

Modelling Writing as the Basis for a Writing Tutor Computer Program

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Abstract: To provide the basis for a writing tutor program which could be used in a variety of contexts, a modelling process was followed which produced both a practical and a theoretical model of writing. While the practical model provided learner writers with metacognitive strategies to carry out composing processes, the theoretical model underpinning it consisted of a system of communicative functions necessary for effective communication. Having been validated empirically, the practical model formed the basis for a writing tutor program, which was produced in the form of a help menu designed around the five stages of composing shown in the model. The program can be loaded onto the learner writer's home computer and consulted while the writer is composing on computer, and was designed to allow for input by both teacher and student, which means that it can be customised to suit different educational contexts and purposes.

Introduction

This paper deals with the design and production of a prototype writing tutor program (WTP) for individual use by learner writers from Grade 10 upwards, informed by a theory of written composition based on extensive observation of actual composing in a variety of contexts. Both the WTP and the theory underpinning it were developed in a four-year doctoral research project, but represent the culmination of nearly twenty years of intensive research into composing. A recent review of currently available writing tutor programs suggests that there are six basic categories: (1) conferencing-type tutors, (2) tutors based on text-analysis, (3) tutors based on heuristics or invention strategies, (4) text or revision tools, (5) organisers and (6) process-based tutors. Of the latter, into which category the WTP fits, the majority are based on cognitive models of composing (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981), the most comprehensive example being Rowley & Meyer's (2003) "Computer Tutor for Writers". An advantage of cognitive models is that they present a generalised description of composing processes: a disadvantage is that they tend to omit the social element inherent in writing, as the work of the social constructionists (Bartholomae, 1985; Berlin, 1988; Bizzell, 1992; Bruffee, 1986; Coe, 1986) and critical language theorists (notably Fairclough, 1989) attests. In a writing tutor program based on a cognitive model the social aspect of composing has to be supplied in an ad hoc way during the teaching programme in which the program is implemented, and, since it is not stressed in the tutor program itself, may be thought to be inconsequential by the learner. The intended outcome of the doctoral research was to design and produce a prototype writing tutor based on an accurate description of composing, and informed by a theory which went some way towards explaining the deep structure of writing itself. The description would need to take into account the commonalities and variables in composing, and be general enough to be used in any context: it must also acknowledge that composing, as with other forms of communication, is context-specific. The program itself was envisaged as being a hybrid (to allow for customising to suit local requirements), economical, easy to use and capable of being used either in a networked computer laboratory or loaded on to the learner writer's home computer. It was intended to remain open and visible onscreen while the student was composing on word processor. In spite of the advantages of using word processors for composing (Daiute, 1983; Eyman, 1995; Monteith, 1993; Snyder, 1993), the WTP would also make it clear to the learner writer that certain composing strategies might be better performed with pencil and paper.

The Modelling Process Informing the Writing Tutor Program

The WTP is based on a practical (empirical) model of composing (Fig. 1) formulated in masters research from extensive teacher observations and research into composing processes. The practical model depicts composing as a series of five recursive stages, 1. Prewriting, 2. Draft writing, 3. Major editing, 4. Minor editing and polishing, and

5. Evaluation, and is part description, part advice. Formulated in 1986 to assist with conferencing sessions with first-year Commerce students (Pratt 1990), it has been used extensively since then in teaching programmes, coaching and remedial initiatives. Its main benefit is that it can be communicated directly to learner writers to give the kinds of metacognitive strategies which are thought to be crucial for the development of independent learning (Hurd 2003).

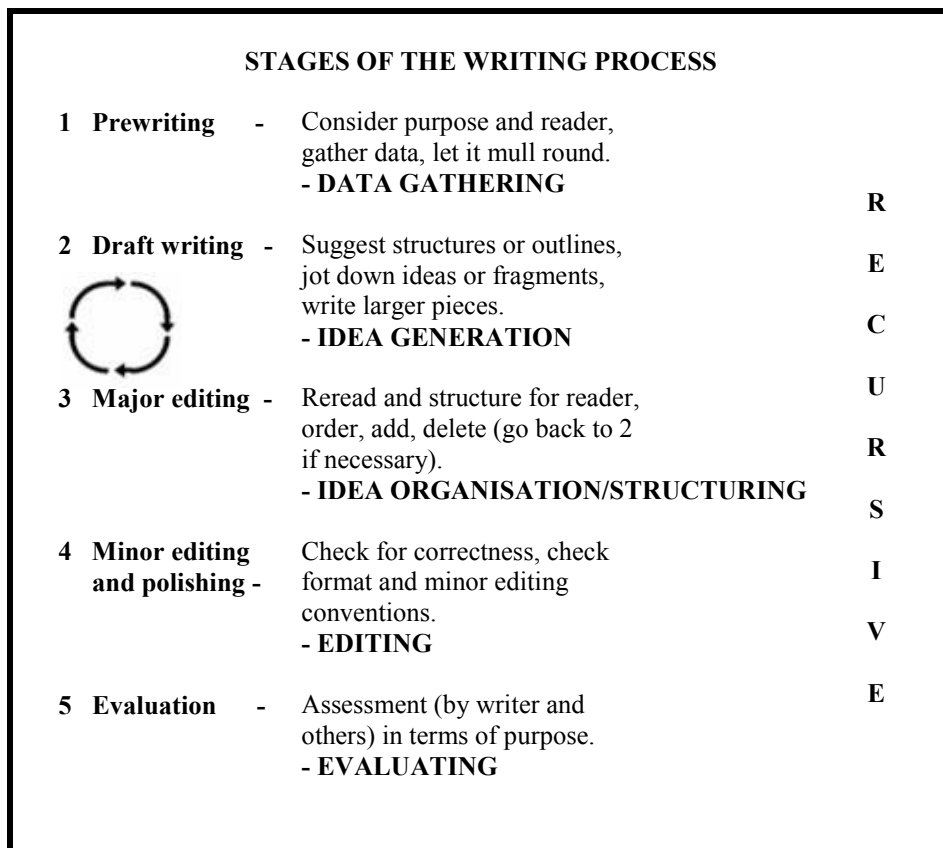


Figure 1: The Practical Model of Composing

The practical model was therefore considered to be a suitable basis for the writing tutor program. While the practical model superficially resembles cognitive models, implementation of Franck’s (2002) modelling process revealed it to be underpinned by a system of functions necessary for communication in general, and not just writing. The system of functions “without which” successful communication cannot occur comprises the contextual, ideational, interactive, social and reflexive functions, corresponding roughly to Stages 1-5 of the Stages of Composing. For effective communication to take place:

- a. The communicative interaction has to be *contextualised*, that is, set in a context. The context includes elements such as past history, the social setting, the physical setting, the people communicating, their relationship, their purpose in communicating, and so on.
- b. Some kind of *ideational* content must be generated for communication to take place, even in phatic communication.
- c. As meaning is negotiated in the interaction, there must be an *interactive* element in communication (even in intra-personal communication).
- d. All communication has a *social* loading (impersonal or mass communication signals a type of social relation, and not the lack of it.)
- e. For communication to occur successfully, the *reflexive* function needs to be carried out, and regulates the whole communication process in the manner of a feedback loop.

The practical model, the five stages of composing, can be viewed as a mechanism (Bhaskar 1978) for carrying out the above communicative functions in written mode. It must be remembered that this is a model which simplifies composing for the learner, and that in actual practice there is some leakage and overlap of the communicative functions from stage to stage. For example, social elements pervade all phases of composing, but are mostly emphasised in Stages 1 and Stage 4. Inner dialogues which take place during the stages of composing mean that there is an interactive element throughout composing, but this is most evident at Stage 3. The practical model and the theory underpinning it was validated by a type of grounded theory methodology (Strauss & Corbin, 1994) in five research projects carried out over a period of thirteen years, and involving over forty video protocols of students composing in various academic contexts.

The Production of the Writing Tutor Program

Once the practical model had been validated, a storyboard was created, and two versions of the writing tutor program were programmed, CourseMaker, an HTML application running off a local browser, and the WTP prototype, a stand-alone Visual Basic program which can be loaded into the user's hard drive from an executive file on a CDROM disk and can also be installed in networked computer laboratories. The HTML version was rejected because of (1) operating difficulties and (2) requiring too much time and effort to set up by the teacher to be of practical use. The WTP prototype took the form of a floating menu bar superimposed on the word processor screen without actually interfacing with the word processor program. The learner writer can thus compose on a word processor while referring to help offered in the writing tutor, which stays open unless closed or sent to the Start bar. The help menu is structured around a hierarchy based on a human process, the composing process, and not an abstract computer systems hierarchy, or a procedure based on the way application functions need to be carried out. This means that it is potentially much more user-friendly than, for example, an unfamiliar email program. While intended to provide a standard version, the WTP was geared towards developing composing expertise in a school situation from Grade 10 to first-year tertiary level, and still needs to be tested out for usability and user feedback on whether (and how, if at all) it facilitates composing. Thereafter, further anticipated projects will involve more animated versions (see Pellone 1995) for both younger writers and adult freelance writers, and a more scholarly version for the writing of dissertations and theses.

The Scope of the Prototype Writing Tutor Program

The WTP is geared towards assisting individual users engaged in composing, which means that it presents to users (including the teacher) from the perspective of writing as an individual act. It is based around the five recursive stages of composing represented in the practical model, with the understanding that these have been found to constitute a type of mechanism reflecting the deep-level system of communicative functions which drive composing. The WTP itself then constitutes a type of generative stochastic mechanism. Because it is based on a body of data from detailed, long-term observations of composing behaviour, and underpinned by a theory of generalizable communicative functions, rather than on rule-of-thumb, ad hoc theorising, or classroom practice alone, the WTP is extremely versatile, and can be applied in any situation where composing expertise is to be learned, given that the learner is word-processor proficient and has access to a computer and the requisite software. The program was designed to be self-explanatory and requires very little (if any) training: how the WTP is used depends on learner need and preference and the learning situation itself. The prototype WTP is not limited to academic writing per se, although it acknowledges the fact that writing is learned mainly in a formal educational context, facilitated by teachers. However, the fact that academic writing is teacher-driven and has specific academic requirements even at junior levels meant that academic requirements needed to be considered when developing the prototype, and therefore provision was made for specific customising by the teacher. The prototype also deals with writer's block, and the inner dialogues which researchers view as an integral part of composing (Daiute, 1983; Graves, 1981; Widdowson, 1984). To demystify composing and explain the functioning of the writing tutor program to the user, some composition theory was included in the form of preliminary lessons for the learner writer, but this does not go beyond the level of research into the process approach (i.e. observed proficient composing behaviour), apart from mentioning that writing is a delayed interaction. A writing tutor for more advanced levels might give more detail about the social aspects of writing to explain more complex academic requirements, as well as an account of the

theoretical model. Features such as a simplified “Readings database” and “Working notes” were included to encourage learner writers to collate prewriting materials and to reflect on their progress throughout composing.

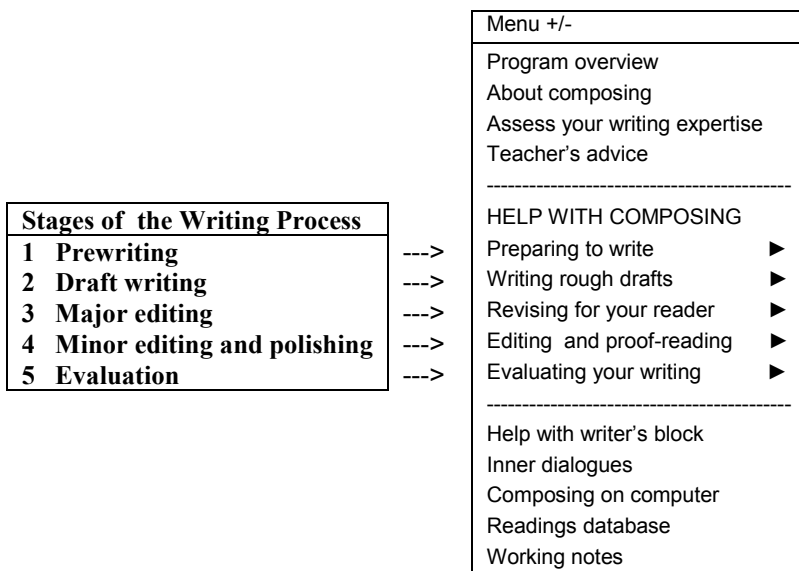


Figure 2: The WTP Help Menu Based on the Practical Model of Composing

The Design of the Writing Tutor Program

From the outset of this project the writing tutor program was envisaged as a help menu based around the five recursive stages of composing (Fig. 2): the stepped nature, recursivity and open-endedness of help menus (see Alessi & Trollip, 1991) mirror the dynamic, complex and layered nature of the process of writing itself. The WTP menu was intended to be accessed while the user was composing on word processor, but, unlike most help texts, the help texts (or routines) of the WTP can remain on display for ease of reference while the user continues typing. Initially it was intended that the menu be integrated into the Microsoft Word menu bar much in the same way as earlier versions of Research Workshop, but this would have required expensive programming options and copyright negotiations with Microsoft - somewhat premature at this stage of development. The solution devised by the programmer was to have the program as a floating menu bar independent of Microsoft Word itself. The advantage of this option is that the WTP can be used with any word processor - in a Microsoft Windows environment, that is - extending the versatility of the program considerably. The stages of composing of the practical model were depicted on main menu of the help bar as “Preparing to write”, “Writing rough drafts”, “Revising for your reader”, “Editing and proof-reading”, and “Evaluating your writing” so as to be self-explanatory and immediately accessible to the user (an explanation of the stages was provided in a section, “About composing”, but in my experience very few users read the program instructions first). An option was provided to concentrate or collapse the main menu to a shorter menu with just the five stages, so that users could focus on the five-stage menu and rapidly shuttle from stage to stage as required while engaging in composing. It also meant that the menu became less obtrusive on the Microsoft Word screen. Sub-menus running off the main menu contain help and advice (taken from the practical model of writing) as to how the user can achieve each stage of composing. When any of the sub-menus of the five-stage menu is accessed, a prompt appears at the bottom of the screen giving the focus for that stage. Users can remove the prompts easily by mouse-clicking on them. Initially other screen display options were envisaged, such as a display option for the audience, purpose and genre which had been input by users in the “Work through preparing to write” section, as well as the “Inner dialogue” relevant to any specific stage. These features were abandoned as they would have made the word processor screen too cluttered for the writer to compose easily. The main menu also contains a “Program overview”, and a fairly long text section called “About composing”, which provides the user with the rationale for the writing tutor program. “Assess your writing expertise” offers the learner writer a short quiz based on the behaviour of “good” and “poor” writers (Bereiter & Scardamalia, 1981; Daiute, 1983; Raimes, 1985). Other main menu options include “Help with writer’s block” and “Inner dialogues”, which

offer users help and advice on these processes, although these sections can also be accessed from within the “five stages” submenus. “Composing on computer” is a lesson text suggesting how composing on word processor can assist with each stage of writing. A “Teacher’s advice” section in the main menu allows the user to input specific advice from the teacher on each stage of writing - the advice will then be displayed when “Teacher’s advice” sections are accessed in the submenus for each stage. It is entirely up to teachers and their students as to how this facility is used: teachers could offer general advice for their writing classes, or specific advice for each written assignment. They could even tailor advice to each student’s progress and learning needs if they so chose. Most importantly, teachers could offer students input on key assessment criteria and other academic requirements. This facility emphasises the fact that school writing, no matter how flexible or creative, is teacher driven, in that the teacher ultimately defines what constitutes “good writing”, or how learning is demonstrated in an academic assignment. At best, it will encourage students to persuade teachers to make their expectations explicit - and even if teachers disagree with the definition of “good” composing behaviour as represented in the writing tutor program, it might at least encourage them to make their own definitions of good composing explicit, and to communicate their expectations in regard to this clearly to students.

Conclusion

The approach used to develop the writing tutor program can be seen to be fairly atypical in that extensive theoretical development was emphasised at the outset rather than extensive testing of software based on existing theories of written composition, and in that the basic communicative functions thought to underpin writing were identified before programming on the writing tutor program commenced. The theoretical modelling process described by Franck (2002) is considered to be particularly effective in capturing the key elements of social systems, as it focuses on the actual functions necessary for social processes to be effected, and validates these by rigorous observation of the means whereby these functions are carried out in real-life situations. The resulting empirical (i.e. practical) model is then not an ad hoc fabrication or drawn from rule-of-thumb, but geared to focus the learner on the essentials of the process involved. The identification of the essential functions also focuses software development on the achievement of these functions, and prevents recidivism into “what computers can do” as opposed to “what the learner really needs”. This is not to say that extensive testing by actual learners is not considered a key part of educational software development, but that it is important to understand the deep structure of social processes - particularly complex processes such as the various communication modes - so that the software supports the social system rather than the social process being forced into the Procrustean bed of computer systems. The patterns of social processes are infinitely variable and often inchoate, defying definition. However, these patterns are the true templates for educational software design, particularly in the case of programs which are intended to simulate the functions of human tutors, and such templates need to be identified if our proposed tutoring programs are going to prove efficacious in preparing learners not only for school-type tasks, but for real-life functioning in the wider social context.

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