



Capturing, Managing and Analyzing Teachers' Informal Professional Development on Social Media

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and Computer Science

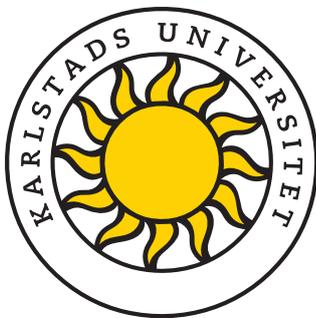
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1 Introduction

Let us listen to [the teachers'] experience and work to support, not hinder, their learning. Rather than deny, seek to control, or standardize the complexity and diversity of professional learning experiences, let us accept, celebrate, and develop insights from these experiences to support professionals as they continue to learn (Webster-Wright, 2009, p. 728).

We agree with Webster-Wright's recommendation for listening to teachers' experiences in order to develop insights about their professional development processes. In an ongoing study we explore how teachers in Swedish and mathematics engage on Facebook and discuss professional issues. For teachers, social media is, amongst other things, a new resource where they can shape their professional learning experience. They use social media for networking, sharing knowledge, giving and taking advice, and discussing curricular material (e.g., Bissessar, 2014; Borba & Llinares, 2012; Manca & Ranieri, 2014; Liljekvist, 2016; Ruthven, 2016; van Bommel & Liljekvist, 2015). Sometimes, such activities are discussed in relation to the emergence of prosumers and prosumerism, i.e. the coincidence of both consumption and production (cf. Tapscott 1996, Olin-Scheller & Wikström 2010; Ritzer & Jurgenson 2010).

Thus, participants on social media can be said to be, while using or "consuming" social media, also producing new content; as Fuchs (2012) puts it: "the users are also content producers, there is user-generated content" (p. 56). This user-generated content on social media is of huge relevance for educational research as we can now get insights into the informal professional development of teachers.

However, issues arise concerning the new challenges for researchers when aiming to capture, manage and analyze data that highlight the character of practices in social media. In this report, we will address methodological issues drawing from the collection of our data regarding teachers' discussions in different groups on Facebook. By taking our study as a point of departure to highlight issues central to our considerations, we present and discuss our thoughts and concerns when using digital open accessible data. The main question for this

report is: How can we capture, manage and analyze data emerging in this new digital era?

2 **Where are we now?**

Robutti and her colleagues (2016) show that there are few studies on [informal] professional development initiated and sustained by teachers themselves on social media. Nevertheless, social media are a vibrant part of teachers' day-to-day practice and Webster-Wright (2009) calls for educational researchers to study teachers' professional development that is constructed and embedded in their everyday activities. However, some studies have been conducted on groups on social media related to teachers' formal professional development. For instance, one study investigated five Italian Facebook groups and focused on the motivation, activity level and outcome (Ranieri et al., 2012). This study gives valuable information about and insight into teacher concerns and teacher behavior in Facebook groups, information that in its turn informs educational researchers on professional development. Bissessar (2014) sees in her study that the teachers address issues on curriculum, and general and subject-specific pedagogical concerns, but states that we need more studies to examine the extent to which critical discussions occur. Al-Oqily, Alkhatib, Al-Khasawneh, & Alian (2013) bring up how student teachers' professional growth on social media can be described in terms of interpersonal cognitive awareness, and that this knowledge is of great importance in understanding networking communities and professional development.

Teacher-initiated informal professional development on Facebook is the focus of this study. Al-Oqily and colleagues (2013) use the term "networking community" and continuing on Bissessar's study (2014), it is important to study the quantity and quality of critical discussions teachers have in (informal) networking communities. Thus, communication and community building are two important aspects of professional development into which we aim to get more insights (Liljekvist, van Bommel, Olin-Scheller, 2017). The dialogues in Facebook groups give us an opportunity to look into parts of professional development we previously did not have access to. It also places new demands on us as researchers. For example, since the data entails so many different aspects we have to be very clear on what questions we want to

pose to our data and we also have to be conscious about how to deal with the ethical issues regarding the gathering of such data.

3 Capturing data

Dialogic media

Teachers in Sweden use different social media to inform others on ongoing activities: Twitter, Instagram, LinkedIn, Facebook and other media are all used on a daily basis (cf. Findahl & Davidsson, 2015). Desimone (2009) described in her overview of studies over the past two decades that inquiry-oriented learning approaches and collaborative participation were two of the design principles that maximized teacher learning. In our study, in order to capture communication within communities initiated and formed by teachers, we focus on dialogic media. Therefore, blogs, homepages and similar types of media were ruled out, since the communication in such contexts is mostly monological (Thompson, 1995). Obviously, the owner of such a site communicates his or her messages, but the response from others is relatively sporadic. Further, platforms such as Twitter or Instagram do make dialogic communication possible, but in those fora people are bound to a maximum number of characters (for instance 140 characters in tweets and retweets on Twitter). As we aim to study both the content and the depth of the topics discussed, a maximum number of characters may give us deceptive data in terms of the discussions. Therefore, Facebook groups initiated by teachers seemed to be able to provide us with suitable and relevant data to study. Teachers engage in discussions, they respond to input from other members of the Facebook group, and get responses on their input from one or more members in the group.

Population and ethics

Since the project focuses on the main teacher population, the school subjects Swedish and Mathematics were chosen. On Facebook, teachers have organized several groups within these two subjects. The groups differ in specific aims and topics, but also in the number of members. The size of the groups became of crucial importance when considering the ethical issues related to research on social media. Only groups with over 2000 participants were considered at this stage. This is justified by the argument that in such a group the members most likely behave as if they were in a public place, i.e. the members

probably consider the activity in the group as a public activity instead of a personal activity (Knobel, 2003; Roberts, 2015).

4 Managing data

Time lap

In our next phase of managing the data, we had to decide upon a time lap for the data that enabled us to take a stratified sample from the groups, using the same time lap for all groups. We expected different types of discussions throughout the school year and therefore a one-year-period seemed suitable, as it would include all activities during a school year. As the start of the school year differs within Sweden, we decided upon one specific calendar year as our time period, covering a school year. Within this one-year period, we identified all status posts per group. At this stage, we did not consider the comments or any other response to each status. Names or other identification details were not collected either. However, we did note the date and time of each status.

Once the all data from the ten groups chosen was gathered, we considered different aspects that were feasible to take into account. We looked at the following characteristics:

- activity level within in the group (not of individuals);
- time of day of activity: working hours/non-working hours;
- time of year: autumn term/spring term/holiday;
- type of day: school day/weekend/holiday.

It was decided that in order to (later) be able to choose a stratified sample, the date and time of each status had to be considered. The activities were divided into working hours and non- working hours, as well as working days and non-working days (weekends, holidays). From that a stratified sample could be taken from all groups. The aspects that became criteria for the stratified sample were the two semesters (autumn and spring), combined with (school) holidays.

Stratified sample

In the stratified sample we aimed to gather 100 statuses from each group. Given the rate of status posting per day in a specific group (different for each group) we calculated how many days it would take to get 100 statuses for each group. In group 1, the status rate/day was

2.32. In order to be able to collect 100 statuses, we had to consider 43 days in this group (100/2.32). In group 2, the number of statuses/day was much higher (8.47), which meant that fewer days had to be considered to be able to collect 100 statuses (11 days) – see Table 1.

Table 1 Example of calculation for number of days to be collected (group 1 and 2)

		Whole year	Spring term	Autumn term	Holidays
Group 1	Average status/day	2.32			
	% of statuses	100	47.0	46.5	6.5
	Number of days to be collected	43	20	20	3
Group 2	Average status/day	8.47			
	% of statuses	100	55	36	9
	Number of days to be collected	11	6	4	1

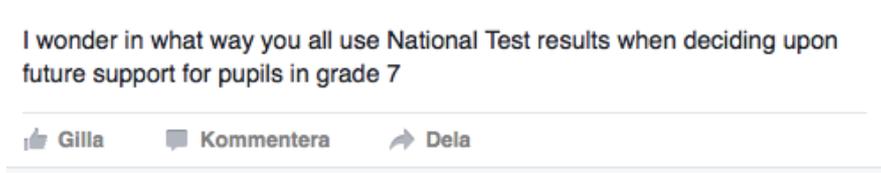
Once the number of days was decided for each group, the division over the three periods was calculated in the following way: For each group the percentage of statuses per period was calculated. In the first group, 47 percent of the statuses appeared in the spring term, 46.5 percent in the autumn term and the remaining 6.5 percent during holidays. For a total of 43 days to be collected, this resulted in 20 days to be collected in the spring term period, 20 days in the autumn period and 3 days during the holidays. For the second group, the division over the year was 55 percent, 36 percent and 9 percent, resulting in the collection of 6 spring term days, 4 autumn term days and 1 day during the holidays (Table 1).

The specific days were then generated at random, using a random sampling method. In the event of a date appearing twice, a new date was randomized. In these calculations so-called ‘zero-days’ were left out. A zero-day is a day on which no activity took place within one specific group.

5 Analyzing data

A separate unique coding string was given for all statuses and comments on a specific day in a specific post. This made it possible for us to filter in specific ways while analyzing the data.

Figure 1 Fictive status (*gilla=like, kommentera=comment, dela=share*)



The fictive status in Figure 1, posted in group 7 on April 21 2015 (a Tuesday) at 14:37, resulted in the string shown in Table 2.

Table 2 Coding string for (fictive) status in Figure 1

ID # of the group	Date	Day of the week (1-7)	Time (hhmm)	Status (1/0)	Status ID#	# like	# share	Comment (1/0)	Comment to comment (1/0)	Comment#	ID # person	Modality Text #	Modality Photo#	Modality Video #	Modality Document #	Modality Other #
7	210415	2	1437	1	202	4	0	0	0	0	456	1441	0	0	0	0

At this stage we started to analyze our data. A first statistical analysis of the activity patterns of the teachers was done, similar to the study of Ranieri et al. (2012). Examples of the questions we sought to answer through analysis are: When are teachers active in the Facebook groups? Are there different activity patterns visible in the different groups? In our study we are, at this stage, not concerned with specific teachers' behaviors within the group. We are aware, however, that there are different activity patterns even within a Facebook group, where teachers might participate as viewers, communicators, information seekers and producers (Usluel & Atal, 2013) or, as described before, as prosumers (Ritzer & Jurgenson, 2010; Fuchs, 2012).

Just like Borko (2004) suggests, there are different phases of research on professional development, starting with a focus on one specific professional development program and continuing with a focus on the relationships between the different actors within the professional development context. Going further, we wanted to conduct a descriptive analysis of our data and, since our specific interest is in subject-specific knowledge, we chose Shulman's framework on pedagogical content knowledge (1986) as a suitable one for a first categorization of our data. The framework describes teachers' knowledge through seven categories, amongst others curricular knowledge, subject knowledge, pedagogical content knowledge and knowledge of learners. This categorization can then be put side by side with other frameworks. For instance, it is interesting to see what type of input is connected to the different parts of Shulman's framework. Do teachers mostly pose questions concerning their pedagogical content knowledge? Do teachers mostly share and discuss ideas concerning curricular knowledge?

6 Unresolved questions

In this report we address some issues related to our own study and consequently regarding our considerations. We would now like to offer some different perspectives on some of the choices made. When capturing data from social media sites it may actually be of interest to take into account monological social media sites. Blogs or other sites could give other perspectives to inform professional development not captured by dialogical social media, for instance in what way a special event like a new curriculum is evident on such a site and how it is addressed. Our focus on the informal arena steered the choice of platform, but if one aimed to investigate formal professional development, other platforms would be of more interest. Further, each country has its own culture, in terms of school system, professional development and the social media used. As noted above, Facebook is widely used in Sweden, both privately and within professions, but this will differ between countries.

Social media are tools that mediate activity in certain ways: “[T]he nature and composition of a specific tool will have a significant influence in the nature of the tasks that can be accomplished with it” (Brown 2009, p. 20). Different modalities can be used in social media – text, film, pictures, links, etc. So far we have not yet dealt with the different modalities that appear on Facebook. Teachers use a variety of modalities and each of these modalities may be of interest for further research – with each modality creating its own considerations to take into account.

During the data collection, Facebook changed some of its settings and functions. For instance, the function of “liking” a status or a comment was expanded to six different forms of “liking”. Further, previously it was not possible to comment on a comment. Neither was it possible to include live streaming. Such changes will continue to take place, and that is the strength of social media. It does, however, imply some challenges for researchers. Karpf (2012) mentioned research methods being slower than the media they study, and we have to be aware of this. Are the results still valid in a newer version? Results for something that happened in a Facebook group in 2015, analyzed during

2016, might be published at the earliest in 2017; by then Facebook may not even exist anymore. However, the phenomenon of “informal professional development initiated by teachers” will continue to exist, and therefore the results of these kinds of studies will still be of interest. Moreover, the methodological issues as elaborated upon in this article will continue to be highly relevant as fora like Facebook will vary in use. The future directions of educational research on teachers’ informal professional development on social media will, therefore, convey new scholarly knowledge that has methodological implications as well as implications for formal professional development.

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Teachers' professional discussions have now expanded onto different platforms on social media. Collecting such digital open accessible data from social media brings new challenges for educational researchers. Teachers' discussions on Facebook are the focus of this study and the methodological issues coming from capturing, managing and analyzing our data are explored.

Different social media generate different types of data and the difference between dialogical and monological communication becomes clear. Further, the issue of anonymity requires special attention, as one has to redefine what can be considered public information. As the data is relatively easy to gather, it can result in large quantities and a stratified sample of the data is suggested, both for qualitative and generalizable results.

This report aims to convey our findings but also raises some unresolved questions, for instance concerning the use of different modalities or future technological development.

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