Integrated, interactive, and visualized teaching of writing and grammar: Prototypes of two ICALL tools

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We demonstrate prototypes of two interactive ICALL tools for integrated writing and grammar instruction: COMPASS-II for secondary/tertiary levels of education, and the Sentence Fairy for the primary level. Fully developed versions will enable teachers to generate exercises by specifying a story in a simple dialogue. Student-produced sentences are automatically evaluated by a natural-language paraphrase generator, even if they deviate considerably from the canonical/correct version(s) in terms of lexical choice or clause combinations. The generator can also provide informative online student feedback tailored to the students' grammatical knowledge.

COMPASS-II
Students who are learning to write in a foreign language, often want feedback on the grammatical quality of the sentences they produce. The usual approach to this problem is based on parsing student-generated text. Here, we propose a generation-based approach aiming at preventing errors ("scaffolding"). In our ICALL system, the student constructs sentences by composing syntactic trees out of lexically anchored "treelets" via a graphical drag&drop user interface. A natural-language generator computes all possible grammatically well-formed sentences entailed by the student-composed tree. It automatically provides positive feedback if the student-composed tree belongs to the well-formed set, and negative feedback otherwise. If so requested by the student, it can substantiate the positive or negative feedback based on a comparison between the student-composed tree and its own trees (informative feedback on demand). In case of negative feedback, the system refuses to build the structure attempted by the student. Frequently occurring errors are handled in terms of "malrules." COMPASS-II includes a graphical component that displays the structure of sentences in the form of easily interpretable syntactic trees which the student can assemble and modify interactively on screen. The demonstrated system is a prototype which can be parameterized with respect to L1 and L2, the size of the lexicon, and the level of detail of the visualized grammatical structures.

Sentence Fairy ("Satzfee")
This system is an elementary-school version of COMPASS-II. It supports story writing exercises for elementary-school children, with German as the target language. Based on an abstract representation of the story under construction, all paraphrases of simple and combined clauses are generated automatically. From this source, the system produces exercises enabling the pupils to improve their sentences. Parsing technology is used only in the teacher mode, where new stories are entered into the system through a simple dialogue yielding unambiguous syntactic structures and rhetorical relations. The teacher can add new words and synonyms interactively. The demonstrated prototype includes an exercise generation mode and a rudimentary teacher mode.

References

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