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'ELENA Goes Mobile': a Mobile Assisted early Foreign Language Learning Pilot for Familiarizing Children with Neighbouring Languages

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Abstract
How do you involve (grand)parents in early language learning of their (grand)children outside school? How can young children become familiar with languages that are used in neighboring countries that are geographically proximate to where they live, in an entertaining and explorative way?
These questions are addressed in a pilot with a mobile learning game that is part of the ELENA project (Early e-learning of neighboring languages). Within the Euregio, in the border region between the Netherlands, Belgium and Germany, several languages are spoken within a geographically small region. However, when children start to learn a foreign language, still in the majority of cases English is chosen. Opportunities for early language learning of e.g. German, French and Dutch, within children's neighborhood are left unexploited. Within the ELENA project seven European partners collaborate to develop digital learning material to improve the learning and teaching of neighbouring languages from an early age on. Elena is not only the name of the project, but also the name of the central character within the learning material, developed by the MAD-faculty. Hand in hand with Elena, children between 4 and 8 from the border regions familiarize themselves with their neighbouring languages by means of 8 themes that are taken from a child's immediate environment (e.g. family, school, the body etc.), so the online learning material suits children's perception of the world.
Within the ELENA pilot we explore and exploit the functionality that a mobile phone offers to additionally familiarize children (6-8 years) with a neighbouring language (German) in a 'real world context', in an interactive and playful way. The mobile game connects to the theme 'Elena goes shopping' that is introduced in the online learning material. The game scenario directs and guides children and their (grand)parents to do the shopping that is needed for baking pancakes. Underlying objectives of the game are, next to involving (grand)parents or other family members, to reinforce children's' interest in a 'neighbouring' language; to familiarize them with sounds and pronunciation; to learn, repeat and practice vocabulary and to connect language to the direct (living) environment and perception of children. Therefore, the focus is on listening, understanding and speaking the language. Outside the school and in company of a (grand)parent children make a shopping list for baking pancakes on their mobile phone. Subsequently they go with their mobile to a store where they will do the shopping, can entertain themselves on their way by means of a song (and 'singing' tasks) in the neighboring language and carry out tasks in a nearby supermarket. This pilot makes use of the ARLearn platform in which educational mobile games can be developed. The mobile game predominantly uses audio instruction and selection of answers by means of 'graphical/picture' buttons, so that the child for the most part (with some help of their (grand)parent) can go through the scenario independently.
In this paper the underlying principles of the design, the design process as well as the first evaluation results of the mobile game scenario are presented.

1. Introduction
Since 2002 there is an increased stress on and EU policy towards mastering two languages, next to the mother tongue, when compulsory education of European citizens ends [1]). Consequently, early foreign language learning received more attention, as starting early potentially increases the total time spent on language learning as well taps into cognitive possibilities and language sensitivity of young children [2]. Indeed, most of Europe nowadays starts early and offers more years of foreign language learning than before the Barcelona policy statement. However, English is still the most dominant language within early foreign language learning contexts [3], also in regions where other language options are within geographical proximity. The Euregio, at the borders of The Netherlands, Belgium and Germany, is one of such regions where within a geographically relatively small area (about

60km^2), three languages are spoken (Dutch, French and German). Within the ELENA project seven European partners collaborate to develop digital learning material to improve the learning and teaching of such neighbouring languages from an early age on (4 to 8 years).
Within this project a pilot with the use of a mobile phone to support early foreign language learning is held. This pilot aims to connect the teaching approaches interwoven in the material with everyday experiences outside the classroom, thus offering an extra opportunity for informal foreign language learning [4]. We also explore the functionality that a mobile phone offers to additionally familiarize children with and reinforce their interest in a neighbouring language. In this paper we describe how design decisions of the mobile scenario were grounded in theory, then we describe how the scenario was developed, followed by an expert evaluation. We conclude with a reflection and future plans.

2. Design: principles and decisions

2.1 From the Early language learning perspective

Several benefits of early foreign language learning, next to the mother tongue, are distinguished. Language experts indicate that young children are highly language sensitive and can relatively easy learn several languages in parallel, especially until the age of 7 or 8 [5]. During this period they show extra openness towards languages, learning without effort and intention, and in an internally motivated, spontaneous, playful way. After this period they become more aware of the structure and rules of languages, and start to learn accordingly. Learning a language at an early age best seems to works through immersion and play. Although opponents of early foreign language learning are afraid that learning extra languages next to the first language will negatively affect the mastering of children's first language, there is no evidence of such effects [1, 5]. The contrary seems to be the case: next to improving foreign language skills and even the mastery of the first language an extra language improves cognitive flexibility and skills (such as analytical thinking and problem solving), meta-linguistic awareness (grammatical structures and insight in the composition of word significance), learning skills and strategies and intercultural sensitivity of early language learners [1,2,5].
Several general principles can guide early (foreign) language learning. For young learners it is especially important to learn with all their senses [1]: learning should be supported visually and multi-sensory. They also learn easier when they start to learn things related to their direct environment, to become familiar with the phenomenon of using different words for the same object, but also as the experience connects to their immediate personal experience and perception. Therefore, learning should be situated in meaningful contexts and linked to themes adapted to personal interests and characteristics, such as age, level and aptitude, of the children. It is also important to train the ear (as comprehension precedes production) and pronunciation, to become familiar with the sound system of the language. 'Immersion' (learning a language through using it directly during lessons) [1] and learning through imitation (e.g. repeating what a character says) are very efficient learning approaches at an early age. Other important principles mentioned by Edelenbos, Johnstone and Kubanek [2] are related to children's internal motivation and enjoyment to learn an additional language; repetition of and frequent (out-of-school) exposure to the language; and awareness of the relationship between the sound and written systems of the languages they know and are learning (p.156). Also, to start a sustainable foreign language learning initiative within a school, involvement of all parties (from school management till parents [4,5]) is necessary.

2.2 From the Play theory perspective

As young children seem to learn languages relatively easy and in a playful way, we looked into what theory about 'play' of young children says that can support early foreign language learning. The national play policy of Ireland (2004) as cited in Kernan [6] defines play as '*freely chosen personally directed behaviour, motivated from within by needs, wants and desires. Through play children explore social, material and imaginary worlds and their relationship with them, elaborating all the while a flexible range of responses to the challenges they encounter.*' Although the idea of *designing* a scenario that supports learning conflicts with the *'freely chosen'* part of the play definition, we still found several key forms of play that could inform the design. From the list of Kernan [6], Table 4, p.19) of six forms of play three seemed to be especially informative. First, 'exploratory play', *using physical skills and sensations to learn about materials and their properties, what they feel like and what can be done with them*. Second, 'pretend, fantasy and socio-dramatic play', which includes '*role play, pretending with objects, pretend actions and situations, persistence within the imaginary play frame to create a play episode or event.(…)'.* Third, 'language or word play', *'unrehearsed and spontaneous manipulation of sounds, and words often with rhythmic and repetitive elements.(…)'.* These forms of

play (partly) overlap with the play patterns 'object play' (manipulating and discovering characteristics of objects), 'imaginative and pretend play' (create their own sense of their mind by pretending) and 'storytelling-narrative play' (stories help to understand ourselves and others) identified as elemental forms of play by the National institute for play [7].

2.3 From the mobile technology for learning perspective

What is the specific surplus value that the functionality of a mobile offers to support (informal) learning compared to other ways? Laurillard [8] mentions that the most critical benefit is that a mobile enables learning to be digitally-facilitated in any location and supports a site-specific learning experience, whether defined as a learning environment or not. However, we pose that to profit from this characteristic it is important to connect (guided/scripted learning or user-generated) activities with observations, activities and experiences in the environment, so that interaction between the user, the device and the environment is ensured. Another advantage [9], which may be hindered by low bandwidth and limited input and output capabilities of (the user interface of) a phone, is access to (multi-media or socially-constructed) information anywhere at any time, while learners can travel to locations physically *with* or virtually *through* their devices. Multiple sensory, cultural and environmental cues can aid the understanding of the *uses* of information within a context and can be tailored to the user(s) [10], which may in turn enhance encoding, comprehension and recall [9]. A more practical advantage is that you can use otherwise differently spent time (e.g. for travelling) for learning. Sandberg, Maris & de Geus [11], specifically looking at the effects of a mobile early English language scenario about Zoo animals on the retention of English words, conclude that with their scenario (that could also be played without being in the Zoo) children especially increased the time spent on the language tasks, as they liked playing it at home, thus improving retention. They didn't find a contextualized learning effect, however, this could be due to the scenario not sufficiently tapping in the context itself. They did show that the children were enthusiastic to learn languages starting from a context and that a mobile scenario can connect to their internal motivation, thus enlarging children's willingness to engage in language activities outside the classroom by means of play.

2.4 Design decisions

Based on theory as well as practical considerations, we derived the following design decisions:

Design aspect	**Decision and description**	**Theoretical and practical background of ELENA**
Target group:	Children aged 4-6	At this age children still learn by immersion and in a playful way and are not yet hindered by formal rules & structures of a language. Falls within age range of project (4-8 yrs)
Theme:	Shopping for baking pancakes	Connects to children's near experiences and tendency to role-play, imagine and pretend, as well as storytelling-aspect of internal motivation to play. Also connects to theme 6 'Shopping' of online ELENA material.
Context:	Home and supermarket. Connects both contexts by means of a shopping list.	Relates to environment of children, a real-world context that they know. Taps into internal motivation of child to learn different words for the same object.
Location:	Any supermarket	Activities should not be tied to a specific supermarket, but 'playable' in any supermarket where they have sufficient network access
Learning objectives:	To familiarize children with sounds and pronunciation; to learn, repeat and practice vocabulary; to raise interest in languages	Connects to natural language learning tendency of young children. Importance of training the ear, to become familiar with the sound system
Content:	Target words of theme 1 to 6. Focus on listening, understanding and speaking the language	Connects to learning objectives, repetition of previously learned words, using them in context and increasing 'out-of-school' exposure to the words.

Learning activities:	No collaborative activities. Activities such as: say and record (your name), sing (and record) in alternative ways (fast, slow), listen to a/your recording, search and find/collect and take a picture, show me (by taking a picture), choose (and listen to the alternatives), taste, smell, count. Enthusiastic feedback after an action.	Connects to learning objectives, facilitates connection and interaction with the environment, multi-sensory approach and feedback (by listening to own productions), takes advantage of the affordances of a mobile (e.g. offering additional information/multi-media material on a location), learning by exploration, (word)play, imitation and repetition. No collaborative activities as this needs organisation in an informal setting. Activities don't promote running, shouting etc., to avoid annoyance in the supermarket.
Control: children	Child (with some help) can go through the scenario independently/at their own pace	Children explore social, material and imaginary worlds and their relationship themselves
Assistance/ guidance:	ELENA (a girl aged 7) guides and instructs children's activities in context and (grand)parents assist	ELENA connects to children's own characteristics and helps to 'tell a story'. Foster involvement of all parties when learning a language, also (grand)parents
Instructional language	In mother tongue, short informally formulated instructions (in a 'buddy' type of way), repeated in the target language.	Show relation of the sound system between mother tongue and target language. Avoid misunderstanding of the instruction.
Time needed:	Max. 60 min (incl. travel time)	Limited concentration and attention-span of children. Increase likeliness of playing the scenario in a supermarket
User interface:	Predominantly use graphics and audio	Supports learning objectives as well as learning multi-sensory. Children cannot read yet.
Device and access:	Playable on any android phone and download via play-store	Supports a large group of phone users. Supports open source development and distribution.

3. Development of the mobile game scenario

We first developed the scenario on paper, until the level of dialogues between ELENA and the child. Then we discussed whether any developmental changes to the ARLearn tool sh/could be realized to implement the scenario. ARLearn [12] is an open source tool suite for educators and learners supporting mobile serious games. It enables the creation and management of game scenario's and runs (game instantiations). Several changes to ARLearn were made, such as addition of items with a graphical single/multiple choice and audio instruction in combination with pictures.

We then recorded audio and searched within the existing ELENA image library (developed by the MAD faculty) for accompanying pictures. We developed incrementally and continuously tested between the ARLearn authoring environment and the result on the mobile phone.

4. Evaluation

The first version of the mobile game scenario was evaluated by 8 experts, representing (foreign) language learning as well as learning-and instructional and graphical design expertise. They went through the game and by means of a questionnaire and a subsequent group discussion, evaluated the suitability of the scenario for the formulated objectives and target group, as well as it's usability. Results are presented during the conference presentation.

5. Conclusions and further steps

Mobile game scenario's potentially offer the possibility to connect 'real-world' objects with their alternative names in another language, help children to become familiar with another language, extend foreign language learning time (e.g. by using 'travel time' and promoting 'out-of-class' activities) and can instruct, guide, motivate and activate children to perform foreign language learning activities, while they are acting themselves within an (existing, enhanced or created) environment.

Based on the expert evaluation the mobile game scenario will be adapted and pilot-tested with a small group of target users (children aged 6-8 with (grand)parents) in a supermarket. This further investigation will reveal whether these promising outlooks can be fulfilled in practice.

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