

## **Develop research about scientific literacy**

### **Background**

The importance of encouraging scientific literacy (SL) has been called for both by academics and politicians for a number of years. Many studies (for reviews, see Roberts (2007)) have demonstrated that SL among students does not satisfactorily fulfil the demands of academics or organisations like OECD (2003). Several researchers, such as van Eijck & Roth (2010) and Roberts (2007) emphasize that the focus should be on the use of knowledge, not just its reproduction. Similarly, OECD defines SL as “the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity” (OECD, 2003, p.133). OECD’s definition and Roberts’ (2007) Vision 2 of SL stress the use of scientific knowledge when making decisions and acting in daily situations outside the school environment. Despite this emphasis on using scientific knowledge in different situations, the majority of research and evaluations of SL have been made using methods such as questionnaires, interviews and observations in a school context (Roberts, 2007). Several researchers (e.g. van Eijck & Roth, 2010) question this scientific literacy research. This paper justifies and discusses the opportunity to investigate SL in an everyday context through the use of video diaries and in this way demonstrate alternative ways compared to the majority of earlier studies.

### **Scientific literacy in the wild**

Gee (1999) emphasize that scientific knowledge learned in school cannot easily be transferred to other more complex situations outside school. Science seldom appears in its pure forms in society; instead, it is mixed with other forms of knowledge or values. Individuals have to deconstruct their science knowledge and then construct it in a new way, one that is dependent on the context. Van Eijck & Roth (2010) assert, “there is not so much understanding of ways in which we actually can describe scientific literacy ‘in the wild’ in terms of knowing and current review studies are remarkably limited in this respect” (van Eijck & Roth, 2010, p.186). However, studies investigating SL in an out-of-the-school context cannot be performed in the same way as studies in-the-school context, since situations outside school often are more complex. Therefore, the development of different research methods that investigate scientific literacy ‘in the wild’ - close to the participants - are important.

### **The use of video cameras**

Video cameras have traditionally been used in class room studies in science education research. However, some research fields have, to a larger extent, used the video camera in ways different than the traditional manner; instead the video camera is in the hands of the participant in the study. In video diaries; the informants are requested to document parts of their everyday life. The ambition is to come closer to the informants’/participant’s life (Holliday, 2004). In other words, if the participant has the possibility to immediately document situations, the data may be different when compared to data collected after the event (Lundström et al. 2012). Video diary studies connected to school education but performed outside school have, thus far, not been conducted to any great extent. However, Cotton et al. (2010) studied the use of the video camera as a video diary in an educational

setting outside school during geology excursions. Roberts (2011) used video diaries to investigate undergraduate students' processes of transformative learning in sustainable development during field studies. Lundström et al. (2012) studied teenagers' decision-making in health issues during the outbreak of the new influenza pandemic in 2009.

Video diaries enable the informants to make links to other aspects of their broader daily experiences. The data is richer than conventional interview transcripts, which leads to a challenge: the possibilities of recording, analysis and interpretation are increased (Holliday, 2004). The method may be suitable not only for the investigation of strict educational aspects but also for other perspectives of importance for learning (Noyes, 2004). Cotton et al. (2010) think that the video diaries captured more of the first-hand 'lived experience' when compared to the other forms of diaries that were made during their project.

However, some important conclusions about the difficulties incurred must also be noted. The format of a video diary does not invite in-depth science content reasoning. Another initial difficulty of using video diaries might be in truly succeeding in collecting data that can be used to answer the research questions of the project. When the data collection is left to a high degree in the diarist's hands, the fear of not collecting enough data or not enough "correct" data arises. The ethical aspects of participatory research in general - and video diaries in particular - are detailed by several researchers in the field: (g.e. Holliday, 2004).

### **Analysing video diaries**

Video diaries have been analysed in different ways. However, there is a general consensus that identity often is in focus in video diary analysis (Holliday, 2004). Rees (2009) suggests that video diaries offer an exciting opportunity to explore the visual character of construction and the performance of identities through the "triadic interaction between participant, camcorder and researcher" (Rees, 2009, p. 5).

Roth (2008) proposes discursive psychology as one appropriate framework in analysing scientific literacy because discourse psychology theorizes the function of talk and of language itself (Potter & Wetherell, 1987). A discourse psychology analysis is close to the informant's everyday life and, therefore, gives us a suitable framework for developing knowledge about the video diarist's life. The application of discourse psychology analysis allows the opportunity to analyse the diarist's use of different discourses. Scientific literacy will, in these terms, be a matter of constructing an identity (Sadler, 2009), and it will be understood not only as an appropriation and use of discourses but also as meaning-making in relation to other fields. It must also be understood in relation to what happens with the use of science discourse or with school- science discourse when it is expected to be available in different contexts outside school.

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