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Emergent multilinguals learning languages with the iPad app iTEO: a study in primary schools in Luxembourg

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ABSTRACT

The present small-scale study investigates language learning in primary schools in Luxembourg and the ways in which this process is mediated by peers and the iPad app iTEO. This study draws its data from the larger longitudinal qualitative research project iTEO (2013–2017) and is based on 13 hours of audio and video-recordings. The participants are 6–7-year-olds learning German and French. Grounded in sociocultural theory, this paper examines, first, the ways in which the emergent multilingual primary school children scaffold each other's learning of German and French while collaboratively producing oral texts on iTEO and, second, investigates the affordances of this app for learning. The findings show that the children's language learning was mediated by peers, the task and the app. The children used a range of learning and teaching strategies while completing tasks framed by their teacher. iTEO and the task together mobilised the children's resources, encouraged autonomy and promoted discussion about language.

KEYWORDS

The iPad app iTEO; peers; language learning; mediation; primary school

Introduction

Collaboration is perceived to be a key for learning and development in education. As early as in the 1980s, researchers like Johnson and Johnson (1986) maintained that working collaboratively may promote critical thinking. Nevertheless, there is a dearth of studies in the field of foreign language learning, in particular with young children, that shows how collaboration can lead to learning. In the field of bilingualism, many researchers have studied the ways in which peers scaffold each other's learning or language learning. This body of work often draws on sociocultural theory (Vygotsky 1978) that holds that adults, peers but also material tools can be effective mediators for learning.

IPads hold promise for language learning because of their many assets including portability, social interactivity, multifunctionality, connectivity, individuality and the opportunity to take control over one's own learning (Culén and Gasparini 2011). Although there is no conclusive research evidence to this effect, studies on apps such as storytelling apps that facilitate the production of oral text showed that their use encourages collaboration and can contribute to language learning (Kucirkova et al. 2014; Pellerin 2014). In order to develop the oral language skills in Luxembourgish, German and French of emergent multilinguals in Luxembourg, educationalists of the University of Luxembourg created the iPad app iTEO, an oral text editor. Their aim was to give teachers a portable, flexible and user-friendly tool that they could embed easily in their practices and that lends itself to learning in both formal and informal learning environments.

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Grounded in sociocultural theory and based on a longitudinal qualitative study, the present paper investigates, first, the ways in which emergent multilingual primary school children in Luxembourg scaffold each other's learning of German and French when they collaboratively produce oral texts on iTEO and, second, examines the affordances of this app for learning. The term 'affordance' denotes the opportunities digital tools provide for supporting learning, for example, through providing a learning context or offering structures for participation (Day and Lloyd 2007). This concept goes back to Gibson (1977) who studied visual perception and holds that animals (and humans) identify possible actions as they perceive their environment. He calls these possibilities for action 'affordances'. For instance, a mountain affords climbing and a river swimming.

This article will review literature on peers and digital tools as mediators of language learning, present the context and the design of the study and discuss our findings. We will argue that children develop language skills and learn how to learn languages when engaging in collaborative tasks on the app iTEO, which together mobilise the children's resources, encourage autonomy and promote discussion about language.

Mediation and language learning with peers

According to Moll (2000) and Wertsch (2002) human beings interact with their worlds primarily through 'mediational means' such as artefacts, tools and symbols, which, in turn, shape the development of their minds. Vygotsky (1978) distinguished between the mediating functions of externally oriented tools that influence others and actions (e.g. material tools such as a mobile devices) and of internally oriented ones that aim at developing and controlling oneself (e.g. psychological tools such as language). Mediation enables children to develop higher mental processes including attention and planning and to self-regulate these (Lantolf 2000). Learning happens if children, first, are assisted by adults, peers or tools chosen to support their learning such as digital technologies, and, second, if they work within their Zone of Proximal Development (ZPD). Applied to language learning, Ohta (2001) defines the ZPD as the difference between the learner's actual level of linguistic production on their own, and the level of potential production achieved through collaboration.

A number of studies grounded in Vygotskian theory investigated the role of peers as mediators for second language learning. Most of these studies analysed the interactions between experts and novices based on the assumption that 'more knowledgeable other(s)' teach those with less well-developed skills. The process in which the 'experts' help the 'novices' form utterances they are unable to complete individually, thereby building language skills, has been called co-construction (Foster and Ohta 2005: 420). For example, Martin-Beltrán (2010) described how two bilingual boys co-constructed a text in English by drawing on English and on Spanish. The learners repeated and built on each other's utterances, developed and transformed them. They engaged with each other's ideas and took directions from each other. The older learners in the study by Foster and Ohta (2005) encouraged their partners to continue, provided waiting time and asked for and offered assistance. This co-construction resulted in language learning.

Working within the same theoretical framework, other authors have offered insights into the ways in which peers interact and support each' others language learning. For instance, Chen and Gregory (2004) showed how two 8- and 9-year-old Chinese children, recent arrivals in Britain, deployed repetition and translation when they tried to make sense of a biology text in English. Chen and Gregory use the term 'synergy' in order to indicate that the assistance was cognitively challenging for both. By contrast, other researchers use the term 'scaffolding' (Wood, Bruner and Ross 1976) to denote the way in which the expert assists the novice. For instance, studying bilinguals in Year 1 classes, Angelova, Gunawardena and Volk (2006: 179) identified a range of scaffolding strategies including echoing, practising by repetition, paraphrasing, translating and clarifying as well as non-verbal communication strategies. The bilinguals in Year 5, investigated by Martin-Beltrán (2010), also deployed strategies that testified to their metalinguistic knowledge. For instance, they offered input, rephrased, compared languages, demonstrated understanding and verbalised rules. Studies with adolescent and

older leaners similarly show that learners negotiate meaning, request explanations or repair language (Foster and Ohta 2005; Storch 2002).

Swain (2000) confirms that learners are able to engage in a dialogue where they co-construct knowledge, solve language-related problems and internalise speech. She calls the process of consciously using language to build knowledge 'languaging' (Swain 2006). The relationship between talk and knowledge-construction has been investigated outside the field of second language learning. For example, it is known that 'exploratory talk' (Mercer 2008; Mercer and Littleton 2007) and 'dialogic talk' (Alexander 2004) are effective in fostering children's critical thinking and cognitive development.

Digital tools and apps as mediators for collaboration and learning

Societal, political and technological changes influence the knowledge and skills people require to function in their daily life. Today, educators privilege forms of teaching and learning which rely on flexibility and adaptability, encourage multiple perspectives and promote life-long learning. 'Mobile learning' is a case in point. It is situated in a particular sociocultural context, mediated by collaboration and individualised, and requires learners to actively generate their own learning contexts (Bachmair and Pachler 2015; Seipold 2014). Mobile devices afford this type of complex learning owing to their portability, multifunctionality and ubiquity (Bachmair and Pachler 2015). Kukulska-Hulme (2013), Palalas (2011) and Viberg and Grönlund (2012) are among those who hold that iPads and other mobile devices have the potential to influence cultural practices, widen opportunities for interaction, connect formal and informal learning environments and bring together conscious and incidental learning. They can be used to create meaningful, relevant and authentic situations of communication where language use is at times unpredictable and, therefore, forces the learners to mobilise all their linguistic resources. Furthermore, mobile devices can influence the users' engagement through the multimedia content; the affordance of the technology to direct the learners' attention; the opportunity to work in an interactive way, and the playfulness of the activities (McEwen and Dubé 2015). The findings of the literature review and the large study by Karsenti and Fievez (2013) reveal further benefits of iPads including increased motivation and improved collaboration. Engagement and collaboration have to be seen in relation to child autonomy and control (Kervin 2016), and, thus, the overall learning task designed by the teacher. For instance, Milman, Carlson-Bancroft and Vanden Boogart (2014), who studied the use of iPads with teachers and children from nursery to Year 4, indicated that the teachers tended to initiate goal-oriented learning activities and then left the class the choice of how to carry out the tasks and what material to use, for example, iPads. When working with these devices, the children collaborated well and remained immersed in drawing, literacy and mathematic activities over long stretches of times.

While there is little evidence showing that the use of technology results in learning (Burston 2014; Viberg and Grönlund 2012), findings show that some apps, in particular storytelling apps that enable learners to produce oral text, promote collaboration and language learning. Flewitt, Messer and Kucirkova (2014) revealed that the children in the early years classes and those with special needs they studied while using the Our Story app, collaborated well, frequently shared activities and supported each other's learning. Further, Di Blas and Paolini (2013), Flewitt, Messer and Kucirkova (2014), Pellerin (2014) as well as Xu, Park and Baek (2011) found that the storytelling apps investigated contributed to improved listening and speaking skills. For example, Pellerin (2014), who researched how 6–7-year-olds in Canada used apps in order to invent and record stories and puppet shows, found that the children were highly motivated to produce texts and improve their language skills. Such learning outcomes are often viewed as a result of increased engagement. For instance, Kucirkova et al. (2014) found that the storytelling apps under investigation engaged the 4–5-year-old Spanish children who collaboratively told stories. In order to be effective, language learning apps need to provide learners with open-ended language content and with opportunities to interact and take control over

increasingly difficult language features (Kucirkova et al. 2014; Palalas 2011). In sum, apps that involve learners in the open and playful task of collaborative storytelling have been shown to engage learners and lead to learning (Kervin 2016; Kucirkova et al. 2014; Pellerin 2014). Although digital tools have found their way into schools, teachers seem unsure of how to use the devices to enhance and sustain language learning and teaching. As a result, they call for professional development (Godwin-Jones 2011; Karsenti and Fievez 2013).

The context of the study

Luxembourg is a multilingual country with a trilingual education system. The national policies of the Ministry of Education aim at the development of children's competences in the country's three official languages. Children learn Luxembourgish from nursery school (aged 4–5), German from Year 1 in primary school (aged 6), oral French from Year 2 and written French from Year 3. Such expectations are ambitious in relation to the schools' intake. Statistics show that 50.4% of the primary school children are not Luxembourgish citizens and that the first language of 65% of the 4-year-olds is not Luxembourgish (MENJE 2016). While multilingualism is the lived reality in society, a monoglossic view underpins language learning at school (De Korne 2012). Linguistic skills are perceived as requiring separate and linear development. As a result, language instruction is separated along predefined time slots for each language and is largely based on individualised pencil and paper work. Studies consistently demonstrated that the non-nationals, particularly those of language minority groups, underachieve (Martin, Ugen and Fischbach 2015). In order to tackle these educational issues, the Ministry of Education called for innovative teaching methods and, among others, supported the development of the iPad app iTEO (Gretsch 2014). This app allows users to record utterances of any length, listen to these and edit the text by deleting or re-arranging the recorded utterances at will. An important feature of the tool is the automatic replay, which materialises the language used and encourages users to evaluate their utterances. Users can also insert pictures taken with the iPad's camera in order to visualise the sequence of a text or provide an interface illustration. The app is easy to use. Teachers who discussed the use of iTEO in professional development courses with Kirsch and Gretsch reported that children as young as 3 were able to operate it.

Design of the study

The data for the present article stem from the larger research project iTEO (2013–2017) where two nursery and two primary teachers participated over two academic years. Using iTEO, the teachers designed a range of structured and unstructured oral language activities in order to promote the development of Luxembourgish, particularly in the nursery schools, and of German and French in the Year 1 and 2 classes (Kirsch and Gretsch 2015; Kirsch forthcoming 2017). The present article draws on the data from two primary classes, one in the South and one in the North of Luxembourg, and focuses on two teachers, four children and some of their collaborating peers.

The participants

The teachers were selected on the basis of their teaching experience, their language background and willingness to take part with their class over two academic years. The children attended Year 1 in the academic year 2013/2014 and Year 2 in the following one. In collaboration with the two teachers, we selected two focus children in each class. Anastazie and Kiara attended one class and Aaron and Flavio the other one. Although our small-scale study cannot be representative of Luxembourg as a whole, we nevertheless aimed at selecting children from a range of language backgrounds. Each

Table 1. Information on the focus children.

	Flavio	Aaron	Anastazie	Kiara
Year of birth	2006	2006	2006	2007
Country of birth	Luxembourg	France	Czech Republic	Luxembourg
Year of arrival in Luxembourg	2006	2010	born in Luxembourg	2007
Languages spoken	Portuguese	Ewe	Czech	Portuguese
	Luxembourgish	Luxembourgish	Luxembourgish	Luxembourgish
	German	German	German	German
	French	French	French	French

of the children speaks a home language and Luxemburgish, and all learned formally German and French at school. Table 1 provides some information on each focus child.

Data collection and analysis

In order to investigate the peer mediation and the role of iTEO in supporting learning, we made video-recordings and collected the iTEO audio-recordings over a period of two years. Every six weeks, a research assistant video-recorded the children's interactions on iTEO. As the focus children were free to choose a partner, our final sample included children of Luxembourgish and non-Luxembourgish origin. Altogether, we had 13 hours of video-recordings, which showed how the children collaborated and used iTEO while recording various types of texts in a range of languages. For the purpose of triangulating data, we drew on the interviews with the teachers who explained the use of iTEO. Further data were collected, for example, interviews with the children and the parents, and video-recordings of the teachers using iTEO in class and discussing their experiences with the research team in half-termly meetings, but none of these data are used for the present paper.

The data analysis was multi-layered. We transcribed the video-recordings, taking into account gestures, facial expressions, gaze and posture when relevant for the analysis. Next, we analysed the content of the video-recorded activities and identified the characteristics of the task (e.g. unstructured or structured), the children's goal (e.g. creative storytelling, retelling of a story, completion of an exercise, vocabulary training), the genre of the text (e.g. story, exercise) and the language(s) used. We compared these data with the information gauged from the interviews. The focus of the thematic analysis thereof was on the planning of activities and the implementation of iTEO. In order to analyse the children's talk we used Mercer's (2004: 137) sociocultural discourse analysis, which focuses on the use of language as a social mode of thinking. We examined the participation structure and focused on co-construction (Foster and Ohta 2005). This level of analysis enabled us to identify strategies such as organising turn-taking, and initiating, extending and transforming text. In addition, we investigated teaching and learning strategies including clarifying, thinking aloud, explaining, rephrasing and repeating (Angelova, Gunawardena and Volk 2006; Martin-Beltrán 2010). In order to examine the affordances of iTEO, we sequenced the transcriptions into moments of pre-recording, recording and post-recording and, for each of these moments, we analysed the children's interactions with iTEO when they co-constructed a text or scaffolded a peer's learning. Times when the children listened to their text (moments of post-recording) were of particular relevance since the automatic replay encourages reflection about language.

Co-construction and language learning on iTEO

In the following sections we will begin with an analysis of four representative excerpts of iTEO video-recordings at three different levels. Concerning co-construction, we will investigate the extent to which children built on previous utterances. Concerning language learning, we will demonstrate

that the 'experts' used a range of teaching strategies to help the 'novices' perform in the target language, and that the 'novices' used various learning strategies. Concerning the tool, we will illustrate the particular affordances, functions and roles of iTEO. We will close this section with an overview of the findings, which stem from the 13 hours of video-recordings.

iTEO: fostering collaboration and language learning

Excerpt 1 from 2 May 2014 shows how the 6-year-old girls, Anastazie and Nina, co-constructed a text in German on iTEO. At the time, they had learned German for 25 weeks in Year 1. Anastazie, one of the focus children, speaks mainly Czech at home. Nina speaks Luxembourgish at home. Both were competent in German but Nina's skills were more advanced than Anastazie's, hence, the relationship is one of 'expert-novice'. The children were learning the letter 'R' in class and had read a story about 'Ritter Mil' (knight Mil) and Princess Leila. The teacher instructed them to tell a story based on the one read in class and gave them pictures of a knight, a horse and a castle for support. The aim of the task was to practise select vocabulary. It was semi-open as the children had some scope to introduce new elements.

The video-recording is in German and Luxembourgish. The original languages are in the left column and the English translation on the right. In order to better visualise mistakes, which the children may wish to discuss, we translated the text literally and underlined the mistakes in both columns. The text in English may be correct. This could be, for example, because the children made gender errors in German and French. As there is no gender in English, we cannot represent the mistake in the transcript other than by underlining it. The text in Luxembourgish is in italics in both columns in order for the reader to identify when children moved between languages. The length of pauses is indicated by the number of seconds in brackets.

		Excerpt	Translation
Pre-recording			
1.	Anastazie	Ritter Mil reitet auf Pferd.	Knight Mil rides on horse.
2.	Nina	Auf dem Pferd.	On the horse.
3.	Anastazie	Auf dem Pferd.	On the horse.
4.	Nina	Und reitet zu der Burg.	And rides to the castle.
5.	Anastazie	*Jo. Ech soen*: Ritter Mil, ehm, reitet auf dem Pferd.	*Yes. I say that*: Knight Mil, uh, rides on the horse.
6.	Nina	Zur Burg (…) *an da stoppen mer an da soen ech*: in der die schöne Prinzessin Leila wohnt.	To the castle (…) *and then we stop and then I say*: where the beautiful princess Leila lives.
7.	Anastazie	*Jo. Kuck, esou:* Ritter Mil reitet auf dem Pferd und reitet ins Burg.	*Yes. Look, like this*: Knight Mil rides on the horse and rides in the castle.
8.	Nina	Ins (3s) Ins Tal wo die kleine Burg steht. Ins Tal wo die kleine Burg steht. *Mee daat soen ech*. Und in der Burg wohnt die schöne Prinzessin Leila.	In (3s) in the valley where the little castle is. In the valley where the little castle is. *But I say that*. And in the castle lives the beautiful princess Leila.
9.	Anastazie	*Jo. Ok. Kuck, esou:* Ritter Mil reitet auf Pferd.	*Yes. Ok. Look, like this*: Knight Mil rides on horse.
10.	Nina	Auf dem Pferd.	Rides on the horse.
11.	Anastazie	Auf dem Pferd.	Rides on the horse.
12.	Nina	Ok. *Du fänks un*.	Ok. *You begin*.
13.	Anastazie	Ok.	Ok.
14.	Nina	*Eent, zwee, dräi.*	*One, two, three.*

This example corresponds to a pre-recording moment where the children discussed the plot of a story. Concerning co-construction, the data show that Anastazie initiated the sequence by offering the first sentence (line 1) and that Nina extended it thereby developing the story. She added and chained ideas (lines 4, 6, 8). Anastazie combined the previous ideas and produced the first sentence of the story 'Knight Mil rides on the horse and rides in the castle' (line 7).

Concerning language learning, Nina played the role of the 'expert'. She acted as a teacher listening attentively to Anastazie's utterances and assisting her in producing accurate sentences. She reacted to grammar mistakes in two ways: she provided a recast by adding the missing article (lines 2, 10) and she rephrased the last part of the sentence in order to avoid Anastazie's mistake (line 8). Nina was also a good role model in that she monitored her own language. For instance, she offered alternative

formulations of her utterances (lines 4, 6) and thought aloud (lines 8). Finally, she offered Anastazie the necessary time, opportunity and space to practise structures and rehearse her text (lines 3, 5, 7, 9, 11).

Nina's teaching strategies acted as a scaffold for her peer. Anastazie made good use of the learning opportunities. She took risks (line 1) and combined phrases (line 7). She accepted Nina's feedback in relation to her phrases 'rides on horse' and 'rides in the castle'. She agreed with her responses saying 'yes' (lines 5, 7, 9) and she appropriated Nina's input. She repeated the phrase 'on the horse' three times but she still made a mistake the fourth time (line 9). Nina corrected the sentence once again. Learning required great effort from Anastazie who repeated sentences (lines 3, 11) and rehearsed her text (lines 5, 7, 9).

Concerning the tool, iTEO offered a space where the girls could learn languages autonomously, consciously and collaboratively. The children knew that some peers and their teacher would listen to their text after the recording. This objective guided their motivation to produce an interesting and accurate text, and it explained their engagement to focus simultaneously on content and form.

iTEO: promoting discussion

Excerpt 2, a recording and post-recording sequence, follows Excerpt 1 by seven minutes. The video-recording has been transcribed following the same procedure as previously. The text in bold represents the automatic replay of iTEO.

		Excerpt	Translation
Post-recording			
1.	**iTEO**	**Sami sagt: Nein, Leila ist mein Prinzessin. Und dann sagt Tonio: Nein, Leila ist mein Prinzessin.**	**Sami says: No, Leila is my princess. And then Tonio says: No, Leila is my princess.**
Pre-recording			
		(…)	
Recording			
2.	Nina	Hört auf, euch zu streiten. Ich möchte keinen von euch, ich möchte …	Stop fighting. I want neither of you, I want …
3.	Anastazie	Mil von euch.	Mil of you.
4.	Nina	(moves her finger to the screen, takes the finger back) Aber, ja, Mil ist doch gar nicht hier!	(moves her finger to the screen, takes the finger back) But, yes, Mil is not here!
5.	Anastazie	Wer ist es denn?	Who is it then?
6.	Nina	Kannst du jetzt zauberen oder was?	Can you do magic now or what?
Post-recording			
7.	**iTEO**	**Hört auf, euch zu streiten, ich möchte keinen von euch, ich möchte … Mil von euch. Aber ja, Mil ist doch gar nicht hier. Wer ist es denn? Kannst du jetzt zauberen oder was?**	**Stop fighting. I want neither of you, I want … Mil of you. But, yes, Mil is not here. Who is it then? Can you do magic now or what?**
8.	Anastazie	*Zauberen? Firwaat?*	*Do magic? Why?*
9.	Nina	*Well en, jo well en virdrun nach nët do war.*	*Because he, because he was not there previously.*
10.	Anastazie	*Do war?*	*He wasn't there?*
11.	Nina	*E war virdun nach nët do.*	*He was not there previously.*

Inspired by the text read at school, Anastazie and Nina recorded the sequel of the story where the two knights Tonio and Mil wanted the princess Leila. In the one-minute-long pre-recording sequence, the girls discussed turn-taking but hardly spoke about content. They then recorded the continuation, listened to it and discussed it.

Concerning co-construction, the children paid attention mainly to the content. Nina followed on from their previous sentence replayed on iTEO and then stopped briefly (line 2). In order to assist her friend, Anastazie continued the story adding character Mil. However, this character did not fit in with the content developed by Nina. Nina must have realised the incoherence. She moved her finger to the screen, probably in order to end the recording, but stopped mid-way. She challenged Anastazie by stating that the character was not present and using the word 'but' (line 4). She ignored Anastazie's request for clarification (line 5) and added new content by asking a question about 'magic' (line 6). This could give the story a twist and, thus, possibly solve the issue related to incoherence. Nina then stopped the recording and the girls listened to the replay, which led to a discussion of the

previous content (lines 8–11). Having heard the word 'magic' twice (lines 6, 7), Anastazie asked Nina for clarification and Nina tried to explain the issue (lines 9, 11).

Unlike Excerpt 1, where the girls had meticulously planned and rehearsed the text before recording it, in Excerpt 2, they constructed the text while recording it. This may explain why they focussed mainly on content and why they did not notice any mistakes in German (lines 1, 3, 6). There may not have been any language learning opportunities.

Examining the findings concerning the tool, this excerpt illustrates the ways in which iTEO's recording and the replay function promoted discussion about language. In general, the replay materialises oral language, which, in turn, may make children aware of their own speech and lead them to consciously examine it. The opportunity to listen to previous recordings may help them remember parts, compare these and construct a coherent text. In Excerpt 2, Nina had two possibilities to notice the incoherent part, once during the production and once during the replay. She had the opportunity to solve the problem in various ways. Using iTEO's delete function, she could have deleted the brief discussion about content (lines 4–6). However, she did not. She decided to continue with the recording of the story. This analysis shows that iTEO offers children a space where they can work autonomously, take risks, discuss content and form, and decide what they want to record and delete.

iTEO: capitalising on personal resources and giving control

Recorded on 30 January 2015, Excerpt 3 shows how Aaron, Flavio, Loane and Lina practised French vocabulary in Year 2, having formally learned this language for several weeks. Native French speaker Aaron and Spanish-speaking Lina took on the role of experts. Their French skills were more advanced than those of Loane and Flavio who spoke Luxembourgish and Portuguese, respectively, at home. The children's task consisted of recording some sentences using the structure 'Je veux un/ une … ' and vocabulary related to toys. The teacher gave them some toys to support the activity. The exercise had a clear learning objective: practising vocabulary within a given sentence structure. The excerpt presented here corresponds to five recording sequences and five post-recording ones. The original video recording, in French and in Luxembourgish, has been transcribed in the same way as above.

		Transcript	Translation
Recording			
1.	Aaron	Je veux une balle	I want a ball.
Post-recording			
2.	**iTEO**	**Je veux une balle**	**I want a ball.**
Recording			
3.	Loane	Je veux une avion.	I want a plane.
Post-recording			
4.	Lina	(softly) Un avion.	(softly) A plane.
5.	**iTEO**	**Je veux une avion.**	**I want a plane.**
6.	Lina	*Et ass* 'un avion', Loane.	*It is* 'a plane', Loane.
7.	Loane	Un?	A?
8.	Lina	Un.	A.
9.	Loane	(deletes the previous utterance)	(deletes the previous utterance)
Recording			
10.	Loane	Je veux un avion.	I want a plane.
Post-recording			
11.	**iTEO**	**Je veux un avion.**	**I want a plane.**
12.	Lina	Besser, kloer.	*Better, clear.*
		(…)	
Recording			
13.	Aaron	Voilà une poupée.	Here is a doll.
14.	Loane	Merci, Aaron.	Thanks, Aaron.

(*Continued*)

Continued.

		Transcript	Translation
15.	Aaron	De rien.	You're welcome.
Post-recording			
16.	**iTEO**	**Voilà une poupée. Merci, Aaron. De rien.**	**Here is a doll. Thanks, Aaron. You're welcome.**
	(…)		
Recording			
17.	Lina	Voilà une balle.	Here is a ball.
18.	Flavio	Merci, Lina.	Thanks, Lina.
19.	Lina	De rien.	You're welcome.
Post-recording			
20.	**iTEO**	**Voilà une balle. Merci, Lina. De rien.**	**Here is a ball. Thanks, Lina. You're welcome.**

Concerning co-construction, Loane built her sentence (line 3) along Aaron's model replayed by iTEO (lines 1, 2). The children concatenated in order to construct a short conversation in lines 13–15 and 17–19.

In relation to language learning, the findings show the expertise of Aaron and Lina in guiding Loane's and Flavio's participation. The roles of Lina and Aaron will be discussed in turn. Lina reacted to the feminine article Loane had used instead of the masculine one (line 3). She deployed the following strategies to enable Loane to produce an accurate sentence: recasting the incorrect phrase, changing into Luxembourgish in order to both stress the correct article and ensure that Loane understood her teaching point, and repeating the correct article (lines 4, 6, 8, respectively). Lina also praised her 'pupil' (line 12). Loane demonstrated an intention to learn by asking for clarification, deleting the incorrect sentence and re-recording the correct one (lines 7, 9, 10, respectively). She received positive feedback from Lina (line 12) and could also hear herself speak correctly owing to the automatic replay (line 11). In his 'expert' role, Aaron redesigned the exercise and changed it into a more meaningful dialogue by calling on French expressions (lines 13, 15). Lina and Flavio had an opportunity to listen to Aaron and Loane as well as to the automatic replay (lines 13–16). They copied their peers using the same structure and vocabulary, thereby demonstrating uptake (lines 17–19).

Moving on to the tool, the findings highlight iTEO's recording and replay function. The recording function enabled the children to save performances. It provided evidence of mistakes (line 5) or of uptake (lines 11, 20). It is likely that it secured the children's attention, functioned as a source of input (lines 2, 16) and stimulated learning (i.e. the utterances of Loane, Lina and Flavio in lines 3, 17, 18, 19). Finally, iTEO provided a safe space where Aaron felt free to mobilise his linguistic resources, redesign the exercise and introduce some authentic language (lines 13, 15).

iTEO: encouraging metalinguistic discussion

Excerpt 4 from 20 October 2014 stems from the same class as Excerpt 3. The teacher wanted the children to produce a creative text in German thereby paying attention to coherence. He designed a collaborative oral exercise which he called 'narrative bag'. The children were to take an object out of a bag and produce German sentences that follow on from the previous ones. The excerpt is a post-recording sequence involving Flavio, Viviana and the 'experts' Aaron and Lee.

In order to contextualise the excerpt, we will first describe the recording sequence, which Lee initiated. He took a spiked ball from the bag, and described the object. Aaron fetched a packet of Haribo gold bears and explained that the ball jumped onto the Haribo. Flavio almost echoed Aaron. He repeated that the ball hits the Haribo but he substituted 'jumps' with 'flies' and used 'Haribo' in the singular. He then added a detail about the pencil taken out of the bag. Viviane added the final sentence and stopped the recording. The children had recorded the four sentences in one go. Because they needed time to choose an object and think of something to say, there were natural pauses between the utterances. The children used these pauses during the replay to talk about their text. Excerpt 4 illustrates their discussion.

		Excerpt	Translation
Post-recording			
1.	**iTEO**	**Ich habe ein grüner Ball mit Stacheln. Der ist bald, bald wie ein Igel.**	**I have a green ball with spikes. It is soon, soon like a hedgehog. (6s)**
2.	Aaron	*Du muss 'fast' soën.*	*You have to say* 'almost'.
3.	**iTEO**	**Und der Ball, ehm, springt auf das, ehm,**	**And the ball, uh, jumps on the, uh,**
4.	Lee	Auf die Hariboen.	On the Haribos.
5.	**iTEO**	**Auf die Hariboen und die Hariboen sind platt. (6s) Und där Ball**	**On the Haribos and the Haribos are flat. (6s) And the ball.**
6.	Aaron	Der Ball	The ball
7.	**iTEO**	**fliegt auf der Haribo (3s)**	**flies on the Haribo (3s)**
8.	Lee	Auf die Haribo.	On the Haribo.
9.	**iTEO**	**und der Haribo bleibt platt weil der Bleistift auf, auf der Ball (…)**	**and the Haribo remains flat because the pencil on, on the ball (…)**
10.	Lee	Auf den Ball	On the ball
11.	Lee	(…) Die Haribo**e**. Hariboen	(…) The Haribo**e**. Haribos.

Looking at text construction, the replay shows that the recorded sentences followed on from each other (lines 1, 3, 5, 7, 9). This indicates that the children listened carefully. Concerning language learning, the analysis revealed the extent to which the 'experts' Aaron and Lee endeavoured to correct mistakes. Lee's contribution included both a vocabulary and a grammar mistake (line 1). Aaron addressed the lexical issue (line 2). He chose Luxembourgish and explained which word was to be used. However, Aaron ignored the incorrect declension of the article and the adjective preceding the word 'ball'. Shortly after, Lee reacted to Aaron's use of the wrong article by recasting the phrase (line 4). He then realised that Aaron had already corrected the mistake himself (line 5). Next, Aaron reacted to Flavio's pronunciation of an article (line 6). He offered a recast by pronouncing the article more clearly. Lee also repaired Flavio's sentence by substituting the incorrectly declined articles (lines 8, 10). In line 11, he thought aloud. He offered two different plurals of the word 'Haribo' (lines 4, 8) and then came up with a third.

In this excerpt, iTEO created a space where the children could think aloud and reflect about language. As the content of the text was predetermined by the aim of chaining sentences, the children put all their effort into the formal aspect of their text. They identified pronunciation, lexical and grammatical mistakes, suggested alternatives and tried to find the correct plural form of 'Haribo'. Lee mobilised his linguistic knowledge to try different morphemes used in German to mark the plural.

Summary of the findings

Discussing co-construction, the findings of Excerpts 1–4, representative of our data, show that the children listened with care, built on previous utterances, sequenced sentences, expanded texts, came up with new ideas and, when necessary, challenged a peer and justified their own reasoning. Co-construction varied little with the task.

Concerning language learning, the findings reveal that these young children deployed a wide range of teaching and learning strategies. The experts listened attentively, provided lexical and grammatical input, extended phrases and transformed sentences. They repeated speech, rephrased sentences and, at times, emphasised a correct word or provided explanations. On occasions, they checked for comprehension and asked for clarifications. They switched to Luxembourgish in order to make their point. Furthermore, they assessed their peers and praised them. Finally, they were good models in that they monitored their own speech and corrected their language. As for the novices, they demonstrated a desire to learn. They listened attentively too, combined elements of sentences, rephrased utterances thereby demonstrating uptake, and repeated and rehearsed text. They asked for help, accepted feedback and assessed their productions. Like the experts, they deleted and re-recorded text when necessary. These teaching and learning strategies varied little between pre-recording, recording or post-recording sequences.

Moving to the affordances of iTEO, the analysis showed that the app promoted collaboration and mediated language learning. It created various spaces. First, the children interacted and learned together with peers. The task of recording texts in a target language required collaboration and collective reflection. The knowledge that these texts were available to an audience may have motivated the children to produce an accurate and comprehensible text. Moreover, the iTEO's replay function facilitated language learning. Materialising the language used, it assisted the children in noticing mistakes at the level of content and form. It provided evidence of uptake and learning, and triggered discussion about language. Second, iTEO provided children with the opportunity to mobilise their entire language repertoire. The 'experts' introduced peers to linguistic features not seen in class and created meaningful oral activities. Finally, iTEO offered a safe space where children had the power over what and how much to record within the constraints of the task. The delete function was of particular importance because it allowed children to remove unwanted text, irretrievable thereafter. The children used this freedom, took risks and interacted freely.

A meaningful discussion about the content-free app iTEO must include the task, thus the teachers' pedagogical design, because it also mediates learning. In the excerpts shown, the teachers set the tasks and the children had some, though little, control over these. The findings of the entire data set (all observations and interviews) indicate that the teachers also provided children with opportunities to define their own tasks. In this case, the children often invented stories alone or together (Kirsch forthcoming 2016, 2017). Although the study did not focus on the teachers' interventions, the interviews reveal some uncertainties in relation to planning tasks that involved iTEO. The teachers prepared language learning activities, selected material and grouped children. They differed, however, in their planning. One teacher designed a wide variety of tasks with iTEO (Kirsch and Gretsch 2015). He had clear objectives, carefully selected the material (e.g. 'narrative bag') and encouraged the children to give metalinguistic feedback. He monitored the children's language use and their discussions about language. When he felt they had not met the objectives or provided effective feedback, he re-designed the activities. He took part and, for example, helped children assess their productions. He explained:

> I like the fact that I found different ways of using iTEO during the year. (…) At the end of the year I find it very useful to listen to and comment the recordings with the children. We did not do this at the beginning. They recorded themselves and listened but few children were giving feedback. It was missing. That's why we are doing it now together.
>
> (interview 7 July 2014 translated by the authors)

The other teacher focussed on the children's use of the tool rather than on the pedagogical value of the activity. The following excerpt illustrates her initial uncertainties regarding the implementation of iTEO and her perception that children needed autonomy.

> Initially it was difficult for me. I asked myself 'how do I do this? How do I implement iTEO? Which activities?' With time, I became aware that the children do not need a lot of guidance. The more freedom the kids have, the more fun they have.
>
> (interview 16 June 2014 translated by the authors)

The way the teachers framed tasks and the amount of control they gave children impacted their learning. The children were more creative and produced longer texts when they had the scope to narrate stories.

Discussion: peers, task and iTEO mediating language learning

Adherents of sociocultural theory hold that children develop within their ZPD through social interaction and mediated activity. Neo-Vygotskians proved the existence of a relationship between dialogue, learning and thinking. For example, 'dialogic teaching', characterised by collective, reciprocal, supportive, cumulative and purposeful exchanges, has been shown to raise achievement (Alexander 2008). Similarly, Mercer (2008) holds that 'exploratory talk' in peer interactions enables the learners to

co-construct knowledge and transform their thinking. Children who engage in 'exploratory talk' build on each other's contributions, clarify, share information, challenge each other's views and justify their reasoning. This type of talk can appear if learners work in an atmosphere of respect, share a goal and have an opportunity to collaboratively solve problems. Exploratory talk is more likely in small groups because they operate more flexibly and imaginatively than in teacher-led interactions. Children have greater opportunities to initiate talk, raise questions and negotiate (Van Lier 1988). They may also feel more comfortable taking risks, asking for assistance and taking control of their learning. The findings of the present study indicate that the primary school children worked in an atmosphere of trust, shared the goal of producing a text and worked well in small groups. They interacted freely, kept each other on task and supported each other's learning. Drawing on Alexander and Mercer, we argue that the process of co-construction on iTEO was 'dialogic' and that the talk was mainly 'cumulative' although there was evidence of 'exploratory talk'. There were many instances of uptake and the children were learning languages from each. As seen before, they provided input, repaired language and gave explanations. Having attended primary school for two years by the end of the study, the 'experts' were able to assess oral speech and correct grammar and lexical mistakes although they had not yet developed the necessary metalinguistic knowledge to explain the nature of mistakes. During the process of co-construction and assistance, the learners moved flexibly and strategically between Luxembourgish and the target languages (Kirsch forthcoming 2016). They were 'translanguaging' meaning they use their entire linguistic repertoire for communication (García and Li Wei 2014). The teaching and learning strategies deployed by the children in the present study are similar to those found in other studies (Angelova, Gunawardena and Volk 2006; Esquinca, Araujo and de la Piedra 2014; Foster and Ohta 2005; Martin-Beltrán 2010).

The nature of the peer interactions, the children's scaffolding strategies and the learning outcomes are mediated, among others, by the task and iTEO. These factors will be discussed in turn although they influence each other. Neither the teachers' pedagogy on its own nor the digital tool by itself can explain the nature of the collaboration and learning.

First, the task, digital or not, is always framed by particular teaching methods and learning theories. In the field of foreign language learning, Task-Based-Instruction has been proven to be an effective method (Ellis 2003). Underpinned by socio-constructivist learning theories, this method requires the learners to collaboratively solve purposeful tasks drawing on a range of authentic materials and exploiting their linguistic resources. In the case of the present study, the teachers framed the task and, similarly to those studied by Milman, Carlson-Bancroft and Vanden Boogart (2014), also provided some opportunities and scope to redesign it. The children enjoyed the greatest control during storytelling when they could negotiate the content, the choice of language and some formal aspects such as lexis (Kirsch forthcoming 2016). As with the children in Pellerin's (2014) study, they were motivated, discussed language use, deleted and re-recorded texts. Their habit of assisting each other and correcting mistakes was in keeping with the teachers' pedagogy. In research meetings with Kirsch and Gretsch, they had developed a basic understanding of 'dynamic assessment' which emphasises the dialectical relationship between assessment and instruction (Ebadi and Bahramlou 2014; Lantolf and Poehner 2008). One teacher in particular was keen to implement this development-oriented approach when using iTEO. He may, therefore, have been a role model for the children by the end of the study. The children played a dual role: the instructors who scaffolded their peers' learning processes and the assessors who evaluated their oral productions and gave feedback. In sum, in relation to the task, our findings show that the activities framed the children's interactions. Over the period of the study, the teachers began to develop new practices and hand over more control to the learners. They needed time to learn how to design relevant tasks and implement iTEO effectively. Their uncertainties are not uncommon and have been described by, amongst others, Godwin-Jones (2011), Hutchison and Beschorner (2015) and Karsenti and Fievez (2013).

The second factor mediating the children's collaboration and language learning was iTEO. Content-free tools designed for general users and apps that give learners control over interactions engage users and encourage learning (Kervin 2016; Kumpulainen 1996; McEwen and Dubé 2015).

iTEO is a case in point. It offers learners a blank page. They can collectively decide on a goal, plan, explore, take risks and construct texts. The replay materialises the recorded language and encourages the children to take a critical stance on their production. Finally, iTEO's editing and delete functions allow users to endlessly manipulate texts. The emergent multilinguals in the present study were well motivated and focussed when recording. A similar level of engagement has been found in other studies on digital storytelling (Flewitt, Messer and Kucirkova 2014; Kucirkova et al. 2014).

In sum, the tool and the task, together called for collaboration, encouraged autonomy, and promoted metalinguistic discussion. As such they mediated language learning. The children developed and consolidated their language skills as well as learning what language learning entails. During the process they became aware, almost incidentally, that they needed to take control of their learning, listen, monitor their speech, assess a production, act on feedback, modify speech and practise. They experienced that speech is at times unpredictable, that dialogue calls for flexibility and that there is room for agency and innovation. They also developed learning and teaching strategies as well as the skills to assist peers. As such, learning with iTEO shares characteristics of mobile learning, for instance, being context-bound, personal, collaborative, dynamic and learner-centred (Bachmair and Pachler 2015; Seipold 2014). Working with iTEO contributes to the development of core social skills and cultural competences needed to function in today's participatory culture and mobile world (Jenkins et al. 2006).

Conclusion

This article brings together research on peer mediation and mobile-assisted language learning. The findings of this study show that the primary school children, the app iTEO and the task together mediated language learning. Although the app is easy to use, we realised that the participating primary school teachers found it initially difficult to implement. This was not due to the technology. Rather, it was related to the design of the tasks, which framed the way children collaboratively learn languages with iTEO. In order to use this app effectively, the teachers had to cultivate respect, hand control over to the learners, design meaningful tasks that stimulate speaking and thinking, and teach children how to assess and give constructive feedback. Digital tools do not automatically and by themselves lead to learning: teachers must also learn to implement the technology imaginatively and systematically. Initial teacher education and professional development courses play a key role in helping teachers understand the relevance of mobile learning, design effective digital tasks and plan for sustainable learning. Research can contribute to the same aim, for instance, by defining ways of supporting teachers in integrating mobile devices and further investigating the educational potential of digital tools.

In a follow-up study, researchers could examine how older pupils, who have developed more metalinguistic knowledge, support each other's learning both through languaging and the use of the app iTEO. Further, it would be important to analyse the teacher–child interactions during activities on this device and to compare these to the peer interactions.

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