Modeling and Measuring Social Media Literacy of Digital Natives in the Example of the Lake Constance Region

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Completed Research Paper

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Abstract

Information literacy, i.e. the competent dealing with information, is considered a key competence for the networked information and media society that facilitates civic engagement, a self-determined life, and lifelong learning. With the rise of social media, many new information sources have emerged, opening up new challenges. Despite their growing importance, little is known in information systems research and education about information literacy in the context of social media. Against this background, we propose and empirically test a framework for modelling and measuring social media literacy (SML) in secondary school. Applying the proposed framework on a survey with 434 high school pupils from Germany, Austria, Switzerland, and Liechtenstein, we find relatively poor skill levels in the objective SML for most students, while the self-assessed SML is slightly higher. In addition, the study reveals that three different forms of social media use can explain individual differences in SML.

Keywords: Social Media Literacy, Information Literacy, Measuring Social Media Literacy
Introduction

Information literacy (IL) refers to the skills necessary to effectively and efficiently use information, and it is considered key to facilitate civil engagement, a self-determined life, and lifelong learning (e.g. Gapski and Tesker 2009). It is defined as the ability to: 1) recognize problem-driven information needs, 2) to select relevant information sources, 3) to properly access information sources, 4) to evaluate the gathered information, 5) to use the information, 6) to present the information, and 7) to reflect upon the applied information searching and processing procedure as well as the information resulting from it (see for example Stanoevska-Slabeva et al. 2015a; Gapski and Tekster 2009). With the rise of digital information sources, IL has become a major practical competence relevant for the 21st century networked society (UNESCO 2013). One major benefit of the networked society is the availability of ubiquitous information and knowledge from various information sources, as for example online libraries, online encyclopedia, open data sources or digital media, at our fingertips. However, their effective and efficient use requires a high level of IL to proficiently retrieve and interpret available information (Stanoevska-Slabeva et al. 2015a, Stanoevska-Slabeva et al. 2015b, and Seufert et al. 2016).

The growing number of different digital information sources increases the requirements on IL and results in the development of specialized forms of IL. While initially the term referred to the ability to search for available information in libraries, in the networked society it means effective and efficient use of prevailing and emerging digital information sources. In recent years one major requirement on IL results from the growing number of social media information sources and the need for development of a specialized form of social media literacy (SML).

Social media platforms have become spaces where news is first shared before it reaches other mainstream media. As a result, social media has developed into a digital landscape from which users are obtaining more and more information. According to a report of the Pew Research Center (Gottfried and Shearer 2016), 62% of the adults in the United States get news on social media. The study claims that two-thirds of Facebook users read their news on Facebook and 59% of Twitter users do the same on Twitter. Furthermore, a more recent Pew Research Center survey reveals that half of Americans have turned to social media to learn about the 2016 presidential election (Greenwood, Perrin and Duggan 2016). Similar developments can be observed in Europe as well. According to the Reuters Institute Digital News Report for 2016 (Newman et al. 2016), 51% of the considered sample involving 26 European countries use social media as a source of news each week. 12% of the considered international European sample already say that social media is their main source of news (Reuters 2016). Against this background and given recent developments related to fake news on social media (Allcott and Gentzkow 2017), to use social media as an information source, requires the application of IL principles and development of specific SML. In analogy to the definition of the term IL, we consider SML as a special form of IL addressing the proficient use of social media as an information source.

Nowadays people are exposed to information technology starting from early childhood (Gust von Loh and Henkel 2014). Therefore, early characterizations of “Digital Natives” suggested that young people who were born after 1980 and have grown up surrounded by digital technologies intuitively know how to use technology and how to manage digital information (Palfrey and Gasser 2008; Prensky 2001; Tapscott 1997). However, empirical research has shown that technology exposure cannot be equated to both the ability to use it and the necessary literacy to use information and its sources. Several studies demonstrate that Digital Natives are able to adopt digital information for entertainment and lifestyle purposes, but they largely fail to deal with it in the sufficient quality required for an efficient and effective workplace or academic use as well as for active participation and engagement in today’s digital society (e.g. Seufert et al. 2016; Badilla Quintana et al. 2011; Fraillon, Ainley, Schulz, Friedman and Gebhardt 2014; Miller 2015; OECD 2015; Pritchard and Cartwright 2004; Thirion and Pochet 2009). The latest International Computer and Information Literacy Study (Fraillon et al. 2014) assessing computer skills and IL of 60’000 8th graders from 21 education systems all over the world, explicitly concludes that IL needs to be part of formal education and training. However, despite the growing awareness for the need of formal and broad education related to IL, it has been insufficiently integrated as a learning objective in existing curricula (e.g. Jones-Kavalier and Flannigan 2006). This is even more important since technology is evolving rapidly, resulting in new and growing information sources such as social media. By failing to introduce information and SML in schools, digital natives get exposed to social media use without being made aware of phenomena as for example the filter bubble (Pariser 2011) or the specific characteristics of
social media information (i.e. personal opinions, differences in quality and authenticity and similar). Consequently digital natives are not prepared to use social media beyond private use in a professional manner for business purposes.

Equivalent to IL, competently dealing with social media information has scarcely been considered in Information Systems research and education as well. One reason for this might be the lack of a scientifically sound and proven model to operationalize and measure SML in secondary and higher education. The paper at hand contributes to fill this gap by proposing a new comprehensive framework and instrument for SML on the level of higher secondary and tertiary education. Another scientific contribution is provided by assessing the effect of private and educational social media usage on the ability to adequately deal with the retrieved information. The results of the presented research also have practical implications since they can inform curricula development in secondary and tertiary education.

Against this background, the main research question of the research presented in the paper at hand is: How can social media literacy of higher secondary education pupils be modeled and measured? What effect does pre-existing social media experience have on the level of SML?

To answer these research questions, a two-year research project has been established in cooperation with various secondary schools in the lake Constance region of the following German speaking countries: Germany, Austria, Switzerland, and Liechtenstein. The project is based on a methodological combination of literature analysis, model development, and empirical model testing: first, a literature review is conducted to conceptualize the term SML (documented in section 2). Second, the findings from the literature research are applied to adopt the 7i Framework for measuring SML and to identify different forms of social media use as predictors of different levels of SML (section 3). Third, based on the Social Media 7i Framework, a questionnaire has been developed to assess the objective and self-assessed SML in secondary schools (section 4). Finally, the model is empirically tested in 22 classes in German, Austrian, Swiss, and Liechtenstein secondary schools (section 5). The last section of this paper (section 6) concludes the paper by discussing the results, the scientific and practical contribution and limitations of the presented research and by providing recommendations for future research.

**Defining and Conceptualizing Social Media Literacy**

Under the term social media we understand various platforms that enable the establishment of connections and sharing of content among users. Examples of social media are blogs, wikis, social networking sites like Facebook, microblogs such as Twitter and Tumblr, media sharing platforms such as YouTube and visual content curation platforms such as Pinterest. While at the beginning social media were mainly used to connect and share among private users, they have now become environments where companies, public authorities, politicians, celebrities, scientists, NGOs, and many other business and societal players are breaking and unfolding news, stories and knowledge. Social media have become valuable sources of often exclusive information about, for example contemporary happenings, events and persons that in many cases have historical value. The use of social media as an information source in an effective and efficient way requires the ability to determine in which case social media are appropriate sources of information, how they can be accessed (i.e. knowledge about the Facebook or Twitter search engines), how the information stemming from social media can be assessed and validated (i.e. who is the source of information), how they can be used and how information can be presented in an interactive manner if the target publishing platforms are social media. Overall, the efficient use of social media as information sources has similarities with the concept of IL, but also some specific characteristics. Thus, we consider SML to be a special form of IL and define and operationalize it in analogy to the generic concept of IL.

The origin of IL research and its consideration in education policy goes back to the 1970s. At the beginning, IL was considered in library sciences and the meaning of the term IL was clearly related to the use of available knowledge in classical libraries (Grafstein 2002). Since then, the landscape of available information sources and the need for information has changed radically. The American Library Association’s (ALA) Presidential Committee on Information Literacy was one of the first institutions that responded to the information age in 1989. The committee called for an active learning process that taught students to know when they have a need for information, to find and evaluate required information, to organize the information, and to use the information effectively to address the problem or issue at hand.
The Association of College and Research Libraries (ACRL) offered a similar but more expanded conceptualization of information literacy by putting an additional focus on the understanding and implications of information. According to ACRL (2010) standards, students should be able to determine the extent of information needed, access the needed information effectively and efficiently, evaluate information and its sources critically, incorporate selected information into one’s knowledge base, use information effectively to accomplish a specific purpose, understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.

Further examination of prevailing definitions for IL shows that IL is considered to be a complex phenomenon that consists of several components or sub-competences necessary to deal with information (see for a more detailed analysis Stanoevska-Slabeva et al. 2015a; Stanoevska-Slabeva et al. 2015b; and Seufert et al. 2016). The analysis further shows that the meaning of the term as well as the number of sub-competences and their meaning have changed over time to reflect the changing environments in which information is searched and used. Older definitions (e.g., Kuhlthau 1987; American Library Association 1989; Breivik and Gee 1989; Bruce 1992; Doyle 1992) generally focus on the following components of IL: identifying information needs, finding (locating), evaluating and using information. In comparison, newer definitions reflect the bigger variety of digital information environments with varying quality of information by introducing additional sub-capabilities of IL such as the selection of relevant information sources (Rader, 2003; Livingstone et al. 2005; Chaka 2009; Association of College and Research Libraries 2010), as well as the evaluation of information sources and the information resulting from them. Newer articles, furthermore, rarely define IL, and if they do, they refer to existing definitions that serve as a starting point for deriving new, diverging definitions (see for example Kimmons 2014; Markless 2009; Lin et al. 2013; Vanwynsberghe and Verdegem 2013).

Following a process of comparison, systematization and matching of both the different definitions for IL and their components, the following generic definition of IL has been extracted (see also Stanoevska-Slabeva et al. 2015a; Stanoevska-Slabeva et al. 2015b; and Seufert et al. 2016): IL is defined as the ability: 1) to recognize problem-driven information needs, 2) to select information sources, 3) to properly access information sources, 4) to evaluate the quality of information; 5) to use the found information, 6) to present information, and 7) to reflect both the applied information searching and processing procedure as well as the information resulting from it. This generic IL definition was visualized with the 7i model (see figure 1) and was operationalized with scales to measure the objective and subjective IL of pupils in secondary schools (see Stanoevska-Slabeva et al. 2015a; Stanoevska-Slabeva et al. 2015b; and Seufert et al. 2016).

![Figure 1. The Generic 7i Framework for Information Literacy (Stanoevska-Slabeva et al. 2015b)](image-url)
Literature considering IL in the context of social media introduces new terms for denoting competences to deal with information from social media.

- The terms new literacies and new media literacies appear in several studies considering IL within the context of social media (Coiro, Knobel, Lankshear and Leu 2008; Fahser-Herro and Steinkuehler 2009; Greenhow and Gleason 2012; Jenkins et al. 2009; Kimmons 2014; Lankshear and Knobel 2003; Lin et al. 2013; Mackey and Jacobson 2011). New media literacies or new literacies have been defined as “a set of cultural competencies and social skills that young people need in the new media landscape” (Jenkins et al. 2007, p. 4). New media literacies go beyond access to technology and proficiency with media platforms; rather, they are comprehended as critical skills that are induced and facilitated by an individuals’ digital involvement in a participatory culture (Litrat 2014). New media literacies cover a wide variety of skills such as play, performance, simulation, appropriation, multitasking, distributed cognition, collective intelligence, judgement, transmedia navigation, networking, negotiation, visualization (Jenkins et al. 2006; Litrat 2014). Hence, the term new (media) literacies refers to various social media sub-skills, while IL is more specific.

- Besides the term new (media) literacies, the terms critical (information) literacy and critical media literacy are discussed in a number of social media related papers (Burnett and Merchant 2011; Cope and Flanagan 2013; Dunaway 2011; McLeod and Vasinda 2008; Vanwynsberge and Verdegem 2013). Currently, critical (information) or critical media literacy lacks a clear definition. According to Dunaway (2011), a central principle of critical (information) or critical media literacy is the engagement in critical reflection on political and social frameworks within which information, libraries, and literacies exist. For example, Wikipedia is an illustrative example of how social media have changed the production of information and construction of knowledge. Therefore, Wikipedia provides a vital opportunity for students to engage in critical thinking with regard to the creation and control of information (Dunaway 2011).

- A related term of critical (information) literacy or critical media literacy is the term news literacy. News literacy is a subset of media literacy focusing on the consumption of news items. (Spikes and Haque 2014). News literacy addresses the necessity “to equip the 21st century news consumer with the tools that will enable them to adjust and hone the filters needed to tame today’s tsunami of media” (Spikes and Haque 2014). Similar to critical literacy, news literacy places emphasis on the evaluation of information. Thus, critical literacy and news literacy cover a part but not the whole gamut of IL.

- Another term for IL that has been introduced in literature in recent years is digital literacy (Badilla Quintana et al. 2012; ChisăliŃă 2013; Knobel and Lankshear 2008; Mackey and Jacobson 2011; Smith and Chipley 2015). Digital literacy has been defined as “the myriad social practices and conceptions of engaging in meaning making mediated by texts that are produced, received, distributed, exchanged, etc., via digital codification” (Knobel and Lankshear 2008, p. 5). Digital literacy integrates critical thinking, cultural understanding, and creative production (Hague and Williamson 2009; Smith 2014). While IL focuses on broad information environments that necessarily include a range of technologies, digital literacy rather refers to technological environments (Jones-Kavalier and Flannigan 2006). In this respect, information-literate individuals attain the ability to use technology applications (Erstad 2009) or to understand information using different forms of technology (Mackey and Jacobson 2011).

- Finally, another literacy related to social media is account-based literacy (Cirella 2012). This term refers to user contribution such as creating an account, entering personal information, or contributing content. The focus of account-based literacy is on the ability to protect privacy and data. Account-based literacy is based on a combination of ideas including information literacy, media literacy, digital literacy, and computer security practices. Compared to IL, account-based literacy is a literacy centering more on aspects related to IL than the competent dealing with information itself.

Summarizing, the literature considering IL in the context of social media reveals the occurrence of multiple terms. The terms used are either defined in a rather general or rather specific way, not taking into account the transfer of IL to the context of social media in a sufficient manner.

Since there is no established definition for IL in the context of social media and since we consider SML as a specialization of IL for social media, we use the generic definition for IL and the 7i generic IL model as proposed by Stanoevska-Slabeva et al. (2015b) to conceptualize SML. Grounding the definition of SML on IL allows us to also transfer previous findings with respect to the development of a quantitative...
measurement model, an instrument to collect measurement data, as well as an empirical validation (see Stanoevska-Slabeva 2015b). The specialized SML framework contains all seven sub-competencies of the 7i IL model and comprises social media specific knowledge, skills and attitudes, which can be described in more detail as follows:

(1) **Information needs (1i-sm)** – The emergence of information needs is typically related to the goal “To be informed about something” or to the goal “To know more in order to solve a problem” or “To be able to make informed decisions”. Thus, this first sub-competence of IL refers to the ability to define information needs in a problem and goal driven manner. In the context of social media this means to determine if social media information sources are suitable to meet the defined information needs. In order to be able to do that, a person needs to know what kind of information can be gathered from social media. For example Wikipedia provides encyclopedic knowledge; Facebook contains information about companies and persons as well as their connections; Pinterest and Flickr provide a broad collection of pictures and YouTube contains educational, documentary or entertaining videos.

(2) **Information sources (2i-sm)** – After the needs for information are defined, the next necessary sub-competence is the identification of relevant social media sources that can provide the required information. This sub-competence reflects the knowledge about available social media information sources suitable to provide information in the context of a given problem. For example, if explanations for a certain phenomenon are required, then YouTube and/or Wikipedia might be relevant social media sources of information. In case information about a company or person are required, then Facebook, Twitter or Instagram might be suitable as well.

(3) **Information access and seeking strategy (3i-sm)** – Each information source, in particular social media sources, require specific access and search procedures. The third sub-competence refers to the knowledge, ability and competence to access and search social media as an information source in an appropriate, efficient and effective way. For example, Twitter provides open access to all information and can be searched without having an own account. In comparison, Facebook can be searched with the Facebook search engine, but for that a Facebook account is necessary. Thus, this sub-competence of SML includes also what some authors consider to be account-based literacy (i.e. Cirella 2012). Furthermore, only information that users have not declared as private can be accessed in Facebook. Thus, information found in Facebook is in many cases incomplete. Similar specific knowledge of how to access and search for information in each social media platform is necessary for all other social media.

(4) **Information evaluation (4i-sm)** – Various information sources, particularly social media sources, relevant for a given problem might provide information that differs with respect to its relevance for the problem and its quality and reliability. Thus, the fourth important sub-competence is the ability to evaluate and assess collected information from social media. For example, one major challenge of using social media as an information source arises from filter bubbles. A filter bubble is the restriction of a user's perspective that can appear when websites make use of algorithms to selectively assume the information a user would want to see, and then give information to the user per this assumption (Pariser 2011). Del Vicario et al. (2016) found that filter bubbles promotes a confirmation bias, division, and polarization. The authors point out that when stories shared on Facebook fit in with a user's preexisting mindset, they are more likely to believe the information, even when it is shown to be false. Biases, conspiracy theories, and misinformation are spreading rapidly via social media, as users in filter bubbles see themselves on the right site. An opposite example is seeking information on Twitter via hashtags. Even though supporters and opponents involved in a discussion on Twitter might use different hashtags to differentiate clearly their point of view, very often both parties use the same hashtag. Thus, a stream of tweets related to a given hashtag might involve a mixture of opinions and statements. Another challenge related to the evaluation of social media information is the “fake news” phenomenon (Allcott & Gentzkow 2017). Consequently, this sub-competence of SML should address challenges that arise related to information evaluation in the context of social media.

(5) **Information use (5i-sm)** – After information is found on social media, it has to be used in an appropriate manner to provide answers for the given problem or situation requiring a decision. The collected information needs to be prepared to be used for solving a problem, e.g. by structuring, commenting, synthesizing or processing it through similar structuring approaches. The ability to prepare appropriately the information extracted from social media for further use and to use it in an appropriate way is reflected in this fifth sub-competence.
(6) **Information presentation (6i-sm)** – Before it can be applied, the extracted information from social media needs to be presented in an appropriate and problem-specific way. In case the results are presented in social media the ability to visualize information and to present it in an interactive manner is of great importance (see for example Livingston, Van Couvering and Thumin 2005). While previous information sources were mainly used in a search, read, and use manner (Jones-Kavalier and Flannigan, 2006), social media provide information environments where information is not only searched and used, but also co-created, pushed, presented, and shared.

(7) **Information process & finding reflection (7i-sm)** – All six sub-competences require permanent reflection about the achieved social media results. This involves the reflection of the whole procedure and found information in terms of relevance, sufficiency, quality and quantity. Thus, the seventh sub-competence is a central capability reflecting the ability to assess the quality of the information seeking procedure and its results.

To summarize, according to the adjusted 7i Framework for SML, the student who is social media literate knows (see also Stanoevska-Slabeva et al. 2015):

i1-sm: ... how to determine information needs in a problem-driven and social media relevant manner.

i2-sm: ... which social media apply best as information sources to the identified information needs.

i3-sm: ... which methods and search strategies suit best to access the selected social media information sources.

i4-sm: ... how to evaluate in a platform specific manner whether the sources and information gathered from the identified social media platforms are valid and reliable.

i5-sm: ... how to use the selected social media information appropriately in order to solve the problem.

i6-sm: ... how to present the selected social media information geared to a specific target group.

i7-sm: ... how to reflect the applied information search and processing procedure and the social media information resulting from it and to learn about future information search processes.

**Research Methodology**

In order to answer the two research questions the following research approach was applied: First, a measurement model for SML was developed in analogy with the generic IL measurement model suggested by Stanoevska-Slabeva et al. (2015b) for the 7i IL model. Second, in order to explore the impact of different social media usage experiences of pupils in secondary schools on their SML, three independent variables were defined and hypotheses on the impact of social media use on SML were developed.

**Development of a Measurement Instrument for Social Media Literacy**

The initial 7i Framework has been equipped with a questionnaire that assesses objective and subjective IL in each of the seven sub-competences (see Stanoevska-Slabeva et al. 2015b and Seufert et al. 2016). The questionnaire was developed based on literature and contains crucial aspects of frameworks and conceptualizations of IL presented in literature from two complementary perspectives: the objective perspective based on defined generic tasks for each of the relevant IL competences identified in the model and from the perspective of self-assessment. Previous research has revealed that most studies on IL independently use either objective or subjective measurement. This makes it difficult to compare the advantages and disadvantages of the two approaches in context of a single study. Overall, very little research has been conducted that compares the two measurement approaches with regard to their objectivity, reliability, and validity (Rosman, Mayer and Krampen 2015). While the measurement of IL should not be based on mere self-assessment, it provides additional useful and explanatory information (Rosman et al. 2015). According to Rosman et al. (2015), best measurement results might be achieved by complementing objective measurement with subjective measurement, whereby measurement items used for self-assessment should be presented at the end of the questionnaire after the objective measurement items (Rosman et al. 2015). Based on these considerations, elements of published models for measuring IL from either the objective or subjective perspective served as foundations for developing a combined
model for measuring IL. The questionnaire was applied and tested with high school pupils in Switzerland (see Stanoevska-Slabeva et al. 2015b and Seufert et al. 2016).

In analogy to the 7i Framework questionnaire, a questionnaire measuring SML was created. The questionnaire contains two different types of questions: questions suitable for measuring the objective SML based on generic assignments, and questions suitable to measure the self-assessed SML. For each of the seven sub-competences, an example question for assessing the objective SML is shown in table 1. Example questions for the subjective SML are listed in table 2. To assess the internal consistency of the instruments measuring SML, Cronbach’s alpha (α) was calculated and was found to be questionable for the objective SML (α = 0.63), and acceptable for the self-assessed SML (α = 0.69). Therefore, the measurement instrument should be used with caution.

| Table 1. Example questions for the assessment of objective social media literacy per sub-competences |
|---|---|
| **1i** Imagine that you are supposed to prepare a presentation on a current topic (e.g. presidential elections). At the beginning, you would like to organize the topic and create a task schedule. How would you proceed? | a) When organizing the topic, I rely on my knowledge gained through social media.  
   b) When organizing the topic, I consider controversial opinions and information found on social media and other online information sources (e.g. online newspapers). |
| **2i** You have made a detailed plan regarding the information needs for a presentation on a public person. Which of the following social media platforms are appropriate to obtain the required information? | a) Facebook  
   b) Twitter  
   c) Instagram  
   d) YouTube  
   e) Wikipedia |
| **3i** Your friends have to write an essay on the Harry Potter books and the author Joanne K. Rowling. In doing so, they want to include the most recent information and opinions. In order to seek relevant posts on Twitter and Instagram, they compile a list of #hashtags. How would you evaluate this approach for accessing information on Twitter and Instagram? | a) very appropriate  
   b) rather appropriate  
   c) rather inappropriate  
   d) very inappropriate |
| **4i** Imagine that you have to prepare a presentation on a current topic. Since you do not know much about the topic, you want to get an overview on Wikipedia. However, your friends have different opinions on the quality of Wikipedia. Which of the following statements are true? | a) On Wikipedia, I can see how frequent an article has been retrieved. For frequently retrieved articles, it is likely that blunders have already been discovered and corrected by other readers.  
   b) Due to the anonymity on Wikipedia, I cannot see how many authors have contributed to an article.  
   c) On Wikipedia, many authors can contribute to a topic. Therefore, an entry contains various opinions and angles.  
   d) Since Wikipedia articles are not scientific, the authors do not have to quote their sources. |
| **5i** On social media you have found information on the presidential elections that you would like to bring up in your presentation. Which of the following statements are true? | a) When using information obtained from Wikipedia, I do not have to cite Wikipedia as a source.  
   b) When using information obtained from a social media post (e.g. tweet or Facebook post), I have to provide an in-text citation with the author and date and a reference list entry with the author, date, title, and source URL.  
   c) When using pictures found on Instagram, it is not mandatory to indicate the source. |

 staggered
For your presentation on the presidential elections, you have found and stored articles, pictures, and videos. Now you have the assignment to discuss your findings in social media. Subsequently, you have to submit a summary of the social media discussion.

Which of the following approaches are useful to present and discuss your findings?

a) I use the pictures found to create an Instagram Story that I post on my Instagram account.
b) I develop questions on the topic and post them in my WhatsApp groups.
c) I prepare several Facebook posts addressing different aspects of the topic and post them one after another.

You and your friend have to conduct social media research for a presentation. When comparing your findings, the two of you realize that the information you found has a different viewpoint than the information your friend found.

What conclusion do you draw?

a) I think that my friend did not conduct his research properly. Therefore, I suggest that we only consider my findings.
b) I do not question that. However, I think it is best to use only those findings with a neutral viewpoint.
c) We reflect upon where we found the information and check the sites and sources once again.

Note: correct answers: 6i b); 7i a), b), c), d), e); 3i a); 4i a), d); 5i b); 6i a), c); 7i c)

Table 2. Example questions for self-assessment of social media literacy per sub-competences

<table>
<thead>
<tr>
<th></th>
<th>“When determining a topic, the contradictory information and viewpoints on social media are confusing me.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>2i</td>
<td>“I can assess when it is important to use social media as an information source.”</td>
</tr>
<tr>
<td>3i</td>
<td>“I know how to access various social media platforms to seek information deliberately.”</td>
</tr>
<tr>
<td>4i</td>
<td>“I prefer information obtained from social media as social media posts often reflect my opinion.”</td>
</tr>
<tr>
<td>5i</td>
<td>“I know how to cite information retrieved from social media platforms.”</td>
</tr>
<tr>
<td>6i</td>
<td>“I know how to lead a discussion on social media.”</td>
</tr>
<tr>
<td>7i</td>
<td>“I am able to learn which processes would be helpful for finding social media information in the future.”</td>
</tr>
</tbody>
</table>

Scale from 1 to 5: 1 – Fully applies, 2 – Tends to apply, 3 – Applies in some cases but not in others, 4 – Rather does not apply, 5 – Does not apply at all

Hypothesis Development: Social Media Use as a Predictor of Social Media Literacy

Besides exploring how SML can be modeled and measured in pupils’ secondary school education, an additional research goal of the paper at hand is the analysis of the effects of pre-existing experience of pupils in using social media on their SML. In accordance with Wacker (2004) and an extensive literature analysis as well as by referring to previous results in assessing IL in secondary schools (Stanojevska-Slabeva 2015b and Seufert 2016), three different social media use patterns were identified to distinguish different social media experiences of pupils: private use of social media, teacher initiated in-class use of social media and self-initiated use of social media by pupils for school purposes. In order to operationalize
the three different social media usages we referred to findings from literature assessing the effect of experience on Internet use in general and social media in particular.

As increasingly more people use the Internet and social media to communicate, retrieve information, and contribute content, the discourse concerning the frequently discussed topic of the digital divide is shifting from a digital gap between those who do and those who do not have access to digital technologies (e.g. Hoffman and Novak 1998; Katz and Aspden 1997; Van Dijk 2005), to a digital gap between those who fail to make effective and purposeful use of digital opportunities and those who use the Internet productively. In other words, the focus is shifting from a simplistic and binary conceptualization of Internet access to a more advanced and complex approach that involves the width and depth of Internet usage (Dholakia et al. 2004; Livingstone and Helsper 2007; Van Dijk 2005; Wei et al. 2010). Digital inequality research underlines that beyond the mere access to the Internet, users’ online experiences also vary based on their web experience, amount of use, Internet skills, and autonomy (Van Dijk 2005; DiMaggio et al. 2004). Prior research posits that web experience affects ICT use. Experience plays an important role in the secondary digital divide that describes the gap between those who fail to make effective and purposeful use of digital opportunities and those who use the Internet productively (Dholakia et al. 2004; Livingstone and Helsper 2007; Van Dijk 2005; Wei et al. 2010). In this context, the degree of experience and the level of confidence in using IT emerge as significant factors (Brown and Czerniewicz 2010). Since web experience constitutes a formative learning experience (Shankar et al. 2002), this experience is considered to help individuals achieve the information competency required to fully utilize the potential of the Internet. Research has also found that individuals with more autonomy of use, describing the freedom to use the Internet when and where they want (Hargittai and Shaw 2014), engage in more capital-enhancing activities (Hassani 2006). The same holds true for individuals who spend more time online (Hargittai and Hinnant 2008). Furthermore, a number of studies have unveiled that types of online behavior such as joining communities like Twitter, online engagement, and content creation are related to social-media-use skills, meaning the ability to use social media effectively and efficiently (Correa 2010; Hargittai and Litt, 2011; Hargittai and Shaw 2014). Accordingly, it is important to consider nuanced social media experiences when investigating predictors of SML. While studies of online behavior often include frequency of use as a predictor, more sophisticated measures of online behavior such as distinguishing between different forms of media use are often neglected. Our study meets this challenge by considering three different forms of social media use: 1) the regular private social media use, 2) the use of social media initiated by teachers and as part of teaching and learning routines in classrooms (short: use of social media in class), and 3) the regular use of social media for school purposes by the pupils (e.g. searching social media for homework or for preparation of a presentation) (short: use of social media for school purposes). The three variables related to social media use were operationalized as follows:

The variable “regular private social media use” refers to the everyday use of social media by pupils in order to socialize, i.e. to connect, network and chat with friends. Early characterizations of “Digital Natives” suggested that young people who were born after 1980 and have grown up surrounded by digital technologies intuitively know how to use technology and how to manage digital information (Palfrey and Gasser 2008; Prensky 2001; Tapscott 1997). Thus, this variable was operationalized in analogy to similar research presented in literature by asking whether the participants use the following social media platforms generally and at least three times per week: Facebook, Instagram, Twitter, YouTube, Pinterest, WhatsApp, Snapchat, Wikipedia, and Blogs. It is assumed that a more frequent private use of social media increases the experience of pupils and their knowledge about social media platforms. Given this the following hypotheses was deduced:

**H1: The regular use of social media for private purposes is positively related to SML.**

Even though there is still a controversial discussion regarding the use of social media in schools (Britland 2012), social media are increasingly involved by teachers in teaching and learning in secondary school classrooms (see for example Fewkes and McCabe 2012 as well as Chu et al. 2017). The introduction of social media in teaching involves new teaching approaches as for example connectivism (Siemens 2005, Lewis and Watkins 2016) that either use social media as facilitating learning tools or as information providers. It is expected that the structured introduction of social media to pupils in secondary schools as part of teaching and by clearly pointing out risks and benefits related to their use is positively related to SML. To assess the impact of a more instructed and school-related use of social media on SML, “social media use in class” was introduced as a second measure of social media use by pupils. The respondents
were asked whether they have ever used the nine above mentioned social media platforms in class because
the teacher has encouraged them to use it as part of teaching and learning. Furthermore, the following
hypothesis was deduced:

**H2: The use of social media in class is positively related to SML.**

Besides using social media for private purposes, pupils are increasingly regularly using social media for
school-related purposes. For example: messenger applications such as WhatsApp are used to get
information from other pupils about homework or certain learning topics, to exchange and discuss
possible solutions to learning tasks, to reuse and exchange knowledge or to coordinate group homework.
This self-initiated use of social media by pupils for school-purposes leads to an increase of overall
knowledge about social media and is expected to be positively related to SML. Thus, a third measure was
used to provide insight into pupils’ self-initiated school-related use of social media: the regular social
media use for school-related purposes. This form of social media use was operationalized by asking the
participants whether they regularly use the nine stated social media platforms for school-related activities
such as doing homework, preparing a presentation, or doing a school project.

**H3: The regular use of social media for school purposes is positively related to SML.**

Overall, based on the insights described above, we expect that these three forms of social media usage
have a positive impact on students’ SML level. Since the social media use in class and for school are a
more professional and deliberate way of utilization, we expect the effects on SML to be stronger than for
private social media use.

**Empirical Testing of the 7i Social Media Literacy Framework**

**Sample Description**

The empirical validation of the proposed model was conducted in cooperation with several high schools in
Germany, Austria, Switzerland, and Liechtenstein as part of the project “Measuring and Facilitating
Information and Social Media Literacy of Digital Natives in the Lake Constance Region”. The project is
supported by the International University of Lake Constance (IBH), which is a network of 30 universities
and colleges located in Austria, Germany, Switzerland and Liechtenstein. Each of the four countries
participating in the International University of Lake Constance is represented in the project by one
university or college. Each partner in the project contacted secondary schools in their region of Lake
Constance and invited them to participate in the study. Out of the invited schools, 22 classes agreed to
participate in the study. Data was thus collected from these 22 high school classes through an online-
based survey during November and December 2016. Overall, 434 high school pupils completed the online
questionnaire. The questionnaire asked respondents about various forms of social media use, objective
SML, and self-assessed SML. A subsequent analysis of the participants’ objective and self-assessed SML
levels and their relationships with factors that were assumed to explain individual differences in SML has
been carried out.

As illustrated in table 3, the sample contained 46.8% male and 53.2% female students. About one-third of
the participants attended 12th grade, the other two-thirds was composed of students from 13th grade
(19.8%), 9th grade (17.3%), 11th grade (14.1%), and 10th grade (11.5%). The majority of the students were
17 or 18 years old. More than half of the pupils (55.8%) attended a vocational school that – after
graduating – allows entry to universities of applied sciences. Another 37.8% of the students attended a
secondary school that allows entry to colleges and universities. The remaining 6.5% attended a vocational
school that does not allow entry to universities of applied sciences. With regard to the country, 45.6% of
the participants live in Switzerland, 24.9% in Germany, and 21.7% in Austria. Since Liechtenstein is a very
small country with around 37’000 inhabitants in total, only 7.8% of the survey participants are residents
of Liechtenstein.
Table 3. Sample Description

<table>
<thead>
<tr>
<th>Variables</th>
<th>Distribution</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>203</td>
<td>46.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>231</td>
<td>53.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>434</td>
<td>100</td>
</tr>
<tr>
<td>Grade</td>
<td>9th grade</td>
<td>75</td>
<td>17.3</td>
</tr>
<tr>
<td></td>
<td>10th grade</td>
<td>50</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>11th grade</td>
<td>61</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>12th grade</td>
<td>162</td>
<td>37.3</td>
</tr>
<tr>
<td></td>
<td>13th grade</td>
<td>86</td>
<td>19.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>434</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td>Secondary school that allows entry to university</td>
<td>164</td>
<td>37.8</td>
</tr>
<tr>
<td></td>
<td>Vocational education that allows entry to university of applied sciences</td>
<td>242</td>
<td>55.8</td>
</tr>
<tr>
<td></td>
<td>Vocational education that does not allow entry to university of applied sciences</td>
<td>28</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>434</td>
<td>100</td>
</tr>
<tr>
<td>Country</td>
<td>Germany</td>
<td>108</td>
<td>24.9</td>
</tr>
<tr>
<td></td>
<td>Austria</td>
<td>94</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Switzerland</td>
<td>198</td>
<td>45.6</td>
</tr>
<tr>
<td></td>
<td>Liechtenstein</td>
<td>34</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>434</td>
<td>100</td>
</tr>
</tbody>
</table>

**Descriptive Results**

When analyzing the use of social media platforms in general, the data reveals that across all countries the most widespread platforms are WhatsApp, YouTube, Snapchat, Instagram, and Facebook. The comparison between the four countries shows similarities but also differences. The messenger WhatsApp is equally popular in all countries. With 95.7 to 99.1 percent, almost all participants from Germany, Austria, Liechtenstein, and Switzerland use WhatsApp regularly. For all other platforms, the usage differs considerably between the countries: In Germany, YouTube is regularly used by a vast majority (84.3%), while the proportion is distinctly lower in Liechtenstein (61.8%). Austria (83.0%) and Switzerland (74.7%) are spaced in between. Likewise, in Liechtenstein, the lowest user proportion was found for Instagram (44.1%), Snapchat (50.0%), and Twitter (2.9%). By contrast, Instagram (73.2%) and Snapchat (82.8%) are much liked by Swiss adolescents. Twitter is most widespread in Austria (12.8%), whereas Facebook is nowhere as popular as in Liechtenstein, where 76.5% of the respondents use the platform regularly. Germany ranks seconds (62.0%), followed by Austria (58.5%), and Switzerland (50.5%). Similarly, Wikipedia and Blogs are most common in Liechtenstein (41.2% resp. 14.7%) and least common in Austria (30.9% resp. 5.3%). Finally, the platform Pinterest is generally not widely applied, pre-eminently not in Austria, where none of the respondents use it.
With regards to our second research question we can observe that on one hand, several social media platforms are regularly used by the pupils. On the other hand, the data provides a different perspective in terms of the students’ SML. The measured objective SML proved to be rather low with a mean score of 48.5 points compared to the maximal possible score of 100 points. In the study, the score ranged from 25 to 75 points. The fact that no pupils are located neither in the first nor in the last quartile, shows that digital natives score in the middle of the range. That implies that the vast majority of students have a middle SML level. The self-assessed SML of the students was - with a mean of 56.0 points - slightly higher than the objective literacy. The respondents scored from 33 to 74 points in the self-assessed SML. The results suggest rather high levels of self-assessed IL as most of the students achieved a score in the upper half. The means and standard deviations for the objective and self-assessed IL are shown in Table 4.

### Table 4. Social Media Literacy: Means and Std. Deviation

<table>
<thead>
<tr>
<th></th>
<th>Mean Objective SML</th>
<th>Std. Deviation Objective SML</th>
<th>Mean Subjective SML</th>
<th>Std. Deviation Subjective SML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>48.5</td>
<td>7.6</td>
<td>56.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Regarding the three different forms of social media use that may explain individual differences in SML, the data reveals the following picture: Overall, six of the nine considered platforms are regularly used for private and leisure purposes by a vast majority of the participants: WhatsApp (97.7%), YouTube (77.9%), Snapchat (71.9%), Instagram (65.9%), Facebook (57.1%), and Wikipedia (35.7%). In contrast, using social media in class is not (yet) prevalent at all schools in Germany, Austria, Liechtenstein, and Switzerland. Of the nine listed platforms, Wikipedia (71.1%) and, to a lesser extent, YouTube (38.5%) are the only platforms that have already been used in class by a substantial number of participants. Likewise, the results on school-related social media use displays that Wikipedia (88.1%) and YouTube (58.0%) are also platforms used for doing homework, preparing a presentation, or doing a school project. In addition, WhatsApp (33.3%) is also rather popular to use for school-related purposes. Surprisingly, as with social media use in class, the potential of other platforms has not yet been exploited for school-related tasks yet.
Linear Regression Analysis

To explore the impact of social media use on SML, multiple linear regression analysis has been applied. Based on the postulated hypotheses, the impact of the above predictors on SML has been analyzed with SPSS. In order to assess the premises of the research model, it has been tested for linearity, heteroscedasticity, autocorrelation, and multicollinearity. The validation revealed that the underlying assumptions of the calculation of the linear regression analysis are fulfilled: linearity is given, and the assumptions are not violated by heteroscedasticity, autocorrelation (Durbin-Watson statistics objective SML regression analysis: private use: 1.87; use in class: 1.88; school use: 1.86; self-assessed SML regression analysis: private use: 2.00; use in class: 2.08; school use: 2.11), and multicollinearity (mean VIF for both the objective and self-assessed SML regression analysis: private use: 1.11; use in class: 1.23; school use: 1.05). Overall, the validation indicates a good fit for the model. The results of the analysis include the unstandardized and standardized coefficients, the standard error, and the total variance explained ($R^2$) regarding the considered variables. These results are shown in Tables 5 and 6.

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Private use</th>
<th>Use in class</th>
<th>Use for school</th>
</tr>
</thead>
<tbody>
<tr>
<td>YouTube</td>
<td>$0.107^*$</td>
<td>$0.176^{***}$</td>
<td>$0.224^{***}$</td>
</tr>
<tr>
<td>WhatsApp</td>
<td>$0.087^{†}$</td>
<td>$0.097^*$</td>
<td>$0.113^*$</td>
</tr>
<tr>
<td>Wikipedia</td>
<td>$0.047$</td>
<td>$0.108^*$</td>
<td>$0.088^{†}$</td>
</tr>
<tr>
<td>Facebook</td>
<td>$-0.058$</td>
<td>$0.007$</td>
<td>$0.098^*$</td>
</tr>
<tr>
<td>Blogs</td>
<td>$0.130^{**}$</td>
<td>$0.042$</td>
<td>$0.030$</td>
</tr>
<tr>
<td>Instagram</td>
<td>$-0.060$</td>
<td>$0.020$</td>
<td>$-0.058$</td>
</tr>
<tr>
<td>Twitter</td>
<td>$0.070$</td>
<td>$0.055$</td>
<td>$0.006$</td>
</tr>
<tr>
<td>Pinterest</td>
<td>$0.033$</td>
<td>$-0.125^{*}$</td>
<td>$-0.064$</td>
</tr>
<tr>
<td>Snapchat</td>
<td>$-0.040$</td>
<td>$0.008$</td>
<td>$0.019$</td>
</tr>
<tr>
<td>$R^2$</td>
<td>$0.048$</td>
<td>$0.052$</td>
<td>$0.064$</td>
</tr>
</tbody>
</table>

$^† p < 0.10$  $^* p < 0.05$  $^{**} p < 0.01$  $^{***} p < 0.001$

The results of the multiple linear regressions reveal that the conveyed analysis confirms the impact of the considered predictors on the objective SML: for all hypothesized and estimated relationships, we found significant effects for some of the considered platforms. Furthermore, the analysis confirms that the more the students engage in a professional social media use, the stronger are the effects on the objective SML. With regards to social media use for private purposes, the regular use of the platforms Blogs ($\beta = 0.13, p <$
0.01), YouTube (β = 0.11, p < 0.05), and WhatsApp (β = 0.09, p < 0.10) significantly affected the objective SML. In other words, pupils using Blogs, YouTube, and WhatsApp regularly for private purposes had higher objective SML scores than non-regular users of these platforms. As shown earlier, Facebook, Instagram, Snapchat, and Wikipedia are also popular among digital natives. However, the general and regular use of these platforms did not lead to significant higher objective SML scores. With respect to a more school-oriented social media use, both the use of social media in class and for school-related tasks (e.g. homework) positively affects the objective SML. One exception is Pinterest, where the use of the platform in class is surprisingly related to a lower SML.

Compared to the effects of the private social media use, the effects of using social media in class are stronger (YouTube: β = 0.18, p < 0.001; Wikipedia: β = 0.11, p < 0.05; WhatsApp: β = 0.10, p < 0.05), and even stronger for the regular SM use for school-related purposes (YouTube: β = 0.22, p < 0.001; WhatsApp: β = 0.11, p < 0.05; Facebook: β = 0.10, p < 0.05; Wikipedia: β = 0.09, p < 0.10). As demonstrated in the last chapter, social media is generally rarely used in class. Across country, Wikipedia and YouTube are the only platforms that have already been used in class. Since the linear regression analyses unveiled that the usage in class of these two platforms positively influences the objective SML, we believe that the potential of the other platforms (that are not used in the classroom so far) has not been fully exploited yet. In comparison, the potential of social media use for school-related purposes has been realized. However, this does not hold true for the platform Facebook. Austria is the only country, where at least 21.3% of the participants reported to use Facebook for school. While the private use of Facebook is also high in all other countries (or even higher than in Austria), it has not been recognized that Facebook could also be useful for seeking information for homework or a school project.

### Table 6: Multiple Regression Analysis Predicting Self-assessed SML (n=434), Unstandardized Beta Coefficients

<table>
<thead>
<tr>
<th>Platform</th>
<th>Private Use</th>
<th>Use in class</th>
<th>Use for school</th>
</tr>
</thead>
<tbody>
<tr>
<td>WhatsApp</td>
<td>0.083†</td>
<td>0.126*</td>
<td>0.111*</td>
</tr>
<tr>
<td>Instagram</td>
<td>0.146**</td>
<td>0.009</td>
<td>0.102*</td>
</tr>
<tr>
<td>Facebook</td>
<td>0.095†</td>
<td>0.049</td>
<td>0.133**</td>
</tr>
<tr>
<td>Twitter</td>
<td>0.135**</td>
<td>-0.064</td>
<td>0.072</td>
</tr>
<tr>
<td>Snapchat</td>
<td>0.133**</td>
<td>0.012</td>
<td>0.071</td>
</tr>
<tr>
<td>YouTube</td>
<td>0.028</td>
<td>0.011</td>
<td>0.089†</td>
</tr>
<tr>
<td>Wikipedia</td>
<td>0.013</td>
<td>0.058</td>
<td>0.021</td>
</tr>
<tr>
<td>Pinterest</td>
<td>0.003</td>
<td>-0.001</td>
<td>0.045</td>
</tr>
<tr>
<td>Blogs</td>
<td>0.068</td>
<td>0.046</td>
<td>0.080</td>
</tr>
</tbody>
</table>

| R²       | 0.067       | 0.042        | 0.034          |

† p < 0.10   * p < 0.05   ** p < 0.01   *** p < 0.001

When looking at the findings of the multiple linear regressions predicting the self-assessed SML, we partially find support for our hypotheses. On one hand, there are significant effects for the private use of several of the considered platforms. Concretely, the regularly use of the platforms Instagram (β = 0.15, p < 0.01), Twitter (β = 0.14, p < 0.01), Snapchat (β = 0.13, p < 0.01), Facebook (β = 0.10, p < 0.10), and WhatsApp (β = 0.08, p < 0.10) are positively related to the self-assessed SML. In addition, the regular use of the following platforms for school-related purposes also leads to a higher self-assessed SML: Facebook (β = 0.13, p < 0.01), WhatsApp (β = 0.11, p < 0.05), Instagram (β = 0.10, p < 0.01), and YouTube (β = 0.09, p < 0.10). Thus, both the private and the school use of social media provoke feelings of competence. On the other hand, except for WhatsApp (β = 0.13, p < 0.05), the use of social media in class did not show a significant effect on the self-assessed SML. Since social media is generally rarely used in class, this finding is not surprising. Taken together, the analysis indicates that using the popular and prevalent platforms Instagram, Facebook, and Snapchat for private, i.e. entertainment and lifestyle purposes, fosters the adolescents’ perception of being literate in dealing with social media. However, the same use of these platforms does not facilitate the actual SML (as seen in table 5). These findings are in line with prior studies that demonstrated that digital natives easily adopt various information sources, but fail to deal with it in sufficient quality required for efficient and effective academic use as well as for active participation and engagement in society (e.g. Seufert et al. 2016; Badilla Quintana et al. 2011; Fraillon,
Ainley, Schulz, Friedman and Gebhardt, 2014; Miller 2015; OECD 2015; Pritchard and Cartwright 2004; Thirion and Pochet 2009).

**Scientific Contribution, Limitations and Conclusion**

**Scientific Contribution**

Information literacy is one of the major practical competences relevant for the 21st century networked society, as people can get the information and knowledge they need at any time through the Internet. In recent years, the meaning of IL had to be constantly adjusted to account for the increasing availability of online information in various forms and the required capabilities to deal with it. With the rise of social media, this competence becomes even more crucial as information is not only available 24/7, but also personalized based on self-adjusted settings but also externally selected filters (e.g. filter bubbles). Furthermore, while previous information sources were mainly used in a search, read and use manner (Jones-Kavalier and Flannigan 2006), social media provide information environments where information is not only searched and used, but also co-created, presented and shared (Livingston, Van Couvering and Thumin 2005). Considering the altered circumstances, it is crucial that children develop digital skills from an early age. Despite the growing awareness for the need of formal and broad education, the topic of how to competently deal with social media information has not been integrated as a learning objective in existing curricula in Germany, Austria, Switzerland, nor Liechtenstein. By failing to introduce information and SML in schools, digital natives get exposed to social media use without being made aware of phenomena as for example the filter bubble (Pariser 2011) or the specific characteristics of social media information (i.e. personal opinions, differences in quality and authenticity and similar). Consequently, digital natives are not prepared to use social media beyond private use in a professional manner for business purposes.

Against this background, the paper at hand elaborated the 7i Framework to foster and measure SML as a process- and competency-oriented approach. The seven sub-competences of the Social Media 7i Framework aim to help pupils to manage their learnings, regarding both outcome contents (e.g. by using various social media platforms), and processes (e.g. by reflecting social media information). The initial testing of the 7i Framework reinforce that broad educational support is required to foster the students’ SML. In line with prior research (e.g. Fraillon, Ainley, Schulz, Friedman, and Gebhardt 2014; Miller 2015; OECD 2015), our study has revealed that Digital Natives easily adopt social media sources, but partially naively deal with social media information. On one hand, Digital Natives are highly familiar with social media. This makes them able to adopt digital information for entertainment and lifestyle purposes easily, and gives them the impression of being literate. On the other hand, Digital Natives fail to deal with social media with the sufficient quality required for efficient and effective workplace or academic use as well as for active participation and engagement in society. Thus, even though Digital Natives are heavy users of social media, the way they use it is not adequate for developing profound digital skills. However, the good news is that the findings of our study confirm that using social media for school-related purposes as well as in class, strengthens the students’ SML. Regrettably, in the examined countries (Germany, Austria, Liechtenstein, Switzerland), the potential of social media as information sources has not been exploited yet. Based on our findings, we suggest that the SML of adolescents could be enhanced if teachers and educators would discuss social media in class, and encourage their students to use social media for homework and school projects. Addressing social media in the curricula seems to be even more important since our data demonstrated that even the exclusively usage of social media for private purposes fosters the self-assessed (but not the objective) SML. In other words, using Instagram, Facebook, and Twitter just for connecting with friends and fun, provokes feelings of competences but does not increase the actual literacy. To conclude, many Digital Natives use social media in a way that makes them feel competent, but they lack knowledge when it comes to a professional usage of social media. With that said, we take the view that SML needs to be part of formal education and training, and we strongly recommend teachers and educators to include social media to a greater extent in the curricula. In order to drive this idea forward, we aim to address the framework comprehensively in the curriculum of German, Austrian, Swiss, and Liechtenstein schools. In cooperation with high school and vocational school teachers, interventions on SML have been planned in the four countries.
Overall, the paper provides three major scientific contributions: first, an overview of the current state of research on SML. Second, a comprehensive and up-to-date definition of SML. Third, a new generic and empirically tested comprehensive framework for measuring SML. The literature review gives a scientific contribution by providing detailed insights into the current state of SML research and by identifying important research gaps. Another major scientific contribution is the 7i SML framework. It is based on the empirically validated 7i IL model and further developed to adjust it to better meet the specific requirements of social media. To our knowledge, the 7i Framework is the first generic framework measuring IL in the specific setting of social media in a comprehensive manner by considering SML from a self-assessment and an objective perspective.

**Practical Contribution**

Regarding the practical contribution, the proposed measurement instrument allows educators and teachers to estimate easily their students’ level of social media literacy. In addition, the instrument allows identifying progress, as SML can be measured at various points of time. Thus, the 7i SML Framework helps identifying whether SML increases over time, and it allows comparing the level of SML among classes and schools. Finally, the measurement instrument not only reveals an overall score, but also offers educators and teachers the possibility to monitor which stages of information literacy cause pitfalls among the students and require further intervention.

The inclusion of social media as information sources in schools could furthermore follow the 7i SML framework: it is necessary to explain social media as information source (i1-sm); to characterize when social media are relevant information sources (i2-sm); to teach how different social media can be accessed and searched and point thereby to phenomena as the filter bubble (i3-sm); to show how the quality, authenticity and correctness of social media information can be checked (i4-sm); to explain how it is used in presentation and written work or online (i5-sm), and how it can be presented for different purposes and media (i6-sm).

**Limitations and Further Research**

The results of the study presented in the paper have to be considered in line with their limitations. Even though the survey was conducted in the four countries of the Lake Constance, it is not representative neither for the Lake Constance region nor for each of the involved countries. Different results might occur, if the same survey is conducted over the whole territory of the involved countries. The study furthermore considered a broad spectrum of social media platforms. However, the results show that digital natives in the Lake Constance Region focus their use on few social media platforms. Thus, information provided on platforms as for example Twitter and Facebook remain unnoticed by many digital natives, who don’t use them. Given this one major questions that arises is the following: Should schools introduce pupils to social media that go beyond their own choice of social media? This in particular, when use of social media requires the setup of a personal account. Furthermore, it is also necessary to observe, if with the introduction of social media also phenomena like personal filter bubbles will be introduced in the class. The answer to these questions involves also ethical aspects of social media use that have not been considered in the research presented in the paper at hand.

The achieved results and the limitations of the research presented in the paper are sources for potential future research. These are: further differentiating social media usage patterns of pupils, designing and executing different interventions to test different approaches for introducing SML in schools and considering of ethical questions related to social media use.

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