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Quality in children's digital picture books: seven key strands for educational reflections for shared dialogue-based reading in early childhood settings

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ABSTRACT

The scope of digital children's books is increasing rapidly; however, the quality of these books needs consideration in view of the educational context in which they are to be read. In this article, we present seven key strands to support early childhood teachers in selecting high quality for shared dialogue-based reading with groups of children. The purpose of the key strands is two-sided: first to provide a tool for assessing the aptness of a digital book for use in shared dialogue-based reading in an early education setting. Second, the purpose is to strengthen the educational competence of professional teachers. The key strands are based on 48 video-filmed reading sessions and educational reflections by participating early childhood teachers after each reading session. This research is part of the project books and apps: evaluating e-books for use in dialogue-based reading in kindergarten (VEBB). The seven key strands identified are 1) Theme, 2) Duration, 3) Verbal text and illustrations, 4) Play with language, 5) Conversation and dialogue, 6) Medium flexibility and 7) Interactivity. The first five strands are also relevant for educational reflections on print books.

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Introduction

As the proportion of young children with access to digital media, such as tablets, increases, so does the number of gaming apps, learning apps and digital books aimed at them. As the offer in the market has become unmanageably large, increasingly more stakeholders have advocated for quality rather than quantity in digital learning resources for children and different frameworks for assessing quality are spreading.

The increased access to digital resources for children also applies to digital children's books and picture book apps. It is thus a challenge for early childhood educators to choose suitable digital books for dialogue-based reading from the myriad of digital books (Adriana et al. 2020). A meta-study by Furenes, Kucirkova, and Bus (2021) highlights the need for increased knowledge about digital children's books to support relevant choices. The emerging field requires a theoretical approach that assesses both the literary and the

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technical aspects of digital books (Stichnothe 2014, 7), where, at present, the possibilities for technological enrichment seem to overshadow educational reflection. In this article, we will present and discuss a fully developed tool for assessing the appropriateness of children's digital picture books for shared dialogue-based reading in an early education setting. The developed tool is easily accessible online and is free to use (<http://vebb.uis.no/>).

Internationally, tools for assessing the quality of digital books are available for use in various reading contexts, both educational and for pleasure (see, e.g. Craft 2012; Kucirkova, Littleton, and Cremin 2016). However, it seems that producers and users do not have easy access to evidence-based assessment tools which therefore have little effect (Colliver, Hatzigianni, and Davies 2020) or even seem to be ignored (Dore et al. 2018). In this article, we will argue that specific educational goals in reading will affect the quality assessment of the offered digital picture books; thus, the assessment of these books in early childhood education and care (ECEC) settings needs to be linked to planned reading activities. Hence, the tool we present has been developed through a research collaboration between early childhood teachers and an interdisciplinary research team (Mangen et al. 2019). Based on our data, we identified seven key strands to support teachers in selecting suitable digital books for shared dialogue-based reading with groups of children in ECEC settings. The seven key strands are 1) Theme, 2) Duration, 3) Verbal text and illustrations, 4) Play with language, 5) Conversation and dialogue, 6) Medium flexibility and 7) Interactivity. The first five strands are also relevant for educational reflections on print books. The purpose of the key strands is twofold: a) to provide a tool for assessing the appropriateness of a digital book for shared dialogue-based reading in an early education setting and b) to strengthen the educational competence of professional teachers.

Perspectives on digital tools for children

The year before the iPad was launched, Roskos, Brueck, and Widman (2009) published the article *Investigating Analytic Frame works for e-Book Design*. With an interest in technical aspects, their aim was to develop analytical tools to guide the design of e-books for literacy learning purposes and to encourage studying digital books from different perspectives.

In a review article, Colliver, Hatzigianni, and Davies (2020) present how quality in learning apps for younger children is perceived by four interest groups with differing perspectives:

- (1) The top-down perspective: monitoring the use of apps in various contexts by, for example, policymakers, organisations, and researchers. These stakeholders do not use the apps themselves, and they do not necessarily communicate with the children who use them.
- (2) The outside-in perspective: people who do not use the apps themselves, such as parents and teachers, downloading them to let children use them. These are the producers' marketing target.

Table 1. The six facets.

The six facets	Characteristics
Personalised	Pluralisation: plurality of identities, customised digital books, self-paced reading, choice of text
Affective	Playfulness: relates to feelings such as pleasure, enjoyment, sense of belonging and inclusion – positive attitude to reading
Interactive	Playfulness: individual interactivity with the screen, gently, vicarious and virtual touching – interactivity with the narrative
Creative	Possibility awareness: possibility options within the text
Shared	Participation: reading as a social practice, joint book reading
Sustained	Participation: supporting group interactions of a sustained nature by uninterrupted reading time – easy access to several titles of digital books

- (3) The bottom-up perspective: the end users of the apps, most often the children but also parents and teachers when using the apps with the children.
- (4) The inside-out perspective: the developers, individuals, or companies; people who do not necessarily work directly with children.

Quality criteria for learning apps within each of the perspectives differ; thus, sharp tensions appear between the perspectives of the four interest groups. Colliver, Hatzigianni, and Davies (2020) claim that a holistic perspective on quality, where different interest groups are considered, can contribute to increased quality for most users. However, they point to insufficient research on the end users' perspective, which we will highlight in this article. Tablets are designed for individual use, yet in Norway, reading in ECEC settings is typically a group activity (Hoel and Seip Tønnessen 2019) where both children and teachers are end users of digital books. Hence, in our research, the children's perspective is expressed and safeguarded through the teachers' educational reflections.

A literature review by Kucirkova, Littleton, and Cremin (2016) includes studies with children aged two to eight years, where the focal point is 'children's personal and social engagement with storytelling in digital books' (Kucirkova, Littleton, and Cremin 2016, 4). In giving a nuanced, balanced look at digital books for children, they apply Craft's four P's (Craft 2012), which are designed to support discussion of central aspects in the marketing of digital tools for young children (aged 2–8 years): 1) *Plurality of identities*, characterised as people, places, activities, and literacies; 2) *Possibility-awareness*, understood as awareness of what might be invented, of access options, of learning by doing and of active engagement; 3) *Playfulness of engagement*, characterised as the exploratory drive; and 4) *Participation*, including welcoming all through democratic, dialogic voice (Craft 2012, 7). Kucirkova, Littleton, and Cremin (2016) expanded Craft's four Ps to six facets to understand reading for pleasure with digital books (Table 1). The six facets are an argument for the beneficial use of children's digital books, and the authors want to offer an evaluative tool 'through which both the teaching profession and parents seeking to foster children's reading for pleasure can critically consider children's digital books' (Kucirkova, Littleton, and Cremin 2016, 12).

The playfulness that is emphasised in both Craft (2012) and Kucirkova, Littleton, and Cremin (2016) has an important role in the interaction with the children and maintaining commitment to the reading activity.

Children's digital books in early educational settings

Both researchers and special interest organisations have contributed additional tools designed to ensure that children have access to appropriate high quality digital books. For example, the UK-based *National Literacy Trust* has, with the support of academic advisors, created *LiteracyApps*¹ an online guide that aims to help parents and teachers search for apps by categories such as age and features that support language and literacy development.

In Norwegian early childhood education, reading with children has various educational goals (MER 2017), such as reading for pleasure and learning language and literacy. Early education teachers plan and implement educational activities and thus choose adequate resources, such as books, according to educational goals (Broström 2012; Gudem 2011). This requires professional and educational reflection by the individual, informed by knowledge of the children who are present. Reading together with children thus serves several purposes in early education, such as giving children the opportunity to experience and explore good literature, familiarising them with key topics and applying children's literature as a starting point for participation in expanding classroom dialogue, often referred to as shared dialogue-based reading (Parish-Morris et al. 2013).

A digital picture book can be an efficient starting point for rich dialogues, as the multimodal text (Kress 2010) integrates several modes of meaning-making: text, images, sound, and interactive design. Moreover, not all is told in fiction literature; there are gaps or openings in the text (Iser 1978), providing readers with opportunities for interpretation and allowing them to be active co-creators. Shared dialogue-based reading, which is characterised by the teacher encouraging children to be verbally active participants in dialogues, aims to involve children in exploratory and rich dialogues that extend beyond the here-and-now situation (Dickinson and Tabors 2001), encouraging children's predictions about what they think will happen and why. The teacher can invite and maintain dialogues through questions related to the literary text, and the children contribute with their thoughts and opinions. By engaging in such conversations, children activate their own experiences and skills and develop their own knowledge of text and language. In picture books, the verbal text and illustrations should support each other and build on each other to convey a complete narrative (Hallberg 1982). As we understand this, verbal text and illustrations should not compete with or displace each other because both can be the starting point for rich conversations involving the children.

The digital medium has its own potential to promote children's involvement, not least through interactivity (Richter and Courage 2017). The digital picture books' interactive affordances lie in how the reader navigates the story by swiping a finger across the screen or clicking on an arrow or a picture. In addition, in many digital books, the reader can activate dynamic sequences – animations and/or sound – by tapping different places on the screen (hotspots). The importance of sensory experience (synaesthesia), scaffolding, datafication, user control and computer vision techniques is highlighted for the interactive experience in digital books (Kucirkova 2017, 1177). In our study, scaffolding and user control emerged as particularly relevant.

In our work, we have developed a digital assessment tool to support teachers in choosing suitable digital books for shared dialogue-based reading with groups of children in ECEC settings. Questions that have supported the design of the tool are as follows:

- (1) How can the use of the tool contribute to evidence-based assessment of the appropriateness of digital books in shared dialogue-based reading?
- (2) How can the tool contribute to strengthening the educational competence of professional teachers in ECEC settings?

Method and design

The underlying principles for the seven key strands for educational reflections for shared dialogue-based reading are research based and developed in partnership with early childhood teachers and early childhood teacher students. This partnership helps to ensure the tool's relevance and credibility for professional teachers. The research is informed by an innovation project funded by the Research Council of Norway. The design and development of a tool for evaluating children's digital books was one of the main aims of the interdisciplinary project. Twelve early childhood teachers were invited to participate in the project, reading together with groups of up to six children (4–5-year-olds). All participants gave informed consent, and the ethical requirements were followed. The research project was approved by the Norwegian *Agency for Shared Services in Education and Research*.

In Norwegian early educational settings, where the aim is shared dialogue-based reading, early childhood teachers are the end users of digital books, and in this way, they also support and safeguard the children who participate in reading. All 12 teachers read two book titles each, both as print books and as digital books. All four reading sessions with each teacher were video recorded by the teachers themselves, for a total of 48 films. Each reading session is coded. In the data material, a code for a specific reading session appears as, e.g. *MUapp612*, in which *MU* indicates the title of the book, the *first number* indicates the number of ECEC, the *number 1–12* indicates teacher, *app* indicates digital medium (while *bok* indicates print book) (for in-depth details see Mangen et al. 2019). Different strategies for designing the reading groups were implemented by the teachers (Hoel and Seip Tønnessen 2019). The four digital books which were chosen by literary scholars in collaboration with early childhood teachers had digital features such as an audio track with a narrator's voice and music. However, two out of the four digital books were enriched with interactive features to a greater extent (coded as JAapp and MUapp), while two had less interactivity (coded as LUapp and FRapp). In this way the book selection represents the breadth of variation in digital picture books. The 12 teachers performed four (4) reading sessions each with groups of up to six children. After each reading, the teachers gave their educational reflections on six topics:

Content: How did you like the book? What qualities do you think this book has? What qualities in the text invite you to develop conversation and exploration?

Prerequisites/context: What preparations did you make before the reading? Did you read/explore the book yourself? Did you notice gaps or openings in the text or new and exciting words?

Objective: How did you experience reading this book with the children? What do you think the book and the conversation can bring to the children?

Method: What role did you take in this reading session with the group of [up to six] children? How did you choose to present the book and why?

Assessment: When reading this book again, what would you possibly do differently?

Other comments?: The teachers expressed great satisfaction with the opportunity to share their thoughts and reflections after the reading sessions. A total of 288 reporting records were completed. In this article, we will use excerpts (translated from Norwegian to English) from the teachers' reporting records. To strengthen the analysis, and ensure the tool's reliability, we collaborated with educators at four universities in Norway which provide early childhood teacher education programs, to explore and evaluate the strands. In addition, we conducted focus group interviews with all the teachers to ensure that their perspectives and experiences were taken into account, thus safeguarding the tool's dependability. To identify, analyse, and report patterns within our data material, we applied a thematic analysis (Braun and Clarke 2006, 87), potential themes were identified across the entire body of material, and the strands emerged. The specificity of each theme was refined, generating the seven selected key strands.

Results & discussion

Shared dialogue-based reading in general requires preparation, and it is the early childhood teachers' responsibility to facilitate children's involvement and to make it an enjoyable reading session for all. Preparing the reading session, teachers need to consider the size of the reading group and who should be part of it. For some teachers, the size of the group will depend on staff availability; for others, there might be greater flexibility within the context. In shared dialogue-based reading, all children should participate actively; thus, it is of great advantage if the participating children are aligned in their language skills. Though children with less well-developed language skills may also benefit from opportunities to participate in groups including children with more developed skills.

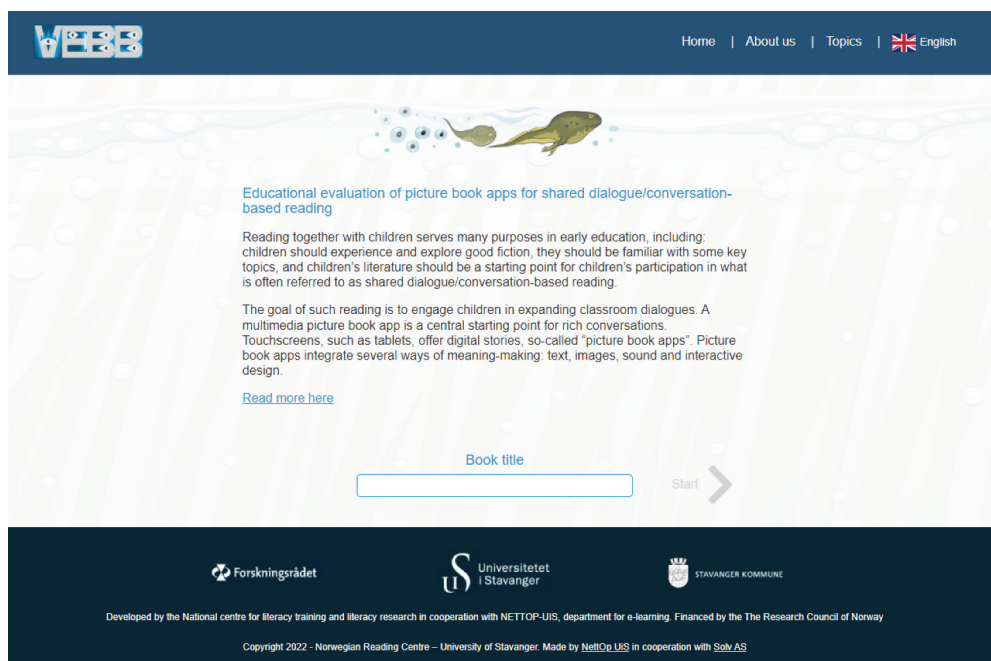
For group-based reading, with digital picture books in particular, the teacher also needs to carefully consider where to place the text in relation to himself/herself and the children (cf. Hoel and Seip Tønnessen 2019). The tablet's screen is usually smaller than the surface of most children's picture books, but it is vital that all children both see and hear the text well. For some, it may be possible to read the book on, e.g. a smart board, while others will not have this opportunity. The tablet used in our study, was the Apple iPad (2017), which measures 240.00 × 169.50 × 7.0 mm (height x width x thickness) and weighs 469.00 grams. There are factors related to both the digital medium (tablet) and the digital books' affordances that influence the extent to which a specific digital book is a suitable resource for dialogue in groups.

The results will be presented here within the framework of *seven key strands*. These strands reflect the end users' perspective (cf. Colliver et al., 2020) and will help teachers evaluate whether a digital picture book is suitable for group-based reading focused on children's participation in rich dialogues (cf. Dickinson and Tabors 2001). We will elaborate on each strand using descriptive excerpts from the data. For the first five strands, the excerpts are selected from reading both print and digital books; however, for the two strands that apply only to digital books, the excerpts are collected from the reading sessions using digital books.

The seven key strands presented in [Table 2](#) are available online (see [Figure 1](#)) as a tool to help educational reflection on digital picture books for shared dialogue-based reading with groups of children.

Table 2. Seven key strands for educational reflections on shared dialogue-based reading in ECEC settings.

Seven key strands	Characteristics (educational and practical issues)
1) Theme	Educational aspect; reflecting on reading goal Relevance to the current group of children
2) Duration	Number of pages and length of verbal text Playback time in digital books
3) Verbal text and illustrations	Relationship between the verbal text and the images
4) Play with language	Playful and mood-creating functions/qualities of the verbal language
5) Conversation and dialogue	Exploratory qualities: curiosity, identification, recognition Beyond the here-and-now situation
6) The medium's flexibility	Opportunities to regulate/turn off sound (narrator voice, background sound/music, sound effects, automatic page turning)
7) Interactivity	Extent of animation, sound sequences, tasks Visible or hidden hotspots Aligned with the story or distracting

**Figure 1.** Tool for educational reflection: <http://vebb.uis.no/>.

1) The theme of the picture book

Teachers commented in the reflections following each reading that they considered the theme in the given book with special regard to the relevance for their diverse group of up to six children participating in the reading. The teachers assessed the relevance for the groups of children based on their knowledge of the children and how the children responded during the reading:

[...] The children generally enjoyed the book, and many would like to read it again [...]

(FRbok102)

[. . .] The text contains known issues for children, some may be self-experienced. This makes it easier for the children to wonder about the text *(JAbok510)*.

The book is still slightly difficult for children to follow on text. There are many qualities in the text to grasp, but when you have a group of children, the children are on different levels in the text. It is hard to stop along the way. Would probably be better with one child *(MUapp305)*.

Additionally, the educational aspects seemed to be important for the teachers when choosing a theme:

The book invites many different themes, both those that go on the surface and those that go in depth, such as parents who are divorced. How a child may experience having divorced parents, the concerns a child may experience over both parents. The book also brings in friendships, which one can have with both humans and animals. [. . .] The fact that people you love and like can also be stupid *(FRapp409)*.

[. . .] How it can be experienced that others do not understand what we mean. The children see that the fish is sad and that it longs for home. I think that the book can help to understand how others feel *(LUapp203)*.

I like the book well in terms of the theme I experience it is about. Having parents who do not live together, needing a friend. One's own feelings and feelings one may have for others *(FRbok409)*.

As we interpreted this, the selection of the book needs to be considered according to relevance to the current group of up to six children. It seems necessary for the teacher to reflect on the extent to which the theme in the book is relevant to the diverse group of children. In this way, the teacher takes the bottom-up perspective (cf. Colliver et al., 2020). Children's interest in the picture book's theme may affect their engagement in the dialogue, and these interests may be linked to cultural background, experiences, age, gender, and previous reading experiences.

2) Duration

Duration seems to be a practical issue when teachers plan to read in groups. Both the number of pages in the book and the length of the verbal text, the total number of words per page and the length of the book as a whole will be important for educational choices. When reading digital books, playback time, including music and automatic reading, will also be crucial for evaluating the duration. In our data material, the teachers reflected especially upon the length of the verbal text, not least considering that the reading took place in groups with children and not in dyads:

A little too much text to keep (so many) children engaged. [. . .] *(FRbok102)*.

The children were active and interested in the beginning, but I experienced during the book that their engagement waned. The story was slightly lost in all the verbal text; it became too heavy. I experienced it as if the children could not keep up with what the book wanted to tell because there were too many words. [. . .] *(FRbok511)*.

The book is nice, and it is easy to read with the children. It has good pictures, funny sounds, and short text. [. . .] *(JAapp510)*.

This was a digital book with few effects and nothing to press. Therefore, it is very close to a regular print book. Got a positive response from the children, and they persevered until the very end, even though we held on for almost 0 minutes. The book may give them thoughts that not everyone has both mom and dad in the same house. At the same time, they see that

it is good to have a friend who can comfort, that they themselves can also be a good friend
(FRapp203).

Some books contain many pages, while others have only a few. Some have long and embellished stories with many words conveyed on each page, while other stories have fewer. The teachers tell of long reading sessions of up to 0 minutes when the book had a lot of written text. Additionally, good and rich dialogues about the book's content, which is the aim of shared dialogue-based reading, will, as we interpret this, affect the duration of the reading session.

Additional observations show that if the teacher chooses to use the digital book's prerecorded reading and the book contains a lengthy written text, this can limit children's spontaneous talk during the reading because the narrator's voice overrides the physical conversations. Thus, our research supports that the length of the written text and number of pages must be considered in relation to the group's overall reading experience and ability to stay focused over an extended period of time.

3) Verbal text and illustrations

The relationship between verbal text and images can be elaborate, expanding or contrasting in children's picture books (cf. Hallberg 1982). Where the illustrations receive the most attention, it seems to be relevant to tell and speak more freely from the pictures. The relationship between the verbal text and the pictures both in printed and digital picture books is often commented on in the teacher's educational reflections:

The book had big, good pictures and little text. The pictures came out well, and the children could quickly see and point to what they saw. [...] (JAbok407).

I think this is a good book, pictures and text fit well together. [...] Think it is a good combination of sufficient text, nice narrator voice and good drawings. [...] (LUapp511).

I found that reading the book with the children invited a good reading session. The book addresses an important topic [...]. I experienced that the conversations often started in what the children saw in the pictures (FRbok408).

It appears from the data material that in some books, the verbal text receives the children's attention, while in others, the illustrations are of the greatest interest. When reading digital books in particular, a tablet screen might be relatively small compared to a traditional print picture book; thus, our data material shows the importance of educational reflection on the choice of which books to read when the purpose is dialogue-based reading in groups with children. In our empirical data, it appears that in some transformed books, the relationship between verbal text and illustration is not the same as in the printed version of the book due to limitations in the digital screen. For example, the verbal text sometimes shades the illustrations, and at the same time, sometimes the entire verbal text is not available on the screen. This forces the reader to scroll up and down to read the whole text while reading and facilitating the dialogue, which can be a challenge whether it is in printed or digital books.

4) Play with language

Play with language refers to using language with an emphasis on its acoustic and mood-creating functions, not on the content. Children's picture books, whether print or digital, may inspire children to play with emphasis on playful and evocative features of verbal language, as the following excerpts illustrate:

When I read, I got the impression that the children thought it was fun that the book was in rhyme. [. . .] (MUbok101).

[. . .] When I stopped by a single word, such as *dusk* or *pebbles*, this opened for dialogue on words more than the content. The children are introduced to rhymes, beautiful pictures, and strange creatures (MUapp204).

[. . .] The word *No* in other languages and crocodile language gave good conversation. The word *abroad* led to much wondering. [. . .] (JAbok204).

[. . .] In this book there is a lot to wonder about, where does this fish come from, why does it use such weird words. One can wonder about both the words in the text and what we see in the pictures (LUapp511).

We know that rhyme in verbal text can inspire children to make their own rhymes, and new and unknown words can lead to new funny nonsense words, which is confirmed in our data. Such joyful language play contributes to linguistic awareness and is important in institutions involved in ECEC language development. In addition, according to Craft (2012), the playfulness of engagement gives an exploratory drive that is important for the make-believe spaces. However, the option to hear the playful words read to the children using a digital book might create more opportunities for them to participate in this type of reading experience. Print books have to be read by someone for children to hear the playfulness of language.

5) Conversation and dialogue

Our data show that rich dialogues involving the children concern the story but also the children's diverse experiences related to the story or fantasies that extend beyond the story. The potential for dialogue in the printed or digital picture book may be realised both through the children's curiosity and exploration of the text, and by the teacher's questions and guidance of the dialogue. To illustrate the exploratory qualities, the educational reflections identify curiosity, identification, and recognition:

[. . .] The text leaves room for wonder, there is a lot to laugh about and a lot the children can relate to. It becomes possible with dialogue when there is a lot of *yes* and *no*, the children do not like to be told 'No'. This helps to create dialogues. I also think that the dialogues are good because much of the action is familiar to the children (JAapp510).

[. . .] The children get empathy for the fish; they feel a little sorry for it. It invites dialogue (LUapp203).

[. . .] The text is simple, but still contains many openings for conversation. Especially the words from the fish are fun. It is a text children can easily relate to. The glossary at the back where the word moon is in different languages was exciting. Then, the children determined that the fish had always told where it was going (LUbok203).

Conversations beyond the here-and-now situation are also central in the teachers' educational reflections:

This book was great to read with the children. They were wondering about the fish that could fly and all the paint. The book invites you to something magical and surreal that helps the children fantasize further! (LUapp102).

[. . .] The book has many qualities, and you can choose whatever you want to stop with. Both with pictures and text. For example, is it the mother who strokes Sandra's cheek or is it the

horse? The book also has a lot to wonder about in relation to friendship. When do we need a friend? What made Sandra need a friend? Do you need a friend? etc. Additionally, in relation to living two places. How it can be experienced. [. . .]
(FRapp408).

This shows how important it is for teachers to consider the potential for dialogue in the books and the ways in which the text can ignite children's imagination, as we know that shared dialogue-based reading aims to involve children in exploratory and rich conversations that extend beyond the here-and-now (Dickinson and Tabors 2001). In dialogue-based reading, it seems that the children's experience of the reading community is of great importance, as this excerpt explicitly points out: '*I thought it was positive to use this book with the children. It gave the children a good community experience while we talked about difficult words, etc.*' (JAbok612). As we interpret it, reading in groups, whether using print or digital books, adds qualities other than what is available when reading in dyads; it adds a social dimension to the conversation about the reading experience.

6) The medium's flexibility

The flexibility in using digital picture books concerns opportunities to adjust the voiceover, the background sound/music (also the ability to adjust the voiceover and at the same time retain the background sound) and navigation between pages in digital books. In most digital books, the reader can decide whether to read the text her/himself or to use a pre-recorded narrator voice, which also allows children to listen to a digital book by themselves. In our data material, the teachers reflect on the medium's flexibility, illustrated by the following excerpts:

[. . .] I liked that there was not so much sound, that it was quiet 'between the pages'. This made it much easier to maintain a dialogue
(JAapp612).

[. . .] If I were to read it again, I would take away the music. [. . .] I find that there is more room for wondering and reading stops when the sound effects are off, at least in this book
(LUapp408).

The print book invited good dialogues. I did not experience that the same thing happened with the use of the digital book. [. . .] I interpreted that some of the children wanted to finish the book. Thus, I chose to turn off the narrator voice and read for a while myself to see if the children showed more interest. I experienced that I got closer to the children by this choice, although still not enough to continue the reading [. . .]
(FRapp408).

[. . .] I felt the children became more concerned with the background sound and everything that happened on the screen than with the actual text that was read
(MUapp612).

Most digital books include a voiceover with a professional narrator, and many have background sound/music and sound effects that can be activated by the reader. In shared dialogue-based reading with digital books, our research points to the importance of being able to decide whether to use the 'read to me' or 'read by myself' options and to be able to regulate the sound level so that the dialogue with and between the children does not compete with the sound coming from the tablet. Meta-research underlines that voiceover as well as background sound can contribute to the children's understanding of the story, provided they are related to the story (Furenes, Kucirkova, and Bus 2021). However, according to the objective of shared dialogue-based reading, the opportunity to regulate/turn off sound (narrator voice, background sound/music, sound effects, automatic page turning) is of importance to teachers' educational considerations about promoting

dialogue. Additional observations show that if the teacher chooses to use the digital book's pre-recorded reading, lengthy verbal texts may limit children's spontaneous input during the reading. If the teacher reads the text her/himself, it is easy to stop the reading, open it to the group for dialogue and then continue reading. Based on the teachers' reflections following each reading, it seems that automatic page turning in the digital book can affect the verbal exchange, especially if a new page appears before the voice-over ends. Hence, the flexibility of the medium is crucial.

7) Interactivity

For many children, digital media is highly connected to interactivity; thus, children have expectations of ways to interact with tablets and digital books, including by tracing, tapping, gaming, and drawing. Additionally, in digital books, interactive features are typically additional elements that allow children to initiate animations and/or sound sequences, zoom in on a scene, make a drawing, or follow a story path. However, when the educational goal is to have the children engage in rich verbal exchange around the text, the teacher needs to consider whether the story works both with and without the activation of interactive features/hot spots or to select the interactive features that best scaffold children's understanding. In our data material, it appears that the extent of animation, sound sequences and tasks is vital for the teachers' educational reflections:

This reading session became very chaotic and incoherent. There were many interruptions due to everyone wanting to tap the screen in turn. This made the storyline in the book difficult to follow
(JAapp101).

I think it was difficult to read the digital book with the children; there is a lot of clutter in the pictures. The children were more concerned with what was happening in the pictures and wanted to tap. The text disappears. [...]
(MUapp510).

Whether the hotspots were visible or hidden or whether interactive features were aligned with the story or distracting also had an impact on the reading situations, as the following excerpts illustrate:

I think it was a difficult digital book to read. The children were very interested in tapping the animations and had difficulty understanding what I was reading. [...] The children were involved in the beginning, but quickly fell off when they discovered everything they could tap. The children were very restless and could not sit where they were supposed to. [...]
(MUapp204).

I was not exactly left with a good feeling after having this reading activity. I think maybe it would be better to read with only 1–2 children, so they could tap on things whenever they wanted. Then, it might have been easier to focus on the text so that the conversation did not revolve so much around who should tap when. [...]
(MUapp612).

Our empirical data illuminate interactive features in digital books that can be distracting and draw children's attention away from the story in shared reading in groups, which affects educational goals such as dialogue inspired by a story. This is in line with research highlighting that well-integrated interactive elements may support comprehension (Mirit, Thomson, and Mangen 2017; Bus, Takacs, and Kegel 2015) and engagement (Hoel and Seip Tønnessen 2021), while interactivity and animations not related to the story tend to negatively affect children's comprehension (e.g. Reich, Yau, and Warschauer 2016; Takacs, Swartand, and Bus 2015). The

tablet is designed for individual use, but with the reading of digital books in groups, there are often many hands trying to touch the screen at the same time. When all children want to tap and click, even the shortest book can become very long, and children's attention is quickly turned away from the story and directed to talk about the interactive features and whose turn it is to tap (Hoel and Jernes 2020). Therefore, we claim that exploring interactive features with children in advance of reading will be beneficial for shared dialogue-based reading.

Summary and conclusion

In this article, we have presented and illustrated seven key strands to help educational considerations of children's print and digital picture books for use in shared dialogue-based reading with groups of children in ECEC settings. The seven key strands are 1) Theme, 2) Duration, 3) Verbal text and illustration, 4) Play with language, 5) Conversation and dialogue, 6) Medium flexibility, and 7) Interactivity. However, these key strands have not been developed for book recommendations, but as support for the individual teacher's assessment of a current book for dialogue-based reading. It is individual teachers in their unique contexts who must make their own educational reflections on the choice of books, either print or digital. However, after assessing a book based on the seven key strands, the tool will give a recommendation as to whether the book is suitable for dialogue-based reading with the planned group of children. The goal of the tool is not only to recommend suitable books, rather it is to give educators experience in educational reflection and assessment of both print and digital picture books for a specific use based on concepts related to text and media. In this way, the digital tool is scaffolding the teachers' considerations, according to Kucirkova (2017). Previously developed frameworks which aim to guide researchers, educators, and designers in evidence-based app development (Hirsh-Pasek et al. 2015, 3) seem to be ignored (Dore et al. 2018). That is why the seven key strands have been developed in partnership with early childhood teachers as well as involving ECE students and educators. In this way, we claim the research results are relevant for educational settings and will have implications both in educational practice and for developers of digital picture books.

Based on the presented research, our recommendations for educational practice go in the direction of not randomly picking a book, either from a digital or physical bookshelf, but rather preparing dialogue-based readings by going through relevant books in advance and considering their potential. Our recommendation to developers and producers of digital books is to carefully consider the flexibility of the medium and the scope of interactivity if the digital book is meant to be read in an educational context, with groups of children and with engagement in dialogue as an educational goal.

Note

1. <http://literacyapps.literacytrust.org.uk/>.

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