat to minors, since exposure to online risks has been shown to cause harm, negative experiences, and emotional distress in a significant number of cases (Mcgivern & Noret, 2011; Ybarra, Mitchell, Wolak, & Finkelhor, 2006). Internet harassment is seen as a major public health issue, with aggressors facing multiple psychosocial challenges including poor parent-child relationships, substance use, and delinquency (Ybarra & Mitchell, 2004). Therefore, a focus on prevention and intervention efforts is essential to ensure the safety of children and adolescents, for whom technology is increasingly important in order to participate in society in the 21st century (Mishna, Cook, Saini, Wu, & MacFadden, 2010).

Prevention campaigns and interventions about online safety

Such prevention efforts are high on the international, political agenda (Department of Homeland Security and the European Commission - Joint Declaration, 2012; European commission, 2012). The number of prevention campaigns and awareness-raising interventions has therefore expanded tremendously over the last few years (see, for example, Insafe, 2014, for an overview of European packages). However, a systematic review showed that almost none of these packages have been empirically evaluated, and the few empirical evaluation studies that have been conducted show that while Internet safety knowledge significantly increased after an intervention, the impact of these interventions on measures of risky online behavior was not significant in any of the studies (Mishna et al., 2010). This is in line with the findings about media literacy education in general, where quantitative intervention studies in classroom settings typically reveal that media literacy education increases knowledge about the specific topic of the course, but generally does not affect attitudinal and behavioral changes (Duran et al., 2008; Steinke et al., 2007).

Changing unsafe behavior

For this reason, it is important to consider how interventions can be adapted, so that they have an impact on unsafe behavior. Theories about behavior can help to direct these adaptations. For example, the Theory of Planned Behavior (Ajzen, 1991) states that behavior is determined by the intention to execute this behavior, which is in turn determined by the subjective norm (described as the social pressure people experience to behave in a particular way), the perceived behavioral control and the attitudes toward the behavior (see Figure 1).
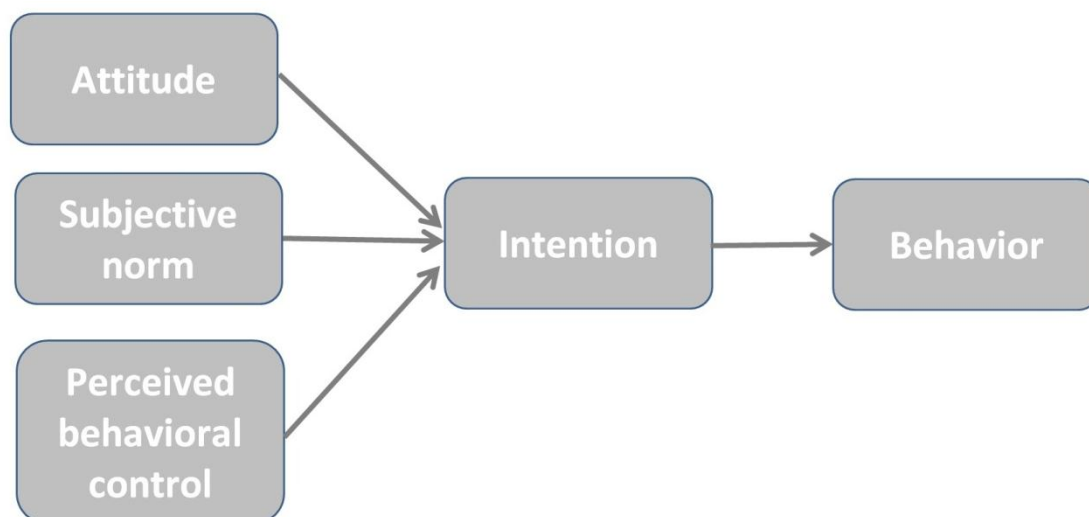
Figure 1. A simple representation of the Theory of Planned Behavior, as described by Ajzen, (1991)

Following this theory, it can be hypothesized that influencing one of the predictors of behavior during an intervention results in a change in the intention to execute this behavior, which is the first aim of any prevention campaign, and finally in a change in behavior. Previous research showed that influencing the subjective norm by decreasing peer pressure during an e-safety intervention indeed has a positive impact on the safety of pupils' online behavior (Vanderhoven, Schellens, & Valcke, 2014b). In light of these results, it is interesting to note that, next to peers, parents have a crucial role in the life of adolescents. Parents are often thought to be primarily responsible for the moral socialization of the child (Maccoby, 2007) and are seen as important actors in the education about online risks (Marwick, Murgia-Diaz, & Palfrey, 2010; Pasquier, Simoes, & Kredens, 2012; Safer Internet Programme, 2009). Moreover, a review of studies about prevention research found that encouraging positive relationships between parents and children is a vital characteristic of effective prevention campaigns (Nation et al., 2003). Collaboration between parents and teachers is also seen as a necessary criterion for effective media literacy education (Brown, 1998). Therefore, while peer pressure negatively influences the effectiveness of the intervention, parental involvement in school interventions might have a positive impact on their effectiveness.

Parental involvement in school programs

According to Berkowitz and Bier (2005), there are three main ways that a school can involve parents. First, the school can consider parents as information recipients, by only informing parents about, for example, school events and school products. This is the least active way, and is considered the least effective. Second, parents can be involved as clients, and the school can be a resource for the parents by organizing trainings on topics of interest. These kinds of trainings are an important part of several prevention campaigns (Lochman, 2000). However, a parental

information evening appeared to be insufficient to involve all parents in an e-safety prevention campaign (Vanderhoven, Schellens, & Valcke, 2014c). Although online safety is one of the most frequently reported concerns of parents (Segers & Van den Cruyce, 2012), only a limited number of parents seem to attend these information evenings (Vanderhoven et al., 2014c). The parents who attend are often higher educated and already more aware of Internet safety than those with lower levels of education (Vandoninck, d' Haenens, & Segers, 2012). Finally, the school can involve parents as partners, recognizing the parallels between parenting and teaching and thus promoting the positive development of youth (Berkowitz & Bier, 2005).

The question arises whether actively involving parents as partners of the school, hence stimulating parent-child communication, is beneficial for the impact of prevention campaigns about online safety on pupils' awareness, their intentions and their behavior. Furthermore, since, without intervention, parents have been found to be more worried about girls and to give more instructions about safely using the Internet to girls than to boys (Segers & Van den Cruyce, 2012), it is interesting to verify whether parental involvement in a school intervention has a differential effect depending on the pupil's gender. To this end, a quasi-experimental study was set up, which compared the impact of an e-safety intervention without parental involvement with that of an e-safety intervention with active parental involvement.

Research questions

With regard to these two interventions, with and without parental involvement, the following research questions were formulated: (1) Is there a difference in impact on the awareness of contact risks on SNSs, and does this differ according to gender? And (2) Is there a difference in impact on the intentions and/or behavior on SNSs, and does this differ according to gender?

Method

Design and participants

Schools and parents of the participating pupils were informed about the goals and procedure of the study, and were asked for their consent before taking part in the study. We then set up a quasi-experimental study in 20 authentic classroom settings in secondary education, randomly divided into two conditions with a different level of parental involvement (see Figure 2). In the control condition, pupils participated in an intervention about contact risks on SNSs without parental involvement, including an individual homework task. In the experimental condition, the same intervention was offered, but the pupils' parents were involved, as they were asked to work together with their children to complete the homework task. Before and after this intervention, pupils had to fill out an online questionnaire. In total, 207 pupils participated in the study with a mean age of 12.6 (SD=0.8). Three pupils did not fill out the posttest questionnaire, and 25 pupils in the experimental condition reported that they had done the homework task by themselves (instead of with their parents). The results of these pupils were left out of analysis.
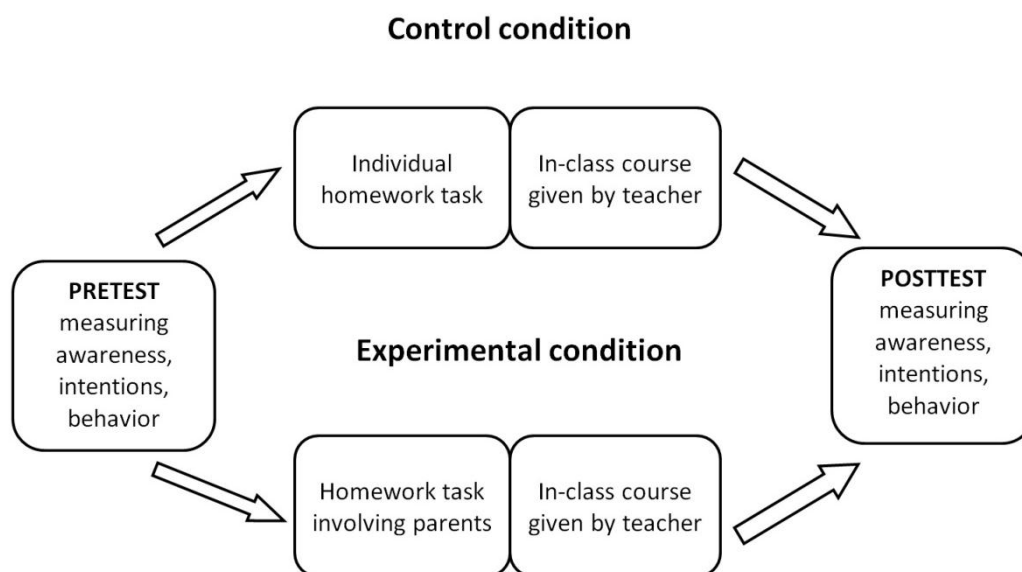
Figure 2. Procedure & design of the research.

Educational materials

The intervention consisted of two parts. First, a homework task needed to be completed. In this task, a worst-case-scenario, simulated SNS profile was given. Pupils had to answer questions about this profile, which scaffolded them toward the different sorts of risks, that is, privacy risks, cyberbullying and sexual solicitation (De Moor et al., 2008). In the control condition, pupils could answer these questions by themselves, while in the experimental condition one of their parents was asked to answer the same questions. After both answering all the questions individually, pupils and parents had to sit together and discuss the similarities and differences in their answers. For the purpose of this study, parents were asked to sign the homework task to prove that the pupils did not complete the task on their own. In both conditions, the homework task was followed by a course given by the regular teacher, in which the different types of contact risks were explored, the homework exercise was discussed, a voting game further deepened the understanding of the different risks, and, finally, some real-life newspaper items were used to provide a summary of the theory.

Measures

A mixed-methods approach was used, collecting both quantitative and qualitative data from pupils in a pre- and posttest online survey, to overcome the weaknesses of single approaches (Denscombe, 2008)

Quantitative data

The survey started with a few general questions concerning the pupils' gender and age. To measure the effectiveness of the intervention, a number of scales were developed. Firstly, to assess the pupils' awareness of risks on SNSs, a scale was developed consisting of six items on a 7-point Likert scale about different risks on SNSs (De Moor et al., 2008), such as "Some information on SNS such as pictures, videos, comments,.. is mean and offensive." (1= totally disagree, 7= totally agree, Cronbach's α=.76). In addition, in order to value the pupils' intentions to behave in different ways on SNSs and their actual behavior, several subscales were established following the manual of Fishbein and Ajzen (2009). Based on the summary of contact risks by De Moor et al. (2008), unsafe behavior on SNSs was operationalized by five particular types of behavior: posting personal information, posting sexual information, cyberbullying, not using privacy settings and not reflecting before posting/doing something on SNSs. For every type of behavior, the intentions to behave as such and the actual behavior were measured using three items on a 7-point Likert scale (1= safe, 7=unsafe; Chronbach's α>.92 for all scales).

Qualitative data from pupils

In order to establish the effectiveness of the intervention, the posttest survey also comprised an open question, which asked the pupils what they had learned during the course. In addition, they were asked whether they had made any changes on their SNS profile, or somehow adapted their behavior after the intervention.

Analysis

To answer the two research questions, we performed repeated measures analyses, with time of measurement as a within-subject variable and condition of parental involvement and gender as fixed factors. For the first research question, the awareness scale was added in the analysis as a dependent variable. For the second research question, five different, multivariate repeated measures analyses were conducted, that is, one for every type of behavior as described above, including the intentions to behave as such and the actual behavior as dependent variables. The qualitative data was analyzed by coding the answers to the open questions, and χ^2-tests revealed some differences according to conditions and gender.

Results

RQ1: Is there a difference in impact on the awareness of contact risks on SNSs, and does this differ according to gender?

Quantitative results

The repeated measures analysis showed a significant increase in the awareness of the different risks on SNSs after the intervention ($F(1,170)= 26.541$, $p<.001$). However, there were no differences in impact between the experimental and the control condition ($F(1,170)=0.029$, $p=.86$), nor were there any differences with regard to gender ($F(1,170)= 0.117$, $p=.73$).

Qualitative results

Of all pupils, 93% reported having learned something during the course. When asked specifically what they had learned (in an open question giving no suggestions), 19% mentioned cyberbullying, for example

> *"I learned that there are a lot of dangers on the Internet, and that you should be careful. You cannot bully on the Internet (cyberbullying). That is just wrong!" (pupil F.B.)[1]*

Another 17% referred to sexual solicitation:

> *"I learned that you shouldn't post content which is too sexy or provocative; you will face the consequences later. You don't need to share your whole life on Facebook." (pupil C.M.)*

Finally, 39% alluded to privacy risks, such as

> *"I learned that you should be careful with what you post, and that you should be careful that sometimes more people can see this information than you want. Also, if you post something on the Internet, you can never completely erase it."(pupil M.V.)*

Again, there were no differences between the two conditions of parental involvement. However, more girls reported having learned something than boys (97% vs 84%, $\chi^2(1)=9.06$, $p=.01$). These girls referred more to the risks of sexual solicitation than the boys who reported having learned something (21% vs. 7%, $\chi^2(1)=5.20$, $p=.03$).

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[1] The quotes of the pupils are translated from Dutch to English by the authors

RQ2: Is there a difference in impact on the intentions and/or behavior on SNSs, and does this differ according to gender?

Quantitative results

Five different, multivariate repeated measures analyses were conducted as described above. In the first one, the scales that measured the intention to post personal information and the actual posting of personal information were added as dependent variables. Pupils reported having less intention to post personal information, and actually posted less information after the intervention ($F(1,169)= 24.451$, $p<.001$ and $F(1,169)= 5.511$, $p=.02$, respectively). However, a significant three-way interaction effect was found between time of measurement, parental involvement and gender ($F(1,169)= 6.138$, $p=.01$ for intention and $F(1,169)= 4.256$, $p=.04$ for behavior), indicating that this decrease in intention and behavior is dependent on gender and the level of parental involvement during the intervention. More concretely, boys only posted less information in the condition in which the homework task had to be completed together with the parents, whereas girls posted less personal information in both conditions (see Figure 3).

The same tendency was found with regard to the intention to post sexual information, which generally decreased after the course ($F(1,168)= 25.293$, $p<.001$). Again, a three-way interaction was detected between time of measurement, parental involvement and gender ($F(1,168)= 5.434$, $p<.02$): boys benefited more from the condition where their parents are involved, whereas girls benefited from both interventions. However, with regard to the actual posting of sexual information (as opposed to the intention to do this in the future), both boys and girls benefited from parental involvement, as for both there is only a decrease of the actual behavior in the experimental condition ($F(1,168)= 5.237$, $p=.02$). Furthermore, the pupils' intentions to use the privacy settings of their SNSs clearly increased after the course ($F(1,168)= 6.157$, $p=.01$), but there were no differences between the conditions with different parental involvement or between pupils with a different gender, nor was there any impact on the actual behavior.

For cyberbullying, no significant impact was found. However, it should be noted that the pretest scores for both intention and behavior were low (M=1.48, SD=1.15 and M=1.48, SD=1.07, respectively), making an observable average decrease difficult. Likewise, no significant differences could be found for reflection.
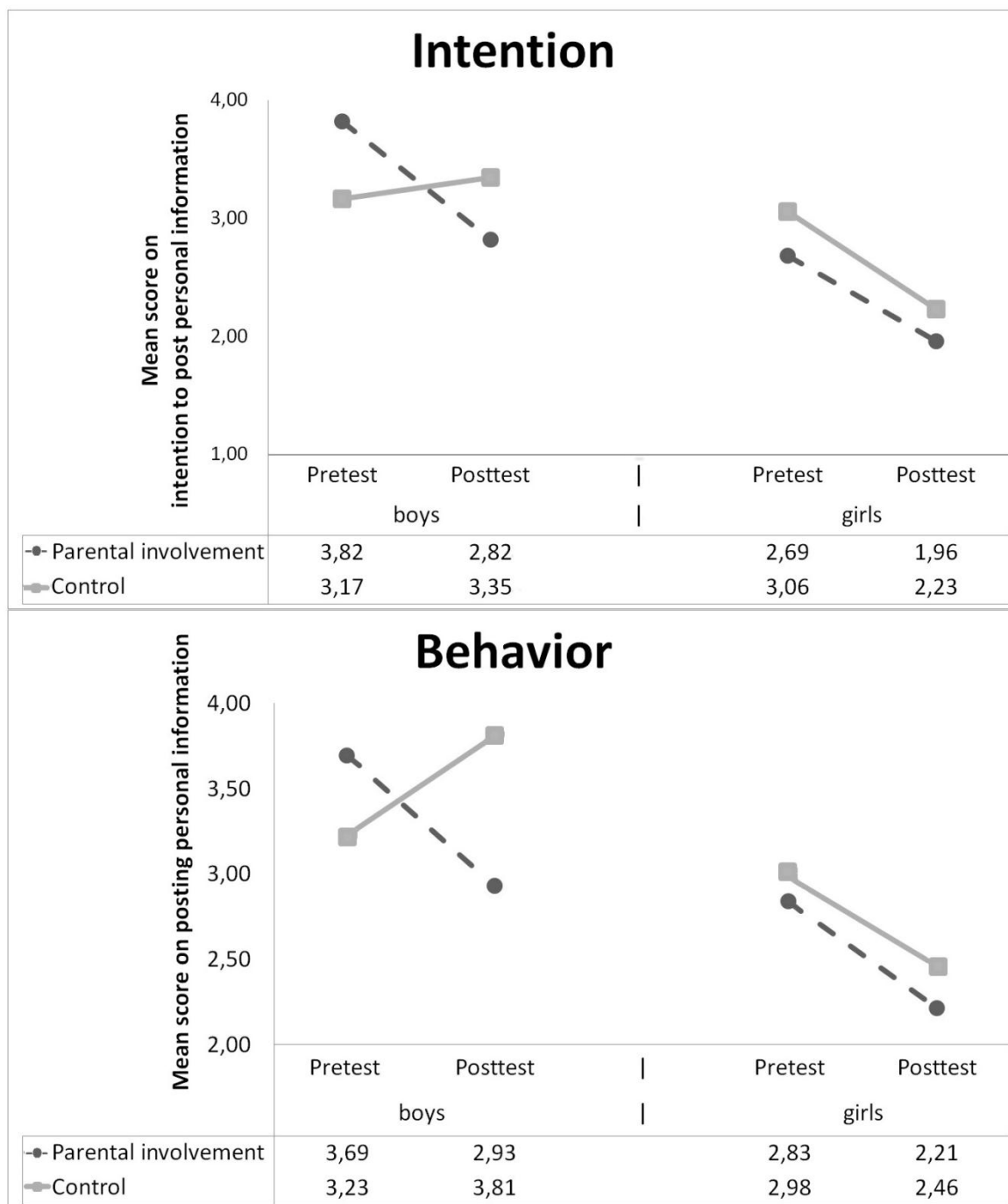
Intention

	Pretest	Posttest		Pretest	Posttest
	boys			girls	
-●- Parental involvement	3,82	2,82		2,69	1,96
━ Control	3,17	3,35		3,06	2,23

Behavior

	Pretest	Posttest		Pretest	Posttest
	boys			girls	
-●- Parental involvement	3,69	2,93		2,83	2,21
━ Control	3,23	3,81		2,98	2,46

Figure 3. Three-way interaction between time of measurement, condition of parental involvement and gender on the intention to post personal information and actually posting personal information.

Qualitative results

Of all pupils, 14% reported having made changes to their profile after the intervention. In response to an open question asking what they had changed (not giving any suggestions), 35% of these pupils mentioned having changed the content on their profile, 13% their password, and 65% their privacy settings:

> *"I deleted certain pictures, since it would be troublesome if someone would find them in the future." (pupil C.M.)*

> *"I changed who can find me on Facebook. Now only friends of friends can find me. I also made my password more complex, and I checked my pictures." (pupil Y.V.)*

There were no differences between conditions of parental involvement or in gender.

Moreover, 12% of the pupils reported having changed their behavior on SNSs in general after the intervention, of which more were boys than girls (96% vs. 84%, $\chi^2(1)=4.935$, $p=.04$). Of the pupils who changed their behavior, 25% stated that they now show respect and avoid cyberbullying:

> *"I check better who I add as friends, and I don't post any dirty stuff!! I don't post any gossip because that is no fun!!" (pupil A.C.)*

> *"Now, I would never post anything that might be hurtful, or any sexy pictures on my profile" (pupil L.B.)*

Of the pupils who reported having changed their behavior, 45% mentioned posting less personal or sexy information:

> *"I deleted my sexy pictures, and will NEVER post something like that again." (pupil F.V.)*

Interestingly, although no impact on reflection could be found in the quantitative analyses, 58% of the pupils who reported having changed their behavior mentioned an increase of reflection:

> *"Now I think before I post something on Facebook. I reflect whether it could be hurtful for someone else, and if someone else posts a picture of me in bikini on Facebook, I ask them to delete this, since I find it a bit too revealing." (pupil L.V.)*

Likewise, as an answer to the open question about what they had learned during the course, 23% of the pupils referred to reflection, a majority of which were girls (28% vs. 11%, $\chi^2(1)=$ 6.749, $p=.01$):

> *"I learned that you should be careful with SNSs. You should always think twice before you post something on your profile. Otherwise, things might turn out bad." (pupil K.D.)*

Discussion & Conclusion

While an increase in awareness of risks on SNSs was found in both the control and the experimental condition, including parents in a school intervention appeared to be beneficial for changing behavioral intentions and behavior. Moreover, for certain risky behavior, the intervention with parental involvement seemed particularly important for boys. This is in line with the expectations, since previous research showed that without any school interventions parents are already more concerned about girls and therefore give them more e-safety instructions (Segers & Van den Cruyce, 2012). For this reason, there is less added value in involving parents in school interventions for girls than for boys. This is a very interesting finding, because it demonstrates the importance of involvement and guidance of parents for both boys and girls when it comes to preventing harm caused by the use of SNSs.

Moreover, while previous research showed the difficulty of involving parents in interventions about the risks on SNSs (Vanderhoven et al., 2014c), the results of this study illustrate that a well-developed homework task provides an excellent opportunity to get parents involved in an intervention, which is beneficial for the impact of this intervention. This implies that other prevention campaigns that aim at behavioral change could benefit from a similar approach. Nonetheless, it should be kept in mind that the current approach also has some possible drawbacks. For example, teenagers may not be completely honest doing the homework task in cooperation with their parents, and instead finish the task without consulting their parents. In our study, we decreased the possibility of this sort of fraud by requiring the homework task to be signed by one of the parents, but still 25 pupils reported to have finished the homework task

by themselves (these pupils were left out of analysis). In certain environments, a required signature of the parents might not be sufficient to ensure active participation of the parents. Moreover, in environments in which parents are generally uninvolved in the activities of their children, these kinds of homework tasks might cause problems for teenagers because they cannot reach their parents. A similar kind of problem might arise when parents do not speak the language of the educational materials. Future research should focus on the possibilities and impact of the proposed method in the environments in which parents are particularly difficult to reach and to get involved.

Nevertheless, this research has important implications for several parties, such as prevention researchers, developers and teachers. Governmental and non-profit organizations often still finance the development of prevention campaigns and educational materials that are not evidence-based. The current research shows the invaluable contribution of evaluation studies, which result not only in effective interventions, but also in suggestions for design principles that can guide us toward more effective prevention campaigns.

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PART 3

A reflection to produce revised design

principles

10 A reflection to produce revised design principles

This chapter is partly based on:

Vanderhoven, E., Schellens, T., Vanderlinde, R., & Valcke, M. (2014). Developing educational materials about the risks on social network sites: A design-based research approach. Manuscript resubmitted for publication in *Educational Technology Research and Development* (after a second revision based on the reviewers' comments).

Vanderhoven, E., Raes, A. & Schellens, T. (in press). Interpretation in the process of designing effective learning materials: A design-based research example. In Smeyers, P., Bridges, D., Burbules, N., & Griffiths, M. (Eds.). (2015). *International handbook of interpretation in educational research methods* (2 Vols.). Dordrecht: Springer.

Chapter 10
A reflection to produce revised design principles

Abstract

In this chapter, the last step of the design-based research is described. This includes a reflection of the overall research procedure and all findings of the previous steps, resulting in improved theoretical understandings (Reeves, 2006). Therefore, this chapter is introduced by a short summary of the previous parts and their resulting conclusions. Second, based on these results, design principles are proposed that could lead future researchers and developers when creating new educational materials in the context of risks on SNSs. These new principles are compared with the initial principles, to emphasize the gain in specific theoretical knowledge. Finally, we discuss some of the related limitations and implications.

Introduction

A design-based research approach has several typical characteristics and is defined by (Wang & Hannafin, 2005) as

> *"A systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real world settings, and leading to contextually-sensitive design principles and theories"(p. 6-7).*

The procedure iteratively involves four sequential steps (Reeves, 2006): (1) the analysis of practical problems, (2) the development of solutions based on existing knowledge, (3) evaluation research of the solutions in practice, and (4) reflection to produce design principles. As can be seen in both the definition and the description of the procedure, the methodology aims both practice related solutions and a theoretical contribution, in the form of design principles (Vanderlinde & van Braak, 2010).

While in the previous parts of this dissertation, there was a focus on the problem analysis and the development of practice related solutions, this chapter will focus mainly on the design principles that can be derived out of the studies described in part 2 of this dissertation. To help readability, we first summarize the results that were found in the previously described research.

Previous design-based research steps

In the first phase of the research, the educational situation with regard to risks on SNSs was analyzed thoroughly. In a literature study and three explorative studies, it was found that while teenagers do face certain risks on SNSs, and school attention for the topic seems to be beneficial, existing materials needed to be adapted and evaluated (see Chapter 2 to Chapter 4). Consequently, based on the results of these studies and different theoretical design principles, new materials have been developed in a second phase of the study.

Furthermore, through five iterative cycles of implementation, evaluation and revision, the materials have been refined to assure their effectiveness with regard to increasing risk awareness and changing unsafe behavior on SNSs. The materials that were initially developed, based on initial design principles, appeared to be effective in increasing risk awareness, but they did not have an impact on attitudes and only a limited impact on unsafe behavior (see Chapter 5). Revised materials that included more time for individual reflection, and less collaborative learning, were more effective in changing behavior (see Chapter 6). An intervention that made use of a more authentic context, that is where students needed to finish a homework task with scaffolding questions about their own SNS profile instead of a simulated profile, appeared to be a little less effective (see Chapter 7). Involving parents appeared to be beneficial though. However, when only organizing a parental evening, most parents are not involved because they do not show up. A homework task that actively involves parents is proposed as the better solution. This appeared to be especially beneficial for boys. Taking into account all these findings, a final solution for practice has been developed, that effectively has an impact on both awareness and unsafe behavior.

However, as was already stated, it is important that design-based research goes beyond designing and testing particular interventions. It must lead to sharable "prototheories", that help to communicate relevant implications to practitioners and educational developers (The Design-based Research Collective, 2003). The design-based research described in this dissertation therefore also improves some theoretical understandings, as it revealed important characteristics of effective educational materials. Indeed, at the start of this research, a number of theoretical frameworks were put forth (see introduction Part 2). In the light of the results found in this design-based research, these frameworks need to be reinterpreted and contextually-sensitive design principles and theories need to be put forth. The revisions in the different intervention studies related to the used design principles are shortly summarized in Figure 1. In the following, we describe the characteristics of educational materials that are important to guarantee effective learning when it comes to teaching pupils about the risks on SNSs, and to teaching them how to behave safe on SNSs.
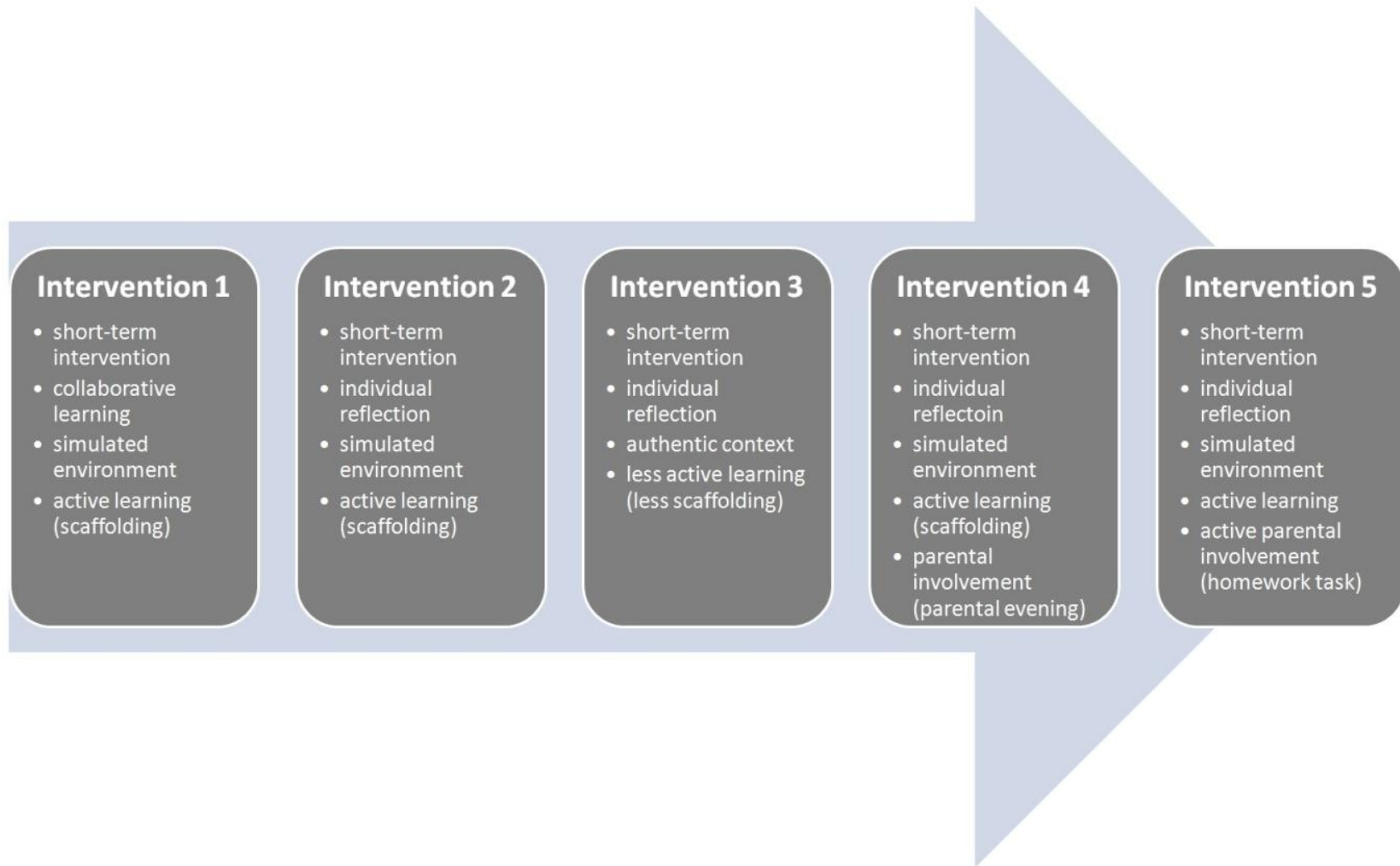
Figure 1. Schematic overview of the adaptations on the educational materials related to the design principles

Proposing design principles

Individual reflection is critical

Because of the focus on collaborative learning, the pupils involved in the initial intervention did not have the time to reflect about the risks on SNSs individually. The course consisted of a two-by-two exercise and classroom activities (see Chapter 5). No individual exercises were included in the course. These initial materials did not have an impact on pupils' SNS behavior. The second version of materials included opportunities for individual reflection, that is, exercises needed to be completed individually before classroom discussions took place. These materials had more impact on pupils' SNS behavior than the initial materials. We concluded that time for individual reflection is important to change unsafe SNS behavior (see Chapter 6).

These results can be explained by the fact that using SNSs is reputation related and posting information on a SNS is an important aspect of creating an online and social identity (Hum et al., 2011; Madden & Smith, 2010). Posting personal or other risky information is therefore often desirable between peers (e.g., posting pictures drinking alcohol might give a 'cool' impression), especially with adolescents who are less likely to recognize the future consequences of their decisions and have difficulties in controlling their impulses (Cauffman & Steinberg, 2000; Lewis, 1981). Moreover, teenagers are particularly sensitive to peer pressure, and resistance to peer influence only increases when getting older (Sumter, Bokhorst, Steinberg, & Westenberg, 2009). For these reasons, teenagers are majorly motivated by their peers to reveal information online and peers have an important impact on different forms of online decision-making (De Souza & Dick, 2009; Heirman & Walrave, 2012; Marwick, Murgia-Diaz, & Palfrey, 2010).

Individual reflection during the course, decreases the possible negative impact of peers promoting risky behavior. It gives pupils the time to reflect about how they feel about things themselves, and to reflect about possible negative future consequences of their actions, before being influenced by their peers. This time for individual reflection appears to be critical, to assure an impact of the intervention on unsafe behavior on SNSs.

Simulated environments are sufficient

The learning principle of situated learning states that learning is more likely to be meaningful if it is embedded in a realistic context, that is a socio-culturally relevant context that maintains the complexity of the authentic context (Duffy & Cunningham, 1996; Karagiorgi & Symeou, 2005; Snowman, McCown, & Biehler, 2008). This is why it could be argued that educational materials about the risks on SNSs need to involve technology and real SNS profiles. However, we found that the use of a simulated SNS profile is sufficient to obtain the proposed goals of increasing risk awareness and changing unsafe behavior on SNSs (see Chapter 7). Moreover, the impact of the intervention when using a controlled, simulated worst-case scenario profile in an exercise with scaffolding questions, was larger than the impact with the same intervention using a realistic profile of the pupils themselves. Therefore, we concluded that simulated digital environments in

educational materials about the risks on SNSs are sufficient to obtain the goals of increasing risk awareness and changing unsafe behavior.

This design principle has important practical implications, as the integration of technology in interventions is often still challenging. Moreover, when developing materials with simulated digital environments, it is easier for the teachers to control the progress of the course. The used materials are fixed, while real and authentic digital environments are variable, making guidance during the course more complex.

Involving parents is beneficial

Parents have an important role in the life of adolescents. Generally, they have a positive influence on children's attitudes and online behavior (Kirwil, 2009; Moscardelli & Liston-Heyes, 2011). Consequently, in our design-based research we found that involving parents in the intervention about risks on SNSs has a positive impact on the outcome. Particularly courses where parents are actively involved, for example by letting them participate in a homework task, are more effective with regard to decreasing unsafe behavior (see Chapter 9). This became particularly apparent with boys, probably because girls receive already more information about online safety from their parents without any school intervention (Segers & Van den Cruyce, 2012).

It is important to note that simply organizing an information evening appears to be insufficient (see Chapter 8). It is critical to find a way to involve all parents, and not only those who are already involved, in an active way in the intervention. Therefore, a homework task that needs to be completed in collaboration with the parents, is proposed as a good solution. In any case, efforts to involve parents in the intervention have a significant added value.

A short-term intervention is sufficient

Teachers often complain about the workload they experience. While media literacy and online safety are often part of the compulsory program (Safer Internet Programme, 2009), teachers feel like this is yet another 'extra' that is added to their already fully loaded teaching program (see Chapter 3). It is therefore interesting that an intervention including a homework task and a one-hour course appears to be sufficient to obtain the proposed goals of increasing risk awareness and changing unsafe SNS behavior.

Comparing initial and revised design principles

Considering these proposed design principles, it is remarkable that a few of the design principles that guided the initial development of the materials can be put in perspective. For example, collaborative learning, which was proposed as an important instructional strategy in constructivism (Duffy & Cunningham, 1996), appears to be less effective in the case of reputation related behavior like unsafe behavior on SNSs. Also, the importance of authentic learning is put into perspective: while it seems to be important to make use of a SNS profile

during the course, a simulated profile is sufficient to obtain results. There is no added value of making the context even more authentic, by including a real online SNS profile. On the other hand, the role of positive relationships that was described by Nation et al. (2003) as a critical characteristic of effective prevention campaigns is confirmed in the results of our research: by including parents in the intervention, the impact on unsafe behavior increases. This, together with the finding that collaborative learning might be less effective given the negative impact of peers, confirms the importance of the impact of the social norm on behavior, as stated by the theory of planned behavior (Ajzen, 1991). Finally, while Nation et al. (2003) argued that prevention campaigns need to be sufficiently dosed, it seems that an impact is obtainable already after a short-term intervention when it concerns an intervention about risks on SNSs. The reconsideration of the initial design principles is summarized in Table 1.

The formulation of contextually-sensitive design principles based on the fact that the initial developed materials did not obtain all the goals that were put forth (i.e., they did not change unsafe behavior), reveals the importance of design-based research. Furthermore, the typical collaboration among researchers and practitioners in this type of research, has shown to be essential. Indeed, it appears that it is possible to find a balance between the teachers' needs and the theoretical design principles. For example, a short-term intervention which satisfies needs of teachers appears to be enough to have an impact. Finding this balance is crucial, since it maximizes the possibilities for dissemination and the actual use of the materials in the classroom.

Table 1

Initial design principles compared to the revised design principles

Initial design principle	Revised design principle
Collaborative learning	Individual reflection is critical.
Authentic setting	Simulated environments are sufficient
Positive relationships	Individual reflection is critical
	Involving parents is beneficial
Sufficiently dosed	A short-term intervention is sufficient.

Limitations

Regardless of the invaluable contribution of design-based research when it comes to the construction of design principles, the sensitivity to the specific context of the design principles also jeopardizes the external validity of the implications. Therefore, future research can bring clarity about the specific contexts in which these design principles are valuable. For example, it has been stated that individual reflection is especially important in this context, because the undesirable unsafe behavior on SNSs is very reputation related. This means that the same principles might count for different reputation related behaviors typically tackled in other prevention campaigns, such as smoking, drug abuse or aggressive behavior. Ideally, an experimental manipulation comparing two of these interventions, with and without collaborative learning, would point this out. The same counts for all other context specific design principles that were put forth: future research should point out the generalizability of these principles.

Furthermore, one of the limitations of design-based research is that it is very time consuming, considering the different iterative phases that need to be completed. It is for this reason that in the studies in this research only a short-term impact has been measured. This has important consequences for the interpretation of the results. For example, it might be reasonable that the interventions have a delayed impact on attitudes and behavior, so that this impact was not completely observable in the posttest scores that were measured immediately after the intervention. Of course, although in our research no conclusions can be drawn about long-term effects, the observed immediate impact on attitudes and behavior is very valuable. It surely is desirable that the impact of interventions about risks on SNSs is observable as soon as possible. Still, given the raising importance of sustainable learning, future research using a longitudinal approach might be interesting, not only to find out if the materials have a delayed impact but also to find out whether the impact of the intervention is persistent over time.

Moreover, another consequence of the time constraints is the decision to finish the materials after five iterations. The multiple iterations ascertain cumulative knowledge and an improvement of the design, but there is always room for upgrading (Anderson & Shattuck, 2012). When can one decide a design is good enough, to finalize the research? In the current research, several more iterations could have been conducted, possibly even increasing the impact of the intervention. Therefore, the design principles that are put forth in this chapter are not exhaustive, as time constraints limited the amount of iterations to five. More design principles might have been revealed in other iterations.

Finally, the design principles that are formulated are based on the results of the previous steps of the research, and therefore not only dependent of the amount of iterations but also of the choices made about the revisions of the materials. Although these choices were led by both quantitative and qualitative results of previous intervention studies, by observations and input from practitioners and by theoretical considerations, the interpretation of the researcher always has a substantial impact. This impact is discussed extensively in the final chapter of this

dissertation, that is the chapter that includes the conclusion and discussion of the total design-based research as described in this dissertation.

Implications

The theoretical design principles that have been described in this chapter are valuable both for practitioners, developers, and future researchers. First, teachers benefit from the developed intervention, as it is ready-to-use. To make sure that teachers understand the importance of the design principles, the teacher manual of the final material includes an introduction with some rules of thumb, based on the design principles described above. This should help teachers to understand why the materials are built the way they are, and why certain instructional strategies are used. Indeed, it is important that they use the materials that were developed exactly the way they should be used. Moreover, there are also teachers who like to develop their own courses instead of using ready-to-use materials, to teach their pupils about the different topics in the curriculum. Therefore, the design principles should be disseminated so that teachers can use these as guidelines when developing new materials about online safety, to guarantee a positive impact of these newly developed materials.

Second, other developers of materials about online safety benefit from the theoretical gain in knowledge. Previously existing materials were mostly not evidence-based (Mishna, Cook, Saini, Wu, & MacFadden, 2010). Still, given the international digital agenda a lot of non-profit organizations have been developing prevention materials about online safety, without any theoretical base and without any outcome evaluation, due to a lack of financing resources and expertise (e.g., Insafe, 2014, see Chapter 3). These developers profit from this design-based research, as it resulted in design principles that can be used for the creation of new online safety interventions to ascertain their impact.

Finally, the principles described in this chapter are an important starting point for future researchers. Particularly the re-interpretation of the initial design principles in the context of teaching about risks on SNSs, proofs that design-based research is very valuable. Therefore, further research about context-specific design principles is necessary, to differentiate from general principles. Although design principles derived from meta-analytic reviews that generalize over different educational and prevention topics, such as the prevention guidelines from Nation et al. (2003) as described in Chapter 3, and instructional guidelines from constructivism (see Chapter 5) are very valuable, it appears that they are not valid in all possible contexts. This implicates a large research agenda for researchers, with an important role for the design-based research approach.

Conclusion

As a conclusion, it can be stated that the design-based research described in this dissertation has not only proven to be successful to develop a solution that can be used in practice. As is important in any design-based research, a prototheory has been developed, including four

context-specific design principles that are important to guarantee an increase in risk awareness and a decrease of unsafe behavior on SNSs: (1) time for individual reflection is critical, (2) simulated environments are sufficient, (3) involving parents in the intervention is beneficial and (4) a short-term intervention is sufficient to obtain the proposed goals. These design principles can be used in the future by researchers, practitioners and educational developers. This is especially valuable given the increasing importance of online safety on the international digital agenda.

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11 | General discussion and conclusion

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Vanderhoven, E., Raes, A. & Schellens, T. (in press). Interpretation in the process of designing effective learning materials: a design-based research example. In Smeyers, P., Bridges, D., Burbules, N., & Griffiths, M. (Eds.). (2015). *International handbook of interpretation in educational research methods* (2 Vols.). Dordrecht: Springer.

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Chapter 11
General discussion and conclusion

Abstract

This chapter provides a general conclusion and discussion of the different studies described in this dissertation. The general research challenges and research objectives described in Chapter 1 are repeated, followed by an overview of the main results that were obtained in answer to these research objectives. The strengths and limitations of the current design-based research are summarized and linked to suggestions for future research. Special attention is given to the discussion of the methodology, the study sample, the research context and the role of interpretation. Finally, we end with the implications of this research for practitioners, for theory and empirical research and for policy makers, and we offer a final conclusion.

Introduction

The emerging popularity of social network sites (SNSs) with young people has raised concerns about their security and health. Given the amount of risks teenagers face when using SNSs, online safety has become an important aspect on the regulatory agenda all over the world (e.g., Department of Homeland Security and the European Commission – Joint Declaration, 2012). Schools have been proposed by researchers and policy makers as an ideal place to teach young people about online safety (e.g., Safer Internet Programme, 2009). The main goal of the current dissertation was therefore to ensure that teenagers are aware of the risks on SNSs, and to decrease unsafe behavior on SNSs if necessary, by means of school education.

Although a lot of research has been conducted with regard to teenagers' behavior on SNSs, and about the risks they face when using them, three main research challenges were revealed in the literature at the start of this dissertation (see Chapter 1). First, it was quite unclear which problems most urgently needed an intervention. Moreover, the relationship between school interventions and actual online behavior was unknown and little was known about the needs of teachers and educational stakeholders. Second, existing online safety interventions were not evidence-based. There was a lack of research about the impact of these interventions. And third, theoretical knowledge about the development of online safety interventions was scarce and not evidence-based. It was unclear which characteristics of these interventions were necessary to obtain their goals.

These research challenges led to the three research objectives of the studies that were conducted in the context of the current dissertation.

Research objective 1 (RO1): Formulating a state-of-the-art proposal with regard to the current educational situation related to online safety, and formulating a concrete and clear problem statement taking into account the needs of teenagers and educational stakeholders.

Research objective 2 (RO2): Developing evidence-based educational materials that can be used in secondary education that fulfill the needs as defined by the research conducted in the context of RO1.

Research objective 3 (RO3): Developing design principles that can be used by future practitioners, researchers and developers when creating new educational materials concerning the problem statement within the context of RO1.

Given the nature of the different research objectives, the advantages and characteristics of the design-based research methodology were ideally suited to obtain these goals. The different steps of the design-based research correspond to the three research objectives, and therefore structured the chapters in this dissertation in three parts: 1) the problem analysis and formulation of initial design principles, 2) the development and evaluation of solutions and 3) a reflection to produce revised design principles. In the following, the results of the studies conducted are summarized as answers to the three research objectives. After this overview of the main results, a more detailed discussion of the strengths, limitation and implications of the research follows.

Overview of the main results

Research objective 1

The first research objective was to analyze the current educational situation with regard to online safety and to formulate a concrete and clear problem statement, taking into account the needs of teenagers and educational stakeholders. This objective was the aim of the first phase of the design-based research process. To conduct a thorough problem analysis, a literature study was extended with three explorative studies.

The first study was described in Chapter 2, and aimed at exploring Flemish teenagers' behavior on SNSs. In this study, the Facebook profiles of 1050 Flemish teenagers were analyzed. The following research questions led this analysis: (1) What kind of information do these teenagers post on their Facebook profile page? (2) Do these teenagers manage privacy settings to secure this information? and (3) Does the available information entail particular risks? As an answer to the first research question, it was found that teenagers mostly post pictures, interests and some basic personal information on their profile. With regard to the second research question, we found that some teenagers manage their privacy settings so that this information is reserved for friends' eyes only, but that a lot of information is still accessible on the friends-of-friends' pages. With regard to the third research question, general risk scores indicated a low

amount of risks, but a more detailed analysis showed that teenagers post a significant amount of risky information online. Moreover, older teenagers and girls post more (risky) information while there are no differences in applying privacy settings. Teenagers enrolled in different education forms did not behave differently on Facebook.

The second explorative study was described in Chapter 3. In this study, we aimed at mapping the educational situation with regard to online safety. The study was twofold, and included both a theoretical evaluation of existing educational materials and a focus group identifying the needs of educational stakeholders. The following research questions were posed: (1) Do available educational packages tackle all the risks on SNSs?; (2) Are these packages meeting the conditions of effective prevention campaigns?; (3) How are they perceived by educational stakeholders?; (4) Which criteria are considered important by educational stakeholders?; and (5) How should an educational package be implemented in the classroom? The first two questions were answered by a theoretical evaluation of five existing Flemish educational packages using two theoretical evaluation frameworks, one about the risks on SNSs and one about the conditions of effective prevention campaigns. These frameworks were used to evaluate the content and program characteristics of the selected materials. As an answer to the first research question it was found that of the seven risks described in the theoretical framework of De Moor and colleagues (2008), only one package tackles all the risks, and two packages tackle only three of the seven risks. Regarding the second research question it was found that most packages meet the majority of the conditions of effective prevention campaigns described by Nation et al. (2003). In line with previous research, however (Livingstone & Bulger, 2013; Mishna, Cook, Saini, Wu, & MacFadden, 2010), we found that no packages were clearly theory-driven and that none of the packages had a clear outcome evaluation. The last three research questions were answered during a focus group with educational stakeholders. It was found that educational stakeholders were positive about the existing materials, but found them too time-consuming. They liked packages that are short and to the point, preferably implementable in a one-hour course.

The third explorative study was described in Chapter 4. This survey study aimed to link the research of the previous studies, by trying to map the relationship between teenagers' behavior on SNSs and school attention to the topic of online safety. It was questioned whether teenagers care about their privacy and whether they behave unsafely online. Furthermore, the impact of school education on both privacy care and the safety of teenagers' behavior on SNSs was studied. It was found that teenagers do not care much about their privacy, and that this lack of care leads to unsafe behavior on SNSs. However, school education has a positive impact on privacy care and by raising privacy care it also has an indirect positive impact on the safety of pupils' behavior.

Summarizing these three studies, it could be concluded that it was important to put more effort into school education concerning safer use of SNSs. The first study showed that teenagers show risky behavior on SNSs, the second study showed that the existing materials are not sufficient to offer a solution, and the third study suggested that school education is promising

with regard to changing unsafe attitudes and behavior. Therefore, the results of these three studies gave a clear overview of the state of the art of the educational situation with regard to online safety interventions, thereby fulfilling our first research objective.

It should be noted, though, that the focus of our research started predominantly from a formal education perspective. Non-formal and informal educational contexts (Vadeboncoeur, 2006) were not taken into account in this state of the art. Still, SNSs are often used as entertainment during leisure time, and bringing it into the classroom might be harder than tackling the subject in an informal setting, such as youth organizations. Research shows that youth organizations often reach at-risk youth, and that they can have a significant impact on the skills, attitudes, and experiences of young people (McLaughlin, 2000). Besides the materials that were the subject in the research in the first part of the design-based research (see Chapter 3), there are also a lot of educational materials developed for these informal contexts, which we did not evaluate (Insafe, 2014). Given our second research objective, we chose to focus on materials that could be used in secondary education. However, it would be interesting to include informal and non-formal learning in future studies. A more detailed discussion of the decisions made in this research with regard to the first research objective, the research context, the study sample and the implications can be found later in this chapter.

Research objective 2

The second research objective was to develop evidence-based educational materials that can be used in secondary education and that fulfill the needs as defined by the research conducted in the previous phase of the design-based research. This goal was aimed at during the second phase of the design-based research, that is the iterative development and evaluation of the educational materials. As five iterations were necessary to complete the development, five intervention studies were described in individual chapters in this dissertation to complete the second research objective. The evolution of the materials, starting from the initial developed intervention and ending with the final developed intervention can be seen in Figure 1.

In Chapter 5 the first intervention study is described. After developing a first version of educational materials, based on the results of the first phase described above, these materials were implemented in secondary education. The intervention consisted of a one-hour course, starting with an introduction, followed by an exercise with a simulated SNS profile about which pupils had to answer scaffolding questions two-by-two, a non-anonymous voting game and ending with a summary of the instructional content with real-life examples. Results of the implementation study of these materials showed that the awareness of contact risks on SNSs increased when pupils were involved in the course as compared to when they did not receive a course. On the other hand, there was no impact on attitudes and only a limited impact on behavior. These results were in line with previous research about media literacy education and online safety prevention packages (Martens, 2010; Mishna et al., 2010).
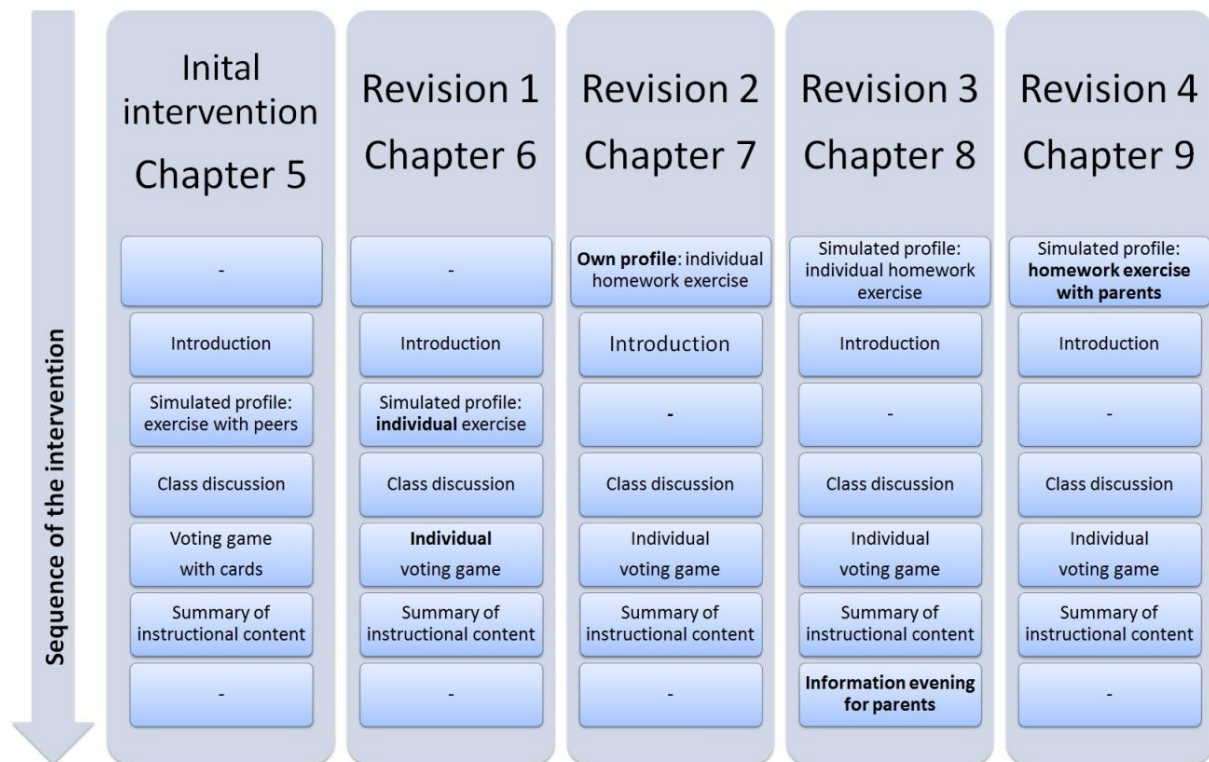
Figure 1. Schematic overview of the evolution of the educational intervention over the five iterations. Evaluation studies of each intervention are described in five successive chapters. Items in bold refer to the specific changes in the intervention in this study.

Following the lack of impact on attitudes and behavior, different aspects of the intervention were inspected more closely. Based on the theory of planned behavior (Ajzen, 1991) and theories about teenagers being particularly sensitive to peer pressure (Sumter, Bokhorst, Steinberg, & Westenberg, 2009), it was hypothesized that risky behavior might have been stimulated between peers, and peer pressure might have prevented behavioral change after the first intervention.

Therefore, materials were adapted so that the time for individual reflection during the intervention was increased and the peer time in which pupils could be influenced by their classmates was decreased. Specifically, the two-by-two exercise was substituted by an individual task, where pupils had to answer the questions accompanying the simulated profile on their own. Afterwards, there was a class discussion. The same adaptation was applied to the voting game. While previously pupils had to raise cards so that everyone could see each other's cards, in the revised version of the materials pupils had to reflect on the statements individually before discussing them with the whole class.

In Chapter 6, the second intervention is described, in which these revised materials were implemented in other secondary classrooms and compared to the previous intervention. In this study, it was found that a change in attitudes and behavior could only be observed when the

course gave the opportunity for individual reflection as compared to the control group that did not receive a course. The previous course, with an emphasis on collaborative learning, had no different impact to the control group on either attitudes or behavior. As a conclusion of this second evaluation study, it can be stated that more time for individual reflection is beneficial for the outcome of the intervention.

Although the results of the second implementation and evaluation study were already more promising than those of the first, there was still room for improvement. Again, the intervention and the remarks of teachers, pupils and observers were analyzed in more detail. A striking remark was the fact that the simulated worst-case-scenario profile in the course contained so many risks that it was not realistic. Pupils seemed to dissociate themselves from the profile, and might therefore feel that the risks are not applicable to their own profiles. Therefore, it can be argued that this exercise does not satisfy the requirements of an authentic setting as described by constructivism (Duffy & Cunningham, 1996; Snowman, McCown, & Biehler, 2008). To counter this argument, the materials were adapted. The exercise where the students had to answer questions about the simulated profile on paper was changed so that they had to answer the questions about their own profile on a computer. However, this also implicates that less risks were available than on the 'worst case scenario' profile, thereby making scaffolding toward all risks more difficult.

In Chapter 7, the third intervention study is described. It was found that although the simulated profile was indeed judged as a non-realistic profile, there was no added value to making the context more authentic by using their own profile. On the contrary, the scaffolding questions about the simulated profile were found to be more effective in teaching the teenagers about the diverse categories of risks that were tackled. Therefore, it was opted to keep the simulated profile in the package.

The theory of planned behavior (Ajzen, 1991) supported the further improvement of the materials. In the second study, it was found that the social norm has an important impact on the behavior of the pupils involved, as is shown by the increase in impact when the possibilities of peer pressure were decreased. In the light of these results, it was interesting to note that next to peers, parents have an important role in the life of adolescents. It was hypothesized that parents might have a positive influence on pupils' online behavior. For that reason, materials were adapted in order to increase parental involvement. More concretely, the materials were extended with an information evening for parents, thereby involving the parents in the intervention.

Chapter 8 describes the fourth intervention study, in which this revised package was implemented. It was found that while an information evening seems to be effective, at least to some extent, it does not succeed in involving all parents, since only 15% of the invited parents showed up at the information evenings.

Therefore, the materials were revised again, so that parents were more actively involved by means of a homework task instead of an information evening. In Chapter 9, the last intervention study is described. In this fifth intervention study, it was found that while active parental

involvement was not necessary to improve the impact on risk awareness, it was beneficial in changing the intentions to engage in certain unsafe behavior and to decrease problematic behavior that previously existed. Moreover, this beneficial impact was particularly evident for boys. Therefore, the homework task that actively involved parents in the intervention was kept as part of the intervention.

After these five iterations of development, evaluation and revision, the resulting educational materials were proven to be effective with regard to increasing risk awareness and changing unsafe attitudes and behavior on SNSs. Given the effective final practical solutions, the second research objective was fulfilled at the end of these five intervention studies.

Again, it should be noted that these five intervention studies started from a formal educational perspective. While we took into account psychological theories about behavior (such as the theory of planned behavior, Ajzen, 1991), there is another broad research field studying behavior modification based on behavioral and cognitive biases in decision making (Miltenberger, 2012). This psychological perspective could have led us to other interventions. For example, in the field of behavioral economics, researchers propose interventions which they call libertarian paternalistic, or soft paternalistic (Thaler & Sunstein, 2003; Wang et al., 2013). These interventions involve nudging software, which tries to alter the behavior of users of SNSs without changing their options, for example by giving users feedback about the possible consequences of their posts (Wang et al., 2013). In future research, the current educational perspective could be merged with other perspectives to improve the results of interventions. A more detailed discussion of the chosen frameworks in this research with regard to the second research objective and the corresponding impact on the results can be found later in this chapter, along with a discussion of other limitations and strengths of the research and the implications for practitioners, future research and policy makers.

Research objective 3

The third research objective was to develop design principles that can be used by future practitioners, researchers and developers when creating new educational materials concerning the problem statement as defined by the research conducted in the context of the first research objective. This goal was aimed at during the third phase of the design-based research, that is the reflection on all the studies conducted in the first two phases to produce design principles. This reflection has been described in Chapter 10 of this dissertation.

At the end of the first step of the design-based research (problem-analysis), two theoretical frameworks were put forward that described initial design principles. The first framework was described by Nation et al. (2003), and described nine general design principles for effective prevention campaigns. Important program characteristics are that it needs to be comprehensive, integrate varied teaching methods, be sufficiently dosed, be theory driven and encourage positive relationships. Furthermore, the program needs to be matched with the target audience, this is it should be appropriately timed and socio-culturally relevant. Thirdly, the implementation and evaluation of the program are important as well. Therefore, a well-trained

staff and an outcome evaluation are necessary (see Chapter 3 for more details). The second framework described four instructional guidelines derived from constructivism: active learning (Duffy & Cunningham, 1996), using an authentic context (Snowman, McCown, & Biehler, 2008), multiple perspectives (Kafai & Resnick, 1996) and collaborative learning (Duffy & Cunningham, 1996). In Chapter 5 we describe how these principles are applied on the developed materials.

Based on the results of the five intervention studies, four revised design principles were proposed in Chapter 10. First, it is argued that time for individual reflection is critical, as it increases the impact of the intervention on the SNS behavior of the pupils. Second, it is stated that the use of a simulated digital environment during the intervention is sufficient to achieve the proposed goals of increased awareness and decreased unsafe behavior. Therefore, no technology needs to be involved during the intervention. Third, the importance of involving parents in the intervention is emphasized. It is discussed how this cannot be obtained just by organizing information evenings for parents, but that only active parental involvement is beneficial, which can be achieved with a homework task. Finally, the fourth design principle concerns the duration of the intervention. It is proposed that a short-term intervention is sufficient to obtain the proposed goals. The first two revised design principles put the constructivist principles of collaborative learning and using an authentic context in perspective. The third revised design principle emphasizes the importance of positive relationships as described by Nation et al. (2003) and the last design principles contradicts the principle of sufficient dosage that was proposed by Nation et al. (2003).

These design principles are formulated to help future practitioners (e.g., teachers), researchers and developers. Practitioners cannot only use the developed materials (research objective 2), but they can also use the gain in theoretical knowledge when constructing new educational materials. The same applies to developers of educational materials about online safety (e.g., Insafe, 2014). The knowledge that certain criteria are important or even critical to obtain a proposed goal of increasing awareness and changing unsafe SNS behavior can be used when developing similar educational packages. Last but not least, future researchers can build on the proposed design principles to verify their generalizability and significance in prevention topics other than only safety on SNSs, or to start new design-based research procedures about different topics (i.e., use them as initial design principles). A more detailed discussion of the implications can be found further on in this chapter, along with a discussion of the strengths and limitations of the research with regard to the third research objective.

Strengths, limitations and suggestions for further research

The research described in the current dissertation has, as with all research, both strengths and limitations. The contributions and limitations related to the individual studies are described in the previous chapters. In this chapter, the general strengths and weaknesses of the research are discussed and linked to corresponding suggestions for further research. First, the design-based research methodology is evaluated. Second, the limitations related to the study sample are described. Third, the significance of the changing research context is explained. Finally, the important role of interpretation and ethics in the whole research procedure and its consequences for the results of the research are elaborated upon.

Discussion of the methodology

Design-based research evaluated

To overcome problems of previous research, as described in the research challenges in the introduction, the design-based research approach was chosen as the appropriate methodology. The procedure of this methodology is described in four steps which correspond nicely with the three research objectives that were proposed: problem analysis, development of materials, iterative implementation and evaluation of the materials and the formulation of design principles. The advantages and specific characteristics of this research approach were well suited to fill in the gaps that existed in the literature and research about e-safety interventions. For example, design-based research directly involves researchers in the improvement of education. Whereas, previously, the design and development of educational materials was often in the hands of publishers and practitioners, the expertise and knowledge of researchers now directly influences the design. In this research it is the conjunction of the experiences of the practitioners, and the knowledge and theoretical background of the researcher which made several evaluation studies possible and which led to an effective course that could change both risk awareness and unsafe behavior.

Yet, although most literature focuses on the invaluable contribution and advantages of design-based research, some of the pitfalls that are inherent to this research approach also need to be mentioned (Anderson & Shattuck, 2012; Barab & Squire, 2004; McKenney & Reeves, 2013). For example, while generalizability and ecological validity are often argued to be positive aspects of design-based research, the fact that design principles are context-specific might also jeopardize the external validity of the implications. In our research example, the research only assures that formulated design principles are applicable in the context of teaching pupils about the risks on SNSs and how to behave safely. However, these design principles might also be applicable to the design of interventions about different behaviors that are typically tackled in other prevention campaigns, such as smoking, drug abuse or aggressive behavior. Further research is necessary to prove this generalizability.

A second challenge in design-based research that is described in the literature is the fact that it is difficult to know when (or if ever) the research program is completed. The multiple iterations ascertain cumulative knowledge and an improvement of the design, but there is always room for upgrading (Anderson & Shattuck, 2012). When can one decide a design is good enoughfor the research to be finalized? In the research example above, five iterations of development, implementation and evaluation have been conducted. However, several more iterations could have been conducted, possibly even increasing the impact of the intervention. Most of the time, the end of funding means the end of research, independent of whether this happens after one or five iterations (Anderson & Shattuck, 2012).

These time limits are a third disadvantage of design-based research: the total research procedure is very time-consuming, considering the different iterative phases that need to be completed. It often needs a multiyear project to finish a design-based research (Anderson & Shattuck, 2012). The research conducted in the context of this dissertation took about three years, with every step of the process lasting several months. Time constraints also have negative consequences for the individual studies, such as the fact that only a short-term impact of the intervention is measured. Since the conclusions from one study lead to the next step of the research, it is difficult to include long-term impact measures. If a long-term impact were to be measured, several further steps of the research process would already have been started, or even finished. Given the increasing importance of sustainable learning, additional research using a longitudinal approach might be interesting, not only to find out whether the materials have a delayed impact but also to find out whether the impact of the intervention is persistent over time.

Finally, it should be noted that although we can elaborate upon the advantages and disadvantages of design-based research for our research project, it is difficult to evaluate the impact of this research method in general. Anderson & Shattuck (2012) reviewed the impact of several design-based research interventions and concluded that this method may be meeting its promised benefits. However, McKenney & Reeves (2013) stated that alongside the scientific impact, which is easy to find in academic articles, there is also a practical impact, which is much harder to identify and therefore to evaluate. Nevertheless, the contribution of the current design-based research adds to the credibility that the research approach leads effectively to both theoretical and practice-related solutions.

Measures

Throughout the individual studies described in this dissertation, we attempted to use data from multiple sources of evidence, both quantitative and qualitative, which are triangulated, as is typical for design-based research (Cohen, 2011). The use of a mixed methods approach allows a complete picture to be obtained, overcoming the weaknesses of single approaches (Denscombe, 2008). For example, during the first phase of the research, a literature study, theoretical evaluation, observational study and survey study all added to the analysis of the educational situation with regard to online safety (see Chapter 2 to Chapter 4). In the

intervention studies, both quantitative and qualitative data were gathered to obtain a complete picture of the impact of the interventions (see Chapter 5 to Chapter 9). The efforts that were put in the data collection are definitely beneficial with regard to the validity and reliability of the final conclusions.

However, some limitations need to be taken into account. First, although we argued in Chapter 2 that self-report measures about online SNS behavior have several disadvantages (e.g., social desirability, Phillips & Clancy, 1972), and that there is a discrepancy between teenagers' self-reported SNS behavior and their actual behavior, the measures used in the intervention studies were predominantly self-report measures. The reason for choosing this approach, instead of observation, was based on ethical considerations. We felt that it would be unethical to teach teenagers about privacy and the importance of securing online information, while at the same time asking for their consent to observe their personal information and their actual behavior on SNSs. It would have been easy to let all pupils in the participating classes install an application on their SNS profile, which would, after the consent of the pupil, give us the opportunity to observe all their SNS profile data and their behavior (e.g., the application tested by Mazzia, LeFevre, & Adar, 2012). However, these kinds of technical approaches would involve a high level of surveillance, which could be considered a breach of privacy in itself, even if in the end it would lead to better practical solutions that empower users to protect their privacy (Sayaf, Rule, & Clarke, in press). Although an observational approach would have been used with good and ethical goals in mind, we feel that the end does not justify the means in this case. Therefore, we judged this methodology to be unethical, and still chose to use self-report measures. Nonetheless, it is important to keep in mind the consequences of using this approach – for example, caused by the social desirability that might have influenced the results of the intervention studies.

Second, based on previous literature and theoretical frameworks (i.e., the summary of risks described by De Moor et al., 2008, and the theory of planned behavior, Ajzen, 1991), we chose to develop a questionnaire that took into account awareness, attitudes and behavior regarding all the risks pupils might encounter on SNSs. Still, it was chosen to limit the length of the questionnaire to make it more reliable, as teenagers tend to be sloppy when filling out long questionnaires. Therefore, the selection of risky behaviors that were measured in the survey study and the intervention studies, is not exhaustive. Moreover, since no validated questionnaire existed, a new questionnaire needed to be developed. Although this questionnaire appeared to be reliable and valid, the development of a good measurement tool was not the main goal of this research. More studies about good measurement tools in the context of online safety, which can be used in media literacy intervention studies, would be valuable.

Study sample

We stated before that we achieved the second research objective, since an effective evidence-based educational intervention has been developed through the different steps of the design-based research process. Furthermore, we stated that the third research objective was obtained,

since we proposed a number of design principles that can be used by future researchers and practitioners when developing similar interventions. However, we need to acknowledge that the research conducted only resulted in materials that can be used in secondary schools in Dutch-speaking countries and is only validated in Flanders, the Dutch-speaking part of Belgium. Although the research objectives partly resulted from the worldwide policy agenda about online safety (see Chapter 1), it is hard to guarantee the worldwide generalizability of the research results. Since all studies have been conducted in Flanders, there is also no certainty about the validity of the proposed design guidelines in Chapter 10 in other countries. It is a typical research trend to have most research conducted in the global north and to lack results regarding children's behavior in the global south (Livingstone & Bulger, 2013). Therefore, research reviews have concluded that there is an increasing need for cross-national comparative studies that can establish a better understanding of children's experiences and that can lead to the generalizability of the good practices of one country to others (Livingstone & Bulger, 2013).

Nonetheless, it has been found that Belgian children are average with regard to their use of SNSs, the risks they face and the coping strategies they use, with only limited differences between French-speaking and Dutch-speaking Belgian children (d' Haenens & Vandoninck, 2012). Therefore, there is no reason to believe that the initial state of the art with regard to teenagers' behavior in our sample would not be generalizable toward teenagers in other countries (although again, particularly other countries in the global north). However, the state of the art with regard the educational situation regarding online safety might be influenced by specific political decisions. The Belgian context, where the political responsibility for education is divided between the Flemish and Walloon government, can serve as an example for the significance of political decisions with regard to media education. D' Haenens & Vandoninck (2012) showed that Dutch-speaking Belgian children are more often guided by their teachers when it comes to the use of the Internet, while French-speaking Belgian children are supported by better guidance from their parents. They claim that this is most probably caused by the extensive efforts that the Flemish government has put into ICT-education, extending over a longer period of time and entailing larger (material) investments than the efforts of the Walloon government. This shows that the efforts of the government might have an impact on the attitudes of teachers, and the support they give to their pupils. However, in the first phase of our research, we found that the attention to the topic of online safety in schools in Flanders is scarce as well, pointing toward a similar state of the art to that of countries with less supportive governments. Still, since all our research was conducted in Flanders, it is possible that the results of the design-based research described in this dissertation are especially generalizable toward countries that have supportive governments, and that have already put effort into a basic ICT-curriculum integration. Given the influence on the attitudes of teachers, this might be particularly important concerning the dissemination of developed educational materials. Follow-up research is necessary to have certainty about the generalizability of the results toward other geographical locations.

Second, the intervention studies were all conducted in secondary education and included pupils from all education forms, aged 13 to 19 years old. In most of the intervention studies,

individual differences between the pupils have not been taken into account. Since we did not find differences between teenagers enrolled in different educational forms, that is general, vocational and technical education, or between pupils of a different gender (except in the study described in Chapter 9), we decided not to elaborate upon these results. However, while we did not find differences in impact, there might have been a difference with regard to pupils' motivation to participate in the course, or in their experiences with the intervention. These aspects have not been taken into account in the current research. It might be interesting to verify the significance of individual characteristics of pupils with regard to their experiences during the intervention.

Third, since individual characteristics were not taken into account, the final results do not leave much room for in-class differentiation between pupils. All the design principles that are described in Chapter 10 are based on averaged findings, strengthened with qualitative information. However, it might be possible that certain classes, certain teachers, or certain pupils benefit more from other principles. While our materials are aimed at all pupils, with no differentiation, it would be interesting for future research to focus on the conditions that make some children especially vulnerable to risks on SNSs so that educational efforts can be targeted effectively (Livingstone & Bulger, 2013; O'Neill & Staksrud, 2012). Given the diversity of pupils in contemporary classrooms with regard to their abilities, culture, economic background, and many other characteristics, differentiated instruction has been described as a promising approach (a strategy in which teachers provide different instruction in answer to different pupil characteristics, Roy, Guay, & Valois, 2013; Tomlinson et al., 2003). Moreover, some of the proposed design principles in Chapter 10 might be hard to execute practically. For example, actively including parents using a homework task is much more difficult to orchestrate when parents speak a foreign language. Therefore, future research is necessary to develop adapted materials that enable differentiation in the classroom.

Fourth, we need to acknowledge that the focus of this dissertation was on the development of theoretical and practical solutions for secondary education, and not for primary education. Given the fact that children are increasingly using SNSs at younger ages (Livingstone, Haddon, Görzig, & Olafsson, 2011), although this is often prohibited by SNS providers who want to conform to the COPPA regulation (Children's Online Privacy Protection Act, 1998), future researchers are challenged to develop materials for a younger target group without pushing them toward the *forbidden fruit*.

Finally, education might not be needed only for pupils. As stated in Chapter 8, parents may need more information as well. Research has shown that in countries where parents and teachers have less training and support in Internet use, children's online behavior is more risky (Livingstone & Bulger, 2013). Therefore, more research is needed to establish the impact of educating parents and teachers in children's online behavior.

Research context

As stated in the previous section, the Flemish research context has its consequences with regard to the interpretation of the results and their generalizability. However, the limitations related to the research context are not limited to the problems with regard to the research sample. As is described in Chapter 1, SNSs evolved in no time from a niche phenomenon to a commonly used communication tool (Acquisti & Gross, 2006). These revolutionary changes are typical of this digital 21st century, as is apparent in the rapid change of SNSs themselves. For example, at the start of Facebook, users typically owned a profile page and could visit the profiles of friends. Later, the newsfeed was introduced, on which users could see a summary of the updates and changes made by their SNS connections (boyd, 2008). Subsequently, Facebook introduced the timeline, which made it easier to find items posted earlier in time on other users' profiles (van Dijck, 2013). These adjustments of the SNS architecture also entail changes in the nature of the risks that teenagers face (Stutzman, Gross, & Acquisti, 2013). In the given example, privacy is more easily breached in the last case, where information is easily findable and accessible, while in the beginning users had to make an effort to find certain information.

The evolution of the Facebook architecture is only one example of how the digital world changes rapidly. It is hard to predict what the role of SNSs will be in the lives of teenagers in five to ten years' time, or what SNSs will look like in the future, if they still exist. Therefore, the results of the current research are temporary and will need follow-up studies in the future. This does not undermine the value of the current research, since it is a starting point that counters the lack of research about prevention campaigns on online safety. The design principles that have been proposed are likely to count for several upcoming constitutions of digital and social online environments. However, future research should replicate the current findings in these future contexts.

Finally, the research conducted started from the research goal of offering a solution with regard to risks on SNSs (see Chapter 1). Therefore, the developed materials focus especially on these risks, and how to cope with these risks. During the developed intervention, it is emphasized that SNSs offer a lot of opportunities, but it would be useful to have specific materials that focus especially on these online opportunities, and how to support and promote these so that more children benefit from them (Livingstone & Bulger, 2013). Further research that starts from this positive viewpoint would be valuable.

Role of interpretation

In every research, interpretation has a critical role. The researcher's interpretation of the context determines which research method and which measurement tools will be used. Moreover, participants interpret the questions asked in these measurement tools, hence having an impact on the results. Furthermore, the results need to be interpreted by the researcher again: how will he or she analyze the gathered data? Finally, the researcher decides what is interesting for whom when determining which results he or she will report, how and where.

It is important to acknowledge the role of interpretation, particularly in design-based research. One of the reasons is the close involvement of the researcher in the design process, and the bias that this involvement may cause. In addition, it should be noted that while the influence of interpretation is important in one single study, the accumulation of these interpretations and decisions throughout the different steps and studies of a design-based research increases this influence. As different studies are sequentially conducted, with the results of each study influencing the set-up of the following study, the interpretation of the results has a very big impact on the progress of the study as a whole and the final results. Moreover, as stated before, it is argued that because the researcher is closely involved in all the research steps, including the implementation of materials in real-life classroom settings, 'researcher bias' is even larger when using this methodology (Barab & Squire, 2004). Thereby, ethical issues are raised as well (Barab & Squire, 2004). When observing problems in school, do researchers intervene, or do they minimize their impact in the classroom?

Although acknowledgement of the role of interpretation in research is necessary, thereby reflecting on the possible consequences of certain choices and decisions, interpretation should not be seen as a limitation per se. Some authors state that the results of the research must be biased because of the interpretations of the researcher, while others claim that these researchers with their biases and insights are the best research tool (Anderson & Shattuck, 2012; Barab & Squire, 2004). Interpretation is inherent to every research, and should not paralyze us or prevent us from conducting any research at all.

In the following paragraphs, we will repeat the sequential steps of our research, thereby indicating the role of interpretation in every phase. The decisions and interpretations that were made are only examples of the interpretations any researcher needs to make when conducting design-based research. As stated, the interpretations discussed below are not limitations per se, but reflecting on them is necessary to put the results in the right perspective.

Part 1: Analysis of practical problems

As stated in the introduction of the first part of this dissertation, there are three important resources to describe the problem: previous literature, the shared experience of researchers and practitioners and one or more pilot studies (Reeves, 2006). A first decision a researcher needs to make is what he or she will do to analyze the problem, and to what extent. The decision could be taken to focus on previous research, or to have one focus group with practitioners to have an idea of the state of the art. It could also be decided to conduct multiple pilot studies, creating a complete picture of the state of the art possible. Several aspects, such as organizational capacity and investment, influence these decisions (Livingstone & Bulger, 2013).

In the current design-based research, it was decided to complete an extensive needs analysis, including three exploratory studies in addition to the literature study, and one focus group with practitioners (see Chapters 2 to 4). Regarding the literature study, it is clear that the interpretation of the researcher is of critical importance. One example is the search for information about privacy care with teenagers (see Chapter 4). We found that some authors

reported that teenagers care about their privacy, while others reported the opposite, depending on the exact measure of privacy care in their study, the age of the respondents, and other methodological differences. These kinds of contradictions are often found in literature, and should be taken into account when making a state of the art during this first needs-analysis phase.

In addition to the interpretation of previous literature, different decisions needed to be made about the method, the data collection, the measures, the data analysis and the reporting of every individual study in this first phase of the design-based research. As an example, we analyze the different interpretations made in the observational study of Facebook profiles (see Chapter 2). We chose to use the method of observation in order to overcome problems that are inherent in the self-report methods that are mostly used to study teenagers' behavior on SNSs, such as social desirability (Phillips & Clancy, 1972). With this, we wanted to eliminate the amount of variation caused by the interpretation by the participants of the questions in a survey. However, this does not mean that observation is free of interpretation. A detailed codebook was developed to code the information that was observed on the profile pages. When composing this codebook every effort was made to be as exhaustive as possible, but there is always information that is excluded, depending on the choices of the researchers. Moreover, we chose to use research assistants to collect the information. A total of 179 research assistants coded the information on the Facebook profiles of their friends and friends-of-friends. By including so many researchers, the aim was to randomize the researcher bias, a method rarely used in social sciences. While most of the time efforts are made to eliminate researcher bias, we tried to randomize the impact of the observer, thereby eliminating the significance of the different interpretations for the overall research results. Finally, the results of this study were also impossible to report without any interpretation. To give an example: 34% of the minors in the study were tagged in pictures in which they were drinking alcohol. This is a fact, a number, that can be interpreted in several ways. Is it a risk? Is it a problem? Is 34% a significant amount, enough to put effort into preventing it? We concluded that indeed a significant amount of teenagers show risky behavior (of course, there were also other risk indicators that we found to be threatening), and we based our further intervention on these interpretations. It is important to note that this is a decision, and that others might feel that the amount of risk teenagers face is not important enough to put so much effort into prevention campaigns.

Part 2: The development and evaluation of solutions

This part included two steps in the design-based research: the design of materials and the iterative implementation, evaluation and revision of these materials. Designing materials includes a sequence of decisions and choices, made to balance the proposed goals with given constraints. The process can be divided into three sets of decisions: how the design process will proceed, what needs and opportunities the design will address, and what form the resulting design will take (Edelson, 2002). The iterative cycles of evaluation are especially dependent on decisions of the researcher, as revisions are always based on the interpretations of results of the

previous study. In the following, several aspects that need to be taken into account with regard to the researcher's interpretation and the ethical decisions in this second part of the design-based research process are described.

A first thing to consider is that besides the results that are found in the first phase of the design-based research, other context variables influence these decisions as well. In the current research, the development of materials is primarily guided by the results of the problem statement and needs analysis (Chapters 2 to 4), but some influencing context variables need to be acknowledged. For example, the research in this dissertation was funded by the Flemish Agency for Innovation through Science and Technology (IWT), more specifically in the context of a Strategic Basic Research (SBO) Program. These kinds of projects have an important focus on valorization of the research results and on the value of the research for society. The Flemish government showed special interest in the development of educational materials, following the policy agenda described in Chapter 1. This implies that stakes, norms and values were colored by this agenda. It is important to acknowledge these norms and values were part of the research from the start, even if this is not detrimental since the development of materials was still primarily based on the results of our extended needs analysis in the first phase of the design-based research.

A second thing to consider in the second phase of the design-based research is the role of ethics with regard to the goals that are the aim of the educational materials. As stated in the introduction, developing interventions in an attempt to influence users' attitudes and behavior raises important ethical questions about the extent to which a researcher can impose his or her values (Kimmel, 1988). We argued that aiming a change in behavior was justifiable in the current research, because minors might not be mature enough to make good informed decisions (Walrave & Heirman, 2013), and because schools have a broad range of responsibilities (Greenberg et al., 2003). Given these ethical considerations, we chose to use the facilitation method, as this is ethically most acceptable. However, by showing several bad practices and 'worst case scenarios' (e.g., the simulated SNS profile), and because of the hierarchical relationship between pupils and teachers, one can argue that persuasion techniques have been used as well. However, it was clearly stated in the teacher manual that teenagers need to be informed, but that they can decide for themselves whether they find something 'worth the risk' or not. Teachers are encouraged to keep this message in mind while giving the lesson using the educational materials. The final materials that have been developed increase awareness of risks in SNS and have an impact on certain behaviors (e.g., on average, teenagers post less personal or sexual information on their SNS profile). However, it became clear throughout the different intervention studies that not all pupils changed their behavior. This indicates that our developed materials facilitate safer behavior, but as was intended do not persuade, manipulate or coerce any pupil into a certain behavior.

A third aspect to take into account in this second part of the design-based research is that the results of each study of the research influence the set-up of the following study. This is, as mentioned before, especially the case in the iterative implementation, evaluation and revision of

the materials. For every cycle, the revisions are based on quantitative and qualitative results (sometimes contradicting each other, making an interpretation by the researcher necessary in order to proceed in the research), observations in the classroom, collaboration with practitioners and a theoretical framework. It is the conjunction of all these different aspects that guides the decision to change specific aspects of the materials and to improve the impact that these materials have on the pupils. It goes without saying that this amount of information can lead to different decisions, making the interpretation and the decisions of the researcher at the moment of revising materials of tremendous importance for the final results.

To demonstrate this importance, we analyze our decisions during the first revision of materials (after the first intervention study), described in Chapter 6. The materials were changed so that moments of individual reflection were increased during the intervention, while moments of collaborative learning were decreased, trying to minimize peer pressure during the course. This decision was based on different pieces of information: the observation that popular kids raised their voice during the course to influence their peers, the quantitative and qualitative results of the first study indicating that there was no impact on unsafe behavior (see Chapter 5), the theory of planned behavior stating that the social norm has a significant impact on people's behavior (Ajzen, 1991), and theories about peer pressure in adolescence stating that teenagers are especially vulnerable to peer pressure (Sumter et al., 2009). Of course, there were other observations as well that might have influenced the impact of the intervention, but that were not chosen for revision. For example, maybe students did not have the technical skills to act more safely and more attention should have been given to the training of specific skills. This example clarifies how the interpretation and decisions of the researcher have an impact on the progress of the research, and therefore on the development of the final materials.

Part 3: Reflection to produce revised design principles

In the last phase of the design-based research, design principles were formulated, to obtain the third research objective. The design principles that are formulated are based on the results of the previous steps of the research, and therefore again dependent on the interpretation of the researcher. Moreover, they are dependent on several context variables, such as the number of iterations and the choices made about the revisions of the materials. In our research examples, the design principles that were proposed are not exhaustive, as time constraints and the choices of the researcher limited the amount of iterations to five. More design principles might have been revealed in other iterations.

We can conclude that although the design-based research approach is appropriate for studying the design of new educational learning materials, it must be acknowledged that the presence of interpretation plays an undeniable role in all parts of design-based research. In that sense, design-based research can be seen as a story, which can be told as objectively as possible, but which is undoubtedly colored by the interpretations of the storyteller. Nevertheless, this

should not be seen as a detrimental limitation, but as an inherent part of every research that needs to be acknowledged and integrated in the discussion of the results.

Implications

The design-based research described in this dissertation resulted, as is typical for any design-based research (McKenney & Reeves, 2013), in two separate outcomes: solutions for practice and theoretical design principles. Both these outcomes have important implications for practitioners, researchers and policy makers. In the following, we describe several implications for these three target groups.

Implications for practitioners

The practitioners that might benefit from the results of the current design-based research can have several backgrounds. Educational stakeholders such as school boards, teachers, educational counselors and educational guidance institutes can make use of the evidence-based materials that were developed to obtain the second research objective. Developers, publishers and non-profit organizations that focus on the development of e-safety interventions can make use of the design principles that were formulated in response to the third research objective.

The result of our second research objective, that is the development of effective educational materials, is especially interesting for educational stakeholders. These practitioners' needs were assessed as part of the problem-analysis phase (see Chapter 3) and the newly developed materials meet the several criteria they have suggested, while balancing them with other important prevention criteria. First of all, the developed materials are easy to implement in the classroom. They do not add to the workload of the teacher, and do not take up much valuable course time. The balance between the teachers' need for short packages and a prevention guideline of sufficient dosage (Nation et al., 2003) is discussed in Chapter 10. Second, the materials are corresponding to the compulsory, cross-curricular attainment targets in Flanders (Flemish Ministry of Education, 2010). These attainment targets are described in the teacher manual to guide teacher administration. Since the attainment targets are cross-curricular targets, the materials can be used by teachers of all subjects, making it easier to implement the materials in the weekly curriculum.

The results of our third research objective, that is the design principles that were formulated, are also interesting for educational stakeholders. Not all teachers prefer easy-to-implement materials, and some teachers want to develop courses that are particularly appropriate for the pupils in their classroom. The design principles can help them to organize courses that are likely to be effective. The same applies to developers, publishers, and non-profit organizations that focus on the development of materials to promote e-safety. While previously they developed materials without a theoretical base or empirical research (see Chapter 3), they can now start from the principles proposed in Chapter 10 when developing new e-safety materials. It is indeed important that these developers start from these principles, since we showed that certain

general design principles that are often applied in these materials, such as collaborative learning, are not effective in the context of safety on SNSs.

Finally, it is important to recognize that along with the development and evaluation of evidence-based educational materials, the dissemination of these materials is crucial. This step is often left out of design-based research, causing uncertainty regarding the widespread usage of the tested intervention (Anderson & Shattuck, 2012). If the developed materials are not reaching the practitioners, they are of no use. For now, the materials we developed are downloadable online on a website, and in several educational databases. Moreover, with the support of the Flemish government, all secondary schools in Flanders will receive a copy of the developed educational materials. Nevertheless, follow-up research would be valuable to find out whether the materials are actually used in class.

Implications for theory and empirical research

First of all, the design-based research conducted in the context of this dissertation also aimed at the development of theoretical, context-specific design principles. As an answer to the third research objective, four design principles were formulated for the development of educational materials regarding the risks on SNSs: (1) time for individual reflection is critical; (2) simulated environments are sufficient; (3) involving parents in the intervention is beneficial; and (4) a short-term intervention is sufficient to obtain an increase of risk awareness and a decrease in unsafe behavior. Some of these principles contradicted the general prevention guidelines or the general guidelines that resulted from constructivism that were the basis of the initial materials. For example, the principles of collaborative learning and authentic learning were put into perspective (see Chapters 6 and 7). The importance of other characteristics was confirmed in our research, for example encouraging positive relationships with parents (see Chapters 8 and 9). This way, the existing theoretical knowledge about significant prevention characteristics has been extended toward a whole new domain of prevention, that is the promotion of Internet safety, in which empirical research was lacking.

Second, next to the theoretical goal that was particularly aimed at, the current research also delivers a contribution to the field of design-based research as a methodology. This methodology is fairly recent and reports of empirical studies in this field are even more so (Anderson & Shattuck, 2012). Moreover, the majority of the studies are conducted in the United States, and focus on technological interventions (Anderson & Shattuck, 2012). The current research extends these results, and proves that the methodology is an appropriate approach in prevention research as well. As already stated, the contribution of the current design-based research thereby adds to the credibility of the approach leading effectively to both a theoretical contribution and solutions for practice. However, the design-based research approach is still in a stage of adolescence, and future research should continue to build on the approach to fine-tune the methods used and to strengthen the evidence for its effectiveness and usefulness.

Third, not only does design-based research result in solutions that can be used by practitioners, these practitioners are also closely involved in the whole research process. Given

the fact that the collaboration between practitioners and researchers has proven to be successful, as a balance is found between their needs and the effectiveness of the intervention, future research should continue to focus on these forms of collaboration. This can help to offer a solution for the often discussed problem of the gap between research and practice (Vanderlinde & van Braak, 2010).

Finally, the results of our research demonstrate the critical role of evaluation studies and evidence-based materials, as it is shown that the effectiveness of educational interventions cannot be taken for granted. The scarcity of evaluation studies leads to underdeveloped and even wasted interventions (Livingstone & Bulger, 2013). Therefore, future research should continue to focus on the assessment of prevention programs regarding online safety. While the current research is a first step in the direction of evaluating e-safety interventions, it only focuses on certain unsafe behaviors on SNSs. Given the rapidly changing digital context, follow-up research that takes into account other digital environments, other risks and other characteristics of the materials is necessary.

Implications for policy

As was clarified in the introductory chapter, there is a worldwide regulatory agenda focusing on online safety for children (see Chapter 1). The current research tried to meet the needs that were put forth in this agenda by developing educational solutions and design principles for the development of these materials. Several policy recommendations can be derived from this research.

First, while it is clear that at least Europe and the US have a consensus about Internet safety as a policy goal, countries vary in the degree of governmental importance attached to the issue (O'Neill & Staksrud, 2012). The implementation of the—sometimes compulsory—curriculum about online safety is inconsistent or non-existent in a lot of schools (Eurydice, 2009). Still, the educational system might have a significant influence on the digital skills of children, as demonstrated above with the Walloon–Flanders example (see section Strengths, limitations and suggestions for further research – Study sample). As we argued that it is possible that the results of our research are especially generalizable toward countries that have supportive governments, we can only recommend to governments that they continue putting effort into a basic ICT-curriculum integration. This starts with efforts to ascertain equality of access and opportunity for all children, and support to provide sufficient resources for the development of pupils' digital literacy skills (O'Neill & Staksrud, 2012).

Second, as stated before, this research proves that evaluation research is necessary. While governments typically invest in the development of educational materials (e.g., Insafe, 2014), there is often a lack of money and expertise to evaluate these materials (Livingstone & Bulger, 2013). As we argued in the previous section, a lack of evaluation studies leads to underdeveloped interventions and lost investment (Livingstone & Bulger, 2013). Therefore, it is increasingly important for governments to support the assessment of developed prevention programs about online safety, rather than to keep on investing in development.

Finally, while we have already focused on the role of parents and educators, it should be noted that the organization of teacher and parental training might be necessary. Moreover, it is important to recognize that schools are not the only actors in the online safety discussion. General media (e.g., television) can also help to raise awareness of Internet risks. Moreover, the industry (e.g., SNS providers) has its own responsibility in providing safer online environments for children and even in increasing risk awareness (O'Neill & Staksrud, 2012). Governments can play a crucial role in motivating these media and industry engagement (O'Neill & Staksrud, 2012).

Final conclusion

At the start of this dissertation, three research challenges were presented based on previous literature and a worldwide policy agenda concerning online safety. These research challenges led to three research objectives, which were all achieved using a design-based research methodology. The different studies that were part of this design-based research approach were described in the different chapters of this dissertation and divided into three parts: the problem-analysis and formulation of initial design principles, the development and evaluation of solutions, and a reflection to produce revised design principles.

The first three research chapters (Chapters 2 to 4) described explorative studies, of which the results respond to the first research objective. The current educational situation with regard to online safety was analyzed, leading to a clear problem statement. The subsequent five research chapters (Chapters 5 to 9) described intervention studies, in which educational materials have been iteratively developed, implemented and evaluated in close collaboration with educational stakeholders. This resulted in effective educational materials that can be used in secondary classrooms to increase risk awareness and to change unsafe behavior on SNSs, corresponding to the second research objective. Finally, Chapter 10 described the revised, contextual design principles derived from the intervention studies described before and corresponding to the third research objective: 1) time for individual reflection is critical; (2) simulated environments are sufficient; (3) involving parents in the intervention is beneficial; and (4) a short-term intervention is sufficient to obtain the proposed goals. Although the current design-based research has some limitations, and further research is necessary to replicate findings and to strengthen certain results, the results of this research have significant implications for practitioners, theory and policy. In this way, this dissertation has tried to offer an important contribution to the field of online safety and design-based research, in addition to offering practical solutions to practitioners.

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NEDERLANDSTALIGE SAMENVATTING

SUMMARY IN DUTCH

Nederlandstalige samenvatting

Het verhogen van het bewustzijn van risico's en het veranderen van onveilig gedrag op sociale netwerksites: een ontwerponderzoek in het secundair onderwijs

Inleiding

Hedendaagse jongeren leven in een wereld waar nieuwe media zich met enorme snelheid ontwikkelen. Sociale netwerksites (SNSs) vormen een nieuwe communicatievorm in deze digitale wereld, waar mensen een persoonlijk profiel kunnen aanmaken dat hun identiteit en hun netwerk van connecties weergeeft. Dit profiel kunnen ze vervolgens gebruiken om met elkaar in interactie te gaan (Acquisti & Gross, 2006). De groei in populariteit uit zich in het voorbeeld van Facebook. Deze SNS evolueerde in vijf jaar tijd van een SNS die enkel doelde op de studenten van één Amerikaanse universiteit tot de populairste SNS van de wereld met meer dan één miljard gebruikers, waaronder zowel jongeren als volwassenen (Hampton, Goulet, Rainie, & Purcell, 2011; Ortutay, 2012). Onderzoek toont aan dat in Europa 73% van de 13-14 jarigen en 82% van de 15-16 jarigen een profiel heeft op een SNS (Livingstone, Haddon, Görzig, & Olafsson, 2011).

Vele auteurs beschrijven dan ook de voordelen en opportuniteiten van dergelijke SNSs, zoals de communicatiemogelijkheden (Pruulmann-Vengerfeldt & Runnel, 2012) en de mogelijkheden tot identiteitsvorming (Hum e.a., 2011; Madden & Smith, 2010; Zhao, Grasmuck, & Martin, 2008). Er worden er in de literatuur echter ook veel risico's beschreven die gepaard gaan met het gebruik van SNSs (Christofides, Muise, & Desmarais, 2012), zoals het stoten op onbetrouwbare of schokkende informatie, cyberpesten, ongewilde seksuele toenadering, privacyrisico's, en commerciële risico's (De Moor e.a., 2008). Dit leidt tot bezorgdheid bij onderzoekers en beleidsmakers (Safer Internet Programme, 2009; Walrave & Heirman, 2013; Watson, Smith, & Driver, 2006). Zij zien de rol van onderwijs over online veiligheid voor kinderen als een belangrijke uitdaging in deze digitale wereld. Over de hele wereld werden dan ook beleidsmaatregelen genomen die de rol van onderwijs over online veiligheid benadrukken (Department of Homeland Security and the European Commission - Joint Declaration, 2012; European commission, 2012).

Om die rol van onderwijs te ondersteunen, werd een heel aantal preventiepakketten ontwikkeld (Insafe, 2014). Onderzoek toont echter aan dat deze pakketten en bewustzijnscampagnes niet volstaan omdat ze geen theoretische basis hebben, noch geëvalueerd zijn door middel van wetenschappelijk onderzoek (Mishna, Cook, Saini, Wu, & MacFadden, 2010). Het is daarom niet duidelijk of deze initiatieven wel een impact hebben op

jongeren, en aan welke kenmerken interventies moeten voldoen opdat ze ook daadwerkelijk een effect zouden hebben (Livingstone & Bulger, 2013).

Onderzoeksdoelen

Het hoofddoel van dit doctoraatsonderzoek was te zorgen dat jongeren zich bewust zouden zijn van de risico's op SNSs, en te zorgen dat ze zich zo veilig mogelijk zouden gedragen op SNSs, door het onderwerp op te nemen in het secundair onderwijs. Om dit doel te bereiken, stelden we eerst enkele tekortkomingen vast in de bestaande literatuur rond reeds uitgevoerd onderzoek:

(1) Onderzoek toont aan dat jongeren verschillende risico's lopen bij het gebruik van SNSs, maar het is niet duidelijk welke risico's het meest problematisch zijn. Er is verder geen onderzoek naar de stand van zaken met betrekking tot de rol van onderwijs rond online veiligheid: wat zijn de bestaande initiatieven, zijn deze zinvol, worden ze daadwerkelijk ingezet en wat is de mening van directies en leraren?

(2) Bestaande initiatieven rond online veiligheid voor kinderen zijn niet gebaseerd op theorieën of op empirisch onderzoek, waardoor hun impact onduidelijk is. Nieuwe educatieve pakketten die goed onderbouwd zijn door theorie en empirie zijn noodzakelijk.

(3) Er is weinig geweten over de kenmerken waaraan educatieve pakketten moeten voldoen, opdat ze hun beoogde effect zouden bereiken. Dergelijke theoretische kennis zou nochtans de ontwikkeling van nieuw materiaal kunnen vergemakkelijken.

Op basis van deze tekortkomingen in voorgaand onderzoek, werden drie onderzoeksdoelen vooropgesteld voor het huidige doctoraatsonderzoek:

Onderzoeksdoel 1 (OD1): Het beschrijven van de stand van zaken van het huidige onderwijslandschap met betrekking tot risico's op SNSs. Het formuleren van een duidelijke probleemstelling, waarbij de mening van tieners en leraren in rekening wordt gebracht.

Onderzoeksdoel 2 (OD2): Het ontwikkelen van empirisch geëvalueerd educatief materiaal dat gebruikt kan worden in het secundair onderwijs, en dat tegemoetkomt aan de vereisten die vooropgesteld werden in het kader van onderzoeksdoel 1.

Onderzoeksdoel 3 (OD3): Het ontwikkelen van ontwerpprincipes die gebruikt kunnen worden door toekomstige leraren, onderzoekers en ontwikkelaars wanneer deze nieuw educatief materiaal maken over veiligheid op SNSs.

Deze drie onderzoeksdoelen werden nagestreefd doorheen de verschillende hoofdstukken van deze doctoraatsthesis.

Onderzoeksmethode

Om deze doelen te bereiken, werd een ontwerpgerichte onderzoeksmethode toegepast. Deze methode wordt gedefinieerd als "een systematische maar flexibele methode die tot doel heeft de onderwijspraktijk te verbeteren door iteratieve analyse, ontwerp, ontwikkeling en implementatie, gebaseerd op een samenwerking tussen onderzoekers en praktijk in een

authentieke context, en resulterend in contextgevoelige ontwerpprincipes en theorieën" (Wang and Hannafin, 2005, p6-7). Een dergelijk onderzoek resulteert dus zowel in praktijkgerichte oplossingen, als in een theoretische bijdrage (Edelson, 2002; McKenney & Reeves, 2013; Reeves, 2006; Vanderlinde & van Braak, 2010).

Reeves (2006) beschrijft de ontwerpgerichte onderzoeksmethode in vier opeenvolgende stappen: (1) een analyse van het probleem, (2) de ontwikkeling van oplossingen gebaseerd op bestaande kennis, (3) de evaluatie van deze oplossingen in de praktijk en (4) een reflectie op het onderzoeksproces om tot ontwerpprincipes te komen. Deze onderzoeksmethode is dan ook geschikt om de vooropgestelde onderzoeksdoelen te bereiken. Het eerste onderzoeksdoel, het formuleren van een probleemstelling, wordt nagestreefd in de eerste fase van het ontwerpgericht onderzoek. Het tweede onderzoeksdoel, het ontwikkelen van empirisch geëvalueerd materiaal, wordt nagestreefd in de tweede en derde stap van het ontwerpgericht onderzoek door het cyclisch doorlopen van ontwikkeling, evaluatie en revisie van het educatieve materiaal. Het derde onderzoeksdoel, het formuleren van ontwerpprincipes, wordt nagestreefd in de vierde en laatste stap van het ontwerpgericht onderzoek.

Overzicht van de belangrijkste bevindingen

Onderzoeksdoel 1

Het eerste onderzoeksdoel was het analyseren van het huidige onderwijslandschap met betrekking tot online veiligheid en het formuleren van een concrete en duidelijke probleemstelling, waarbij rekening gehouden wordt met de vraag van jongeren zelf en belanghebbenden in de onderwijssector. Zoals reeds vermeld, werd dit doel nagestreefd in de eerste fase van het ontwerpgericht onderzoek, dat gerapporteerd werd in deel 1 van deze doctoraatsthesis. In deze eerste fase werd een literatuurstudie uitgebreid met drie verkennende studies.

De eerste studie werd beschreven in hoofdstuk 2, en had tot doel het gedrag van Vlaamse jongeren op SNSs in kaart te brengen. Om dit te bereiken werden de Facebookpagina's van 1050 Vlaamse tieners geobserveerd en geanalyseerd. De volgende vragen werden hierbij voorop gesteld: (1) Welke informatie posten tieners op hun Facebook-pagina?, (2) Gebruiken deze tieners hun privacy-instellingen om hun informatie te beschermen? En (3) Is de beschikbare informatie op hun profiel risicovolle informatie? Als antwoord op de eerste onderzoeksvraag vonden we dat tieners vooral foto's, hun interesses en enkele basisgegevens over zichzelf op hun profiel plaatsen. In het kader van de tweede onderzoeksvraag vonden we dat een belangrijke hoeveelheid jongeren hun privacy-instellingen aanpast, zodat enkel vrienden deze informatie kunnen zien. Toch is een groot deel van de informatie vaak ook zichtbaar voor vrienden van vrienden (en dit zijn meestal vreemden). Ten slotte vonden we als antwoord op de derde onderzoeksvraag dat tieners ook risicovolle informatie op hun profiel plaatsen. Bovendien plaatsen oudere tieners en meisjes meer (risicovolle) informatie op hun profiel, terwijl zij hun

privacy-instellingen niet beter gebruiken. We vonden geen verschillen met betrekking tot de onderwijsvorm die zij volgden (ASO, TSO, BSO, KSO).

De tweede verkennende studie werd beschreven in het derde hoofdstuk. Hier wilden we het onderwijslandschap met betrekking tot online veiligheid in kaart brengen. Dit werd enerzijds gedaan door een theoretische evaluatie van bestaande educatieve pakketten rond online veiligheid, en anderzijds door het organiseren van een focusgroep met belanghebbenden uit het onderwijs (leraren, CLB, ontwikkelaars van educatieve pakketten,..). Volgende onderzoeksvragen werden vooropgesteld: (1) Behandelen de bestaande pakketten alle risico's op SNSs?, (2) Voldoen deze pakketten aan de voorwaarden van effectieve preventiepakketten?, (3) Hoe worden deze pakketten onthaald door belanghebbenden uit het onderwijs?, (4) Welke criteria vinden deze belanghebbenden belangrijk? En (5) Hoe zou een pakket volgens hen best geïmplementeerd worden in de klaspraktijk? De eerste twee vragen werden beantwoord in de theoretische evaluatie van vijf Vlaamse educatieve pakketten op basis van twee theoretische raamwerken. Het ene raamwerk gaat over de risico's op SNSs (De Moor e.a., 2008), het andere over de voorwaarden van effectieve preventiecampagnes (Nation e.a., 2003). We vonden dat slechts één pakket alle risico's behandelde en dat twee pakketten slechts drie van de zeven risico's behandelden. We vonden wel dat de meeste pakketten aan de meeste voorwaarden van effectieve preventiepakketten voldeden. Toch vonden we, en dit bevestigt voorgaand onderzoek (Livingstone & Bulger, 2013; Mishna, Cook, Saini, Wu, & MacFadden, 2010), dat de pakketten geen theoretische basis hadden en dat geen enkel pakket empirisch geëvalueerd werd. In de focusgroep vonden we dat de belanghebbenden uit het onderwijs positief waren over de bestaande pakketten (ze vonden ze mooi en nuttig), maar ze vonden ze wel te tijdrovend. Ze gaven aan pakketten te verkiezen die kort en krachtig zijn en die te implementeren zijn in één les.

De derde verkennende studie werd beschreven in hoofdstuk 4. Deze vragenlijststudie had tot doel de relatie tussen het gedrag van tieners op SNSs en de aandacht die aan het onderwerp gegeven werd op school aan elkaar te linken. We onderzochten bij 638 jongeren of ze hun privacy belangrijk vonden en of ze zich veilig of onveilig gedroegen online, om vervolgens na te gaan of onderwijs hierop een impact heeft. We vonden dat tieners hun privacy niet heel belangrijk vinden, en dat dit verband houdt met onveilig gedrag op SNSs. We vonden wel dat onderwijs een positieve invloed heeft: onderwijs verhoogt het belang dat men hecht aan privacy, en hierdoor heeft het ook een indirecte positieve impact op de veiligheid van het gedrag van jongeren op SNSs.

Wanneer we deze drie studies samenvatten, konden we concluderen dat het belangrijk was om meer energie te steken in onderwijs over veilig gebruik van SNSs. De eerste studie toonde aan dat jongeren risicovol gedrag vertonen op SNSs, de tweede studie toonde dat bestaande educatieve pakketten niet volstaan om hiervoor een oplossing te bieden, en de derde studie gaf een indicatie van de belangrijke rol die onderwijs toch kan spelen met betrekking tot het veranderen van attitudes en gedrag. Deze drie verkennende studies bieden dus een duidelijk overzicht van de stand van zaken, zowel wat betreft het gedrag van jongeren als wat betreft het

onderwijslandschap met betrekking tot online veiligheid. Op deze manier bereikten we het eerste onderzoeksdoel dat vooropgesteld werd voor dit doctoraatsonderzoek.

Onderzoeksdoel 2

Het tweede onderzoeksdoel dat vooropgesteld werd, was het ontwikkelen van empirisch geëvalueerd educatief materiaal dat gebruikt kan worden in het secundair onderwijs, en dat tegemoetkomt aan de vereisten die vooropgesteld werden in het kader van onderzoeksdoel 1. Dit onderzoeksdoel werd nagestreefd in de tweede en derde fase van het ontwerpgericht onderzoek en werd gerapporteerd in het tweede deel van deze doctoraatsthesis. Er werden vijf iteraties van ontwikkeling, evaluatie en revisie uitgevoerd. De vijf interventiestudies werden gerapporteerd in vijf verschillende hoofdstukken.

In hoofdstuk 5 werd de eerste interventiestudie beschreven. Na het ontwikkelen van een eerste versie van educatief materiaal, gebaseerd op de resultaten uit de eerste fase van het onderzoek dat hierboven werd beschreven, werd dit materiaal geïmplementeerd in 79 klassen in het secundair onderwijs. De interventie bestond uit een les van één uur, waarin de leerlingen na een korte inleiding in duo's vragen moesten beantwoorden over een gesimuleerd SNS-profiel. Deze vragen leidden hen tot de verschillende risico's die op dit profiel te vinden waren. Vervolgens werd er een stellingenspel gespeeld, waarbij studenten groene of rode kaartjes in de lucht staken die aangaven of ze al dan niet akkoord waren met een stelling. De les eindigde met een theoretisch gedeelte waarin ook nog enkele voorbeelden uit het echte leven werden gegeven. Voor en na de les werd een vragenlijst afgenomen waarin gepeild werd naar de kennis van de leerlingen over de verschillende risico's op SNSs, hun attitude ten opzichte van deze risico's en hun gedrag op SNSs. Dezelfde vragenlijsten werden afgenomen bij een controlegroep van 43 klassen, die geen interventieles kregen. In totaal namen 2071 leerlingen tussen 11 en 19 jaar deel aan deze eerste interventiestudie. De resultaten toonden aan dat de initieel ontwikkelde les een positieve invloed had op het bewustzijn van de jongeren over de verschillende risico's. Er werd echter geen impact gevonden van de les op de attitude van de leerlingen, en slechts een kleine impact op hun gedrag.

Omdat we geen impact vonden op de attitude en het gedrag van de leerlingen, werd de initiële interventie in detail bekeken. Op basis van deze analyse en op basis van verschillende theorieën zoals de *Theory of planned behavior* (Ajzen, 1991) en theorieën over de gevoeligheid van jongeren voor groepsdruk (Sumter, Bokhorst, Steinberg, & Westenberg, 2009), stelden we de hypothese voorop dat jongeren risicovol gedrag bij elkaar stimuleren, waardoor de initiële interventie niet tot een gedragsverandering kon leiden. Op basis van deze hypothese werd de interventie aangepast. Er werd tijdens de les meer tijd voorzien voor individuele reflectie en minder tijd voorzien voor samenwerking (waardoor de leerlingen beïnvloed zouden kunnen worden door hun klasgenoten). Concreet moesten de vragen bij het gesimuleerde SNS-profiel nu individueel opgelost worden en moesten de leerlingen ook eerst individueel noteren of ze al dan niet akkoord waren met de stellingen, alvorens alles in de klas besproken werd.

In hoofdstuk 6 werd de tweede interventiestudie beschreven, waarin dit aangepaste materiaal werd getest. In deze studie werden 1544 leerlingen tussen 11 en 19 jaar betrokken. Het materiaal werd geïmplementeerd in 25 klassen in het secundair onderwijs, en opnieuw werd voor- en achteraf de kennis, de attitude en het gedrag van de leerlingen gemeten. De resultaten van deze groep werden vergeleken met een groep die de initiële interventie volgde (43 klassen) en een groep die geen interventie volgde (43 klassen). Onze resultaten wezen uit dat enkel de aangepaste les, waarin meer tijd was voor individuele reflectie, effectief was in het veranderen van de attitudes en het gedrag van de leerlingen. We concludeerden dus dat individuele reflectie van groot belang is wanneer gedragsveranderingen worden beoogd.

Ondanks deze positieve resultaten was er nog steeds ruimte voor verbetering. Daarom werd de interventie opnieuw aandachtig geanalyseerd. Het was opvallend dat jongeren en leerkrachten rapporteerden dat het gesimuleerde profiel dat gebruikt werd tijdens de les te veel risico's bevatte om realistisch te zijn. De leerlingen konden zichzelf niet identificeren met het profiel en zouden daarom kunnen denken dat de risico's waarover ze leerden tijdens de oefening niet van toepassing zouden zijn op hun eigen profiel. Men zou dus kunnen stellen dat deze oefening daarom niet voldoet aan de vereisten van een 'authentieke context', een kenmerk dat als belangrijk naar voren wordt geschoven door constructivisten (Duffy & Cunningham, 1996; Snowman, McCown, & Biehler, 2008). Om na te gaan of de oefening effectiever zou zijn wanneer deze meer overeenkomt met de echte wereld hebben we de interventie opnieuw aangepast. In de aangepaste interventie moest de oefening uitgevoerd worden met het eigen SNS-profiel in plaats van met het gesimuleerde profiel. Dit impliceert echter dat mogelijk niet alle risico's aanwezig waren (in tegenstelling tot het gesimuleerde profiel) en dat het moeilijker was om leerlingen op deze risico's te wijzen.

In hoofdstuk 7 werd de derde interventiestudie gerapporteerd, waarin deze aangepaste interventie geëvalueerd werd. De resultaten van de pre- en post-vragenlijsten van de leerlingen die deze aangepaste interventie volgden (n=40) werden vergeleken met de resultaten op deze vragenlijsten van leerlingen die de vorige interventie volgden (n=40). In totaal namen 18 klassen deel aan dit onderzoek. We vonden dat het gesimuleerde profiel inderdaad onrealistisch werd bevonden, maar dat de aangepaste interventie waarin met het eigen profiel gewerkt werd geen meerwaarde bood. Integendeel, de vragen over het gesimuleerde profiel bleken effectiever om jongeren de verschillende soorten risico's aan te leren. We verkozen daarom om het gesimuleerde profiel in de interventie te behouden.

Na deze derde interventie werd het materiaal opnieuw aangepast om de impact te verhogen. Op basis van de Theory of planned behavior (Ajzen, 1991) en de preventierichtlijnen van Nation en collega's (2003), stelden we de hypothese voorop dat ouders een positieve impact zouden kunnen hebben op het gedrag van de leerlingen. Om hierop in te spelen, werd de ouderbetrokkenheid bij de interventie verhoogd door naast de les ook een ouderavond te organiseren waarop informatie werd gegeven over de risico's op SNSs. In hoofdstuk 8 beschrijven we de evaluatie van dit aangepaste materiaal in 14 klassen (n=307). De ouderavonden bleken een zekere impact te hebben, maar waren onvoldoende om alle ouders te

betrekken. Slechts 15% van de uitgenodigde ouders kwam ook daadwerkelijk opdagen op de ouderavonden.

Om aan dit probleem tegemoet te komen, herwerkten we de interventie opnieuw. We probeerden de ouders nu actief te betrekken bij de interventie door middel van een huiswerkopdracht. De oefening met het gesimuleerde profiel moest nu thuis opgelost worden samen met de ouders. Dit zou de communicatie met de ouders moeten stimuleren. De vijfde interventiestudie, waaraan 20 klassen deelnamen (n=207), werd beschreven in hoofdstuk 9. In deze studie vergeleken we de resultaten op de pre- en postvragenlijsten van leerlingen die de herwerkte interventie volgden met de resultaten van de leerlingen die de vorige interventie volgden (zonder ouderbetrokkenheid). We vonden dat actieve ouderbetrokkenheid een positieve impact had op de intenties van jongeren om zich veilig te gedragen op SNSs en het problematische gedrag dat reeds bestond verminderde. We zagen bovendien dat deze positieve impact zich vooral uitte bij jongens. Omwille van deze resultaten, werd de huiswerkopdracht behouden in de uiteindelijke interventie.

Na deze vijf iteraties van ontwikkeling, evaluatie en revisie, is er empirisch bewijsmateriaal dat de uiteindelijke educatieve pakketten effectief zijn in het verhogen van het bewustzijn over risico's op SNSs en in het veranderen van onveilig gedrag op SNSs. Op deze manier werd ons tweede onderzoeksdoel bereikt.

Onderzoeksdoel 3

Als derde onderzoeksdoel hadden we vooropgesteld om ontwerpprincipes te ontwikkelen, die gebruikt zouden kunnen worden door toekomstige leraren, onderzoekers en ontwikkelaars wanneer deze nieuw educatief materiaal maken over veiligheid op SNSs. In ontwerpgericht onderzoek is het belangrijk te vertrekken vanuit bepaalde theoretisch onderbouwde ontwerpprincipes, die doorheen de verschillende evaluaties worden aangepast om zo te leiden tot herziene en contextspecifieke ontwerpprincipes. Het derde onderzoeksdoel werd nagestreefd in de derde fase van het ontwerpgericht onderzoek, waarin gereflecteerd werd over alle vorige onderzoeksresultaten om zo tot herwerkte ontwerpprincipes te komen. Deze reflectie werd gerapporteerd in het derde deel van deze doctoraatsthesis, in hoofdstuk 10.

Op het einde van de eerste fase van het ontwerpgericht onderzoek (de probleemanalyse), werden twee theoretische raamwerken naar voren geschoven die initiële ontwerpprincipes opleverden. Het eerste raamwerk werd beschreven door Nation en collega's (2003) en bevat ontwerprichtlijnen voor effectieve preventiecampagnes. Concreet gaat het om negen ontwerpprincipes: preventieprogramma's moeten allesomvattend zijn, verschillende instructiestrategieën combineren, voldoende gedoseerd zijn, onderbouwd zijn door theorie, positieve relaties aanmoedigen, tijds- en sociocultureel relevant zijn, aangepast zijn aan het doelpubliek, een training van de lesgever voorzien en ze moeten geëvalueerd worden. Deze kenmerken worden uitgebreid besproken in hoofdstuk 3. Het tweede raamwerk bevat instructierichtlijnen uit het constructivisme, de dominante theorie in de onderwijswetenschappen van de laatste decennia (Gordon, 2008). Concreet worden vier

ontwerpprincipes naar voren geschoven: actief leren (Duffy & Cunningham, 1996), gebruik van authentieke context (Snowman, McCown, & Biehler, 2008), aanbieden van meerdere perspectieven (Kafai & Resnick, 1996) en samenwerkend leren (Duffy & Cunningham, 1996). In hoofdstuk 5 komt aan bod hoe deze richtlijnen geïmplementeerd werden in het ontwikkelde materiaal.

Op basis van de resultaten van de vijf interventiestudies, werden vier herziene ontwerpprincipes vooropgesteld die specifiek gelden voor interventies met betrekking tot veilig gebruik van SNSs: 1) tijd voor individuele reflectie is cruciaal, 2) het gebruik van een gesimuleerde digitale omgeving is voldoende, 3) ouderbetrokkenheid is nuttig en 4) een korte interventie volstaat om de vooropgestelde doelen te bereiken. De eerste twee herziene ontwerpprincipes relativeren de respectievelijke constructivistische principes van samenwerkend leren en het gebruik van een authentieke context. Het derde ontwerpprincipe bevestigt het belang van positieve relaties zoals beschreven door Nation en collega's (2003) en het laatste ontwerpprincipe gaat in tegen het vooropschuiven van voldoende dosering zoals gesteld door Nation en collega's (2003).

Door het formuleren van deze vier ontwerpprincipes werd ook het derde onderzoeksdoel bereikt. Deze ontwerpprincipes werden ontwikkeld om leraren, onderzoekers en ontwikkelaars te helpen. Leraren kunnen niet enkel gebruik maken van het ontwikkelde materiaal (onderzoeksdoel 2), maar kunnen ook gebruik maken van de theoretische kennis die dit onderzoek opleverde om nieuw materiaal te ontwikkelen. Hetzelfde geldt voor ontwikkelaars van educatief materiaal over online veiligheid (bv. Insafe, 2014). De wetenschap dat sommige criteria belangrijk zijn om een bepaald doel te bereiken (bv. een gedragsverandering), kan toegepast worden bij het ontwikkelen van gelijkaardige educatieve pakketten. Tenslotte levert deze kennis ook nog een belangrijke theoretische bijdrage voor onderzoekers. Zij kunnen verder bouwen op deze ontwerpprincipes om zo bijvoorbeeld de veralgemeenbaarheid ervan na te gaan. Zo kan nagegaan worden of deze ontwerpprincipes ook toegepast kunnen worden binnen andere preventiedomeinen, zoals rook- of pestpreventie. De ontwerpprincipes kunnen ook als initiële richtlijnen gebruikt worden bij het opstarten van nieuw ontwerponderzoek.

Algemeen besluit

In dit proefschrift worden drie onderzoeksdoelen behandeld: 1) het formuleren van een stand van zaken van het onderwijslandschap betreffende risico's op SNSs, 2) het ontwikkelen van geëvalueerd educatief materiaal voor secundair onderwijs en 3) het ontwikkelen van ontwerpprincipes. Deze drie onderzoeksdoelen werden bereikt door middel van een ontwerpgericht onderzoek, bestaande uit drie overeenkomstige delen: 1) de probleemanalyse en het formuleren van initiële ontwerpprincipes, 2) het ontwikkelen en evalueren van materiaal en 3) reflectie om tot herziene ontwerpprincipes te komen.

De eerste drie empirische hoofdstukken (hoofdstuk 2 tot 4) beschrijven verkennende studies, waarvan de resultaten een antwoord bieden op het eerste onderzoeksdoel. Het huidige onderwijslandschap met betrekking tot online veiligheid werd geanalyseerd, wat leidde tot een

duidelijke probleemstelling. In de volgende vijf empirische hoofdstukken (hoofdstuk 5 tot 9) werden interventiestudies beschreven waarin educatief materiaal op iteratieve wijze werd ontwikkeld, geïmplementeerd en geëvalueerd in nauwe samenwerking met mensen uit de onderwijspraktijk. Dit resulteerde in doeltreffend, educatief materiaal dat gebruikt kan worden in klassen uit het secundair onderwijs om het bewustzijn van risico's op SNSs te verhogen en onveilig gedrag te verminderen. Hiermee werd het tweede onderzoeksdoel bereikt. Ten slotte werden in hoofdstuk 10 vier herziene en contextspecifieke ontwerpprincipes naar voren geschoven: 1) tijd voor individuele reflectie is cruciaal, 2) het gebruik van een gesimuleerde digitale omgeving is voldoende, 3) ouderbetrokkenheid is nuttig en 4) een korte interventie volstaat om de vooropgestelde doelen te bereiken. Hiermee werd het derde onderzoeksdoel bereikt.

Hoewel het huidige ontwerpgericht onderzoek enkele beperkingen kent en toekomstig onderzoek nodig is om de huidige bevindingen te bevestigen en te veralgemenen naar andere contexten en doelgroepen, hebben de resultaten belangrijke gevolgen voor leraren, onderzoekers en beleidsmakers. Op deze manier levert dit proefschrift een belangrijke bijdrage aan het veld van online veiligheid en ontwerpgericht onderzoek en reikt het praktische oplossingen aan voor de onderwijspraktijk.

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ACADEMIC OUTPUT

Academic output

Output integrated in this dissertation

Journals (A1)

Vanderhoven, E., Schellens, T., Valcke, M. (2014). How safe do teenagers behave on Facebook? An observational study. *Plos One*, 9(8), doi:10.1371/journal.pone.0104036.

Vanderhoven, E., Schellens, T., & Valcke, M. (2014). Educating teens about the risks on social network sites: Useful or Pointless? An intervention study in Secondary Education. Comunicar, (43), 123–132. doi:10.3916/C43-2014-12

Vanderhoven, E., Schellens, T., Vanderlinde, R., & Valcke, M. (2014). Developing educational materials about the risks on social network sites: A design-based research approach. Manuscript resubmitted for publication in *Educational Technology Research and Development* (after a second revision based on the reviewers' comments).

Vanderhoven, E., Schellens, T., Valcke, M. (2014). Decreasing risky behavior on social network sites: the impact of parental involvement in secondary education interventions. Manuscript resubmitted for publication in *The Journal of Primary Prevention* (after a first revision based on the reviewers' comments).

De Wolf, R., Vanderhoven, E., Berendt, B., Pierson, J., & Schellens, T. (2014). Self-reflection in privacy research on social network sites. *Manuscript Submitted for publication in Ethics and Information Technology.*

Journals (A2)

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Exploring the usefulness of school education about risks on social network sites: a survey study. *Journal of media literacy education, 5*(1), 285‐294.

Vanderhoven, E., Schellens, T., & Valcke, M. (2014). How authentic should a learning context be? Using real and simulated profiles in a classroom intervention to improve safety on social network sites. Manuscript accepted for publication in *The International Journal of Cyber Society and Education.*

Journals (A4)

Vanderhoven, E., & Schellens, T. (2012). Sociale netwerksites: een gevaar voor jongeren? *Welwijs, 23*(1), 3–6.

Book chapters (B2)

Vanderhoven, E., Raes, A. & Schellens, T. (in press). Interpretation in the process of designing effective learning materials: A design-based research example. In Smeyers, P., Bridges, D., Burbules, N., & Griffiths, M. (Eds.). (2015). *International handbook of interpretation in educational research methods* (2 Vols.). Dordrecht: Springer.

Vanderhoven, E., Schellens, T., Valcke, M. (2014). Changing unsafe behavior on social network sites: collaborative learning vs. individual reflection. Manuscript accepted for publication in a book volume, Springer.

Conference papers (P1)

Vanderhoven, E., Schellens, T., Valcke, M. , & De Koning, E. (2014). Involving Parents in School Programs about Safety on Social Network Sites. *Procedia - Social and Behavioral Sciences*, *112*, 428–436. doi:10.1016/j.sbspro.2014.01.1185

Vanderhoven, E., Schellens, T., & Valcke, M. (2014). Educational packages about the risks on social network sites: state of the art. *Procedia - Social and Behavioral Sciences*, *112*, 603–612. doi:10.1016/j.sbspro.2014.01.1207

Other conference contributions (C1, C3)

Vanderhoven, E., & Schellens, T. (2011). The role of parents, media, teachers and peers in raising the awareness of privacy-issues on social networks. Presented at the Digital Media & Learning Conference (DML - 2011), Long Beach, US.

Vanderhoven, E., Schellens, T., & Valcke, M. (2011). How safe do youngsters really behave on Facebook: an observation-study. Presented at the EU Kids Online Conference : Children, risk and safety online: Research and policy challenges in comparative perspective, London, UK.

Vanderhoven, E., Schellens, T., & Valcke, M. (2012). The role of education in pushing back responsabilisation: raising awareness of the risks on social network sites. Presented at the Conference of International Association for Media and Communication Research (IAMCR - 2012), Durban, South-Africa

Vanderhoven, E., Schellens, T., & Valcke, M. (2012). How safe do youngsters really behave on Facebook: an observation-study. Presented at the Conference of International Association for Media and Communication Research (IAMCR - 2012), Durban, South-Africa.

Vanderhoven, E., Schellens, T., & Valcke, M. (2012). Educating our kids about the risks of social network sites: useful or pointless? Presented at the Conference of International Association for Media and Communication Research (IAMCR - 2012), Durban, South-Africa.

Schellens, T., Vanderhoven, E., & Valcke, M. (2012). How safe do teens really behave on Facebook and what is the role of education. Presented at the International Conference on Privacy, Empowerment and Technology in the context of Online Social Networks : For Your Eyes Only, Brussels, Belgium.

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Changing unsafe behavior on social network sites: collaborative learning vs individual reflection. *16th Biennial Conference on Teachers and Teaching, Abstracts*. Presented at the 16th Biennial Conference on Teachers and Teaching (ISATT - 2013), Ghent, Belgium.

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Changing unsafe behavior on social network sites: the role of school education. Presented at the Youth 2.0, Antwerp, Belgium.

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Considerately developing e-safety interventions: a design based research approach. Presented at the Media and Learning, Brussels, Belgium.

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). Changing unsafe behavior on social network sites: collaborative learning vs individual reflection. *European Association for Research of Learning and Instruction, Abstracts*. Presented at the European Association for Research of Learning and Instruction (EARLI - 2013), Munchen, Germany.

Vanderhoven, E., Schellens, T., & Valcke, M. (2013). The impact of a short-term school intervention about risks on social network sites. Presented at the American Educational Research Association (AERA -2013), San Fransisco, US.

Schellens, T., Vanderhoven, E., & Valcke, M. (2014). Teach me how to Facebook! A design-based research about risk prevention on social network sites., Presented at the International Conference of the Learning Sciences (ICLS 2014), Boulder, US.

Vanderhoven, E., Schellens, T., & Valcke, M. (2014). Raising risk awareness and changing unsafe behavior on social network sites: a design based research in secondary education. Accepted for presentaion at the Conferencee of International Association for Media and Communication Research (IAMCR - 2014), Hyderabad, India.