User Models for Free in Second Language Learning?

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Abstract: Commentary on VP^2: The role of user modelling in correcting errors in second language learning by Ethel Schuster.

A Computer Assisted Instruction (CAI) system that knows what it is trying to teach (the domain model), that knows what its student knows beforehand as well as what he or she learns along the way (the user model), and that knows how to teach most effectively given the presumed disparity between the evolving user model and the domain model (the set of teaching strategies) is justifiably referred to as an example of Intelligent CAI (ICAI). Of the three ICAI elements, the user model is often the most elusive: we know what we want the student to learn and if we could just assess his or her misconceptions accurately the appropriate teaching strategy should be directly computable.

For certain domains, e.g., arithmetical calculation skills, user models can be constructed by careful decomposition of the skills involved and laborious analysis of student reponses. The nature of these analyses suggests that in more complex or less well structured domains such as language learning, any user model must be sparse and tentative.

Ethel Schuster in "VP^2: The role of user modelling in correcting errors in second language learning" offers an enticing counter example to this bleak picture. She claims that a student's knowledge of the grammar of his or her first language (L1) effectively defines the range of probable misconceptions in learning a second language (L2). Thus, a model of the student's grammatical knowledge is an appropriate user model for teaching L2. Assuming the standard grammar for L1 is reasonably well understood, we can then use it as <u>the</u> user model for all speakers of L1, thereby obtaining this precious aspect of ICAI virtually for free.

There is an important contribution here. Schuster shows that a user model is possible in the area of language learning. Moreover, for specific error types in the Spanish to English domain: missing verb particles, incorrect prepositions and added prepositions, the VP^2 system appears to provide useful information to the student. But it is a mistake to think that we now have user models for free in teaching second languages. To understand what we do have it is necessary to examine VP^2 in a larger context.

There are three important qualifications on the usefulness of VP^2-like systems that must be made, even while accepting the value of VP^2 in extending our ideas of how to construct user models. First, equating the user model with the grammar of L1 provides a convenient, but implausible invariance to the user model. Schuster herself says that to "accommodate different levels of detail" it would be useful to have dialect specific rules and "ideally...a system capable of using more 'tailored' user models". Such tailoring would have to address not only dialectal, but general language development differences as well, if it were to serve a truly general system. But the greatest danger of invariant user models is not at the outset of use of a system, but in the ongoing process, in which the student learns, generalizes, relearns, and generally changes what he or she originally knew. For VP^2 no speaker of Spanish ever learns that the English verb "put" takes the particle "on". The missing particle error just stops occurring. Yet one can imagine an apparent missing particle error occurring because of carelessness or some other compounding language difficulty in more complex translation tasks. The argument Schuster makes about the need for a user model must be raised anew: in order to provide the "most adequate explanation", the tutor needs to know why the student makes a given mistake. In short, different students need different user models and one student's user model should change as she does.

Second, the VP^2 approach works well when what we mean by language learning is learning the details of certain syntactic constructions. The system is designed for students "who have acquired most of the English vocabulary and syntax and who have basic knowledge of grammatical terms". But second language learning clearly comprises much more than this. Even if we focus on learning to translate from L1 to L2 in their written forms (and set aside issues of orthography and phonology) a language learner cannot stop with closed class syntax (although that area has undoubtedly been formidable enough to frustrate many). It is at best an open question whether the VP^2 methodology extends to learning of vocabulary, social conventions on language use (e.g., tutoyer), discourse structure, reference patterns, conjugations, and declensions, and so on. The question is not just the usual one of generalizability, but a more fundamental one regarding the existence of grammar-like knowledge in other aspects of language.

The third qualification to make has less to do with the inherent value of VP^2-like user models and more with underlying assumptions about learning. The VP^2 system assumes a model of language teaching based on translation from L1 to L2 with subsequent error detection and correction. While this model may be appropriate in some circumstances, it is far from adequate as a general model for second language teaching. Substantial research on how children develop language, and on how people learn second languages raises questions about any (first or second) language teaching model not based on language use in context.

Moreover, the test/correct paradigm for CAI is too restrictive. This paradigm takes natural advantage of the VP^2 user model, but other modes of interaction, which allow greater student initiative and richer responses could also do so. It would be interesting to see whether VP^2 could be extended to connected discourse or to language events with consequences, as in

Adventure games. A more ambitious effort would be to use it as a support for functional translation, as in a bilingual message system.

These comments on VP², that the user model should be variable, that one needs to consider other than the syntactic aspects of language learning, and that the paradigm for interaction with the student needs to be enriched do not negate the value of Schuster's work. However, they do remind us that a user model for second language learning, as for other domains, will not come easily.