Scientific Report Short Term Scientific Mission COST ISO703 - Veerle Baaijen

December 6th - 17th of December 2010

Purpose of the visit - Writing to learn and Writing Beliefs, part 1

Writing is often used as a tool for learning in schools. Current theories of writing, however, have different conceptions of the processes responsible for its epistemic effects. The aim of my PhD research is to bring together two widely differing accounts of how writing facilitates learning and to test how processes of writing relate to knowledge change.

In addition, I have investigated what effect writing beliefs have on the effectiveness of writing strategies. Initial analysis of these data showed that, although outlining helps writers with poor beliefs to improve their text quality, it is not as beneficial for writers who already have sophisticated beliefs. For the development of understanding, results showed that development of understanding depends on having beliefs that acknowledge writing as a tool for learning and that outlining had a negative effect for writers with sophisticated beliefs. These results, therefore, might have important implications within educational settings.

The purpose of this visit was to (i) carry out follow up analysis of the writing beliefs study, (ii) to discuss possible analyses on the process data in the study as a whole, and (iii) in the light of the developed analyses, to develop a strategy for the analyses that need to be carried out in order to be able to publish the above results in refereed international journals.

Description of the work carried out during the visit

During the STSM the following tasks were carried out:

(i)   We spent the majority of the STSM hand-analysing a small sample of key-stroke logs and the associated final texts in order to see how the recursive nature of the writing process can be captured. In order to do so, two analyses were developed. (i) For all sentences in the final text we wanted to find out whether the sentences were produced linearly (i.e. in the same order as presented in the final text) or whether a more recursive underlying writing style was used to construct the final text. (ii) For each sentence that was produced we want to find out how fluently the writer produced the sentences by looking at monitoring and editing within sentences versus insertions in previously written text. The following categories were developed in order to identify different kinds of processing within the texts :

- Within sentence revision which is at leading edge
- Within sentence revision which is not at leading edge
- Revision at sentence boundaries
- Text level revisions
- Text written during the process which does not end up in the final text

These units of analysis were then used to identify features of text production and revision taking place during writing. Production and revision phases were distinguished by the point in the text at which they occurred.

(ii)   We discussed possible ways of classifying the pausing data and defined some overarching principles to guide the coding of the process data. This involved distinguishing between linear and non-linear continuations at different pause locations (between paragraphs, between sentences and between words). We defined the non-linear continuations as events. Events can be distinguished from

the linear continuations on the basis that they include other material or operations before the continuation of text production. Examples of non-linear material or operations include revision (the insertion of text within previously written text) or other operations (scrolling and movements in order to re-read but not modify text).

(iii) Some initial analyses were carried out on the data derived from the classification of linear continuations and events at different locations. We discussed the theoretical implications of these findings and developed a strategy for further analysis of the pause behaviour data.

(iv) In addition, a more detailed analysis was carried out to investigate whether writing beliefs have an effect on the processes underlying text production. We discussed the theoretical implications of these findings and developed a dissemination strategy.

(v) We discussed the statistical methods to be used to analyse the results from both studies. The results of our studies are complex and the process data in particular would benefit from analysis strategies that go beyond traditional univariate ANOVAs. We discussed possibly approaches to fit the data to different models and made some initial arrangements to further develop expertise in polynomial regression using a multinomial response variable.

Description of the main results obtained

During this STSM the following results have been obtained:

(i) Detailed coding schemes were developed: (a) to classify linear continuations and events at different pause locations; (b) to investigate the recursive nature of the text production processes; and (c) to identify different kinds of revision during text production. These coding schemes will be used to analyse the full set of texts and key-stroke logs.

(ii) Some preliminary analysis on the pausing behaviour data were carried out to test the validity of a global text modification index that we have used in previous publications. These preliminary findings support previous findings and suggest that high self-monitors employ a top-down writing strategy whereas low self-monitors apply a more bottom-up writing strategy.

(iii) On a personal level I have improved my knowledge about writing process data and the implications of writing process models and the predictions of these models as they relate to my data.

Future collaboration with host institution

This short term scientific mission has proven to be very productive. The opportunity to work together with David Galbraith from Staffordshire University has helped me with the development of my understanding of possible ways to analyse process data. Furthermore, this Short Term Scientific Mission also gave me the opportunity to develop my understanding of writing research and it has helped me to develop my PhD project. Future collaborations will involve the development of further analytical methods, the preparation of jointly authored papers, and the design of further research.

Projected publications/ articles resulting or to result from STSM

Previous STSM's have been extremely successful and already resulted in a joint publication:

Baaijen, V.M., Galbraith, D, & K. de Glopper (2010). Writing: The process of discovery. In S. Ohlsson & R. Catrambone (Eds.), *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (pp. 1774-1779). Austin, TX: Cognitive Science Society.

The next step is to carry out the work that was discussed during this STSM and to code the process logs and the final texts on the basis of the coding schemes that have been developed. When this work is carried out, this data will be the basis for at least two more joint publications in refereed international journals.

Confirmation by the host institute of the successful execution of the mission
I confirm that the mission was productive and has led to preparation of several joint publications as well as the development of detailed plans for future collaborations between the two research teams. I can be contacted at d.galbraith@staffs.ac.uk if further details are required.

Other comments (if any)