Towards an understanding of social media use in the classroom

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Towards an understanding of social media use in the classroom: a literature review

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Towards an understanding of social media use in the classroom: a literature review

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ABSTRACT
The importance of social media for today’s youth often elicits teachers to explore educational use of these media. However, many teachers appear to struggle with the tension between possible pedagogical use and the tempting distraction of this technology. The current literature review aims to present a synthesis of conditions and outcomes relevant for a well-considered, evidence-based use of social media, and teacher professional development. A conceptual model consisting of intended curriculum (school level), implemented curriculum (teacher level) and attained curriculum (student level) guided the research questions. The review included 271 articles, which were analysed with framework synthesis. Ambiguous results and poor quality of studies often hindered clear statements about conditions and outcomes regarding social media in the classroom. Nonetheless, reported factors include school culture, attitude towards social media, support, teacher professional development, learning goals and a clear position in the curriculum. Considerations and advice for educational practice were formulated.

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KEYWORDS
Framework synthesis; primary; secondary; higher education; social media

1. Introduction
The importance of social media for today’s youth often elicits teachers to explore the added value of educational use of these media (e.g. Bate, 2010). However, many teachers experience social media in classrooms as disturbing (Selwyn, 2010). Teachers appear to struggle with the tension between possible pedagogical use and the tempting distraction of this technology (Rosen, Carrier, & Cheever, 2013). Often a lack of technical pedagogical content knowledge to enrich teaching with social media intensifies this tension (Van Acker, Van Buuren, Kreijns, & Vermeulen, 2011).

Defining social media is argued to be elusive (Tess, 2013). However, the concept of social media can be summarised as encompassing Internet applications that support the creation and exchange of user-generated content, that require a certain degree of self-disclosure and that allow for a certain level of social presence (Kaplan & Haenlein, 2010). Carr and Hayes (2015), in an effort to present a more precise and future-proof definition, summarised social media as:

Social media are Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others. (Carr & Hayes, 2015, p. 50)

Existing literature reviews on social media and education emphasise the pedagogical use of specific applications and channels, such as wikis (Trocky & Buckley, 2016), Twitter (Aydin, 2014; Forgie et al., 2013) or Facebook (Yang, Wang, Woo, & Quek, 2011), and examine (improvement of) learning results.
Although educational software, such as learning management systems, increasingly includes social media-like functionalities, it often appears to limit aspects like self-presenting and types of audiences.

Earlier reviews distinguished the researchers’ wish for a successful use of social media in classrooms and the often weak empirical evidence for this success (e.g. Tess, 2013). Some authors point out that social media were never developed for pedagogical uses (Bruneel, De Wit, Verhoeven, & Eelen, 2013; Kuiper, Volman, & Terwel, 2005), while others take this as a starting point for research (Taylor, King, & Nelson, 2012). These reviews also showed that the evidence for increasing learning results often consists of self-reports (Hew & Cheung, 2013). To our knowledge, only one large existing review on 951 articles discussed multiple aspects of the complex whole of factors and effects (CASE, 2011). However, this review was limited to descriptions of these factors, instead of offering explaining relations. One broader perspective meta-analysis of 40 years of research on ICT and learning showed a small, yet significant, increase in learning results caused by ICT use in classrooms (Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011).

Both empirical studies and literature reviews that analyse pedagogical use of Internet applications, such as social media, mainly focus on partial aspects. For instance, the relation between Internet applications and reading skills (Takacs, Swart, & Bus, 2015), between Internet applications and information literacy (Mills, 2010), or pedagogical approaches that suit Web 2.0 in secondary or higher education (Hew & Cheung, 2013).

The focus on partial aspects, rather than an integrated view of social media in education, prohibits understanding of what is known as the hidden curriculum: societal, institutional or lecturers’ values that are transmitted unconsciously to students (Cotton, Winter, & Bailey, 2013). Edwards (2015) explained how software, or rather computer code, is never objective, and reinforces existing preferences of, for instance, teachers.

Taken together, many of these reviews reported barriers to using social media in class (e.g. Henderson, Snyder, & Beale, 2013; Minocha, 2009), such as the fear of losing control over students (Tess, 2013), lack of ICT skills (Minocha, 2009), and possible distractions of social media (Piotrowski, 2015). In contrast to these barriers, research also reports affordances, such as engagement and student motivation. Reviews often also reported uncertainty about the effectiveness of social media for improving learning results. Nonetheless, social media are imputed with great potential for improving education.

1.1 Conceptual framework and research questions

For our analysis, we take the integrated perspective of three levels of curriculum (Van den Akker, 2003): (a) the intended curriculum – the formal ideal image; (b) the implemented curriculum – the operationalised version; and (c) the attained curriculum – the curriculum as experienced by learners. Using this perspective allows us to explore hypotheses around conditions and outcomes in sub-areas, at the same time considering the complexity of everyday educational practice.

Each curriculum level helps to point out direct and indirect factors. For instance, the intended curriculum especially plays out at the school level, where social media, like any other learning materials, are (supposed to be) part of the educational vision and the policy on learning materials (cf. Kirschner & Wopereis, 2003). Conditions in the implemented curriculum can be learning goals, pedagogy, and existing knowledge, skills and values of teachers (Van Veen, Zwart, & Meirink, 2012). In the attained curriculum, student characteristics play a role, such as preferences for types of interactive media (Van den Beemt, Akkerman, & Simons, 2010), and knowledge, values, age and gender (Kuiper et al., 2005).

Indirect factors play a role on all curriculum levels, and are, for instance, distraction in class (Grosseck & Holotescu, 2008), changes in the perception of time (Duncheon & Tierney, 2013) and developing learning skills, such as deep learning, influenced by a permanent disturbance of attention (Kuiper et al., 2005).
To do justice to the complex situation of factors and outcomes related to social media in classrooms, this literature review intends to extend existing research using the perspective of the three curriculum levels. Its intended audience is researchers and teachers. Our purpose is to enable teachers to make a well-considered and evidence-based choice for the pedagogical use of social media in their classrooms, while taking into account all three levels of the curriculum. In the process, we focus on clarifying relevant factors, the relations between these factors and subsequent effects on (the learning of) students, which taken together form a framework for our investigation (Figure 1). The research questions central to this review are:

1. Which goals and considerations are relevant for teachers in their choice to apply social media in classrooms? (Intended curriculum)
2. How and in what context do teachers use social media in their teaching practice? (Implemented curriculum)
3. What evidence (theoretical and/or empirical) can be found to show whether the intended outcomes are realised? (Attained curriculum)
4. What is the relation between factors and outcomes of social media in class?

2. Method

To answer our research questions, the pre-defined procedure called **framework synthesis** (Brunton, Oliver, & Thomas, 2015; Oliver et al., 2004) was followed. Findings from individual studies are placed into a framework which is based on existing and former studies (Brunton et al., 2015; Oliver et al., 2004), which is then used to describe and interpret findings. In the current review, the conceptual framework (see Figure 1) served as this framework. Moreover, framework synthesis supports to understand the complexity of a given phenomenon, because it structures individual studies' findings, and examines how these are related in the context of that phenomenon (Brunton et al., 2015).

Framework synthesis consists of six concessive stages (Brunton et al., 2015). First, research questions are posed, after which studies are searched (stage 2) and selected using several in- and/or exclusion criteria (stage 3). Next, data is extracted from the selected studies into the framework.
The fifth stage consists of synthesising the individual studies’ findings. The content of each part of the framework is analysed by applying a thematic approach. Finally, these findings are interpreted.

2.1 Searching, screening and selecting studies

To search, screen and select studies, the databases Scopus and Web of Science were consulted. The following keywords guided the search: ‘social media’ OR ‘social networking sites’ OR ‘social networking software’) AND (education OR teacher OR student OR school). The query included peer-reviewed articles published between January 2005 and November 2016. Furthermore, editions of relevant journals (i.e. Computers & Education, Computers in Human Behavior, Journal of Computer Assisted Learning and Learning, Media & Technology) were consulted, as well as the reference lists of found articles (‘snowballing’; Petticrew & Roberts, 2006). This resulted in 4727 articles from Scopus, and in 2590 articles from Web of Science. After deleting duplicates, 6210 articles remained. Sixty-nine articles were included from specialised journals on learning with ICT. Most of these (38 articles) were published in Computers & Education.

Titles and abstracts of the complete set of articles were scanned based on the following inclusion criteria: (a) the investigated social media include Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others (Carr & Hayes, 2015); (b) the study focused on at least one of the three levels of curriculum (Van den Akker, 2003); (c) the study was performed in primary, secondary and/or higher education; and (d) the study investigated at least one of the factors and/or effects of social media in education. This stage resulted in 2001 articles. Next, the full text scan resulted in 1602 more articles being labelled as off-topic, because they did not fit the inclusion criteria, despite promising titles and abstracts.

2.2 Data extraction

In the fourth stage of the literature review, findings from the individual studies were extracted into a results matrix (i.e. an Excel file) that was based on a codebook that linked to the conceptual framework (Petticrew & Roberts, 2006). Each row of this matrix represented an individual study. The columns consisted of information about the method, such as country of origin, number of participants and data collection strategies. The codes, describing the conditions and outcomes of the conceptual framework, were added to the columns of the matrix. Findings from each individual study that discussed specific conditions and outcomes were extracted to the respective cells. During this stage, another 128 articles were excluded, because they were not empirical, appeared to be off-topic, or full texts were not available, even after contacting the authors. This resulted in 271 articles to be included in this review (see Figure 2).

2.3 Synthesising and interpreting findings of included studies

During the fifth and sixth stages, results from the studies were continuously compared with factors in the conceptual model. To increase the reliability of this literature review, the authors collaborated closely in the process. Points of debate and uncertainty were discussed until consensus was reached. Results were brought together that focused on shared conditions or outcomes. This resulted in enrichment of the model with relations between conditions and outcomes of the possible educational use of social media. The most important addition to the model concerns the variable ‘interpersonal relation’ between teachers and students, which emerged from many studies.
3. Findings

This section first discusses an overview of included studies, followed by results on the three levels of the intended curriculum (school), the implemented curriculum (teacher) and the attained curriculum (student). References included in this section serve as illustrative examples of found results.

3.1 Overview of included studies

Descriptives of the included studies (see Table 1) show, amongst others, that a large number of studies included empirical results about students, followed by studies that made statements about teachers. Only a few studies discussed school level. Most studies were performed in higher education. The small number of studies in primary and secondary education is not surprising; much educational research takes place in higher education, and many social media applications apply an age limit. Furthermore, social media are often textual, which suggests that a good command of language is needed (Van den Beemt et al., 2010).

The number of respondents ranged in the studies from three to more than a thousand, with 6000 respondents in an Italian study as the upper limit. However, a considerable number of studies were not explicit about respondents or demographics. Most studies showed equal gender divisions among participants, apart from domains such as medical education or social sciences, which were female dominated. This is in line with studies without an educational focus that show equal gender divisions in social media use (e.g. Gray, 2018). Studies with larger respondent numbers mostly transcended single domains or disciplines. Included single domain studies showed a slight over-representation of medical education. Most studies applied surveys and used a quantitative approach (112 studies) or a mixed-method approach (84 studies). Qualitative approaches, for example
interviews, were pursued in 65 studies. Two articles described a series of lessons, without further analyses. The eight remaining articles contained reviews of empirical studies.

Most of the articles were designed as a single case study (Borko, 2004), in which social media were applied as part of an educational programme in a specific educational context. Often these studies first presented a large claim, such as ‘learning results will increase when one uses social media’. The results of these studies subsequently showed more nuance, with strikingly often little statistical significance of the results. The tone of voice of discussion and conclusion sections sometimes betrayed the attitude of the researcher regarding social media.

Perception research was conducted in a large part of the studies. Researchers asked students about their experienced outcomes on learning and motivation of a tool. In addition to perception research, many articles present effect studies that only examined partial aspects of educational use of social media. For instance, the relation between social media and diverse effects such as academic achievement (e.g. Kirschner & Karpinski, 2010), motivation (e.g. Junco, Heiberger, & Loken, 2011), collaboration (e.g. Purser, Towndrow, & Aranguiz, 2013) and the development of information literacy (e.g. Ahn, 2013). Studies also connected informal learning to social media (e.g. Bartlett-Bragg, 2006) and examined ways in which teachers use these media in class (Bate, 2010).

<table>
<thead>
<tr>
<th>Country</th>
<th>Articles</th>
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</thead>
<tbody>
<tr>
<td>USA</td>
<td>45</td>
</tr>
<tr>
<td>Asia (e.g. China, Taiwan, Malaysia)</td>
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</tr>
<tr>
<td>UK</td>
<td>19</td>
</tr>
<tr>
<td>Australia</td>
<td>13</td>
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<tr>
<td>Turkey</td>
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<tr>
<td>Canada</td>
<td>5</td>
</tr>
<tr>
<td>Other countries, groups of countries</td>
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</tr>
<tr>
<td>No location reported</td>
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<td>Primary and secondary education</td>
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<tr>
<td>Higher education</td>
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<tr>
<td>Undecided</td>
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<tr>
<td>Qualitative</td>
<td>65</td>
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<tr>
<td>Mixed methods</td>
<td>84</td>
</tr>
<tr>
<td>Other (case description or literature review)</td>
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<tr>
<td>General education</td>
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<td>Other</td>
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<tr>
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<td>16</td>
</tr>
<tr>
<td>Image</td>
<td>7</td>
</tr>
<tr>
<td>Policy on curriculum materials</td>
<td>3</td>
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<tr>
<td>Educational vision</td>
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<td>Professional development</td>
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<tr>
<td>Experiences, skills, values</td>
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</tr>
<tr>
<td>Learning goals</td>
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<td>Pedagogical activities</td>
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<tbody>
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<tr>
<td>Motivation</td>
<td>58</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>85</td>
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<tr>
<td>Experiences, skills, values</td>
<td>108</td>
</tr>
<tr>
<td>Interpersonal relation teacher–student</td>
<td>24</td>
</tr>
</tbody>
</table>

*The numbers do not add up because some studies discussed multiple aspects.

Table 1. Descriptive results of included articles (271 studies).
3.2 School

3.2.1 Facilitation and support of processes

Facilitation and support entailed two aspects: (1) facilitating the use of social media for learning, for instance with infrastructure or possibilities for professional development, and (2) using social media, for instance to support communities of practice. The included studies emphasised facilitation of infrastructure or professional development. Often this included attention to teachers’ responses and attitudes, for instance by showing that teachers were less inclined to use social media when facilitation did not meet their expectations. On the school level, there is still work to be done to take away fears among teachers about social media as pedagogical tool (Goktalay, 2013). Teachers reported fear of insufficient support, and of insufficient knowledge to find things out by themselves. These fears are affected by experience with social media (see also subsection ‘3.3 Teacher’), thus showing a relation between facilitation (policy on school level) and attitude (teacher).

Additionally, the included studies most often reported barriers on the school level. For instance, organisational limitations (‘the principal would not allow it’; Mawdsley, 2015; Minocha, 2009), network restrictions (‘we should avoid network overload’), lack of money to invest in technical infrastructure, lack of knowledge among management and lack of access to technology. These barriers are related to school leaders’ anxiety about using social media (Cox & McLeod, 2014a). School leaders thought that social media require extra time or they thought technical problems would hinder them from being online. On the other hand, reasons that made school management more inclined to allow for social media use were, for instance, increased transparency in decision-making processes and budgets, positive influence on personal and professional development of school leaders, and an extra channel for management information (Cox & McLeod, 2014a).

Regarding the second aspect of facilitation, social media were used in two studies to support teachers. In one study, school leaders used Twitter to organise a community of practice and to communicate policy (Sauers & Richardson, 2015). The other study used Facebook to support teachers in implementing a new learning approach (Shraim, 2014).

3.2.2 Image

One reported benefit of using social media to improve the image of schools and universities is that a larger audience can be reached, although this did not result in more student engagement (Bélanger, Bali, & Longden, 2014). Furthermore, students reported thinking more positively about teachers and their university when social media were used in education (Neier & Zayer, 2015).

Both school leaders (Cox & McLeod, 2014a) and school principals (Cox & McLeod, 2014b) reported that social media enabled more rapid and frequent interaction with stakeholders, which resulted in better mutual relations. School principals reported that social media allowed them to express and share their visions better (Cox & McLeod, 2014b), and school leaders argued that they could no longer work without these media in contemporary times (Cox & McLeod, 2014a). In particular, Facebook and Twitter were reported as being the most popular tools (Bélanger et al., 2014).

Reported disadvantages were the possible negative publicity, for instance when disturbing events about the school appeared on social media (Cox & McLeod, 2014a), and the obligational character: once you start communicating through social media, people expect you to continue (Cox & McLeod, 2014a).

3.2.3 Educational vision and policy on curriculum materials

Only two studies discussed educational vision and policy on curriculum materials. Cox and McLeod (2014a) showed that publicly sharing and communicating the school’s vision was perceived as a benefit. Preston et al. (2015) were more critical: they concluded that for education to renew in the direction of digital teaching, school boards should acknowledge and recognise this goal, and incorporate it in plans for improvement. Social media can help to share this goal and vision with stakeholders (cf. Cox & McLeod, 2014a).
3.3 Teacher

Several studies discussed teacher professional development and social media. One group of studies discussed how professional development plays a role for using social media. A second group of studies investigated how teachers could use social media in professional development trajectories.

3.3.1 Professional development for using social media

Implementing social media implies new teacher roles and new approaches to teaching and learning (Hoyos, 2014). Furthermore, Buus (2012) argued for the need for teachers’ awareness of possibilities and technical challenges. To fulfil these roles, approaches and awareness, training and re-training of teachers are required (Gan, Menkoff, & Smith, 2015), including technophobic teachers. In contrast to Gan et al. (2015), Buus (2012) suggested scaffolding learning processes. Scaffolding strategies could include peer mentoring and experts demonstrating technical aspects (Cochrane & Narayan, 2012). Teachers who took part in such a trajectory along the way obtained an early adopter role, using similar strategies to help their colleagues. Whatever its form, teacher professional development was shown to be a significant predictor of the integration of Web 2.0 in schools (Pan & Franklin, 2011). However, when applying the plan in practice, lack of time on the teacher side could be a barrier (Preston et al., 2015).

3.3.2 Professional development by means of social media

Studies that applied social media for teacher professional development all concluded that social media promoted teacher professional development (Ostashewski, Moisey, & Reid, 2011; Visser, Calvert Evering, & Barrett, 2014). In particular, the possibility to reflect and respond instantaneously was valued (Yuksel, 2013). The popularity of websites such as Facebook is reported to be increasing among teachers because these websites can be used to gain knowledge, receive feedback and support, while simultaneously sharing teachers’ knowledge and expertise (Trust, 2012).

3.3.3 Experiences, skills and values

Many teachers would like to use social media (Kukulska-Hulme, 2012; Sobaih, Moustafa, Ghandforoush, & Khan, 2016). Some studies discussed earlier experiences (Goktalay, 2013) and concluded that, for instance, earlier experiences with blended learning correlate positively with the educational use of social media (Manca & Ranieri, 2016). Other studies reported that inexperienced teachers in higher education are more worried about the effects of social media on their person, while more experienced teachers are especially worried about the impact of social media on their students (Goktalay, 2013). When teachers experienced social media creating a tension between private use and professional responsibility, they tried to find a middle ground with their professional culture on the one hand, and their own values and ideals on the other (Veletsianos & Kimmons, 2013).

From the included studies, a long list of experienced barriers can be derived. In addition to lack of experience (Goktalay, 2013) and of knowledge about social media (Dickie & Meier, 2015; Sobaih et al., 2016), teachers also did not know how to integrate social media in existing online learning environments (Kamalodeen & Jameson-Charles, 2016; Minocha, 2009; Sobaih et al., 2016). Reported practical problems are lack of infrastructure (Kamalodeen & Jameson-Charles, 2016), access (Balakrishnan, 2014; Veira, Leacock, & Warrican, 2014) and time (Kukulska-Hulme, 2012; Margaryan, Littlejohn, & Vojt, 2011; Sobaih et al., 2016). Teachers also worried about privacy and security (Dickie & Meier, 2015), cyberbullying (Minocha, 2009) and ethics (Sobaih et al., 2016).

Furthermore, teachers were afraid to lose control in class (Minocha, 2009; Sobaih et al., 2016). They also thought that social media belong to students and that they should not interfere (Dickie & Meier, 2015). Sometimes the attitude of students was experienced as problematic (Goktalay, 2013), or teachers were afraid that students who are less technically proficient would remain behind (Minocha, 2009). It was also argued that social media are better suited for topics such as languages
(Margaryan et al., 2011). Finally, motivation (Kamalodeen & Jameson-Charles, 2016) and the willingness to put effort into learning how to use social media in class were reported (Kukulska-Hulme, 2012), just like resistance to change (Margaryan et al., 2011). Veletsianos, Kimmons, and French (2013) argued that resistance and fear are not so much barriers as an expression of high expectations about the contribution of social media to education.

The demographical factors of age and experience were reported to correlate negatively with attitude towards social media (Manca & Ranieri, 2016; Minocha, 2009). Gender differences were not found for the actual use of social media (Manca & Ranieri, 2016). One study found that male teachers, with a slight difference, reported more often a necessary distinction between private and professional life (Prescott, 2014).

Some teachers distinguished between reasons for using specific tools (Manca & Ranieri, 2016). For instance, Facebook and Twitter were used to motivate students, and blogs and wikis to improve education. Social media was reported as a way to stay in touch with other teachers (Dermentzi, Papagiannidis, Toro, & Yannopoulou, 2016) or to remain up to date with developments in their field (Tenopir, Volantine, & King, 2013; Veletsianos & Kimmons, 2013). Teachers with a teacher-guided style thought that what happens on Facebook should stay there (Prescott, 2014), which implies a distinction between private and professional exchanges. Teachers with a more student-oriented style reported that they should teach students how to deal with online discussions and inappropriate online behaviour (Prescott, 2014).

A handful of studies asked students about their teachers’ skills and knowledge (e.g. Gikas & Grant, 2013; Jones, Blackey, Fitzgibbon, & Chew, 2010; Margaryan et al., 2011). In sum, students thought that teachers have insufficient social media skills and knowledge, and that they do not know how to use these media, and that, frustratingly, they do not even try to start with social media. Teachers, in the eyes of students, do not want mobile devices in class. Furthermore, students reported that humour and personal things shared by teachers on Facebook positively affect students' engagement with the specific teacher’s course (Imlawi, Gregg, & Karimi, 2015).

### 3.3.4 Learning goals

Two studies discussed learning goals (Bicen & Uzunboylu, 2013; Dougherty & Andercheck, 2014). These studies showed that teachers and students reported the importance of formulating and communicating learning goals related to the use of social media.

### 3.3.5 Pedagogical activities

Several social media were used as learning tools in the included articles. Facebook was the most often investigated (e.g. Kabilan, 2016; O’Bannon, Beard, & Britt, 2013; Safuan & Soh, 2013; Vikneswaran & Krish, 2015). Twitter (e.g. Lin, Hoffman, & Borenghesser, 2013; Prestridge, 2014; Yakin & Timmaz, 2013) and blogs (e.g. Greenhow, Gibbins, & Menzer, 2015; Kiili, Multisilta, Suominen, & Ketamo, 2010) were less often investigated. In addition, YouTube, tools developed for specific purposes and discussion forums (e.g. Abdullah, Yaacob, & Rahim, 2013; Mbati, 2013) were investigated as curriculum materials. In general, these studies concluded that the tool was an interesting addition; however, that its use should not stand in the way of instruction (e.g. Yakin & Timmaz, 2013). The included studies rarely reported social media as part of domain-specific pedagogies.

Studies asked students how they perceived specific applications as learning tools. Respondents reported social media as user-friendly, especially compared with specific learning management systems such as Moodle (Bahner et al., 2012; Deng & Tavares, 2013). Social media were reported as interactive (Jong, Lai, Hsia, Lin, & Liao, 2014; Loving & Ochoa, 2011) and easy to use for communication and discussion (Manasijević, Živković, Arsić, & Milošević, 2016; O’Bannon et al., 2013), and for sharing knowledge and information (Lin et al., 2013; Loving & Ochoa, 2011).

One advantage reported in some studies was the combination of informal and formal learning (McCarthy, 2010). This connects to the affordance of social media to collaborate and support (Chen & Bryer, 2012; Jong et al., 2014; Safuan & Soh, 2013), and to get help from the teacher (Prestridge,
In other studies, there was reference to community building (Andersson & Räisänen, 2014; Kabilan, 2016; Kaufer, Gunawardena, Tan, & Cheek, 2011), with the aim of collaboratively practising specific skills in authentic situations (Safuan & Soh, 2013; Whittaker, Howarth, & Lynn, 2014). This, in turn, prepares students for the future and enables them to develop knowledge (Yakin & Tinmaz, 2013) and (professional) identity (Kabilan, 2016; Kaufer et al., 2011; Rinaldo, Laverie, & Tapp, 2011). These benefits resemble social constructivist approaches to learning (Mbati, 2013), and Facebook was especially valued because it enables teachers to apply such social constructivist approaches (Gomez & Lee, 2015). The final benefit is increased transparency of assessment procedures through using social media (Kiili et al., 2010; O’Bannon et al., 2013; Shih, 2011). However, this benefit was refuted by Loving and Ochoa (2011), who argued that Facebook can never compete with a good learning management system when it comes to assessment.

Teachers’ interference in online discussions made students feel less free to express their thoughts and opinions (An, Shin, & Lim, 2009). However, evidence is ambiguous because Prestridge (2014) showed that teachers’ input promoted learning and Lin et al. (2013) showed that when teachers did not interfere at all, collaboration between students did not take place.

Finally, it should be emphasised that most of these studies presented students’ self-reports. Moreover, two studies nuanced the pedagogical use of social media and proposed conditions (Chen & Bryer, 2012; Veletsianos et al., 2013). Both argued that social media are no panacea. Goals and application in classrooms should be appropriately considered and preceded by clearly defined goals (cf. Gomez & Lee, 2015).

### 3.4 Students

#### 3.4.1 Motivation

Many studies examined the effect on motivation of educational uses of social media. A large number of these studies found that social media, especially Facebook and Twitter, increased students’ motivation and engagement (e.g. Cole, Brynn Hibbert, & Kehoe, 2013; Evans, 2013; Rinaldo et al., 2011; Wang, 2013). The more students used Facebook, the more they felt part of their class (Dougherty & Andercheck, 2014). Furthermore, the number of tweets sent was found to correlate positively with student engagement (Evans, 2013; cf. Menkhoff, Chay, Bengtsson, Woodard, & Gan, 2015).

In contrast, other studies reported no increase in student motivation (Selwyn, 2009; Welch & Bonnan-White, 2012), or even a decrease (Dyson, Vickers, Turtle, Cowan, & Tassone, 2015; Flanigan & Babchuk, 2015). Welch and Bonnan-White (2012) for instance found that students who did not use Twitter showed more study engagement compared with students who used Twitter. Other students showed less positive attitudes towards social media when they reported social media as being distracting because new messages appeared too fast, which caused feelings of being overwhelmed and resulted in decreased participation (O’Bannon et al., 2013). Furthermore, students did not appear to be motivated to use Twitter if it was used only as a source of information (Buzzelli, Holdan, Rota, & McCarthy, 2016).

#### 3.4.2 Learning results

Learning results were reported to improve by increasing interaction between students (e.g. Ahern, Feller, & Nagle, 2016; Al-Rahmi, Othman, & Musa, 2014; Lai, 2016) and being active with learning content (Bicen & Uzunboylu, 2013; Kabilan, 2016; Smith, 2014). However, social media did not evidently cause this, because it can also be achieved in other ways. Or, as Al-Rahmi et al. (2014) argued, collaborative learning is a condition to use the advantages of social media in class. Moreover, Bicen, Ozdamli, and Uzunboylu (2012) showed that blended learning environments lead to better results compared with just online learning.

Studies with an explicit focus on learning results in relation to social media as a learning tool showed a diversity of results. Reported positive effects of Facebook and Twitter are for instance increased student engagement (Junco et al., 2011) and better grades (Clarke & Nelson, 2012; Wang, 2013).
However, in many cases, students (González-Ramírez, Gascó, & Taverner, 2015; Safuan & Soh, 2013) and teachers (Bicen & Uzunboylu, 2013) thought that learning results improved.

Negative learning results were often related to the distraction of social media and to students’ short attention spans (Gupta & Irwin, 2016; Junco, 2015; Paul, Baker, & Cochran, 2012; Wood et al., 2012). Several studies that compared education with social media to education without these media reported no differences in learning results (Callaghan & Bower, 2012; Evans, 2013; West, Moore, & Barry, 2015). Only West et al. (2015) based this result on actual grades. The other studies’ results are based on surveys among students, sometimes supplemented with observations and extended feedback by students.

Some studies took diversity and students’ characteristics into account. Young students spend more time on Facebook and consequently achieve lower grades compared with older students (Junco, 2015). Strong self-regulation led to less distraction by social media and resulted in higher grades (Rouis, Limayem, & Salehi-Sangari, 2011). Several studies nuanced claimed causality of earlier found relations. For instance, Alwagait, Shahzad, and Alim (2015) and Abu-Shanab and Al-Tarawneh (2015) proposed a reverse argument: getting lower grades could lead to increased Facebook use.

A noteworthy result is the use of social media, and especially Facebook, for writing lessons and language courses. Studies with a focus on writing and language showed increased results and interest among students when using social media as learning tools (Lee, Koo, & Kim, 2016; Suthiwartnarueput & Wasanasomsithi, 2012; Vikneswaran & Krish, 2015).

3.4.3 Experiences, skills and values

The results of the included studies suggested that experience and values relate to country of origin. For instances, studies from East Asia (Al-Rahmi et al., 2014; Huang, 2011; Menkhoff et al., 2015) or Turkey (Baran, 2010; Ekoç, 2014; Uzunboylu, Bicen, & Cavus, 2011) reported more reticence and ignorance among students. Western studies reported enthusiasm for social media (Dougherty & Andercheck, 2014; Hill, Thomas, Diaz, & Simm, 2016; Thalluri & Penman, 2015), yet they also reported worries about privacy and security (Wang, 2013). Furthermore, the studies showed a rapid development over time: the earliest papers often showed negative values among students towards social media, whereas more recent papers often showed evidence of a change in attitude (Pilli, 2015).

Regarding experience, Lowe, D’Alessandro, Winzar, Laffey, and Collier (2013) reported that students with much social media experience are not necessarily convinced about the benefits of social media as a learning tool. This connects to the image of social media as a leisure activity (Balakrishnan, 2014; Donlan, 2014; Prestridge, 2014). When students had experience with computers, they were more easily convinced of the use of social media in class (Lowe et al., 2013).

Also, skills can influence the attitude and use of social media as learning tools. Students who possessed skills for applications different to those used in the classroom felt disadvantaged (Evans, 2013). Furthermore, students were more reserved in using discussion forums, for fear of their lack of knowledge being clear (Veira et al., 2014).

Usually, studies reported positive values (i.e. attitude) towards social media as a learning tool among students. In studies on Facebook, most students were positive about this application because it provided more options for personal engagement (Arteaga Sánchez, Cortijo, & Javed, 2014), communication (Souleles, 2012) and collaboration (Shram, 2014). Other advantages were flexibility, no travel time and fitting personal learning strategies (Kohtz, Gowda, Stockert, White, & Kennel, 2012). One study that compared attitude towards social media before and after using Facebook in the classroom showed that students were less convinced afterwards of Facebook’s effectiveness as a learning tool (Irwin, Ball, Desbrow, & Leveritt, 2012). Nonetheless, a majority of students stated they would use Facebook in the future.

A few studies showed that students preferred Facebook over Twitter as a learning tool (Rinaldo et al., 2011; Welch & Bonnan-White, 2012). Although in general students were not inclined to change tools, they were more positive about Facebook for learning about grammar and writing (Suthiwartnarueput & Wasanasomsithi, 2012). Other studies, in turn, showed that students were
reluctant to use any social media tool in class, which directly affected their learning behaviour when no alternative was provided (Nemetz, Aiken, Cooney, & Pascal, 2012).

3.4.4 Interpersonal student–teacher relations

Our conceptual model did not include teachers’ actions that strengthen their relations with students, also known as interpersonal student–teacher relations. The data extraction phase, however, showed several studies explicitly discussing this outcome. For instance, a positive attitude correlated with student engagement in a course (Imlawi et al., 2015) and more positive interaction with the teacher (Al-Rahmi et al., 2014). When teachers were able to efficiently shape their role in the chosen social media tool, this led to a more learning-centred attitude among students, instead of an attitude focused on communicating (Callaghan & Bower, 2012). This is especially the case when social media were used for an online community (Evans, 2013). In these situations, students liked to be in touch with their teacher through applications such as Twitter (Sendurur, Sendurur, & Yilmaz, 2015). Facebook was in this context evaluated as a significantly faster communication channel compared with other social media tools (Mueller, Della Peruta, & Del Giudice, 2014).

Again, contradicting results were found. Nkhoma et al. (2015) found a positive relation between experience with social media and the quality of student–teacher interaction experienced on Facebook. However, use of Facebook outside negatively influenced this relation: the more a student used Facebook, the more negatively this student thought about the teacher–student relation. Matzat and Vrieling (2016) reported no evidence for the correlation between social media use and teacher–student relations. And finally, Eköç (2014) and Hershkovitz and Forkosh-Baruch (2013) reported that students do not consider Facebook to be the place to communicate with teachers.

4. Discussion

The motivation for this review was a lack of clarity in educational practice about social media: is the distraction that comes with these media a burden for education? Or is it a blessing and could social media usefully be applied as learning tools? Starting from the levels of curriculum (Van den Akker, 2003), we formulated research questions about the intended, implemented and attained curriculum. Finally, we formulated a research question about the complete model of factors and effects related to social media in class. We intended to bring together research on any of the three curriculum levels, operationalised in aspects on school, teacher and student level (see Figure 1).

The answer to the first research question follows from the goals and considerations of teachers to use social media in their teaching. Teachers use social media specifically to motivate students and to improve teaching. The main goals reported for school leaders were improved communication with the outside world and colleagues. Furthermore, school leaders use social media to promote social learning and teacher professional development. They do so by mobilising early adopters and by applying blended learning. This not only concerns improving ICT skills but also strengthening teacher self-efficacy.

Considerations for using social media can be summarised as: reaching a wider audience, motivating students and improving transparency in (internal and external) communication, assessment and evaluation. Another consideration was that students are already familiar with social media. However, this led to the objection that social media belong in students’ leisure time. One condition at school level is facilitation of teachers, especially organisational (i.e. time) and technical support. Furthermore, teachers need support to develop their social media knowledge and skills. They experience a lack of this support as a barrier. Finally, uncertainty regarding privacy and security, lack of experience and a negative attitude towards social media or ICT in general are reported barriers. These results confirm conclusions from earlier review studies (e.g. Henderson et al., 2013; Minocha, 2009; Tess, 2013). The many barriers reported in the results of our review suggest that much is to be gained by a systematic and profound elaboration upon the intended curriculum regarding social media.
The second research question discussed the context and pedagogical use of social media in classrooms. Facebook, in particular, was used, followed by Twitter and blogs. Teachers perceive their own role as coach that supports students in their learning. Social media are used for collaborative learning, for active engagement with the course content and to support metacognitive skills. However, this last type of support is also perceived as conditional: a high level of self-regulation among students leads to focused use of social media. This makes social media suitable for social constructivist learning approaches (Ertmer & Newby, 1993).

Social media are used mainly in regular learning situations, where chosen applications are used as an addition to or replacement of traditional curriculum materials. The purpose is to improve communication, share knowledge and learn collaboratively. Also, interpersonal teacher–student relations can be improved by social media. However, positive results on these aspects strongly correlate with teachers’ actual behaviour on social media and their attitude towards these media and ICT in general. This is in line with earlier research about teachers’ attitudes towards innovation (Thurlings, Evers, & Vermeulen, 2015) and about considerations for ICT use among teachers (Van den Beemt & Diepstraten, 2016).

The evidence for the outcomes, our third research question, is far from convincing. The results of studies vary, just like the conclusions drawn from these results. Sometimes the belief of researchers or the attitude of participating teachers leads to these varying results, which can also be seen as an instance of the hidden curriculum (Edwards, 2015). Additionally, many studies refrained from being explicit about the demographics of respondents, which only allowed us to draw less specific conclusions. Furthermore, weak evidential power originates in perception studies and self-reports (see for instance also Thurlings & den Brok, 2017), and is therefore ‘anecdotal’ (Hew & Cheung, 2013). These perceptions and self-reports lead to statements about increasing motivation among students or about improved learning results. Reported risk factors are for instance distractions caused by social media and short attention spans among students. The central point of the evidential power is diversity among students: differences in age, development, preferences for ICT or specific social media, and in skills (see also Van den Beemt et al., 2010). This diversity is also apparent for teachers. Most convincing is the use of social media in writing and language courses, which leads to better results and motivation among students. For other domains, such as STEM or medical studies, the included research showed less convincing results, regarding, for instance, specific pedagogical activities. However, the general question, discussed in no single study in this review, is retention: How persistent are learning results? In a similar tone, it can be questioned whether actively engaging with course content can be achieved in other ways, without social media, possibly leading to even better learning outcomes. Taken together, our review results suggest difficulties in making well-considered and evidence-based choices for the pedagogical use of social media, because of poor quality of studies and because of the large variety of results.

The last research question discusses the complete conceptual model. The relation between conditions and outcomes regarding social media in classrooms remains unclear as a result of variety in evidence. Rarely are cause and effect clearly pointed out: is Facebook a cause of lower grades, or do students go online more often once they get lower grades? The context-dependency of studies also influences this obscurity: executed in a specific course, and in a specific educational culture. This hinders generalisations and determination of causality, even within specific domains such as STEM or the social sciences. Nonetheless, facilitation (at school level) and attitude (teacher level) appear to be related, for instance where professional development predicts integration of social media in classrooms. Barriers experienced by teachers for the pedagogical use of social media can be reduced with the right policy and support. This serves as a positive influence on student–teacher relations, and a better understanding by teachers of students’ attitudes towards social media. The implicit advice for teachers appearing from our results is that teachers should learn to know what drives their students.
5. Conclusion

The questions about social media in class play at the interrelated levels of student, teacher and school. This review showed that existing research repeatedly focused on one single aspect, without paying attention to this interrelatedness. Future research on pedagogical uses of social media should attend to the complexity of interrelated factors, this raising awareness of hidden positions and curriculum aspects. Furthermore, cause and effect should clearly and objectively be identified to determine the effectiveness of specific pedagogical uses of social media in classrooms, while taking into account content domains. This implies mixed methods including analyses of, for instance, learning results, rather than relying on self-reports and perception surveys.

Our review resulted in an integrated model that gives educational practice starting points to formulate considerations, while taking into account the interrelatedness of student, teacher and school. As such, we contribute to knowledge and understanding about the educational use of social media in teaching and in supporting educational processes. This, in turn, leads to practical advice and considerations that can help schools and teachers to enrich their education with social media. This advice can serve as grounding for practice-based organisations such as the International Society for Technology in Education that aim to solve problems in education.

School

(1) Apply social media to reach a broader audience and to increase transparency in internal and external communication.
(2) Include social media in policy on curriculum materials and educational vision as this promotes the use of social media as learning tools.
(3) Develop focused policy and support to diminish the barriers experienced by teachers. Facilitate teachers especially in technical support and in time to work on their social media skills.
(4) Consider diversity among teachers in experience, skills and values regarding social media.
(5) Mobilise early adopters of social media within the school.
(6) Support the development of knowledge and skills within teacher teams, small informal groups of teachers.

Teacher

(1) Develop social media skills to be taken seriously by pupils and students.
(2) Scrutinise your own experiences, skills and values regarding social media to understand barriers to pedagogical use of this technology.
(3) Facilitate students with clear, instruction-focused goals while adapting to their social and educational needs. Effective learning goals are related to communication, sharing knowledge and collaborative learning.
(4) Social media are suitable for social constructivist approaches to learning. Central is active engagement with content, for instance by producing digital content. The teacher’s role is coaching (Wopereis, Sloep, & Poortman, 2010).
(5) Use social media as a tool for collaborative learning. For instance, by enabling students to have informal discussions about assignments.
(6) Be purposefully present on social media, to support groups of students as an online community. This can strengthen interpersonal teacher–student relations.
(7) Present social media as optional, and offer an alternative for reluctant students (Chen & Bryer, 2012). Social media are an addition that should not stand in the way of instruction.
(8) Promote students’ formative feedback on (improved) use of social media to collaborate and share knowledge. This promotes reflection on learning with social media.


**Student**

(1) Examine the status quo: not all students perceive social media as tools for learning. Consider diversity in experience, skills and values regarding social media.

(2) Students use social media to communicate rather than develop or share information.

(3) Social media are not a panacea: learning results (i.e. grades) do not increase automatically. Social media in the classroom can improve indirect learning outcomes, such as collaboration, communication or motivation.

(4) Metacognitive skills are a prerequisite for a focused use of social media. However, this use also increases these skills.

(5) Not all students have sufficient social media knowledge and skills. Explain aspects of security and privacy (Chen & Bryer, 2012).

Are social media in class a burden or blessing? This appears to be connected to school culture, attitudes of teachers and students regarding social media, support and teacher professional development, clear learning goals and a clear role for social media in the curriculum.

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