Keystroke logging – a didactic tool for analysis and development of writing and language skills

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Abstract

This paper presents several studies in which keystroke logging has been used as a didactic tool for writing and language development. Keystroke logging, as presented here, provides learners with a tool for analysis and reflection on their own written production and teachers with a tool for analysis and individual feed-back. The paper aims to outlines the theoretical assumptions behind the studies, discuss the impact of keystroke logging on writing and language development and critically examine the results from a classroom perspective.

1. Keystroke logging

Keystroke logging is a method that is represented though a number of software programmes (e.g. JEdit, Scriptlog, Inputlog, Translog) which all share the basic common principles of recording every keystroke and mouse action a writer undertakes during a writing session. The programmes typically include a replay function and various statistics about, for example, pauses and revisions. The data enables export to other tools for visualisation and statistical analyses.

1.1 An awareness-raising tool

When used retrospectively, the replay function provides writers with an opportunity to observe their own writing process in detail. The main advantages of such an approach are 1) that learners' cognitive load is reduced, 2) that noticing is promoted, and 3) that learners are provided with input on a suitable level. A group of young writers improved their texts in their first language after such a reflection and discussion session (Lindgren, 2005). In their foreign language retrospective replay and discussion enhanced their awareness of, in particular, stylistic aspects of writing and the reader (Lindgren, Stevenson and Sullivan, 2008).

1.2 A tool for analysis

For instructors, keystroke logging provides a tool for analysis. Through the automatic analyses of pauses and revisions, measures of fluency can be easily calculated (Spelman-Miller, Lindgren and Sullivan, 2008; Lindgren, Spelman-Miller and Sullivan, in press). Measures of fluency include the length of text span writers produce between interruption, i.e. a pause or a revision. By measuring fluency instructors receive indications of writers development in a first or a foreign language. Higher fluency indicates that a writer has achieved a higher level of automatisation of writing or language aspects, such as spelling. Higher level of automatisation of spelling enables writers to focus more on other aspects of writing, which results in better text quality. Further, the automatic data can be used for visualisation, which can assist both learners, individually or class, and instructors in understanding what goes on during writing (Lindgren and Sullivan, 2002; Lindgren,

Spelman-Miller, Lindgren and Sullivan, 2007).

2. Conclusions

The studies above present positive results of the use of keystroke logging as a didactic tool. However, they also raise questions of how to best use the method to maximise the result for each individual writer, how to best provide feed-back and whether the method is useful for all learners.

References

Lindgren, E. (2005). The uptake of peer-based intervention in the writing classroom Rijlaarsdam, G., Van den Bergh, H. & Couzijn, M. (Vol. Eds.), Studies in writing, Volume 14, Effective learning and teaching of writing, 2nd edition, (259–274). Dordrecht: Kluwer Academic Publishers.

Lindgren, E. and Sullivan K.P.H. (2002). The LS graph: A methodology for visualising writing revision. Language Learning 52(3), 565–595.

Lindgren, E., Sullivan, K.P.H., & Spelman Miller, K. (in press, 2008). Development of fluency and revision in L and L2 writing in Swedish high school years 8 and 9. *International Journal of Applied Linguistics.*

Spelman Miller, K., Lindgren, E., & Sullivan, K.P.H. (2008). The psycholinguistic dimension in second language writing: opportunities for research and pedagogy. *TESOL Quarterly.*

Lindgren, E., Sullivan, K.P.H. & Stevenson, M. (2008). Supporting the reflective language learner with computer keystroke logging. In B. Barber and F. Zhang (Eds.), *Handbook of Research on Computer Enhanced Language Acquisition and Learning* (pp. 189 – 204). Hershey, NY: Information Science Reference, IGI Global.

Lindgren, E., Sullivan, K.P.H., Lindgren, U & Spelman Miller, K. (2007). GIS for writing: applying geographic information system techniques to data-mine writing's cognitive processes. In G. Rijlaarsdam (Series Ed.) and M. Torrance, L. Van Waes & D. Galbraith (Vol. Eds), *Writing and Cognition: Research and Applications* (pp. 83–96). Amsterdam: Elsevier.