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Similar products different processes: Exploring the orchestration of digital resources in a primary school project

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ABSTRACT

Today, teachers and pupils are interacting with digital devices during different types of activities in the classroom context. During such activities, dialogic interaction has a particular value as a pedagogical practice that helps to develop pupils' understanding. This study has explored the question: In what ways do digital resources support dialogic and synergistic interaction? In order to explore primary school pupils' interaction within group activity and how they make use of the features of the laptops, the empirical material was collected through video recordings and further analysed with the interactivity analysis framework (IAF) developed by Beauchamp and Kennewell (2010). The findings show that although the products produced by the different groups of pupils were similar in a technological way (i.e. the pupils used the same modes of expression), the patterns of interaction during the group processes varied. Two out of six groups used the digital resource as an 'object of interaction', where the tool had a more passive role during the group collaboration. The other four groups used the ICT resource as a 'tool for interaction', where the resource became more of an interaction partner during the meaning-making processes, which opened up opportunities for learning. The findings also indicate that the interplay in these four groups between the group members and the laptop features seems to have developed the pupils' understanding of ICT resources as well as their understanding of the subject content during the group work. Synergistic interaction with ICT was rather rare but was observed in one of the groups.

1. Introduction

During the last decade the number of computers and other digital devices in primary schools has increased, both in Sweden and in other countries. Along with these artefacts new pedagogical questions have also emerged, e.g. how could digital resources be implemented in the classroom context to achieve new possibilities for learning?

At present, teachers and pupils are interacting with information and communication technologies (ICT) during different types of activities in the classroom context. Designed ICT tasks may be set up with different interactional scope, e.g. whole-class and individual activities, or group collaboration. There is growing evidence concerning the value of increased dialogic and synergistic interactivity for enhancing learning during whole-class, group and individual activity (Kennewell et al., 2007; Mercer & Littleton, 2007; Wegerif & Dawes, 2004). Dialogic interaction is characterized by being reciprocal, supportive, cumulative and purposeful, and dialogic processes are of importance for stimulating and supporting the collaborative development of knowledge in an educational context (Alexander, 2004; Bruner, 1978; Rojas-Drummond & Mercer, 2003; Wegerif, 2008).

From a sociocultural perspective, dialogic interaction as a cultural tool has the role of mediating thinking. Learning depends on the interaction between the individuals, the social practice and the opportunities afforded (Vygotsky, 1986). Learning always takes place in a situated practice through the actions of individuals and is not understood simply as an individual process but also as a process mediated by the use of cultural tools, where the notion of artefact has a special impact (Vygotsky, 1978; Wertsch, 1998). During these processes, interaction can be carried out in various ways where the dialogic forms create greater potential for improving learners' understanding (Beauchamp & Kennewell, 2008, 2010; Scott, Mortimer, & Aguiar, 2006).

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Wegerif (2010; 2011) puts forward a dialogic theory of thinking that is in contrast to the sociocultural perspective. He uses the notion of 'dialogic space', which has its roots in the dialogic theories of Socrates, and argues that dialogues have two sides, the 'outside' which is situated in space, time, culture and history and the 'inside' which is unsituated and can invoke any time and space. In contrast to the sociocultural approach, with its focus on mediating cultural tools such as language and technology, Wegerif highlights the space of dialogue itself and how the engagement in dialogue creates another kind of thinking. According to Wegerif, children do not only learn how to think in the context of interaction but how we interpret the meaning of any utterance must depend on the dialogue. The metaphor of 'dialogic space' allows us to speak of opening, closing, widening and deepening a space, all of which proves to be useful in the classroom (Wegerif, 2010, p.180).

Educational research has emphasized the importance of conversations in the classroom (Dawes, 2004; Mercer, 2000; Wegerif & Dawes, 2004; Wells, 1999). This research indicates that pupils became more successful at thinking after they had been taught the ground rules of dialogic interaction. By developing 'exploratory talk', the groups of pupils became better at reasoning and solving problems. On the basis of these findings, Wegerif (2010) argues that the relationship in the groups was more important than explicit reasoning. The signs of dialogic interaction were found not only in the language but in the way the children acted towards each other in asking for advice, listening to each other, having silent pauses and changing their minds in the face of evidence (Wegerif, 2010; 2011).

Research studies have also explored how educational software can support dialogues in primary classrooms during small-group interactions (Wegerif, Littleton, & Jones, 2003). The findings of this research point out distinctive ways in which computer software can participate in and support educational dialogues. The research of Warwick, Mercer, Kershner, and Kleine Staarman (2011) has put forward good examples of dialogic interaction in relation to pupils' orchestration of ICT resources during group collaboration in English primary schools. But the major importance of these findings is the way that the teachers employ their pedagogical competence and the extent to which teachers design appropriate learning tasks relative to dialogic interaction (Palinscar & Brown, 1989). Furthermore, the work of the teacher has to be understood in relation to the features of digital technologies. When pupils are interacting in groups and they are working independently of the teacher, the 'vicarious presence of the teacher' is important in two ways (Warwick et al., 2011): firstly, regarding how rules and procedures are introduced in relation to group talk, and secondly how the teachers use the design of the task to guide pupils' interactions with the ICT resources.

Wegerif (2010) argues that: 'There are ways of using ICT in education which close down dialogic space and ways which open this up' (p. 348). Tutorial software in groups will open up for dialogic spaces 'but the technological support alone does not make a dialogic space' (p.348). However the right pedagogy could lead the pupils to reflect on their own as well as others' assumptions in dialogue (Wegerif, 2010). According to Beauchamp and Kennewell (2010), most of the orchestration is carried out by the teacher or by rigidly structured software, but there is a potential for ICT to support more dialogic and synergistic interaction in both group and individual activities, thereby moving towards an educational landscape where learners are empowered to orchestrate their learning resources in the classroom.

According to previous research, there are various features that are of importance in accomplishing dialogic interaction in teaching and learning activities, such as teaching dialogic group talk (e.g. Warwick et al., 2011), the engagement in dialogue itself (Wegerif, 2010) and focusing on the notion of tools (Wertsch, 1998). The way in which digital technology is used in education seems to be of importance for accomplishing dialogic interaction e.g. tutorial software in relation to teaching (Wegerif, 2010), teacher instructions in relation to ICT (Warwick et al., 2011) and the use of the physical tools we have at our disposal in a particular practice (Wertsch, 1998).

However with the increasing amount of digital technology in Swedish schools, teachers do not only use tutorial education software but they also design classroom tasks using the digital resources provided by laptops and other devices such as digital applications and the Internet. In view of this, further research based on classroom interaction is needed in order to understand the effects of technology in education (Beauchamp & Kennewell, 2010).

This study is situated in a classroom context where pupils, teachers and artefacts, such as books, pens and ICT resources, interact in meaning-making processes for different purposes, and dialogic interaction may then involve both pedagogical and technological perspectives (Beauchamp, 2011). The research described in this paper has investigated primary school pupils' interaction with ICT during a small-group assignment. The material analysed comes from an explorative case study where the learning task was to create an advertising film about a planet, in the video production software, *iMovie*, which was not designed for educational purposes but was used as a medium for communication during this classroom task. The children participating in this social interaction study were not specifically taught how to interact dialogically in small-group interaction and the learning task was rather open in the sense that the pupils had the opportunity to explore and orchestrate the ICT resources afforded by the multimodal software during the small-group activity.

Consequently, this study highlights pupils' interaction with digital resources, in this case the resources offered by the laptop including the Internet. The Internet could be seen as a tool for interaction offering a range of voices and perspectives on every topic (Wegerif, 2010). ICT as semiotic resources for dialogic interaction both create opportunities and impose constraints i.e. software applications and the Internet provide both possibilities and limitations for the users in the learning context of the classroom (Jewitt, 2008).

In order to understand the interaction processes with ICT in the classroom context, the interactivity analysis framework (IAF) of Beauchamp and Kennewell (2010) was applied to the data (see Table 1 in Subsection 2.2). In this classification model, ICT can be used as the 'object of interaction', a 'participant in interaction', or a 'tool for interaction'. Furthermore, in this classification, the role of ICT goes from being a more passive tool to being a tool for active support and assistance for the learners. ICT becomes an 'object of interaction' when the resource is used as a large display of webpages, video clips and pupils' work. This can be compared to ICT as a 'participant in interaction' where ICT becomes a partner to interact with (e.g. in games or quizzes) or ICT as a 'tool for interaction', allowing interaction through, for example, annotations, e-mail, chat, and the Internet browser (Beauchamp, 2011; Beauchamp & Kennewell, 2010).

In summary, the empirical data presented in this paper comes from pupils' group interaction with laptops as mediating sources for learning. The IAF (Beauchamp & Kennewell, 2010) has been used to discern pupils' group interactions with ICT.

The study in this paper has explored the question:

In what ways do ICT resources in a classroom context support dialogic and synergistic interaction?

2. Material and methods

The setting for the research was a Swedish primary school. The school was involved in a project called '2-to-1', where two pupils shared one laptop, which was frequently used in learning activities in more or less all subjects.