Exploring iPads in Practitioners' Repertoires for Language Learning and Literacy Practices in Kindergarten

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English abstract

We have explored the role of a tablet computer (the Apple iPad) and a shared display as extensions of a practitioner's repertoire for language learning and literacy practices in a multicultural kindergarten.

In collaboration with a practitioner, an intervention was designed that included the use of two iPad apps in a language learning and literacy practice session with a group of 5 children aged 5.

We have analysed the conversations around the tablet computers and in front of a shared display, trying to identify types of talk. The roles of the iPads, the apps and the shared display are discussed in relation to the types of talk, engagement and playfulness observed in the activities.

We argue that the intervention led to valuable activities for language learning and literacy practices. The two selected apps differ in their levels of structure (directed vs. open) and genre (show and tell vs. fairy tale), and this difference will be discussed in relation to the types of conversation they initiate, and the extent to which they enable the children to transfer experiences from books and hence develop their literacy to include digital and multimodal resources.

Keywords: iPad, apps, teacher role, conversations

Introduction

The newly published report *Toddlers' digital universe. 0-6-year-olds' access to and use of digital devices in their spare time* (Guðmundsdóttir and Hardersen 2012) shows that there is a great variety of access and use of digital devices among young children, and that many parents are positive about their children's use of digital devices, as they see it as having potential for learning and development. Practitioners in many kindergartens also share this view, and growing attention is being paid to the role of digital devices for pedagogical purposes in kindergartens (ref. this issue). However, there is scant research available about how digital devices can be utilized as a source of development and learning, and in particular for language learning and literacy practices in a context like ours – a multicultural kindergarten in a suburban area in Oslo.

Practitioners have a rich repertoire of pedagogical actions to support learning, but need help to reflect on how they can apply their expertise to enhance children's encounters with ICT (Plowman and Stephen 2007, McManis and Gunnewig 2012). Practitioners and researchers need to identify a range of strategies for supporting learning with ICT that are rooted in the dynamics and constraints of authentic settings and maintain a balance between child-initiated and adult-led activities.

This article reports an exploratory study where we introduced iPads and a shared display in a group consisting of the oldest children (aged 5), in an adult-led activity. In collaboration with a practitioner, we selected two iPad apps that we believed would support language learning and literacy practices.

The empirical material consists of video recordings showing conversations and interactions around the iPads in both adult-led and child-initiated activities. We review the literature about conversation types related to language learning and literacy practices in kindergarten, before we discuss the types of conversation we observed in the activities, relating them to properties and affordances in the iPads and iPad apps. Our research questions are explorative:

1. What role might tablet computers have as scaffolds for language learning and literacy practices in kindergartens?

2. What important properties and affordances need to be assessed when selecting apps for different types of talk?

Research on the use of touch technology in language learning and literacy practices in kindergarten

When children interact with touch technology in kindergarten, these situations can be seen as *literacy events*. In our daily activities – whether in education, in our leisure time or during working hours – we are involved in situations that make demands on our literacy. Such situations are called *literacy events* (Østerud et al. 2012). A similar perspective is taken by Barton, who defines *literacy events* as "all sorts of occasions in everyday life where the written word has a role" (Barton 2007). The role of the written word can vary according to the occasion, which implies that pictures, films, commercials, hypertexts and artwork can also be the basis of a literacy event. Traditionally, literacy has been defined as the ability to read and write. But if we are to understand articulation and meaning-making in our society, we cannot separate written texts from images, sounds and numbers. Since print

literacy is intertwined with other modes, especially the visual mode, and since reading changes as society shifts from dependence on the page to reading the screen, we speak of human communication as being *multimodal.*

In a learning perspective iPad apps can be seen as a scaffold for language learning, and as such the apps can be described as multimodal texts which support the children's understanding and invite them to act and produce meaning themselves (Sandvik 2009).

There are many ways of conceptualising supported learning within the Vygotskyan tradition, including scaffolding (Wood, Bruner and Ross 1976), assisted performance (Tharp and Gallimore 1989), dialogic enquiry (Wells 1999), guided participation (Rogoff et al. 1993) and guided interaction (Plowman and Stephen 2007). For our study it is relevant to try to combine these perspectives to ensure that we assess the role of the teacher and her scaffolding by also placing emphasis on technology-mediated learning and the role of artefacts.

The impact of touch technology on language learning and literacy practices in the kindergarten has not yet been studied systematically, although many literacy teachers express their belief in integrating digital technologies into literacy instruction and equipping students with the new literacy skills necessary for reading, writing and communicating in digital environments (Hutchison and Reinking 2011). Many preschool teachers agree with this, although there is disagreement about the role of ICT in kindergartens. For the literacy classroom, iPads and apps promoting literacy skills have been shown to be effective learning tools (Hutchison et al. in press).

However, findings related to outcomes for learning from educational content on touch technology are growing. A study involving iPod touch devices and PBS-created content (Public Broadcasting Service) for children ages 3 to 7 found that the children made gains in vocabulary and phonological awareness, with children ages 3 to 5 making the most gains (Chiong and Shuler 2010). A recent study of kindergartners randomly assigned to use an iPad to focus on literacy found that the children using the tablet had consistently greater gains than those not using tablets. The researchers found notably strong effects in respect of the iPad children's levels of phonemic awareness and ability to represent sounds with letters (Bebell, Dorris and Muir 2012). A study which combines a comparison of learning at home and in kindergarten reports that ICT was used to promote three main areas of learning: extending knowledge of the world (subject knowledge), acquiring operational skills (the functions of items such as the mouse and on/off switches, as well as the ability to operate them) and developing dispositions to learn (a range of affective, social and cognitive features of learning to learn) (Plowman et al. 2010). The same learning outcome is reported in Plowman and Stephen (2007).

Both the communicative role of the teacher and how the computer software is integrated in daily activities, are of relevance for learning outcomes: when teachers support children and media-rich content is integrated with the curriculum, technology experiences are associated with better language and literacy outcomes, such as letter recognition, sequencing and sounds, listening and comprehension, vocabulary and understanding concepts about stories and print (Primavera, Wiederlight and DiGiacomo 2001, Nir-Gal and Klein 2004, Penuel et al. 2009).

In a study of vocabulary development conducted in the same multicultural kindergarten as the present study, the researcher claims that there is no evidence of increased vocabulary growth from

using interactive whiteboards. However, there is growth in motivation and persistence while participating in activities training vocabulary (Svestad 2012).

Types of talk

Children's conversations in educational settings is a vast research field. Much research on classroom talk has revealed the IRF-structure (initiation-response-feedback), in which the teacher does most of the talking, performing initiations and thereby eliciting the children's responses, which are followed by the teacher's feedback or evaluations (Sinclair and Coulthard 1975, Mehan 1979). This pattern can continue over many exchanges with little or no connection between them. This "recitation script" has been criticised for being dominating and teacher-led at the expense of the children's freedom and influence in the interaction (Wood, 1992). Further, it disadvantages children from cultures in which this form of interaction is uncommon (Heath 1983, Tharp & Gallimore 1988), an aspect of great importance in multicultural kindergartens. Children's everyday registers and the school's disciplinary knowledge will not meet when this three-part exchange pattern is practiced (Lemke, 1990). In opposition to this controlled and restricted use of language in the classroom, a number of studies have begun to investigate the possibilities of making classroom interaction more dialogic (Gibbons 2002, Nystrand 1997, Wells 1999, Wells and Arauz 2006).

A more dialogic perspective on interaction is in harmony with pedagogical thinking, in which children are seen as subjects (Bae 1992, 2004). Further, research on differences in communicative tone directed towards children of different ethnic origin in Danish kindergartens (Palludan 2007) can be said to represent the IRF-structure (tone directed towards children from minority backgrounds) and a more dialogic tone (directed towards children of Danish origin), a difference Palludan describes in terms of a "a teaching tone" and "an exchange tone".

Within the socio-cultural field, some studies on ICT and learning have drawn attention to the talk produced while working on computers, and of particular interest is the SLANT project (Fisher 1993, Wegerif and Mercer 1996), which came up with a taxonomy of three types of non-overlapping categories: disputational talk, cumulative talk and exploratory talk.[1] Briefly described, *disputational talk* is characterised by disagreement where no attempt is made to solve it collectively, but rather by individual decision making. Nobody offers suggestions or constructive criticism. In *cumulative talk* conversationalists relate their contributions to what the other party has said; this is done uncritically, but positively. Consequently, 'common knowledge' accumulates. *Exploratory talk* is considered the most educationally relevant type of talk. The conversationalists build both critically and constructively on what the other party has said, thus offering suggestions and statements for joint consideration. Arguments and counterarguments are justified, and alternative solutions and perspectives are offered.

Fisher claims that *exploratory talk* has a learning potential which the two other types of talk do not share. Based on studies on pair work and computer-based problem-solving, Light et al. (1994) forward the same claim, since in these studies language was used to make plans explicit, to make decisions and to interpret feedback, which are characteristics closely connected to exploratory talk and operations which seem to further problem-solving and understanding. The same claim is proposed by Mercer, who suggested the term *exploratory talk* for this type of talk emerging from naturalistic classroom studies of collaborative learning with computers (1994, 1995). However, exploratory talk has been difficult to find in studies of young children's interaction with, in front of and via the computer (Alant et al. 2003).

For the present study, Wells and Arauz's action research project, in which teachers attempted to create conditions for dialogue by adopting an inquiry approach to the curriculum (Wells and Arauz 2006), is of methodological interest.

The potential of tablet computers in kindergarten

The iPad is interesting for exploratory studies like ours in kindergartens for a number of reasons. We will first discuss these in relation to the tablet computer itself, and then in relation to the two selected apps we used.

Portability of the tablet computers allows the children and practitioners to take advantage of various locations in the kindergarten, such as on the floor, at tables and on sofas, etc. These locations invite various formations of peer groups and involve a highly flexible use situation influenced by the children. The tablets' shared display and an appropriate sound level from the apps are obviously important for the dialogue around the tablet, and this is the main focus for our analysis in this paper. The shared display also plays a role for adult intervention and guidance as they show status and interactions. The tablets' multitouch interaction allows for sophisticated single-user interaction, but also allows two children to mutually interact with an app.

We also experimented with a projected large display for the full group. This display could be connected to the tablet computer, thus making it possible to act on the tablet and to display individual activities on the larger display for the full group.

The interaction between the two types of displays and interactions promote cooperation and joint activities between the child controlling the tablet and the "audience", and the co-narrators and co-operators benched in front of the projected display. The "audience" is eager to suggest where to tap and see how the fairy tale develops.

In the present study, we investigate the use of iPads in a learning environment, with apps that can be described as having an educational goal, by training vocabulary and fairy tale production, thus strengthening the child's literacy and language learning. We selected two apps which we believed could shed light on our research questions when we used them for language learning: *Se og si (See and Say)* and *Puppet Pals.*

See and Say is a simple app, requesting the child to find images in a detail-rich picture and thereafter providing positive feedback. Its behaviouristic stimulus-response structure is not cognitively challenging, although the children are perceptually challenged due to the overloaded visual information in the picture. However, some children only master tasks at this level, and for these children apps like these are appropriate. Besides, they can contribute to the children?s vocabulary acquisition, which is a crucial factor in learning to read and write (Snow et al. 1998). All the children in the study were busy with the app, and apparently found it engaging.

Puppet Pals is an "open" and constructivist app, challenging the children creatively and narratively. The children in the study produced narrative universes, scaffolded by the preschool teacher, who suggested typical fairy tale elements like the contrast between the kind and the cruel, the kissing between the princess and the dragon, and the possibly converted prince.

In *Puppet Pals* all the children discovered an activity which was soon established as their favourite activity, namely the possibility for manipulating the images into tiny or huge ones, even so huge that the whole screen was covered by the cloth of the image?s dress.

Digital activities like those in *Puppet Pals* can help children to start the process of building more sophisticated structures in their second language. Socio-dramatic play is an area of the classroom where children use their discourse skills to the greatest extent, and second-language learners more seldom participate in play in this area at the same age as first-language learners do (Tabors 2008). To take active roles in the storytelling is more exciting and affirming for the children, and the joint activity with *Puppet Pals* on the large shared display nourishes these characteristics of the interaction.

In multicultural kindergartens it is important for preschool teachers who are aware of second-language learners' proficiencies and their need to develop higher-level skills, like narration, negotiation problem-solving, and reasoning. For this purpose, apps like *Puppet Pals* are of great value.

As the technology is highly portable, learning can take place in a variety of daily activities in the kindergarten, in formal as well as informal contexts, indoor as well as outdoor. From a pedagogical perspective, it is interesting to see how the use of iPads can relate to six different perspectives on learning (Naismith et al. 2004), which can all be related to digital learning in the kindergarten: behaviourist, constructivist, situated, collaborative, informal/lifelong and support/coordination. Seeing the use of iPad apps from a behaviourist perspective, the apps provide quick and immediate feedback or reinforcement elements, be it a confirmation of the correctness of the answer or just a response to a terminated action. This is typical of *See and Say*. From a constructivist perspective, some apps enable immersive experiences such as those provided by mobile investigations or games, and *Puppet Pals* can serve as an example here. From a situated perspective, learners can bring a portable device out of one context, or use it while moving around a context-aware environment in a specially equipped location such as a museum, or use it on a trip to the forest, thus taking pictures, recording sound or making a movie. From a collaborative learning perspective, portable and shared devices provide a handy additional means of communication and a portable means of electronic information sharing. While the children explore and use the apps in the kindergarten, they collaborate, discuss, explore and express joy and frustration, and even quarrel. The fairy tales they create in *Puppet Pals* can be recorded and shown to the group. From an informal and lifelong learning perspective, it is a general notion that mobile devices accompany their users in their everyday experiences and represent a convenient source of information or means of communication that assists with learning, or records it on the go for future consultation. This perspective can be applied to kindergarten trips and excursions, when utilizing the potential of using mobile devices to take photos, make recordings and make notes and drawings that can be made the subjects of further investigation later on. From a support or coordination perspective, portable devices are available at all times and everywhere, and can be used for activities engaged in by preschool teachers at numerous times during a day in the kindergarten, for example checking the Internet, monitoring attendance or progress, taking notes while documenting children's development, applying resources like apps and other digital learning resources, and many more.

However, a literature review can serve as criticism of the general positive view on mobile technology presented above: Kinash et al. (2011) have a critical perspective on the link between the two words *mobile* and *learning*. In a literature study they make numerous claims that there is a pedagogical link between the words. Yet there does not seem to be any robust empirical evidence to show that this

assumption was tested. Further investigation is needed, and hopefully the present study can serve as an inspiration.

Assessment of apps for language learning

Children working with technology in teacher-led activities or in peer groups can constitute a powerful type of learning, particularly in respect of additional language and social skills development (McManis and Gunnewig 2012). As pointed out by these researchers, when children use technology, teachers tend to pay less attention to interacting with the children in order to strengthen positive learning and increase children's knowledge. To achieve this goal, teachers must ensure that active engagement, group participation, interactivity and feedback, and connecting technology to real-world contexts, are present elements while using technology for learning. This can be done by scaffolding the children's use of technology.

Based on a toolkit (McManis and Parks 2011), McManis and Gunnewig (2012) list a set of questions to be asked when assessing software programs that have the potential to strongly impact children's learning experiences: the educational value of a program, its ability to engage a child in learning, its child-friendliness, the interactivity between child and program and the software program's ability to monitor a child's progress. More detailed, they ask whether the software follows a correct developmental course and effective teaching paths, whether activities are presented in a playlike fashion, whether rewards are used appropriately, whether there are multiple opportunities for success and whether the children can use the software independently and proceed with minimal assistance.

Data and methodology

The videotaped data is drawn from one multicultural kindergarten in a suburban area in Oslo. Four of the five children participating in the study are bilingual, aged 5 years, and thus school starters half a year after this study. According to the practitioner's reflections on the children's first and second language competences, they are well functioning and good, although she describes them as being stronger in their first than in their second language, and with weaker vocabulary and discourse skills than their peers with Norwegian as their first language.

While introducing the iPads to the group of children, four of the children report that they have never used an iPad, although a number of them have seen them in use. One child (Embla) reports that she has experience in using one. Interactions with this child are interesting on the background of her digital skills, and how she will display them in the group.

The empirical data consists of video documentation of children working in pairs on their iPads, in interaction with the preschool teacher, and the same preschool teacher's management of a group of children in front of the large shared display. Excerpts from the video recordings are transcribed, and they are selected on the background of an interest in how the preschool teacher interacts when she is sitting by a child who is investigating an unfamiliar app. Two sequences are selected on this basis, where the same child is familiarising herself with a "behaviourist" app and a "constructivist" app (see characteristics above). The third sequence is selected because it represents another context: the "constructivist" (and most demanding) app has now become familiar to the group of children, and as such the children are more able to display their discourse skills. In addition, another element is introduced: a large shared display on one of the walls in the kindergarten. This is made possible

by connecting the iPad to the large display, thus outweighing the constraints inherent in the small screen of the iPad, and opening up for a common focus and joint activities inherent in the opportunities a larger display offers. The preschool teacher's interaction is also the focus of the third excerpt.

Finally, a basic assumption for the study is that knowledge and action are social phenomena, situated in the settings in which they occur (Vygotsky 1962, Bruner 1986, Wertsch1991, Rogoff 1990). In the transcriptions below, both verbal and non-verbal actions are included, as well as activities on the screen.

Analysis of interactions

In the present article we will apply an adapted version of a coding procedure drawn from Wells and Arauz (2006). The analytical unit is first an episode of discourse, which is defined as a stretch of talk in which the topic and the participant structure continues essentially unchanged. At this level important descriptive categories are the curricular activity involved, the participant structure and the role that the discourse plays in relation to the curricular unit in question, a level that can be further described by relating to Halliday's three dimensions of register: field, tenor and mode (1975).

At the next two levels, those of sequence and its constituent exchanges, the analytical questions are who initiated the sequence and the function of the discourse move performed by this initiator. Discourse moves can have a variety of functions, for example questions (requests for information, control questions and suggestions, etc.), explanations and emotional outbursts, etc. Further, the teacher's follow-up moves and the functions that they perform, are analysed. The length and complexity of student moves is also a relevant issue to examine.

Transcript 1

Embla has no previous experience with the application *See and Say*. In the transcript below she has understood the intention of the application and has chosen the theme *harvest*. She is sitting with the preschool teacher, and in front of them another pair of children is occupied with the same application:

iPad:	can you find the anthill?
Embla:	(taps the anthill)
iPad:	great!
Nashaad:	(sitting at the other side of the table) we also have that! (refers to the theme)
iPad:	do you see the chanterelles?
Embla:	(searches in the picture for the chanterelles)
Preschool t:	(searches in the picture for the chanterelles)
Preschool t:	strange . . hm . . we cannot find the chanterelles
Embla:	(taps the icon of the moose named Elly, which is in all the pictures/topics, and which is never requested from the app)
iPad:	there, you found Elly!

Nashaad:	(is leaning over the table) Elly!
iPad:	can you find the napkin with blue squares? (Embla has left "harvest" and proceeded to "the backyard party")
Nashaad:	we have the same game! (leans over the table watching Embla's iPad)
Preschool t:	we have to search carefully
Embla:	here it is!
iPad:	where is the mustard?
Embla:	(sliding her finger across the board without touching, searching for the mustard on the ground)
Preschool t:	perhaps it is on the table?
Somaan:	we too ((= search for the mustard))
Embla:	I found it! (directed to the other group) you have to look by the grill …where they are grilling the sausages…where the chef is
Nashaad:	yes! yes! (taps the mustard)

In this extract the preschool teacher is closely following one child, Embla, letting her decide the tempo and the navigation in the application, which is intended to stimulate the children's vocabulary. When Embla does not find the chanterelles and moves to another site, the preschool teacher does not pursue her to continue searching for the item and the vocabulary training for this theme comes to an end, and a new theme is opened, with the potential for learning another vocabulary. The preschool teacher's moves "strange . . hm . . we cannot find the chanterelles" and "we have to search carefully" can be characterised as statements displaying wonder and patient advice on how to continue to look. The preschool teacher's use of "we" indicates that she is involved in the activity and that she is sharing the child's wish to find the item. Her next move, the question "perhaps it is on the table?" is more like open advice on where to search for the mustard, on the background of where a glass of mustard is likely to be placed, but this is not where the mustard actually *is*, it is next to the grill, which tells us that the preschool teacher is actually involved in the searching herself, and that she is thinking aloud when she is suggests searching on the table. Her way of acting is far from the typical teacher-led instructions often found in educational settings, the IRF-structure, which requires active and dynamic question-asking teacher. This teacher is more withdrawn and aware of the child's investigation.

This excerpt also shows how the children, sitting at the same table, and being able to monitor the activities on the other side of the table, are able to multitask.

Transcript 2

Embla is sitting with the preschool teacher, and she has been busy with *Puppet Pals* for a short while, thus having discovered its purpose and how it works. Now she is concerned with choosing actors to be included in the fairy tale. From the personal gallery, she can choose from a fairy, a princess, a knight, a dragon, a witch, a squirrel and a raven, which she can place in the landscape where the story will unfold, and she has chosen a forest landscape.

Embla:	the fairy, the squirrel, the princess, the witch, the prince (tapping the actors, then manipulating them into a bigger size)
Preschool t:	you haven't tried the squirrel
Embla:	(making it huge) but the squirrel is so huge!
Preschool t:	yes . but you can make it very tiny (shows with her thumb and index finger that it is possible to shrink and blow up the actors)
Embla:	the fairy then? perhaps the fairy and the squirrel? the witch? I want her . I want to have more . . all!
Preschool t:	all of them?
Embla:	yeaaaaah
Preschool t:	press "next" then
Embla:	(selects the forest as a background)
Preschool t:	out in the forest yes . . a scary forest (pretending voice)
Embla:	(moves the fairy up and down in front of the squirrel) these two belong together . "hello . we belong together" (dramatic play voice)
Preschool t:	imagine you had met such a large squirrel then! @
Embla:	(lets the fairy dance in front of the squirrel, makes the fairy tiny repeatedly, thereafter the squirrel is made tiny)
Preschool t:	no . but watch! so small! tiny . tiny . so tiny! @
Embla:	(tries to make the squirrel bigger, but does not succeed)
Preschool t:	have you shrunk it so much that it is not excessive @ . . . shall I help you? (tries to blow it up, but does not succeed) I cannot do it@
Embla:	(manages to blow the squirrel up) yes I managed (makes it tiny again) "you cannot see me . you cannot see me ." @@@ (moves the squirrel and fairy in a circle, before she changes the actors)
Preschool t:	is it night?
Embla:	(includes the princess and the crow) the princess and the crow
Preschool t:	are the two going for a walk in the woods then?
Embla:	num num (lets the princess kiss the crow)
Preschool t:	@@@
Embla:	(includes the) the witch
Preschool t:	are those lovers too?
Embla:	the dragon
Preschool t:	are all in love? that's nice!

In this excerpt the preschool teacher and Embla are in their initial phase of investigating how the application works. The preschool teacher draws upon her experience with the fairy tale as a genre, but apart from that, she is also unfamiliar with how the application works. The curriculum for kindergarten emphasizes that children should gain experience with different genres (Kunnskapsdepartementet 2011: 40), and this application is suitable for this purpose. The excerpt can be characterised as being humorous with lots of laughter from both participants. The preschool teacher's moves vary from mild advice or directives ("you haven't tried the squirrel") to enthusiastic

statements showing that she supports and provides input to the child's narrative ("out in the forest
yes . . a scary forest", "is it night?", "are the two going for a walk in the woods then?", "are those
lovers too?", and "are all in love? that's nice!"). She is also playful and makes connections between
the imaginary world of the application and real life experiences ("imagine you had met such a large
squirrel then! @").

In the last episode, the iPad is connected to the large shared display, thus making it possible to act
on the tablet and to show individual activities on the larger display for the full group. At this point,
all the children in the group have understood the intention of *Puppet Pals,* and have become more
or less familiar with how it works. The application is activated, and the first child starts.

The role of the preschool teacher in this joint activity is mostly to support the children in building
a narrative framework, and to help them participate in socio-dramatic play by giving the images lines
to say in the play. When Nashaad is selecting the princess, the preschool teacher mediates and
scaffolds her fairy tale by saying: "What does the princess say?" This question cannot be compared
to the teacher's initiative in the IRF-structure, where the teacher normally asks control questions.
This question encourages Nashaad to produce verbal actions in addition to her physical actions on
the screen.

The interaction between the two types of technology promote cooperation and joint activities
between the child controlling the iPad and the "audience", and the co-narrators and co-operators
benched in front of the large shared display. The "audience" is eager to suggest where to tap and
how the fairy tale develops. When Hadi is in charge of the iPad, he includes the prince in front of
the castle, where Nashaad has already placed the princess, and then he makes him tiny. Embla, who
has gained advanced competence, is eager to suggest and influence Hadi's actions. But first the
preschool teacher reminds them to talk, not just to operate the iPad physically:

Transcript 3

Preschool t:	don't forget to talk
Embla:	press the castle… next…press the castle . . . the prince is so small that they can eat him!
All:	@@@@
Embla:	no . it's impossible @
Hadi:	they are cruel
Preschool t:	who are cruel?
Hadi:	the green one
Preschool t:	who is that?
Hadi:	the dragon (moves one hand back and forth against the board as if he is fighting, thereafter he turns the prince and the princess into small images, keeping the dragon huge)
Embla:	the witch in *Rapunzel*
Preschool t:	now everyone became small except the dragon …perhaps the dragon is a prince in love?
Nashaad:	all will be lovers here!
Soman:	perhaps the princess is all alone

In this whole-group situation, the preschool teacher shows that she requires both verbal actions ("don't forget to talk") and explicit references to what the children might mean when they refer to actors in the fairy tale ("they", "the green one"), and then she asks questions in order to secure the collective understanding of what Hadi intends to say ("who are cruel?" and "who is that?"). Further, she is supporting Hadi's narrative, by suggesting dynamic elements: "perhaps the dragon is a prince in love?"

Conclusion and further research

We asked what role tablet computers might play in orchestrated language learning in kindergartens. A search through the data for this preschool teacher, represented by the three transcripts presented above, enables us to see that her way of meeting the children and taking their perspective is a common technique in her repertoire. She is not practicing the IRF-structure, often found in classroom talk, rather she both guides the children in finding images in the picture by providing contextual clues drawn from background knowledge about the world, and she is enthusiastically commenting on the children's exploration, thus bringing herself into the activity almost on equal terms with the child. From the children's responses to this kind of adult-led activity in groups and in plenary, we can claim that they benefit from it, on the basis of their verbal and non-verbal actions. The children utilise the preschool teacher's assistance, both when searching for items in *See and Say*, and in particular when they are expected to produce fairy tale narratives, with genre typical elements and verbal lines expressed as the dramatic play evolves. The preschool teacher is actively taking part in these activities, thus scaffolding both their understanding of vocabulary and their genre competences.

The preschool teacher pays attention to each child's active engagement, their group participation and their previous knowledge of the world, and she practices a kind of guided participation, which we can see is productive on behalf of the children's positive engagement, their verbal activity, their will to cooperate with both the teacher and with their peers, their verbal and non-verbal responses,

and their ability to pick up elements from the real-world contexts and connect it to the technology. These characteristics of the interaction between the preschool teacher and the children are requirements for characterising the interaction as a scaffold for the children's use of technology (McManis and Gunnewig 2012).

From the data we can see that the children's smooth turn-taking in controlling the tablet is strengthened by the device's portability and shared display. It is easy for them to cooperate, easy to participate and easy to share. This is in line with other studies on how children organise and establish rules for digital control themselves (Alant et al. 2003).

We also asked what properties and affordances need to be assessed when selecting apps for language learning. The preschool teacher selects the apps on the basis of their educational content and their inherent perspective on learning. The organizational framework is explicit, and groups of children are put together by the preschool teacher. The children will have the opportunity to work in pairs and in joint plenary activities. The preschool teacher directs the young students' use of technology during the class, and scaffolds the children when needed.

From the data we can see that the children are able to transfer their experiences with fairy tales from home or kindergarten situations to the production of a narrative in a digital context, which is the aim of *Puppet Pals*. This transfer of resources is an important aspect in literacy (Østerud et al 2012).

In contrast to what Plowman et al. (2010) and Plowman and Stephen (2005) reported, in this study peer support was extensive, and the children helped each other both in pair work and in the full group activity, and while doing this their communication was verbal in contrast to the non-verbal support registered at times by Plowman et al.. Other studies conducted in early childhood classrooms report that children interact with peers when using computers. They share and help one another, ask for and provide information and explanations, and collaborate to solve problems (Heft and Swaminathan 2002, Wang and Ching 2003).

Digital tools, such as iPads and educational apps, in the kindergarten classroom can provide opportunities for children to engage in useful and purposeful first and second-language and literacy interactions with sensitive interlocutors, both adults and peers. Further research is needed, and it is important to focus on how to design technology for emergent literacy, in both the children's first and second languages.

Transcription notation

@	indicates laughter
.	indicates a pause of one second
..	indicates a pause of two seconds
…	indicates a pause of three seconds
!	indicates emphasis
?	indicates question intonation

References

Alant, L., Engan, B., Otnes, H., Sandvik, M., & Schwebs, T. (2003). *Samhandling med, foran og via skjermen. Småskoleleven på vei mot digital kompetanse.* ITU-rapport nr. 18, 2003. Forsknings- og kompetansenettverk for IT i utdanning, Universitetet i Oslo. Oslo: Unipub http://www.itu.no/filearchive/fil_ITU_Rapport_18.pdf

Bae, B. (1992). Relasjon som vågestykke – læring om seg selv og andre, i B. Bae & J.E. Waastad (red). *Erkjennelse og anerkjennelse – perspektiv på relasjoner*, s. 33-60, Oslo: Universitetsforlaget

Bae, B. (2004). *Dialoger mellom førskolelærer og barn - en beskrivende og fortolkende studie.* Avhandling til graden Dr. Philos, Det utdanningsvitenskapelige fakultetet, Universitetet i Oslo.(Høgskolen i Oslo, HIO rapport nr. 25, 2004)

Barton, D. (2007). *Literacy: an introduction to the ecology of written language.* Malden, Mass.: Blackwell Pub.

Bruner, J. S. (1 98 6) *Actual Minds, Possible Worlds.* London: Harvard University Press.

Chiong, C., and Shuler C. (2010). "Learning: Is There an App for That? Investigations of Young Children's Usage and Learning with Mobile Devices and Apps." New York: The Joan Ganz Cooney Center at Sesame Workshop.

http://pbskids.org/read/files/cooney_learning_apps.pdf

Cole, M. (1996). *Cultural psychology: A once and future discipline.* Cambridge, MA: The Bellknap Press of Harvard University Press.

Fisher, E. (1993) Distinctive features of pupil-pupil talk and their relationship to learning. *Language and Education* 7 (4): 239-258

Gibbons, P. (2002). *Scaffolding language, scaffolding learning.* Portsmouth, NH: Heinemann.

Guðmundsdóttir, G.B. and Hardersen, B. (2012). Småbarns digitale univers. 0–6-åringers tilgang til og bruk av digitale enheter på fritiden. Panelundersøkelse utført høsten 2011. (*Toddlers' digital universe. 0-6-year-olds' access to and use of digital devices in their spare time. Panel Survey conducted in 2011)*, Tromsø: The Norwegian Centre for ICT in Education

Halliday, M.A.K. (1970). Functional Diversity in Language as seen from a Consideration of Modality and Mood in English. Foundations of Language: *International Journal of Language and Philosophy*, 6, pp 322-61

Halliday, M.A.K. (1975). *Learning to mean.* London: Arnold.

Heath, S.B. (1983). *Ways with words.* Cambridge, England: Cambridge University Press.

Heft, T.M. and Swaminathan, S. 2002. "The Effects of Computers on the Social Behavior of Preschoolers." *Journal of Research in Childhood Education* 16 (2): 162–74.

Hutchison, A. and Reinking, D. (2011). Teachers' Perceptions of Integrating Information and Communication Technologies into Literacy Instruction: A national Survey in the U.S. *Reading Research Quarterly*, 46 (4), 308-329.

Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (In Press). Exploring the use of the iPad for literacy learning. *The Reading Teacher.*

Kinash, S., Brand, J., Trishita, M., & Kordyban, R. (2011). "Uncoupling mobility and learning: When one does not guarantee the other". *Teaching and learning papers.* Paper 25. http:// epublications.bond.edu.au/tls/25 (read 7.06.2012).

Kunnskapsdepartementet (2011). *Rammeplan for barnehagens innhold og oppgaver.* Oslo: Kunnskapsdepartementet.

Lemke, J.L. (1990). *Talking science: Language, learning, and values.* Norwood, NJ: Ablex.

Light, P. et al. (1994) Social and communicative processes in computer-based problem solving. *European Journal of Psychology and Education,* 2: 93-109.

McManis, L. and Gunnewig (2012). Finding the Education in Educational Technology with Early Learners. Young Children. National Association for the Education of Young Children. See Permissions and Reprints online at www.naeyc.org/yc/permissions.

Mehan, H. (1979). *Learning lessons: Social organization in the classroom.* Cambridge, MA: Harvard University Press.

Naismith, L., Lonsdale, P., Vavoula, G. and Sharples, M. (2004) Literature Review in Mobile Technologies and Learning. NESTA Futurelab Series, Report 11. [Internet] Available from: http:// www.futurelab.org.uk/research/lit_reviews.htm (read 7.06.2012).

Nir-Gal, O., and Klein, P.S. (2004). Computers for Cognitive Development in Early Childhood— The Teacher's Role in the Computer Learning Environment. *Information Technology in Childhood Education Annual, 2004*, 97–119.

Nystrand, M. (1997). *Opening dialogue: Understanding the dynamics of language and learning in the English classroom.* New York: Teacher College Press.

Palludan, C. (2007). Two Tones: The core of inequality in kindergarten. *International Journal of Early Childhood*, Vol. 39, No. 1, 2007, pp. 75-91.

Penuel, W.R., S. Pasnik, Bates, L., Townsend, E., Gallagher, L.P., Llorente, C. and Hupert, N. (2009). *Preschool Teachers Can Use a Media-Rich Curriculum to Prepare Low-Income Children for School Success: Results of a Randomized Controlled Trial.* New York: Education Development Center; Menlo Park, CA: SRI International www.cct.edc.org/rtl/pdf/RTLEvalReport.pdf (read 6.08.12))

Plowman, L., & Stephen, C. (2007). Guided interaction in pre-school settings. *Journal of Computer Assisted Learning, 23*(1), 14–26. doi:10.1111/j.1365-2729.2007.00194.x

Plowman, L. and Stephen, C. (2005). Children, play, and computers in preschool education. *British Journal of Educational Technology*, 36, 145–158.

Plowman, L., Stephen, C., and McPake, J. (2010). Supporting young children's learning with technology at home and in preschool. *Research Papers in Education*, 25(1), 93-113. doi: 10.1080/02671520802584061

Primavera, J., P.P. Wiederlight, & T.M. DiGiacomo. 2001. Technology Access for Low-Income Preschoolers: Bridging the Digital Divide. Paper presented at the American Psychological Association Annual Meeting, in San Francisco. www.knowledgeadventure.com/jumpstartworld/_docs/ChildTechnology_White_Paper.pdf (read 6.08.12)

Rogoff, B. (1990). *Apprenticeship in Thinking*. Oxford: Oxford University Press.

Rogoff, B., Mistry J., Goncu A. & Mosier C. (1993). Guided participation in cultural activity by toddlers and caregivers. *Monographs of the Society for Research in Child Development* 58 (Serial No. 236).

Sandvik, M. (2009). Digitale læringsressurser – nye tekster, arbeidsmåter og muligheter. I: Østerud, S. (red.): *Enter. Veien mot en IKT-didaktikk*. Gyldendal Akademisk

Snow, C.E., Burns, S. & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. National Academy Press: Washington, DC.

Svestad, P.J. (2012). Bedre læringsutbytte med bruk av interaktive tavler – eller? *Psykologi i kommunen* nr. 2, 2012.

Tabors, P.O. (2008). *One child, two languages: a guide for early childhood educators of children learning English as a second language, Vol 1, 2nd ed.* Baltimore: Paul H. Brookes publishing.

Tharp, R., & Gallimore, R. (1988). *Rousing minds to life*. New York: Cambridge University Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University press.

Vygotsky, L.S. (1962). *Thought and Language*. Cambridge, Mass.: MIT Press.

Wang, X.C. and Ching, C.C. 2003. "Social Construction of Computer Experience in a First-Grade Classroom: Social Processes and Mediating Artifacts." *Early Education and Development* 14 (3): 335–61.

Wells, G. (1999). *Dialogic inquiry: Towards a sociocultural practice and theory of education*. Cambridge, England: Cambridge University Press.

Wells, G. and Arauz, R.M. (2006). Dialogue in the Classroom. *The Journal of the Learning Sciences,* 15(3), 379–428. Lawrence Erlbaum Associates, Inc.

Wegerif, R. and Mercer, N. (1996) Computers and reasoning through talk in the classroom. *Language and Education* 10 (1): 47-64.

Wertsch, J. (1991) *Voices of the Mind: a socio-cultural approach to mediated action.* Cambridge, Mass.: Harvard University Press.

Wood, D. J. (1992). Teaching talk. In K. Norman (Ed.), *Thinking voices: The work of the National Oracy Project* (pp. 203–214). London: Hodder and Stoughton for the National Curriculum Council.

Wood, D. J., Bruner, J.S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychiatry and Psychology,* 17(2), 89-100.

Østerud, S., Gentikow, B., & Skogseth, E.G. (eds.) (2012). *Literacy Practices in Late Modernity: Mastering Technological and Cultural Convergences.* New York: Hampton Press.

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1   The three types of talk referenced here were originally described in the so-called SLANT project (Spoken Language And New Technologies).