Chapter XII
Grammar Animations and Cognition

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ABSTRACT

The present study is situated in the context of cognitive aspects of language processing as it focuses on the learning and teaching of grammar in various modes of presentation. The success of the programs developed for, and used in, the study is measured in terms of short- and long-term learner performances in the application of grammatical rules. Four groups of informants were formed to test four different combinations of the presented materials. The groups used either a cognitive/functional or traditional rule-governed approach to grammar explanation in either an animation or static presentation mode. The results document the overall superiority of the cognitive/functional approach to grammar when presented in the animation mode. The design of the study and its results could serve as a reference point for further research and could help refine parameters for the evaluation of effective language learning software.

INTRODUCTION

The use of electronic media in language learning can be seen as the result of a wide variety of economic or pedagogic reasons, often driven by the aim to offer a method for accelerated learning. However, software producers and publishers rarely provide evidence for the success of their products. In other words, software often is not evaluated at all or evaluated in an introspective manner by means of checklists or reviews. While checklists allow for a more-or-less systematic and structured evaluation, the typical review includes basic information about the program
and the reviewer’s subjective description. The types of criteria found in a checklist and a review largely overlap (see Hubbard, 1992; Knowles, 1992; Schmückler & Shuell, 1989). Often the criteria employed in a review vary according to the reviewer’s taste. Rarely are they derived from a theoretical approach to evaluation. In contrast, empirical evaluations require an extended use of the materials by actual learners (see Scholfield, 2000 for a detailed discussion). A survey of recent evaluation projects of an empirical type (Reeder, Heift, Roche, Tabyanian, Schlickau, & Gölz, 2001) has found a lack of methodological rigour and a lack of agreed upon methodological protocols in the empirical assessment of language learning software.

In order to provide more systematicity in the evaluation process, Hubbard (1992) argues for the application of a curriculum development approach to software evaluation as part of a triangular model for CALL courseware, the other two components being development and implementation. Within the model, Hubbard (1992) argues for the networked operation of these components in a framework which is similar to a curriculum and instructional scheme. In this way, software development, implementation, and evaluation can be explicitly related to instructional principles and their related components.

Following Hubbard’s approach, Reeder et al. (2001), Hufeisen & Leitner (2007), Roche (2003) and Roche (2008) developed a criteria-based framework for software assessment while incorporating cognitive aspects of language processing and acquisition which were largely unconsidered in Hubbard’s model. While the profession is beginning to approach the issue of software assessment more systematically, more research is still needed in order to understand the fundamental principles of media-based language learning, that is, how the use of media leads to an added value in language learning and why positive effects of media use are often difficult to measure. This is a long-term endeavour which is still in its initial phases.

The study presented in this paper can therefore be no more than a small piece in a large mosaic whose overall size is yet unclear. It is rooted in the cognitive theory of multimedia learning (Mayer, 2005) and uses the integrated text and visual comprehension model (Schnotz, 2005) as well as the cognitive load theory (Sweller, 2005) as reference points.

The aim of this chapter is to test the hypothesis that modern electronic media are particularly efficient in language learning when they are properly tuned to the cognitive processes of language acquisition and the coordinated processing of dynamic visual and verbal information. Based on this assumption, the authors of the present study first developed relevant design criteria which were then used in a comparative study involving four different modes of presentation on a particularly difficult grammatical topic. This particular grammar topic generates various, and often lasting, production errors for most learners of German as a foreign language (L2) regardless of their first language (L1).

The design criteria derived from previous research led to the development of four instructional units including a sequence of grammar animations on two-way prepositions in German. The success of the programs developed for, and used in, the study was then measured in terms of learner performance in the correct application of the grammar rules under investigation. A previous pilot study on related grammar topics conducted with fewer informants in a setting similar to the one designed for the present study had shown that learners’ performances increase, error frequencies decrease and retention improves when animations are used (Roche & Scheller, 2004). In the pilot study, 47 animations covering different grammar focus areas (such as syntax, two-way prepositions, pronoun es (it), word formation rules) were processed by a group of intermediate and advanced learners of German with different L1.
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