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The role of the medium for verbal engagement: shared reading in groups with books and apps in Norwegian ECEC-institutions

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ABSTRACT

This article presents findings from a study carried out with groups of children ($N = 72$; $M = 57.2$ months) in early childhood education and care (ECEC) institutions in Norway. Twelve teachers read two stories, once in a print book format and once in a picture book app, with groups of children. Children's and teachers' verbal engagement was coded for dialogue length (duration) and topic (frequency; utterance about medium or narrative/content). Findings revealed that average dialogue length does not vary as an effect of medium. However, there are significantly more utterances about the medium in app readings than in book readings. Moreover, apps that are high in interactivity and hot spots, generate more talk about the medium than low-interactivity apps. Implications of these findings for shared reading with groups of children in kindergarten settings, are discussed.

KEYWORDS

Shared reading; kindergarten; picture books; tablets; verbal engagement

Introduction

This article presents findings from a study carried out with groups of 4- and 5-year olds in early childhood education and care (ECEC) institutions in Norway, comparing shared dialogue-based reading (henceforth, SDBR) with either a print picture book or a *picture book app*. Typically studied in dyads with an adult reading with one child, SDBR is found to nurture the development of children's language skills, in particular, vocabulary (Takacs, Swart, and Bus 2015). The picture book, hence, plays a significant role in scaffolding children's cognitive skills. Less is known about the potential contributions of tablet technologies, such as iPads, in this sense. Over the past decade, there has been a growing interest in, and development of, picture book apps, which combine images, music, movies and sound with interactivity. In contrast, a print book combines texts and illustrations/graphic elements in a fixed configuration. The haptics entailed in pageturning and pointing differ in books and apps (e.g. Al-Yaqout and Nikolajva 2015;

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Merchant 2015, 2017), inviting a number of medium-related research questions. This article presents findings from a study where teachers read the same stories in a book and on an iPad with groups of children. We assessed the influence of medium on the children's and teachers' dialogue. The emphasis is on children's language learning as scaffolded in the social context of rich dialogues and *extended discourse* (see e.g. Hansen and Alvestad 2018).

Shared dialogue-based reading

As an activity for stimulating children's verbal skills, SDBR is unequalled. Numerous studies demonstrate how SDBR nurtures the development of children's language skills and emergent literacy (see e.g. Farrant and Zubrick 2012; Frijters, Barron, and Brunello 2000; Robbins and Ehri 1994; Sénéchal et al. 2008; Weigel, Martin, and Bennett 2006; see Bus, Van Ijzendoorn, and Pellegrini 1995 and Mol et al. 2008, for meta-analyses). The joint attention and the pointing to words and images accompanied by (potentially) rich verbal interaction make the picture book a treasure trove, promoting children's imagination and language development. SDBR as an evidence-based approach were first systematically reported in an intervention by Whitehurst and colleagues (1988). In SDBR, the adult encourages and supports children's language development by inviting them to engage in rich verbal engagement around the story (Burger 2015). In particular, an objective is to facilitate children's use of a decentered language, with the book and the story as prompts. Whereas the traditional print book format is consistently found to foster the kind of rich dialogues that help scaffold children's language skills, the potential of picture book apps to such outcomes is less clear, and research findings are inconsistent. Our study is situated in a sociocultural understanding of children's language learning, with the core theoretical perspective that children learn and develop their language skills through participation in social activities, such as SDBR (see e.g. Dickinson and Morse 2019).

Print and digital reading medium

Tablets (e.g. iPads) differ from print books in a number of ways. A tablet seamlessly integrates static and dynamic modalities, combining images, music, movies and sound, with options for interactivity in myriad ways. In contrast, a print book displays a combination of texts and illustrations or graphic elements in a fixed configuration.

A meta-analysis (Takacs, Swart, and Bus 2014) found that multimedia stories with optimally designed features such as animated illustrations, background music and sound, are better scaffolds for children's narrative comprehension and word learning than print counterparts without adult instruction. However, they did not find significant differences between learning outcomes when comparing the reading of multimedia stories with the reading of print with an adult (Takacs, Swart, and Bus 2014). As observed by Bus and colleagues (2019), there is evidence that multimedia enhancements may be particularly helpful for children with a genetic disposition for being distracted, in that the pronounced sensory stimulation in e-books make them less vulnerable for environmental stimuli.

Another meta-analysis (Takacs, Swart, and Bus 2015) and two reviews (Bus, Takacs, and Kegel 2015; Reich, Yau, and Warschauer 2016) reveal that interactive features that are not related to the story, are distracting and detrimental to learning. These findings echo those found in an earlier meta-analysis (Zucker, Moody, and McKenna 2009). However, Etta and Kirkorian (2018) found that neither relevant nor irrelevant features had any impact on children's understanding. Multimedia features like animations and sound effects that were well-integrated and congruent with the narrative, supported children's story comprehension and word learning (Bus, Takacs, and Kegel 2015; Reich, Yau, and Warschauer 2016). However, the joint attention by child and adult towards the pictures and written text is crucial (Mol et al. 2008).

The role of the adult in SDBR

Navigating through a maze of animations, sounds and game-like options places a heavy burden on children's executive functions, such as the ability to stay goal-directed, regulate their attention, and curtail distractions – at a time in life when these are only developing (Barzillai, Thomson, and Mangen 2017; Garon, Bryson, and Smith 2008; Meltzer 2011). This highlights the importance of a participating adult in the reading session. A number of studies on parent–child dyad reading has found an advantage of print books over their digital counterparts, for fostering rich verbal exchanges (e.g. Krcmar and Cingel 2014; Lauricella, Barr, and Calvert 2014; Parish-Morris et al. 2013; Richter and Courage 2017). When reading the print book, parents are seen to engage in the most enriching talk, including discussions around word meanings and connections to personal experience. Conversely, although children tend to be more engaged in the digital reading conditions, the dialogue during screen reading often pertain to the mechanics of the medium (e.g. 'Click there!') rather than the story (Krcmar and Cingel 2014; Lauricella, Barr, and Calvert 2014; Parish-Morris et al. 2013; Richter and Courage 2017). It is important to note, however, that talk about the mechanics of the medium is not by default less verbally enriching than talk about the story (see e.g. Neumann and Neumann 2014). What is important in SDBR with children irrespective of medium, is to have the children engage in rich, extended discourses that foster their use of decentered language by drawing on their own repertoire of experiences and also conjecture about future possible scenarios.

By comparing SDBR with print picture books and apps, the aim of the present study is to assess if the medium affect verbal engagement during reading. Moreover, we aim to explore the role of the medium in SDBR as a *group* activity rather than as dyadic reading, the latter being more common in research (for an exception, see Hargrave and Sénéchal 2000). To better reflect the typical situation for shared reading in kindergartens in Norway, the reading sessions are carried out with groups of (up to) six children. The following research questions drive our study:

- What are the differences between SDBR with print picture books and picture book apps regarding length, topic of, and participation in the dialogue?
- How does the length, topic of, and participation in the dialogue differ between high- and low-interactivity picture book apps?

Hypotheses:

- (1). The four titles used in the intervention were published as printed picture books before they were remediated to picture book apps. For this reason, we do not expect dialogue length to differ between media.
- (2). In print book reading sessions, we expect less dialogue about the medium and more dialogue about the narrative than in picture book app reading sessions.
- (3). We expect both teachers and children to talk more about the medium and less about the narrative in picture book app readings than in print book readings.
- (4). As high-interactivity picture book apps feature more effects than their low-interactivity counterparts do, we expect there to be less dialogue in high-interactivity compared to low-interactivity picture book apps.
- (5). In high-interactivity apps, we expect more dialogue about the medium and less dialogue about the narrative by both children and teachers than in low-interactivity apps.
- (6). In comparing up to six children to one teacher per group, we expect children to generally talk more about the medium and the narrative than teachers do, both in high- and low-interactivity picture book apps.

Methods and description of data material

The quantitative study presented here is part of the mixed-methods project VEBB (see Mangen et al. 2019 for the study protocol). The intervention took place in six Norwegian ECEC institutions, where kindergarten teachers ($N_{\text{total}} = 12$)¹ and children ($N_{\text{total}} = 72$) participated. The study was approved by the Norwegian Centre for Research Data (NSD; a government-owned agency responsible for managing data for Norwegian research communities) and is handled in line with national guidelines for research ethics of informed parental and child consent, anonymity, safety and information on how the results will be used, also according to EECERA's ethical advice. All children were informed by the teachers that participation in the project was voluntary and that they could quit at any time if they wanted to. They were also asked before each reading session whether they wanted to participate or not. Prior to the data collection, all teachers participated in a workshop on SDBR. To reduce a potential novelty effect, the teachers were given iPads to use in SDBR over six months, with access to backlisted apps that were not used in the video recorded reading sessions. The teachers then designed, carried out and videotaped the reading sessions of two books in both print and digital format with groups of six children ($N_{\text{total}} = 72$; $M_{\text{age}} = 57.2$ months). The four books and corresponding apps were only made available once the data collection started, to ensure the selected titles were not already familiar.

To enable comparisons across the reading sessions, groups were kept intact.² All reading sessions ($N = 48$; 24 app readings, 24 book readings) resulted in video material with a total duration of 18 h 47 min, and an average film length of $M = 23$ min 29 s ($SD = 9$ min 42 s; min = 5 min 18 s; max = 55 min 52 s). However, this varies considerably, with some readings having no dialogue at all, while others spending close to 90% of the total time on dialogue. A possible explanation for this variation is the effect of

the teacher's pedagogical choices in both planning and executing the reading situation, which must be understood both in relation to the reading context and the medium (Tønnessen and Hoel 2019).

Four titles were selected for the intervention: *Yesper & Noper* (Stai, 2008), *How did it go?* (Jansson, 2017), *A fish for Luna* (Aisato, 2014) and *The seed* (Bråten & Markhus, 2013). The apps differ in their degree of interactivity: Both *Yesper & Noper* and *How did it go?* apps have numerous hot spots prompting audiovisual effects when clicked on. We define these apps as high-interactivity apps. In contrast, the low-interactivity apps, *A fish for Luna* and *The seed*, are more direct remediations of their print book counterparts. There are no hot spots, and the apps are enriched with subtle animations and music. Within three weeks, these texts were read once in the print version and once in the app version. Half of the groups read the high-interactivity picture book apps, the other half read the low-interactivity picture book apps (see Mangen et al. 2019 for details).

The video data coding scheme is inspired by Roskos, Burstein, and You (2012) and Merchant (2015), and was adapted to the purposes of this study. The main coding categories are duration codes, *how long* a phenomenon lasts, and frequency codes, *how often* something happens. Frequency codes may occur both within and outside of duration codes. They are also linked to either teacher or children. As our main interest is whether a child/children or teacher is engaged in dialogue, and not which child, we do not distinguish between individual children. However, this needs to be kept in mind when comparing frequency codes of teachers and children: While there is only one teacher per group, we compare the frequency of his/her utterances to the combined utterances of the group of children.

The video material was coded in Interact (Mangold 2010), following a VEBB-specific coding scheme (Mangen et al. 2019). The analyses presented in this article will focus on the video coding data, more specifically the codes on verbal engagement (Table 1).

All analyses were based on the qualitative scoring of the 48 recorded films, and the data material were then transferred to SPSS, version 25 (IBM) (Field 2018). The inter-rater reliability for the coding scheme proved acceptable, following Cohen's Kappa (Cohen 1960) with $\kappa = .71$ for the frequency codes and $\kappa = .60$ for the duration codes (Mangen et al. 2019).

To test the relationship between the categorical frequency variables, contingency analyses were run, stating Pearson's chi-square (χ^2) as an indicator for significance as well as Cramer's V (φ_C) for the strength of the tested relationship (effect size). With $df = 1$, a Cramer's V of $.10 \leq \varphi_C < .30$ is interpreted as a small effect, $.30 \leq \varphi_C < .50$ as a medium effect and $\varphi_C \geq .50$ as a large effect (see Cohen 1988).

The testing of differences in the lengths of dialogues follows two groups: The films of reading sessions with print picture books ($N = 24$) and the films of reading sessions with picture book apps ($N = 24$). To test for the difference and its significance, results from a *t*-test for an independent sample will be presented. All requirements for such a *t*-test were met: The dependent variable (length of the individual films) is on a metric scale and both groups have equal sample sizes, making the testing for homogeneity of variance unnecessary. The normal distribution was assessed and confirmed by the Shapiro-Wilk-Test ($W = .981$, $df = 48$, $p = .610$). This also applies to the testing of differences between the lengths of dialogues in high- versus low-interactivity picture book apps. Effect sizes are estimated using Cohen's *d* with $0.2 \leq |d| < 0.5$ interpreted as a small

Table 1. Codes for verbal engagement.

Code label	Code category	Definition	Example ^a
Dialogue	Duration	Exchange of opinions, impressions and thoughts where the expressions are interrelated, including responses over several turns	Extract of turn taking (cf. 101appJA4): Teacher: Do you remember, what happened here? Child: He says 'No'. Teacher: Why did they make a wall? Child: Because, because they made a room so they couldn't argue. Teacher: Yes, why? Child: Because Jacob got all the things he wanted.
Utterance about the narrative	Frequency	Teacher and child comment on the narrative (the verbal content, illustrations, animations, and audio expressions). Also utterances going beyond here-and-now, e.g. imaginations and associations	The verbal engagement about the narrative may be about the topic, for example 'What has happened [with <i>Yesper & Noper</i>] here?' (cf. 612bokJA2) or 'Where is Moomin?' (cf. 101appMU1). It may also include imaginations and associations, such as 'Once when I was three years old, Mom and Dad told me that they had sold my stroller, and it made me very sad' (association to the seller in <i>Yesper & Noper</i>) (cf. 612bokJA2) or 'If we go to the desert then we have to travel to Africa; to Egypt' (talking about travel in <i>Yesper & Noper</i> , going on a trip) (cf. 612bokJA2).
Utterances about the medium	Frequency	Teacher or child comments on obstructed view or access; to get a better view; questions about where, when and whom can click/swipe/tap; negotiations on turn-taking	Utterances about the medium may include 'It's my turn to click!' (cf. 101appMU1) or 'We have to do like this to turn the page' (cf. 101appMU1). Even though these utterances are expected to be strongly linked to the app-readings, it is likely they also occur in book-readings, for example 'Do you remember when we clicked on this, on the iPad?' (cf. 101bokMU3) or 'And then we did like this with our finger, on the iPad' (cf. 101bokMU3).

Notes: ¹ The film IDs follow a system by their kindergarten (1–6), teacher (1–12), medium (book or app), title (LU = *A fish for Luna*; FR = *The Seed*; MU = *How did it go?*; JA = *Yesper & Noper*) and number of reading session (1–4). The film ID 612bokJA2, e.g. refers to kindergarten number six (6), the twelfth teacher (12), medium (book), the title *Yesper & Noper* (JA) and the teacher's second reading. The film IDs are used as references for qualitative data material.

effect, $0.5 \leq |d| < 0.8$ as a medium effect and $|d| \geq 0.8$ as a large effect (see Cohen 1988). The following chapter will present the results of the analyses.

Results

The following section will present the results concerning the research questions and hypotheses. This article will focus on the length, topic, and frequency of verbal codes in the dialogue in relation to medium and app-interactivity.

Length of dialogue

In general, the length of the 48 filmed reading sessions varied between 5 min 18 s and 55 min 52 s with a mean duration of 23 min 29 s (SD = 9 min 42 s). On average,

45.4% of the overall length of the reading sessions was spent on dialogue. In analysing the first research question on the time spent on dialogue in app- versus book-reading sessions, we did not find significant differences ($T = -.354$, $df = 46$, $p = .725$, Cohen's $d = -0.104$): In app-readings, children and teachers engaged in dialogue in 44.3% of the overall length of the reading sessions ($SD = 22.857$) while in book-reading sessions, 46.6% of the time was spent on dialogue ($SD = 22.403$). This, however, varies greatly. In both app- and book-readings, we find one instance where teachers and children did not engage in any form of dialogue (0%). On the other hand, the maximum percentage of time spent on dialogue is close to 90% in both mediums (87.6% in one app-reading session, 87.0% in one book-reading session). Our findings verify hypothesis 1.

Topic of dialogue

While we do not find any medium-related differences in the time spent on dialogue, we expect there to be differences in the topic of the dialogue (see Table 1).

Over all 48 films, 11.869 such utterances were identified. Out of these, 86.5% were on the narrative, 13.5% on the medium. Hypothesis 2 addresses expected medium-related effects with less utterances on the medium and more utterances about the narrative in book- than app-readings. Table 2 confirms this.

As shown in Table 2, there are significantly more utterances on the medium in app- than book-reading sessions ($\Delta = 15.2\%$, Pearson's $\chi^2 = 587.600$, $df = 1$, $p \leq .001$) and more narrative-related verbal engagement in book-reading sessions, respectively. While this verifies hypothesis 2, it is a small effect (Cramer's $\phi_C = .223$, $p \leq .001$).

Participants of the dialogue

The next analysis follows hypothesis 3 on differences with regard to who is doing the talking. To identify the participants of the dialogue, we distinguished the respective coding scheme in 'teacher' and 'one or more children'.

Table 3 presents the findings on utterances on the narrative and the medium in app- and book-readings by children and teachers.

As can be seen in Table 3, there is generally more narrative-related verbal engagement in book- than app-reading sessions, both by teachers and children (for children: $\Delta = 3.4\%$, Pearson's $\chi^2 = 366.302$, $df = 1$, $p \leq .001$; for teachers: $\Delta = 0.9\%$, Pearson's $\chi^2 = 224.566$, $df = 1$, $p \leq .001$). Respectively, medium-related utterances increase significantly in both groups when texts are being read in an app. The effect sizes are considered small, both for children (Cramer's $\phi_C = .237$, $p \leq .001$) and teachers (Cramer's $\phi_C = .205$, $p \leq .001$). The findings verify hypothesis 3.

Table 2. Overall utterances on the narrative and medium in app- versus book-readings.

	App-readings		Book-readings	
	frequency	Percentage	frequency	Percentage
Utterances on narrative	4.874	79.2%	5.394	94.4%
Utterances on medium	1.281	20.8%	320	5.6%
Total	6.155	100.0%	5.714	100.0%

Table 3. Participants of utterances on the narrative and medium in app- versus book-readings.

		App-readings		Book-readings	
		frequency	Percentage	frequency	Percentage
Children	Utterances on narrative	2.611	22.0%	3.019	25.4%
	Utterances on medium	710	6.0%	165	1.4%
Teachers	Utterances on narrative	2.263	19.1%	2.375	20.0%
	Utterances on medium	571	4.8%	155	1.3%

App-interactivity and length of dialogue

The four picture book apps differ in their degree of interactivity. The high-interactivity apps, *Yesper & Noper* and *How did it go?*, include hot spots prompting a range of audio-visual effects, while the low-interactivity apps, *A fish for Luna* and *The Seed*, have no hot-spots and limited audio-visual enhancements such as animations and ambient sound.

In analysing hypothesis 4 on whether the app interactivity influences the length of dialogue, we did not find a significant difference ($T = .142$, $df = 22$, $p = .889$, Cohen's $d = 0.061$): In the reading sessions with low-interactivity picture book apps, children and teachers engaged in dialogue in 44.9% of the overall length of the reading sessions ($SD = 20.172$) while in reading sessions with high-interactivity picture book apps, the time spent on dialogue was roughly the same (43.6%, $SD = 26.162$). The findings falsify hypothesis 4.

App-interactivity, dialogue topic and participants

While we do not find differences in how long teachers and children engage in the overall dialogue in low- and high-interactivity apps, we expect differences in their utterances on the narrative and the medium by app-interactivity (see hypothesis 5). We also hypothesised that children generally talk more than teachers, both about the narrative and the medium and in both low- and high-interactivity apps (see hypothesis 6). Table 4 presents the corresponding findings.

As can be seen from Table 4, there is generally less verbal engagement on the medium in low- compared to high-interactivity apps, with teachers talking less about the medium than the groups of children do ($\Delta_{interactivity} = 2.9\%$, $\Delta_{participants} = 0.5\%$, Pearson's $\chi^2 = 5.724$, $df = 1$, $p = 0.017$). This verifies hypothesis 5. However, the effect should be considered as practically irrelevant (Cramer's $\phi_C = .067$, $p = .017$).

Comparing groups of children's and teachers' verbal engagement on the narrative we find little nominal differences in high-interactivity apps ($\Delta_{participants} = 0.6\%$) but stronger

Table 4. Utterances on the narrative and medium by participants in low- versus high-interactivity apps.

		App-readings			
		Low-interactivity apps		High-interactivity apps	
		frequency	Percentage	frequency	Percentage
Children	Utterances on narrative	1.397	11.8%	1.214	10.2%
	Utterances on medium	182	1.5%	528	4.4%
Teachers	Utterances on narrative	977	8.2%	1.286	10.8%
	Utterances on medium	114	1.0%	457	3.9%

differences with a small effect size in low-interactivity apps with the groups of children engaging significantly more often in the narrative than teachers do ($\Delta_{\text{participants}} = 3.6\%$, Pearson's $\chi^2 = 51.796$, $df = 1$, $p \leq .001$, Cramer's $\phi_C = .103$, $p \leq .001$). While the nominal difference between the groups of children's and teachers' verbal engagement on the narrative in high-interactivity apps is small ($\Delta_{\text{participants}} = 0.6\%$), it needs to be highlighted that here, teachers talk more than the groups of children. This is surprising, considering that we compare the frequency of utterances of one teacher to up to six children per group. It partly falsifies hypothesis 6.

While testing for significance is not possible for one individual group³ (e.g. differences in verbal engagement on the medium in high- versus low-interactivity groups for children only), the nominal differences point towards children talking slightly more about the narrative in low- versus high-interactivity apps ($\Delta_{\text{interactivity}} = 1.6\%$), while teachers talk more about the narrative in high- versus low-interactivity app readings ($\Delta_{\text{interactivity}} = 2.6\%$). As expected, both the groups of children and teachers talk more about the medium in high-interactivity app readings, compared to their utterances in low-interactivity app readings (children: $\Delta_{\text{interactivity}} = 2.9\%$, teachers: $\Delta_{\text{interactivity}} = 2.9\%$).

The findings presented here partly falsify both hypotheses 5 and 6: While we can verify that the groups of children talk more about the medium and less about the narrative in high- compared to low-interactivity apps, we find that teachers talk more about the narrative in high-interactivity apps, both compared to the groups of children and to teacher's utterances in low-interactivity apps.

Discussion and conclusion

This article aims at investigating the role of the medium for verbal engagement in SDBR in ECEC-groups. The findings point towards a great difference in how much time is spent on dialogue between reading situations with some groups not engaging in any form of dialogue at all, while others spend more than 90% of the length of the reading session on dialogue. We find this both in book and app reading sessions. However, the *average* time spent on dialogue in all book versus all app reading sessions is roughly 45% and hence, does not depend on the medium. This might be a constructive result for teachers to integrate a variety of media for the purpose of shared reading.

Small medium-related effects can be found when comparing the topic of the verbal engagement: While we generally find more utterances related to the narrative of the text and less related to the medium, there are significantly more utterances on the medium when texts are being read in the app-format. This is in line with Krcmar and Cingel's (2014) finding that dialogue during screen reading tend to focus on the mechanics of the medium, more than the story. This seems also to be the issue for our groups of participants, both children and teachers.

As mentioned, two of the four titles show high interactivity features in the app format, while the other two are considered low interactivity apps. The app interactivity does not show a relationship with the length of dialogue. However, we find that in the *low-interactivity* apps, children engage more often in the narrative than their teachers – while we find the opposite effect to be true for *high-interactivity* apps. Here, teachers talk more about the narrative than the children do. Regarding the verbal engagement about the medium, it is found that both the groups of children and teachers talk more about it

in high- versus low-interactivity apps, which seems to be quite natural. Although previous research shows that interactivity that is not well-integrated and congruent to the story may distract and prevent learning (see e.g. Takacs, Swart, and Bus 2014; Bus, Takacs, and Kegel 2015; Reich, Yau, and Warschauer 2016), interactivity does not seem to affect verbal engagement during reading as shown in this study. On average in all readings, 11 minutes were spent on dialogue, and there were no differences between app and book-readings.

The various ways in which the teachers set up their groups and invited the children to access and engage with the story and the medium, likely had a significant impact on the length as well as the topic of the dialogues. Despite that previous research mostly were on parent-child dyads, our findings support the importance of a participating adult in the reading session (e.g. Barzillai, Thomson, and Mangen 2017; Garon, Bryson, and Smith 2008; Meltzer 2011).

When comparing print book readings and app readings in this current study, both children and teachers talk more about the narrative in the print book readings than app-readings, and both the children and teachers talk more about the medium in app-than print book-readings. This may be an indication that the app readings have become a 'hunt for hotspots', and that the teachers struggled to regulate the children's attention (Lauricella, Barr, and Calvert 2014; Parish-Morris et al. 2013; Richter and Courage 2017). However, talk about the medium may entail a range of types of utterances prompted by different concerns: Are the children's utterances related to their (lack of) access to the screen (e.g. 'It's my turn to click now!')? Are the teachers' utterances about regulating and controlling children's access (e.g. 'You'll all get to click, but one at a time')? Alternatively, are utterances related to the medium verbally enriching explorations of the mechanics of the medium (cf. Neumann and Neumann 2014) – e.g. 'this is how we turn the pages on an iPad'? Understanding the extent to which talk about medium in SDBR is interrupting or supporting the overall goals of rich dialogues, requires a more fine-grained approach.

In this study, we aimed to explore differences between SDBR with print picture books and picture book apps. The results verify that both children and teachers talk more about the medium and less about the narrative in app readings than in book readings. Yet these differences are marginal, a practical implication of this finding might be to integrate a variety of media for the purpose of shared reading in kindergarten. Observing the ways in which teachers differently orchestrated the children's access to the medium (book and app), the spatial seating arrangement and the group dynamic, and responded to the children's verbal and nonverbal engagement, shows the importance of the role of the teacher when reading on a tablet as when reading in a print book.

Secondly, we aimed to investigate how the length, topic and participation in dialogue varies between high and low interactive picture book apps. The results show small differences: apps also prompt much dialogue, but the topic of the dialogue tends to be focused on features of the medium rather than the narrative or story. Hence, we know little about whether the talk about the medium is verbally enriching or not. Qualitative, in-depth analyses of the dialogues and of the characteristics of medium-directed utterances may shed further light on this issue. The group setting may have exacerbated the amount of medium-directed talk in that several children seem to 'compete' for access to the interactive features, and that the teacher more often faced situations requiring him/her to

control the children's access. When reading with one child only, such situations may be more easily handled. Nevertheless, in order for research on reading activities in kindergarten settings to better reflect the actual situation, we encourage future research on shared reading in any medium to consider a group rather than, or in addition to, a dyad perspective.

This study contributes to the field of research on shared reading by providing a quantitative look at the relations between length and type of verbal engagement, medium, and level of picture book app interactivity when reading with groups in ECEC settings.

Notes

1. Because of the convenient nature of the sample, no a priori power-calculations for the determination of the sample size were run.
2. In case of absence of individual children in one or more out of all reading sessions within the groups, some reading sessions were performed with less than six children (min = 3). This ratio however, is not included in the analyses.
3. This is due to the qualitative origin of the data material: All codes used for this analysis are frequency codes with one possible value only. Significance testing needs at least two possible values for the test variable.

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