In search of the optimal path: How learners at task use an online dictionary

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Abstract

We have analyzed circa 180 navigation paths followed by six learners while they performed three language encoding tasks at the computer using an online dictionary prototype. Our hypothesis was that learners who follow an 'optimal path' while navigating within the dictionary, using its search and look-up functions, would have a high chance of successfully completing the tasks. We have found that learners who indeed followed such an optimal path were systematically successful in completing the tasks. While alternative paths mostly led to failures, some did, nevertheless, lead to success. One didactic implication that emerged from this experimental study suggests that 'optimal' navigation paths can be taught to learners so as to enhance their navigation strategies while they use dictionary search and look-up functions for specific language learning tasks, and in turn, increase their chances of task success.

Keywords: online dictionary; CALL task; navigation paths; process-oriented analysis; video-screen capture

1. Introduction

In the context of CALL, the analysis of navigation paths (e.g. Rénié, 2000), of learner feedback (e.g. Heift, 2003; Chun and Payne, 2004) and of learner behaviour (e.g. Gass & Mackey, 2000), has revealed key information about the learner-task-tool interaction: its process as well as its outcome. As computer tracking technology becomes more sophisticated as well as more accessible, the technology enables researchers and practitioners in CALL to have a more complete (a dynamic and objective) insight into this interaction (cf. Fisher, 2007) – in collaborative CMC (e.g. Smith, 2008; Madeth et al., 2011) or individual HCI (e.g. Hamel & Caws, 2010) contexts, for instance. Within the latter perspective, we will look at the specific learner- task-dictionary interaction context and present a process-oriented analysis based on data collected using video-screen capture technology.

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2. Method

2.1 Participants, task and tools

The study (fully described in Hamel, 2012) involved six participants, university students who were advanced learners of French (C1). They had to individually complete three micro-tasks at the computer, focusing on their knowledge of French collocations. In total, there were 30 lexical items to find: 10 to translate, 10 to complete and 10 to substitute. Here is an example of each task:

T1 (Translation): a fierce anger: une colère …

T2 (Completion) : Ce chapitre *of…* des conseils pratiques pour se prémunir contre les effets du stress. [This chapter of… practical advice to avoid stress.]

T3 (Substitution): commencer une conversation: … une conversation [start a conversation : … a conversation]

The participants had access to an online dictionary (cf. Appendix 1) if they wished to, during the task completion process. This dictionary, called *Dire autrement*, is a functional prototype (Hamel, 2010) developed to answer some of the specific lexical encoding needs of our clientele of advanced learners of French (Hamel & Milicevic, 2007).

The task session at the computer was screen-captured using Camtasia Studio.

2.2 Data analysis and 'optimal' path hypothesis

The method used to analyse the data collected has been described in Hamel & Caws (2010) and further in Hamel (2012). In a nutshell, it involves describing quantitatively and qualitatively the task process and its outcome using parameters visible on the computer screen. Such parameters are defined in relation to the efficiency and the effectiveness with which participants complete the task with(out) accessing the dictionary. Efficiency parameters relate to the efforts deployed during the task process and the duration of the task while effectiveness parameters relate to the completeness and the accuracy of the task outcome. This being a usability study (Nielsen, 1994), we were concerned with the overall quality of the interaction between the learner, the task and the online dictionary prototype *Dire autrement*, and in particular by the use and usefulness of this dictionary in the specific context of this study (Cf. Hamel, op. cit.). However, for the purpose of this short discussion, we will report on the analysis of the navigation paths followed by the participants within the online dictionary during the task process. Our hypothesis was that they would start their search keying-in the base-word of the collocation provided for each task items, performing a search per *Mot* (word) and furthering this search within the *Liste de collocatifs* (list of collocates), selecting a collocate from that list and then issuing a look-up for its semantic value under *Collocatifs* (collocates). We referred to this three-step navigation path in the dictionary as the 'optimal path' (1. search per word→ 2. search within the list of collocates and select a potential collocate → 3. look-up the semantic value of the selected collocate). The second part of our hypothesis was that by following such an optimal path, participants' chances of successfully finding a correct input for the task item would be high.

3. Results and discussion

The results obtained were as follow:

In total, 178 navigation paths were analysed: 155 of these (87%) were successful paths; that is they led to supplying an accurate input for the task item; 23 of these (13%) were unsuccessful paths; that is, they led to supplying an incorrect (erroneous) input for the task item.

Looking at successful paths (cf. Appendix 2), we observed that: (a) 37 of these corresponded to our anticipated optimal navigation path (24%); (b) 60 were deemed partially optimal, in that they ended with a look-up on *Collocatifs* (39%); (c) 25 were classed as partially optimal, in that they ended with a search in the *Liste de collocatifs* (16%). We observed 33 navigation paths that were deemed alternative (21%), in that theywould have started, for instance, with a search by *Champ* (semantic field) and perhaps ended

with a look-up under the *Exemples* (examples) results. Fully and partially optimal paths accounted for 79% of the task successes.

Looking at the unsuccessful paths (cf. Annex 3), we found that none were optimal navigation paths, as anticipated. However, we observed one case of a partial optimal path ending with a look-up on *Collocatifs* but which lead to an erroneous input, and four cases of partial optimal paths ending with a search in the *Liste de collocatifs,* which lead to erroneous input. There were 18 alternative paths leading to erroneous input (75%). These often would start by a searching for a *Mot* using a collocate-word rather than the base-word of a collocation.

To summarize, optimal navigation paths led to no task failure. Fewer than 5% of the partial optimal paths led to task failure. Partial optimal paths ending with a look-up on *Collocatifs* led to success in all but one case observed while those ending with a search in the *Liste de collocatifs* (cf. Appendix 4 for an example) led to success in most cases observed (86%). Alternative paths (51 in total) led to more successes (19%) than failures (10%). It seems that the search process rather than the look-up process in the dictionary is critical in terms of leading to success or failure.

4. Conclusions

Using video screen-capture technology, we have been able to observe, in real-time, the interactions in the learner--task--tool triangle, or, more precisely, a CALL triangle involving six advanced learners of French, three micro-tasks centred on collocations and the *Dire autrement* online dictionary prototype. We have analysed the process of this interaction by looking at the navigation paths learners have followed within the online dictionary while attempting to find task items when working at the computer. We have found that indeed following an optimal navigation path guaranteed success. Participants with the highest task scores tended to follow either in full or partial optimal paths (where the partial path ended with a look-up on *Collocatifs)* whereas those with poorer scores tended to follow alternative paths or partial optimal paths (where the partial path ended with a search in the *Liste de collocatifs)*. Analysing failures, we now know how critical the search i.e. the beginning of the dictionary consultation process is. For those less efficient participants, more efforts (and time) were indeed deployed at this stage rather than at the look-up stage during the entire dictionary consultation process (Hamel, op. cit.). Analysing successes, looking at alternative paths in particular, we can acknowledge that the examples in the dictionary were used by participants and somewhat useful in providing a correct input for task items.

Some pedagogical implications can be drawn from this study:

- When designing a CALL task (Chapelle, 2001), language teachers must anticipate not only the desired outcome of the task but also the task process.

- Language teachers must provide learners with models of the CALL task process. Such models could include optimal navigation paths associated with specific online dictionaries.

- Learners should rehearse the CALL task process.

5. Acknowledgements

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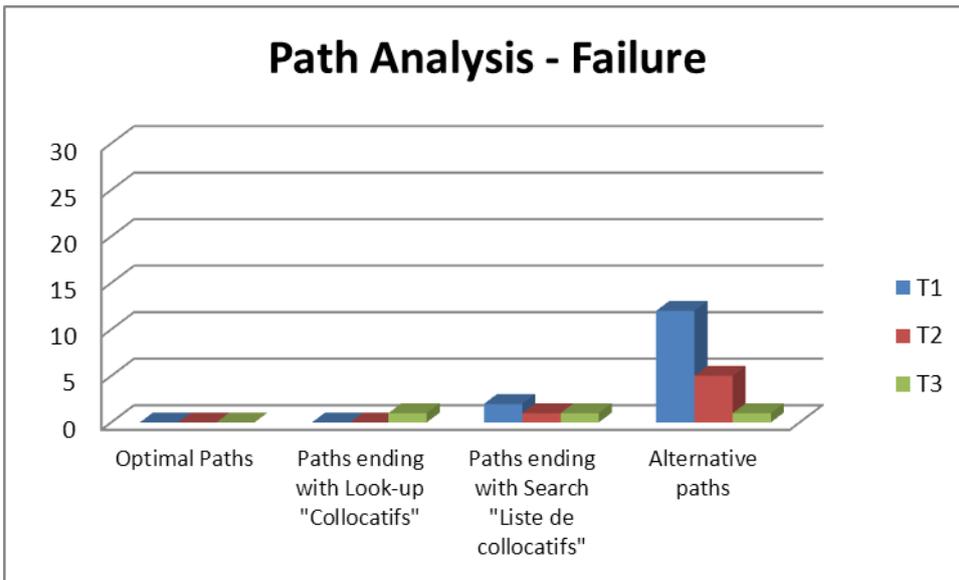
7. Appendices

Appendix 1: The online dictionary prototype: http://web5.uottawa.ca/direautrement/dico/dico.php

Appendix 2: Distribution of navigation paths leading to success.
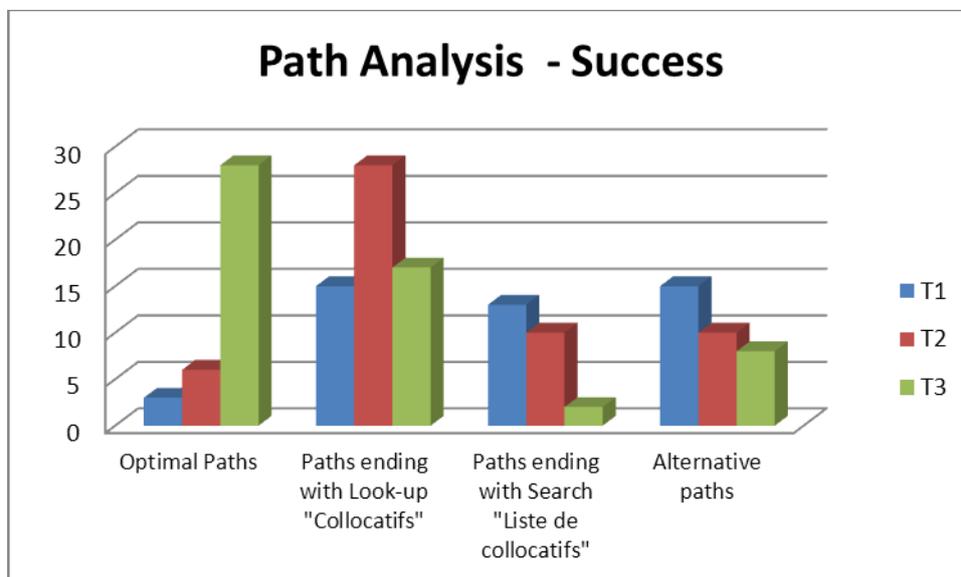
Appendix 3: Distribution of navigation paths leading to failure.

Appendix 4: Example of a failed navigation path ending with a search in the *Liste de collocatifs*.