The use of language tools for writers in the context of learning Swedish as a second language

Specific goals

Technology has the potential to play a major role in the process of learning a second language (Warschauer,1996; Warschauer & Meskill, 2000). The widespread use of multimedia technology, the presence of Internet in schools and homes, and the use of computer-based language technology represent a great opportunity for language teachers to begin to assess the implications of computers for language learning (Ross, 1991). However, the development of this potential is in the early stages. Issues on which the realization of this potential depend include "the shift from thinking of technology as assisting instruction to thinking of it as [supporting and facilitating] learning […]" (Garrett, 1991, p.95). Technological development can support and facilitate the integration of important activities such writing, speaking, listening etc., but today it does not really support more complex and essential activities such as integrating context in meaning-making processes. On the one hand, computer programs for learning language should be able to understand a user's input and evaluate it not just for correctness but also for appropriateness. On the other hand, "the use of the computer does not constitute a method" (Garrett, 1991. p. 75). Rather, it is a tool, an instrument in which a variety of methods, frameworks, and pedagogical philosophies may be integrated and implemented. The usefulness of computer assisted language learning cannot reside in the medium itself but only in how it is put to use.

This project aims to investigate issues that are related to the use of computer support for learning Swedish as a second language. In particular, the project deals with the problem of the use of computer-based language tools for writers in the context of learning a second language. We believe that a better understanding of this problem would both help learners to obtain benefits from technology, and designers of language tools to get adequate principles for the development of writing software for learning.

The goal of the project is twofold :

1. *to study how learners develop their writing practices in the context of learning Swedish as a second language, and how learners and teachers use available writing tools in their training.*
2. *to contribute to improving the design of existing language tools for writing in learning contexts.*

Overview of the research area

Learning and teaching Swedish as a second language does not constitute a new area of research. In Sweden, many studies have been conducted in the area of acquisition and learning of Swedish as a second language (Hammarberg, 1997 ; Hyltenstam,1997; the work conducted by S. Strömqvist at the University of Gothemburg focused on language acquisition at less educated immigrant adults).

However, they have been conducted from linguistic and socio-cultural perspectives ; issues regarding the use of language technology for the development and acquisition of Swedish as a second language have been peripheral in comparison.

Research and development of language tools has been going on for many years at Nada, KTH. It started in the early 90's (Severinson Eklundh, 1991; Cedergren & Severinson Eklundh, 1992) and has since then grown with contributions from several researchers in human-computer interaction, computational linguistics and computer science. Recent work in the group has considered the integration of different functions such as grammar checking and proofreading, linguistic editing functions, language rules and help system into the processes of writing and document handling. This work has resulted in Granska, a prototype Swedish grammar checker and general language toolbox which has attracted interest from both researchers and potential users (Domeij et al, 1998; Domeij, Knutsson, Carlberger, & Kann, 2000; Knutsson, 2001).

The development and use of such language tools for Swedish have an important place within the writing process of native speakers. However, concentrated as they have been on the development of robust and highly efficient algorithms and rules that are able to correctly detect and diagnose language errors, they have neglected the pedagogical potential (Vernon, 2000). Developed to support correct writing, they have often been based on models of native Swedish writers users. An important category of users has therefore been forgotten: writers learning Swedish as a second language. In this sense, our intention is to continue our prior work towards the development of integrated language tools for non-native writers who are learning Swedish as a second language. We believe that the integration of users, who are learning to write a second language, as well as the adaptation of computer-based language tools into pedagogical computer support for writing environments, open new possibilities for education as well as challenges for the design of useful writing software for learning.

The problem of supporting a developmental process such as writing when learning Swedish as a second language raises important issues in the field of computer support for learning. In particular we are interested in the following research questions:

1. How should we approach the use of writing tools for the process of second language learning?

The question addresses the issues of how we should consider the writing process using computer-based language tools in a learning environment, and, more generally, how we should consider the role of technology in cognitive developmental processes.

The way in which writing has been approached has changed in the last 30 years. Traditionally, writing has been studied as an individual process and focused largely as a product. An example of this conception is the stage model considering writing as a linear process entailing idea generation, text generation and revision (Rohman, 1965). In the late 70s' there was a shift. Writing was seen as a process of problem-solving with a set of goals and purposes to be achieved by the writer (Flower and Hayes, 1981, 1984). The writing processes consisted of planning, translating, reviewing and monitoring. In the 80s', the emphasis of writing research changed again, placing the focus on the context of writing. Writing was seen as a form of communication and negotiation, a form of interaction (cf. the social-interaction model, Nystrand, 1987). These approaches can be seen as complementary, providing different perspectives on the way to study the writer and the writing activity. However, which perspective should we take for the study of writing in the context of learning a second language? And in particular, how should we analyze the technology question in this context?

How does technology impact human thinking and the writing practices of non-native speakers ?

According to Haas (1996), although technology is implicated in every literate act, the study of the technology question remains for the most part latent. Issues about technology are often considered as important but are not itself examined in any systematic way. "[…] to ignore this implication is to remain confused about the essential relationship of writing to technology, and about our relationship – as writers, as teachers, as scholars – to both of them" (Haas, ibid. p.21). Haas (ibid.) considers writing as a practice that is intrinsically tied to technology. There is no writing without technology – stone, pen, pencil-paper; keyboards, etc. – and writing is viewed as language made material. Writing is made material through the use of technologies and writing is technological in the sense and to the extent of this material. Questions about the relationship between writing and technology raise issues about the role of computer-based language tools in process of use and process of computer programs development. In that sense, our inquiry entails examining not only the transformative power of tools on developmental socio-cognitive processes, but also how the computer-based language tools are developed, and how they get transformed by the users (cf. Verillon & Rabardel, 1995; Cerratto, 1999).

2. How should existing Swedish writing language tools be adapted for the training of adult learners of Swedish ?

Current models of human-computer interaction place the user at the center of the software design process by defining the tasks that need to be undertaken by the software, the tools that are provided to carry out the task, and the interfaces to those tools. Learners introduce a different kind of user with distinctive features: whereas native-speakers know the language domain, learners/ non-native speakers do not, and they encompass very diverse populations. By definition, a language learner doesn't know what she will learn, and part of her learning is to construct criteria and parameters in order to be able to judge what is an error in the Swedish language. As designing technology for learners is a completely different activity than designing for professionals or experts, an important question is : which are the appropriate models of learners/users to be implemented in a computer program?

According to Soloway (1994), designing for learners requires not only identifying the knowledge and motivation currently present, but also considering how these will change as the learner does learn through whatever activities they undertake. According to Warschauer & Healey (1998), learners need help with more than the mechanics of operating a software program. They also need to know how to make the best use of it for their own purposes. Research has indicated that learners don't always know how to fit new information into an appropriate framework. Learners often fall short in their ability to apply appropriate learning strategies to material (Warschauer & Healey, ibid.; Cerratto & Bélisle, 1995), so how should learning software support naive users and help them along in figuring out how to use the software effectively?

Design choices concerning type and form of computer-program features have fundamental consequences on the way learners/users understand and learn about the written language. For example, we believe that the design of feedback does not limit itself to "rewards" or "describing grammar rules". The feedback provided by the computer program is essential for the user to understand how to operate the system as well as for the learner's understanding of how to achieve a task . The form in which

errors are signaled by the computer program plays an essential role in the way users/learners understand their actions. A grammar checker for instance, provides negative feedback to the writer/user indicating error detected and its correction (the solution). This is also often the case when teachers are reviewing students' texts: teachers indicate the errors and correct them. Doing so, a great part of teachers and programs take for granted that the student knows/understands why s/he was wrong. We see here a space for the development of language technology which to some extent could judge users' utterances and thereby provide constructive feedback focusing on the way to understand the solution rather than just to provide the correct answer.

The type of feedback that Swedish language tools provide today is designed for native speakers, users who know and use Swedish language rules. The function of feedback provided by the program attempts to recall language knowledge already acquired. However, a non-native Swedish speaker needs feedback to help him/her to become aware of and understand grammar and language rules in order to reflect on them and integrate them in his/her own experience of Swedish. According to Laurrillard (1994) "action without feedback is completely unproductive for a learner. As we learn about the world through acting on it, there is continual feedback of some kind, and if we can make the right connection between action and feedback, then we can adjust the action accordingly and this constitutes an aspect of learning. And it is not just getting feedback that is important, but also being able to use it" (p.61). People who are learning to write in a second language present specific characteristics as users that should be seriously studied for the development of adequate computer support.

The operation of the computer program is also essential during the writing process. A special interest of ours lies in how the initiative is divided between learner and computer program, that is, who is expected to take the initiative ? Traditionally in human-computer-interaction, the user should be in control and the system should act only on the explicit request of the user. Recent writing software, however, often performs unrequested actions on the text or offers information pro-actively, as a result of pre-formed default settings or profiles. This may cause disruption if the information offered is perceived as irrelevant or erroneous. On other occasions, it may imply a discovery of unexplored areas for learning. An important question is therefore : How does the mode of interaction supported by the technology affect the learning process ? How does the learner trust the information offered and interact with the mode of interaction ? How do learners discern the importance of errors committed and reported by the computer program?

Description of the project plan for 3 years

The target group to study is second language learners and teachers. Learners that are of our interest are adults; fluent writers and speakers in their first language and motivated in the development of their second-language writing. Learners and teachers to be studied belong to a training program in Swedish for immigrants (cf. Folkuniversitetet).

Phase 1: January 2002 - December 2002
Collection of data and analysis of the use of writing software for learning

In the first phase we conduct ethnographical studies. The phase builds on results provided by prior work conducted in the areas of language technology and computer support for second language learning of Swedish (cf. Knutsson, 2001; Staerner, forthcoming ; Öhrman, 2000 ; Tyndall,1999). The goal in this phase is to know about the experience of teachers and learners interacting with computer programs for second language learning and their opinions. The techniques of interviews and observational user studies are used in this phase. We define and delimitate learning/teaching activities to be studied in detail. We examine the use of available writing software for learning Swedish. Criteria for the re-design of computer-based language tools are expected to be produced in this phase as a point of departure for the re-design of the Granska prototype.

Phase 2: January 2003 – December 2003
Prototyping a writing environment supporting Swedish as a second language

In the second phase of the project we integrate results from prior interviews and user studies conducted in phase 1 in order to start to re-design Granska, create new writing functions and evaluate these changes through the use of the prototype. The learners will use Granska for a longer period of time and for naturalistic writing tasks. Interviews and user studies are planned to be conducted during the prototyping phase. The texts produced will also be studied from a linguistics point of view, investigating error types and error frequencies. The goal in this phase is to work close to the teachers in order to model and define design principles for the development of the prototype to be evaluated with the learners. Workshops with the teachers are used in this phase, as well as detailed observations of the use of the prototype. The goal is to start to articulate users' experiences, and a pedagogical philosophy leading to design changes in the Granska prototype.

Phase 3 – January 2004 – December 2004
Evaluating models and design principles for computer support for learning

In this phase we continue to prototype and evaluate the changes implemented in order to stabilize the prototype. The aim in this phase is to evaluate the final version of the prototype and report the general findings of the project.
Expected results aim to contribute to the educational area with knowledge and experience about the role of computers in learning and writing Swedish as a second language, as well as to the human-computer interaction research field with a methodology for the design of computer support for learning environments.

The project is based on a collaboration with Folkuniversitetet and in particular the teachers Roine Weing and Birgitta Udden. We also have contacts with Mälardalens högskola (adj. Karin Sheikhi) and Lars Borin, Lecturer in Computational Linguistics, Uppsala University and Stockholm University about possible collaboration in the field of computer tools for writing.

Relevance

The amount of people learning Swedish as a second language has increased and changed over the last years. The number of immigrants, traditionally from the Nordic countries, Asia, Africa, South America, and now also those coming from other European countries has increased. The number of workers as well as students coming from other parts of Europe has also increased. Today, more than one million people or one-eighth of the Sweden population, are either not born in Sweden or are the children of immigrants. Although English represents a bridge between Swedes and foreigners, it does not always open doors to the Swedish culture and the Swedish society. To master Swedish as a second language is therefore a key to integrating foreigners to the Swedish society as well as for integrating Sweden into a multicultural Europe. This project aims therefore to contribute to a better understanding of the processes involved in learning Swedish as a second language with the support of computer language tools. It is of particular interest for us to define the role of technology in this context and to identify design principles for the development of computer writing tools for second-language learning purposes.

Preliminary Results : A pre-study of the use of a grammar checking as a tool in second language learning

In a master's thesis (Staerner, forthcoming), the possibilities for a Swedish grammar checker, Granska, to be used in a second language learning environment are investigated. The starting point for this master's project was that language technology tools, like grammar checkers, present a great pedagogical potential for second language learning environments. One of the main questions addressed by the study was how a grammar checker should be modified and adapted to second language learning. The master's thesis reports findings from interviews conducted with six second language teachers. The teachers interviewed were positive of using computer supported "free writing", based on grammar checking, as a part of second language learning. The teachers all agreed that computer support for language learning is already and will continue to be an important part of education. On one hand, the teachers express that CALL (computer assisted language learning) gives new possibilities of pedagogical variation and user adaptation. The teachers mentioned that learners often find it easier to make mistakes in front of the computer than in front of the teacher and the class. On the other hand, the teachers said that the current programs are too limited and the technology is not reliable. The teachers expressed that false alarms from the programs are dangerous for the learning process and will do harm to the students self-confidence. Integrating language technology with CALL programs represents a great challenge for future research in writing and second language learning as well as for the development of usable language technology tools.

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