

## Second Language Teaching in Elementary School with a Multimedia Gloss

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**Abstract.** This work investigates the effects of a special designed multimedia gloss on learning outcomes concerning vocabulary learning in German as a second language in elementary school pupils. The gloss involves annotations of unknown words in three different representations: text translation from German into Greek, presentation of the word in German and its translation pronounced in Greek, and word interpretation by using a picture. Thirty one pupils of ages 10-11 years interacted with the multimedia gloss and participated in computer-based learning activities. The outcomes on vocabulary learning were positive, with the majority of pupils to prefer the aural annotations of the unknown words. The attitude of all pupils towards use of the multimedia gloss and activities was also positive. Our findings support Mayer's cognitive theory of multimedia learning in the field of language learning.

**Keywords:** L2, multimedia gloss, elementary school

### 1. Introduction

Information and Communication Technologies (ICT) are considered to be the most powerful tool for the support of teaching and learning processes. Their main contribution comes from their technological characteristics, the ways they record, represent, manage and transfer information. These characteristics concern the management of high volume of data and information in a short time, information presentation through dynamic interactive and multiple representations, as well as communication and motives they provide. The main contribution of ICT to the learning process comes indirectly, through their pedagogical exploitation and certain attributes that arise from the technological characteristics. This mainly involves processes and tasks for the active participation of students and teachers, action and feedback through interactive activities, as well as processes that support the creation of mental models [1].

Dynamic interactive and multiple representations by using multimedia elements redefine the conventional text and are exploited in teaching and language learning, especially of a second language (L2), usually in the form of Computer Assisted Language Learning (CALL).

Mayer has proposed the generative or cognitive theory of multimedia learning, where "meaningful learning occurs when learners engage in appropriate verbal and visuospatial thinking". The simultaneous presentation of corresponding words and pictures in working memory, "enable the learner to construct mental connections between them" and engage students in cognitive processing and deeper understanding [2].

In second language teaching, the cognitive theory of multimedia learning can be implemented by various ways. This work proposes the application of Mayer's theory by the use of electronic glossing. Electronic or digital glosses are mainly vocabulary annotations in multimedia or hypertext that present information about a specific word in the text and appear on the same screen as the text. The annotations of electronic glosses are not permanently visible on the text, but can be activated by the student at their will through buttons [3].

Mayer's model on multimedia learning and electronic glossing seem to be a powerful approach to L2 teaching and learning. The aim of the present work is to investigate if a special designed multimedia gloss is

positively accepted and brings out positive learning outcomes in learning German as L2 in elementary school pupils.

## **2. Electronic Glossing in L2**

Multimedia glossing seems to promote vocabulary learning and a deeper level of text comprehension. Lomicka has reported that annotations followed by definitions, translation, pictures and pronunciation brought better results comparing with both a traditional gloss providing definitions and translation and a text with no access to glosses [4]. Plass, Chun, Mayer and Leutner supported Mayer's theory by presenting positive learning outcomes with 103 English-speaking college students in a German course. The educational implication of their multimedia gloss was that "learners should have options for selecting and processing material in both visual and verbal modes". Their contribution to theory was the "distinction between building visual and verbal cues for retrieving stored information from memory in vocabulary learning and building visual-verbal referential connections for storing the global comprehension of a story in memory" [5]. In 2001, Gettys, Imhof, and Kautz studied the effect of glossing on comprehension and vocabulary retention of Russian language with university English native speakers. Authors compared a gloss providing a sentence-level translation with another one connecting words with their meanings through dictionary forms. The results showed that although students spent more time on the second type of glossing, they had a better retention of Russian words [6]. Electronic glosses seem to act as a strong motive to learners of English as a second language, and enable vocabulary learning, especially when authentic and meaningful texts are used [3]. Yanguas studied the effect of different types of multimedia glosses that is text, pictures, text and pictures, on text comprehension and vocabulary learning in Spanish native speakers and English as L2. The results showed that students recognized more words in all multimedia glosses and comprehended more words by using the gloss providing both textual and pictorial representations [7]. A recent meta-analysis on the effects of hypertext glosses on L2 vocabulary acquisition showed that text and visual combination was more effective than text only [8]. It was also concluded that hypertext glosses had better results on vocabulary acquisition of beginning learners, but little has been done at the K12 level.

From the above brief review is shown that multimedia glossing is a powerful tool that contributes to L2 teaching and learning and there is limited research with elementary school pupils.

## **3. Empirical Study**

### **3.1. The multimedia gloss**

For the purpose of the present study, a multimedia gloss accompanied by computer-based learning activities was designed and developed. The gloss follows the criteria for teaching L2 using ICT as posed by Overmann [9] that is content and activities are presented in different ways and there is immediate feedback to assist in learning. The gloss is developed in htm and can be used in any web browser. The topic of the gloss is "family members" as they are presented in the school textbook for teaching German as L2. Annotations of the unknown words appear on the computer screen by three different representations: 1) text translation from German into Greek, 2) presentation of the word in German and its Greek translation pronounced in Greek, and 3) word interpretation by using a picture. The pupil may choose any type of word representation by clicking on the appropriate icon which is upon each one of the 20 unknown words (Fig. 1). Every pupil's action is automatically recorded by the software for processing purposes.

The freeware authoring tool "Hot Potatoes" was used for the design of the learning activities. There were a multiple choice exercise with three items of increasing difficulty, a matching words exercise with six items, a short-answer exercise with six items following a song listening, and a gap-fill exercise concerning a family tree with ten items (Fig. 2). Before the empirical study, the software was tested with five pupils and the appropriate corrections were made. All the activities run in any web browser.

### **3.2. Research axis**

The research axis of the present work was the investigation of vocabulary learning as a result of the use of the multimedia gloss and the relevant learning activities.

### 3.3. Sample and procedure

The sample of the study was 31 elementary pupils, 15 boys and 16 girls, 10-11 years old. All children were Greek native speakers with basic English language knowledge. Thirty out of the 31 pupils had basic computer skills. Each child was working individually at the school library. After the study of the annotated text and the learning activities, each child filled a properly designed questionnaire with 14 questions concerning preferences and attitudes regarding the multimedia gloss and activities.

**Meine Familie**



Das ist eine Familie. Auf dem Foto sind auch die Großeltern, die Tanten, der Onkel, der Cousin und die Cousine.

Die Eltern sind der Vater Manolis und die Mutter Claudia.

Der Vater kommt aus Griechenland und die Mutter aus Deutschland.

Manolis ist Lehrer in München und die Mutter ist Krankenschwester.

Sie haben zwei Kinder: Den Sohn Michael und die Tochter Christina.

Die Großeltern heißen Walter und Ingrid.

Sie sind die Eltern von Claudia und leben in München.

Tante Sabine ist die Schwester von Claudia.

Die anderen Großeltern heißen Michalis und Sophia.

Sie sind die Eltern von Manolis und leben in Thessaloniki.

Onkel Kostas ist der Bruder von Manolis.

Onkel Kostas und Tante Aliki sind die Eltern von Jannis und Eleni.

Jannis und Eleni sind der Cousin und die Cousine von Michael und Christina.

Fig. 1: The multimedia gloss

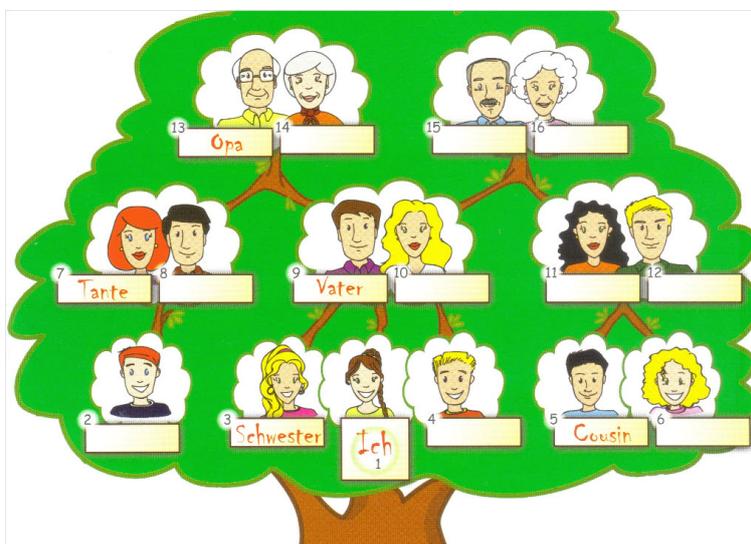


Fig. 2: The gap-fill exercises with the family tree

## 4. Results

Fig. 3 shows the number of clicks for every word in the text, for the three different annotation representations for all the pupils. As it is shown, auch (too, 48 clicks), Lehrer (teacher, 47), Großeltern (grandparents, 45), Onkel (uncle, 41), Eltern (parents, 41), auf dem Foto (in the photo, 40) and Krankenschwester (nurse, 39) are considered as the most difficult German words. For these words, pupils mostly preferred the audio translation followed by the textual representation. Pupils also preferred the audio translation even for words such as Mutter (mother) and Cousine (cousin) that are considered as easy words, although they had a small number of clicks. For these words that they look like the English words, the pupils

used their knowledge from English, a strategic that led to wrong results, since some of the pupils filled the English words instead the German ones in the exercises.

Boys and girls did not show statistically significant differences as far as it concerns the preference of the annotation type (textual, aural, pictorial) ( $p>0.05$ ).

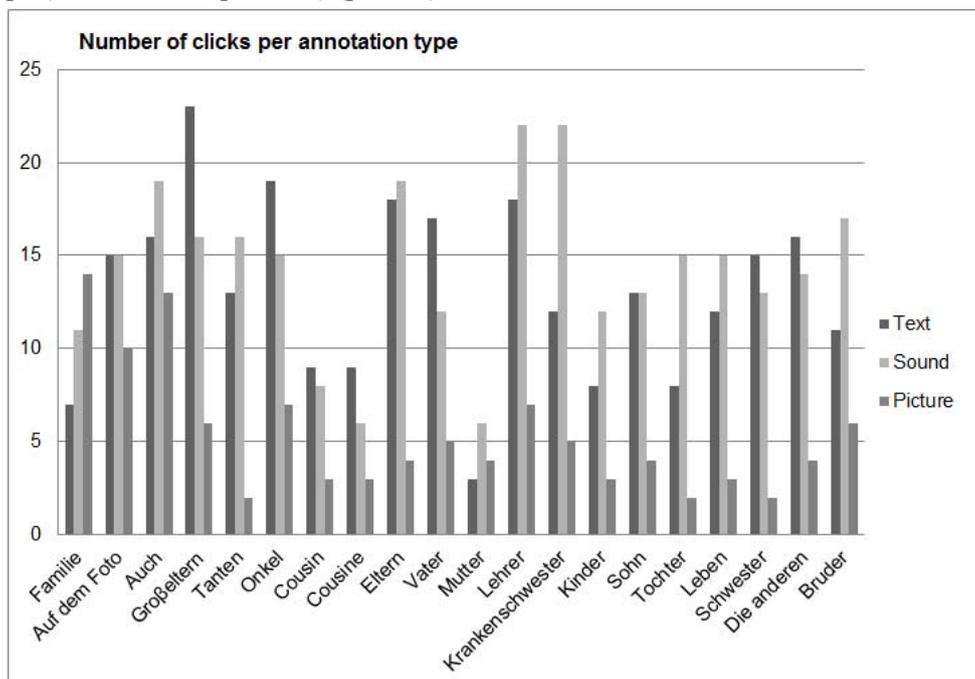


Fig. 3: Word access per annotation type

Vocabulary learning can be shown from the results in the interactive learning activities. In the multiple choice exercise and for its two easier items, the majority of the pupils answered correctly with their first trial (23 for the first, 24 for the second question), while for the third more difficult item they needed two (10 pupils) or four (12 pupils) trials. In the matching word exercise with six items, only nine pupils answered correctly all of them with their first trial. Half of the pupils achieved in four items, 10 in three items, nine pupils in two items, and only one answered one item. In the short-answer exercise following the song listening, 42% of the pupils had 100% success, while they needed to hear the song for less than four times. The gap-fill exercise concerning the family tree is a difficult exercise not only because of the difficulties in the vocabulary, but also because of the difficulties of the relations among the members of a family. Twenty one pupils answered correctly in more than half items, while seven of them gave all the ten correct answers. The majority of the pupils answered correctly in the short-answer and gap fill exercises, but they made some spelling mistakes because of the confusion between the German and English spelling of the words.

All pupils preferred the use of the computer-based lesson instead of the traditional way with the use of the textbook, mainly because of the immediate feedback the software provided. Twenty four pupils reported that the use of the electronic gloss was very easy. Twenty three pupils preferred the audio translation of the unknown words, five the textual translation, one the use of pictures, and unexpectedly only two pupils preferred the combination of sound and pictures.

## 5. Conclusions

This study investigated vocabulary learning in German as a second language in elementary school by using a multimedia gloss and relevant computer-based activities.

Our results are encouraging as far as it concerns the positive attitude of the pupils towards the use of multimedia glossing, as well as computer assisted learning in general. The gloss attracted the attention of all pupils who had a high level of active role and showed a great interest in the teaching process. Our findings support previous studies' conclusions where students prefer the continuous use of digital glosses [3, 6, 10].

The outcomes on vocabulary learning are positive. The multimedia gloss seems to be a precious assistant for reading and comprehension of text, since it attracts pupils' attention and offers an immediate translation of the unknown words by using multiple representations without interrupting the reading process. Our findings support Yun's conclusion stating that beginning learners get better results on vocabulary acquisition [8].

Our findings support Mayer's generative theory on multimedia learning stating that "better vocabulary learning with multimedia input takes place when L2 learners are cognitively capable of dealing with both written and pictorial information at the same time" [2]. We believe that our approach on vocabulary learning approach also extends Mayer's theory, by the addition of audio as an extra multimedia element. The immediate feedback offered by the computer-based activities gives pupils an active role in the teaching process and motivate them to learn. Although properly designed computer-based activities are not often used for learning outcomes' evaluation, our findings are in line with the conclusions of other relevant studies [7, 11, 12]. Moreover, it is shown that the use of the multimedia gloss helps various learning styles such as visual and aural, since pupils may choose their own way to translation and problem solving strategies. Finally, the role of the teacher seems to be very important. He/she becomes a facilitator of the teaching process, collaborates with the pupils and intervenes when it is necessary. These conclusions are also in line with other relevant studies [12, 13].

## 6. References

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