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**IMPROVING LITERACY SKILLS AND
DIFFERENTIATING LEARNING SPEED AMONG 1
ST AND 2 ND YEAR PRIMARY SCHOOL
CHILDREN THROUGH A COMPUTER-ASSISTED
LEARNING TOOL INTEGRATING SPEECH
SYNTHESIS**

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► **To cite this version:**

Claude Beucher-Marsal, Florence Charles, Brigitte Gruson, Carole Le Henaff. IMPROVING LITERACY SKILLS AND DIFFERENTIATING LEARNING SPEED AMONG 1 ST AND 2 ND YEAR PRIMARY SCHOOL CHILDREN THROUGH A COMPUTER-ASSISTED LEARNING TOOL INTEGRATING SPEECH SYNTHESIS. *The Learner*, 2014, New York, United States. hal-04088723

HAL Id: hal-04088723

<https://hal.univ-brest.fr/hal-04088723>

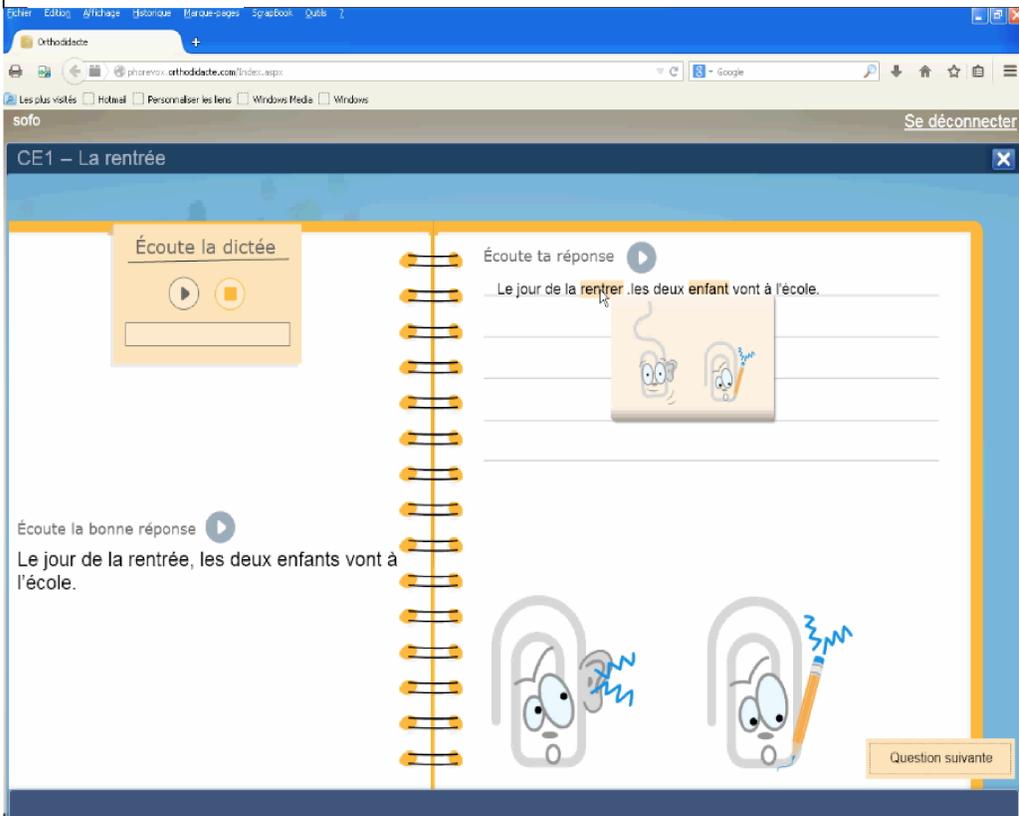
Submitted on 4 May 2023

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INTRODUCTION & RESEARCH QUESTION

The main objective of the contribution is to show the value of creating new interactive software for use in the first two years of primary schools to teach literacy skills through vocal technologies that enable audio feedback. The aim of this computer-assisted learning method is to promote real-time reviewing.

Interaction by synthetic speech as real-time audio feedback can lead to greater command of literacy, especially if linked to other tools to reinforce support for pupils learning to write.

In the research of PhoReVox, speech synthesis plays a key role and performs a guidance function by managing pupil tasks: it can read aloud the text displayed on screen before or during the exercise, provide cues, and read aloud (sometimes at learner request) the pupil's written production.

Research question: How does real-time audio feedback via speech synthesis develop some literacy skills among early school children, particularly with regard to editing a written text?

Theoretical Framework

The major disadvantage of current software tools for writing is that they do not offer the possibility to monitor whether learner entries are semantically correct (Mangenot, 1996). Speech synthesis enables a review of what has really been written down and not what the pupil believes he has written, but it is often underused (Handley, 2009; Gelan, 2011). It gives an alternative to requests for teacher assistance. Young learners will hear the text they have written read aloud via the machine, simultaneously or quasi-simultaneously with the writing process, which should enable them to identify errors (e.g. various omissions, segmentation errors, grammatical, phonetic and syntax mistakes) (Marty, 2005) and to search for alternative wording.

Research perspectives

This guidance function could promote better listening skills and increase attention and concentration (Cohen 1992).

It could be a tool to help pupils during the revision of their written productions and lead to appropriate individual course (differentiation).

Hypotheses

The combination of speech synthesis and a spell checker integrated into simplified word processing software for early primary school pupils reduces the complexity of editing processes (Hayes, Flower, 1980) and thus the effort necessary at the reviewing stage, which could otherwise induce cognitive overload in novice writers (Scardamalia, Bereiter, 1985).

Material and methods: 2 experimental phases

Phase 1 : Test the Platform ergonomics (6 classes)

Phase 2 : Test the effects of audio feedback, study of the exercises' content. Students have been selected in each class : high-performing, middle-performing students and low performing students.

Example (french translate into american language):

- **Software (speech synthesis dictates) :** Mary plays marbles with Emma
- **Thomas (writes) :** Mary playZ marbles with Emma.
- **Software (Thomas makes the speech synthesis vocalize the dictation text) :** Mary plays marbles with Emma.
- **Thomas :** So it's all right ! (validates his text)
- **Software :** (Underlines the letter « z » at the end of « playz » and reads out) « Mary plays marbles with Emma ».
- **Thomas :** Well, it's strange.

Conclusion: Automatic content generation and the adaptation of speech synthesis to the field of learning via dedicated phonological and prosodic models are fields of research that are still in their infancy. PhoReVox, or its derived tools, could provide new insight into the use of speech synthesis and content generation in learning, which will enable new products to be defined or existing products to be improved.

In term of target population, an easily accessible system appears to be an essential factor for learner and teacher acceptance of such a platform.

Références:

- Cohen R. (1992). *Quand l'ordinateur parle. Utilisation de la synthèse vocale dans l'utilisation et le perfectionnement de la langue écrite*. PUF.
- Gelan (2011). Language and Text to Speech Technologies for Highly Accessible Language & Culture Learning. *International Journal of Emerging Technology in Learning (IJET)*, VOL. 6, N° 2, p. 11-14.
- Handley Z. (2009). Is Text To Speech Synthesis ready for use in Computed-assisted language learning?. *Speech Communication*, Vol. 51, N°10, p. 906-919.

- Lété B. (2008). La remédiation des difficultés de lecture par la rétroaction verbale sur ordinateur: bilan des recherches. In Jacques Grégoire, *Evaluer les apprentissages*. Chapitre 6. De Boeck, p. 133-155.
- Mangenot F. (1996). *Les aides logicielles à l'écriture*. Paris. CNDP.
- Marty N. (2005). *Informatique et nouvelles pratiques d'écriture*. Nathan.
- Scardamalia M., Bereiter C. (1985). Fostering the development of self-regulation in children's knowledge processing. In Chipman, S.F., Segal J.W., Glaser R. (eds), *Thinking and learning skills. Research and open questions*, LEA Hillsdale NJ, 563-577.