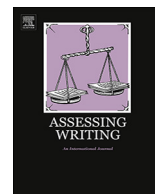




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## Assessing Writing

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## Exploring the potential of process-tracing technologies to support assessment for learning of L2 writing

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## ABSTRACT

Assessment for learning (AFL) seeks to support instruction by providing information about students' current state of learning, the desired end state of learning, and ways to close the gap. AFL of second-language (L2) writing faces challenges insofar as feedback from instructors tends to focus on written products while neglecting most of the processes that gave rise to them, such as planning, formulation, and evaluation. Meanwhile, researchers studying writing processes have been using keystroke logging (KL) and eye-tracking (ET) to analyze and visualize process engagement. This study explores whether such technologies can support more meaningful AFL of L2 writing. Two Chinese L1 students studying at a U.S. university who served as case studies completed a series of argumentative writing tasks while a KL-ET system traced their processes and then produced visualizations that were used for individualized tutoring. Data sources included the visualizations, tutoring-session transcripts, the participants' assessed final essays, and written reflections. Findings showed the technologies, in combination with the assessment dialogues they facilitated, made it possible to (1) position the participants in relation to developmental models of writing; (2) identify and address problems with planning, formulation, and revision; and (3) reveal deep-seated motivational issues that constrained the participants' learning.

## 1. Introduction

Assessment for learning (AFL) is assessment meant to support learning and teaching as opposed to other types that support sorting, certifying, or accountability functions (William, 2011). While AFL has been a central focus of curriculum reform in several countries for more than a decade, AFL research in L2 writing remains scarce (Lee, 2017). Part of the problem may have to do with the capacity for AFL, and L2 writing assessment more generally, to take account of writing processes such as planning, formulating, and revising.

Research has shown major differences between the ways skilled and unskilled writers engage in these processes (Roca de Larios, Murphy, & Marín, 2002) as well as connections between patterns of process engagement and writing quality. In some studies, nearly 80% of the variance in writing quality was explained by the type and timing of the processes writers engaged in (Breetvelt, van den Bergh, & Rijlaarsdam, 1994; Rijlaarsdam & van den Bergh, 2006). And yet, most L2 writing instructors probably know very little about the way their students go about producing the assignments they submit as part of classroom assessment: how much time they

*Abbreviations:* AFL, Assessment for learning; FS, Feedback about the self; FT, Feedback about the task; FP, Feedback about the processing of the task; FR, Feedback about self-regulation; WP, Writing process; WT, Writing task; FS, Follow-up session; RT, Reflection task

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spent, for example, and whether and how they engaged in specific processes. Even if instructors adopt a “process” approach and assign multiple drafts, these drafts are still written products that bear little information about the specific processes that went into their creation.

Meanwhile, the tools that researchers have used to study writing processes have been increasing in power and sophistication. They now include technologies that are largely unobtrusive and increasingly accessible and affordable such that they could be scaled up for use in instructional settings. The present study investigated whether and how such process-tracing technologies might support more meaningful AfL of L2 writing. The study contributes to the existing research on L2 writing assessment by investigating whether new technologies can expand the focus and potential benefits of AfL while also addressing calls for assessments that capture more of the writing construct (Cumming, 2002; Deane, 2013). In line with the theme of this special issue of *Assessing Writing*, it also demonstrates unique and significant advantages of computer-based over paper-based writing.

## 2. Literature review

### 2.1. Assessment for learning and feedback in L2 writing

Assessment for learning has been defined as “the process of seeking and interpreting evidence for use by learners and their teachers to decide where learners are in their learning, where they need to go, and how best to get there” (Broadfoot et al., 2002, pp. 2–3). While AfL has become an important component of curriculum reform in Australia, Hong Kong, the U.K., and the U.S., it has so far inspired little research in the area of L2 writing (Lee, 2017). Such research as exists has been based in secondary and tertiary settings in EFL contexts in Hong Kong and Taiwan. Many of these studies have focused on teachers’ motivations and strategies for implementing AfL and factors that facilitated or constrained AfL initiatives (Lee & Coniam, 2013; Lee & Falvey, 2014; Lee, 2011; Mak & Lee, 2014). Another line of research has examined the influence of AfL on student writing outcomes and student attitudes about AfL innovations (Huang, 2016; Huang, 2012; Lee, 2011) such as providing indirect feedback to help learners develop more independence in error correction.

Feedback is central to AfL because it is the means to convey information about where students’ abilities currently lie in relation to their goals and about the ways they can progress toward those goals (Black & Wiliam, 1998). Hattie and Timperley’s (2007) influential work on feedback, often cited in the general AfL literature, posits four types: feedback about the student him or herself (FS), such as praise; feedback about the task (FT), such as correctness or alignment with a rubric; feedback about the processing of the task (FP), such as the type of behavior needed to make improvements; and feedback about self-regulation (FR), such as information to support self-evaluation. Research shows that, whereas FS is the least effective, FP and FR can contribute powerfully to deep processing and mastery of tasks; FT, which is the most common type of feedback, is powerful when used in conjunction with FP and FR, although in practice this rarely happens (Hattie & Timperley, 2007).

Much of the feedback provided in conventional L2 writing classrooms can be described in terms of FT. Written corrective feedback (WCF) addressing linguistic issues may support focus on form (Doughty, 2001) and thus promote learning beyond the current task (although the WCF research on this question is mixed; see Bitchener & Ferris, 2012). The other common types of feedback on writing—namely, instructors’ written or oral comments about content, organization, and other higher-level concerns—may only serve to improve the current text; that is, it may be too task-specific to generalize to future writing and thus less supportive of learning. FP and FR, meanwhile, are difficult for writing instructors to address because of the lack of information about either of these dimensions of students’ task engagement. However, information about students’ task processing could be gathered by using some of the same methods employed by writing process researchers (described below).

In AfL, it is vital that assessment information be communicated to students in ways that help them clarify goals and understand evaluative criteria (Chong, 2017). AfL is informed by motivation theory that emphasizes learning (i.e., mastery) goals as opposed to performance goals, and when conducted appropriately, AfL is seen to both support and be supported by learner motivation (Lee, 2017). One way to ensure that feedback is conveyed in ways that students can understand and make use of it is for instructors to engage in individual “assessment dialogues” with students (Carless, 2006), which can be mutually beneficial insofar as they may also help instructors synthesize and interpret assessment information (Chong, 2017).

### 2.2. Processes in writing theory and research

Processes are foundational to the major cognitive models of writing (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981; Hayes, 2012; Kellogg, 2008; Leijten, Van Waes, Schriver, & Hayes, 2014), including the pair of models proposed by Bereiter and Scardamalia (1987) to account for differences between novice and skilled writers, which, although based in L1 research, has informed theorizing about L2 writing (Weigle, 2002). In this distinction, the *knowledge-telling* model describes the novice approach, wherein writing is a simple act of retrieving information from memory and “telling” what you know. By contrast, skilled writers exhibit *knowledge-transforming*, which involves an interaction between the author’s mental representation of her ideas and a separate mental representation of the text, with discrepancies between the two occasioning problem-solving and rethinking of the original ideas. Kellogg (2008) expanded this dichotomous conceptualization by adding a third, top-level model, *knowledge-crafting*, which characterizes the work of professional writers. According to Bereiter and Scardamalia (1987), it is not possible to identify the underlying approach simply by studying a given text because knowledge of topic, genre, and language affects writing outcomes. Rather, it is cognitive processes and the different ways they are enacted that make such differentiation possible. These processes include:

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