

Maplenima – formative assessment to shape student belief and practice in creative behaviour

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Abstract

Cultural habits of emphasizing norm-referenced tests, memorization, and recitation while neglecting alternative forms of performance can stifle student creativity due to their fear of failure and embarrassment. Past studies on the use of ICT for teaching creativity often stop short at students using ICT for their own sake in creating tangible products. This paper describes a design-based project to help students become more creative by adopting a dual-pronged approach to generate novel English Language narrative stories: (a) designing and implementing an iterative Maple Story (a massively multi-player online role playing game) gameplay-cum-machinima* production process that mirrors language process writing; (b) designing and implementing formative assessment to support the described learning process. The formative assessment process is designed to include ongoing open-ended conversations (as a source of formative feedback) with respect to students and teacher co-derived criteria. This helps to make visible students' creative thinking process, which allows the teacher to adjust the learning design, and the students to engage in self-regulation and peer-review. Review of data sources such as recorded learning and teaching interactions and creative outcomes both in class and on a Wiki, students and teacher interview data demonstrate that such an assessment design can shape student belief and practice in creative behaviour. The next iteration of the assessment design based on these findings is also described.

*Machinima is real-world filmmaking techniques applied within an interactive virtual space where characters and events can be either controlled by humans, scripts or artificial intelligence. Machinima makes for a very cost- and time-efficient way to produce films, with a large amount of creative control.

1 Introduction

One of the instructional outcomes of primary school English Language instruction in Singapore is a degree of mastery in narrative writing practice. Black *et al.* (2003) noted that carefully planned learning tasks with due consideration to 'Pedagogical Content Knowledge' (Shulman, 1986) are both necessary and sufficient for sound formative assessment practices to support student learning. This study is a design experiment that focuses on understanding how, when and why 'Technological Pedagogical and Content Knowledge' (Mishra and Koehler, 2006) learning designs that incorporate effective feedback practices shape pupils' practice and self-belief in creative writing behaviour.

Difficulty in learning to write across various contexts and purposes includes limited meta-cognitive knowledge and control of idea generation, planning and text organization (Englert and Raphael, 1988; Scardamalia and Bereiter, 1986). Englert *et*

al. (1992) found strong correlation between students writing ability and their ability to articulate their meta-linguistic knowledge of text structures. The challenge then for the proposed narrative writing programme in this study is for students to learn the habits and skills involved in expert writing practices. This include the conceptualization and discussion of ideas, analysis of generic features of narrative writing, the drafting of work, and a consideration of the audience for whom the work is created (National Writing Project, 1989, 1990 in Black *et al.*, 2003)

The National Writing Project (1989,1990 in Black *et al.*, 2003.) found that student experimentation and reflection are central to the learning of writing and this warrants the role of teacher to apprentice the students into the expert writing process. These findings lend credence to the potential adoption of cognitive apprenticeship model (Collins, Brown, and Newman, 1989) to guide the design of the writing programme for several reasons. First, in cognitive apprenticeship, teacher modeling of tacit cognitive and meta-cognitive processes that comprise expert writing can enable students to observe and practice these processes with help from the teacher and from other students. Second, cognitive apprenticeship lessons are designed to situate the abstract tasks of writing in relevant contexts that students can make sense in light of what they already know. Third, cognitive apprenticeship lessons are designed to vary the writing situations and articulate common aspects so that students can transfer their learning. The features are consistent with what we know of how people learn, such as facilitating students to makes sense of new learning experiences in light of what they already know and to share and refine their understandings (Bransford *et al.*, 1999).

The affordances of computer games can be explored in view of student learning needs in writing and the features of cognitive apprenticeship model to augment the learning and teaching of writing. Recent studies by Gee (2003) and Shaffer (2007) have examined learning that leverages on situated meaning in computer games. Murray (2007) discussed and explained the possibility of the emergence of new tales that exceed the storytelling of past novels in interactive media. In interactive media such as massive online role playing games (MMORPG), pupils being the protagonist can socially interact and create their own unique game narratives as the game responds dynamically to their game choices and actions. In this way, pupils are letting their feelings and imagination steer the game narratives in new creative directions. The embodied experiences and complex systems of interactivity in these computer games can thus provide the rich contexts for learners to take on different perspectives and socially construct new imagined narrative scenarios.

The results from the studies by Vincent (2007) seem to suggest that pupils' mental imagery is influenced by interactions and productions of new objects in the multi-media and visual learning environments. These multi-media and visual learning environments play a role in scaffolding the change of representation process as they aid the initiation of mental imagery objects and mediate its re-expression into textual modes. The nature of our student profile in a neighborhood primary school with middle to low Social Economic Status meant that only some students have direct interaction with English Language writing through their own reading, movies watching and the internet environment. In the same way, it is quite plausible that computer games play affords the other students such prior experiences that can serve to develop their mental imagery models necessary to be trans-mediated into writing when referenced against models of tacit expert writing skills.

Sadler (1989) identified three conditions necessary for students to benefit from feedback in learning tasks. He argued that the student must know what good performance is, how current performance relates to good performance, and how to act to close the gap between current and good performance. These findings are important in guiding our design for the forms of formative feedback used to support student learning in our writing programme and will be discussed in more details.

It is important for students to be able to make sense of the performance criteria of learning tasks as this will influence the interest and value they place on external peer and teacher feedback in the learning process (Sadler, 1989; Black *et al.*, 2003). We recognize the need for a shared understanding of these performance criteria between students and teachers so that students are more likely to 'connect' the feedback they receive to the next steps of their learning (Hounsell, 1997). Documentations of these performance criteria may not be necessarily effective in developing this shared understanding as studies have shown that it is difficult to explicate these performance criteria through written documents or verbal descriptions (Rust *et al.*, 2003). Useful approaches in helping students clarify these performance criteria include extensive discussion and reflection about what is targeted to be learnt or developed based on 'exemplars' of performance (Orsmond *et al.*, 2002) as well as involving students in peer assessing other students' work in relation to defined performance criteria (Black *et al.*, 2003).

Effective feedback should cause students to think about their gaps in learning performance and how to go about bridging these gaps in their learning. As well as relating feedback to performance criteria, an important consideration for designing effective feedback for learning is to encourage positive motivational beliefs and self-esteem in students to improve learning. Dweck (1999) noted that some students will attribute their failure in school achievement grades to their beliefs of fixed intelligences. Students who perceive themselves as low-ability learners who are unlikely to improve can be oriented towards a 'learned helplessness'. These students will tend to disengage from their learning to protect their self-esteem from the ego-involving comparison of achievement grades by other students. As Black and Wiliam (1998) note, feedback that draws attention away from the task and towards self-esteem can have a negative effect on attitudes and performance. Studies investigating the effects of task-involving evaluation and ego-involving evaluation on student learning interest and performance also found that students who were given feedback as comments only saw it as helping them to improve their learning involved in the performance of the task and they also out-performed those students given feedback as marks (Butler, 1988; Butler and Neuman, 1995).

Students need to interact with the feedback by taking an active role in understanding and internalizing the feedback information before using them to make productive improvement in their learning. Ongoing open-ended questioning and conversations are thus needed for students to actively participate in expressing and discussing their understandings (Black *et al.*, 2003). Indeed, a 'continuing dialogue' between teachers and students (Freeman and Lewis, 1998) and peer assessment (Black *et al.*, 2003) on the aspects of students' performance should be practiced. Peer assessment affords students practice in applying their understanding of performance criteria to explain to

their peers in a language more accessible than the teacher. In addition, peer assessment also exposes students to alternative perspectives and ideas of learning.

2 Design of Maplenima and formative assessment processes

We harness pupils' enthusiasm in playing Maple Story, a popular MMORPG, by allowing them to express their embodied game play experiences and knowledge in the medium of producing an animated movie named Maplenima. The interface learning environment is iteratively designed (see Figure 1) to provide pupils with the opportunities to translate their embodied game play experiences into the meta-linguistic learning experiences of narrative writing. Smaller writing tasks serve to scaffold the larger task of writing for the storyboard of the Maplenima movie.

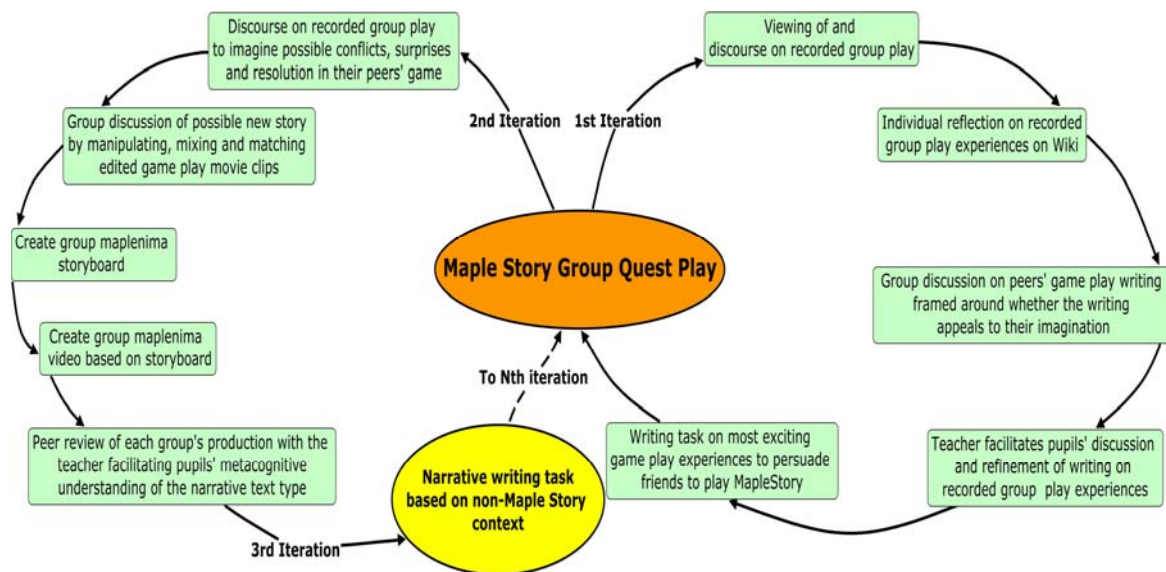


Figure 1 Schematic diagram on the Maplenima Learning Design

The intent of the first iteration is twofold- (i) to encourage reflection and discourse among pupils about their game play to provide a rich context of game imagery and scenarios from which the pupils could draw from when creating their latter narratives; (ii) and to scaffold pupils' crafting of a complication and climax with an authentic audience in mind.

Pupil collaboration and formative assessment learning and teaching processes are emphasized in the second iteration to create visual narratives in the form of the earlier described cross-genre Maplenima movie. This is accomplished by getting pupils to exchange, mix and match scenes from each other's recorded game play, partially adopting their original individual meaning, yet also negotiating with one another to give them their own spin. Extensive class discussions are used to relate the pupils' Maplenima production to the narrative text type and explicate the various writing techniques that pupils could employ to improve on their narratives during the second iteration. This is consistent with the cognitive apprenticeship practices of modeling to develop the shared understanding of the performance criteria for learning. Ongoing open ended questioning and conversations among teachers and peers are also used to scaffold and facilitate pupils' learning of this task to ensure that productive improvements can be made to develop a coherent Maplenima storyboard. This set of open ended questions will be used iteratively, albeit in greater depth with each

subsequent cycle, to heighten pupils' meta-linguistic awareness of narrative writing.

A third iteration is designed to assess how well pupils have internalized the narrative text type. This comes in the form of a narrative writing assignment based on a different (and non-MapleStory) context given to pupils. Subsequent iterations (labeled as Nth Iterations in Figure 1) could possibly be implemented as a means to help pupils learn other text types as the Maple Story game environment is sufficiently generic to support such activities.

3 Method

70 grade 5 pupils and their teachers from 2 classes in a primary school participate in this study over a 6-month period from April – September 2008. These students come from middle to lower social economic status backgrounds and are of mixed ability in terms of academic achievement. The study is based on a design experiment approach, whereby the teacher and the researchers are actively engaged in on-going teaching and design of the lessons from the learning inputs of pupils.

The researchers participate directly in the Maplenima writing programme by serving as pupil coach and teacher in some lessons. The qualitative procedure involved the researchers, as participant observers, collecting data on learning and teaching interactions and creative outcomes both in class and on a wiki over a period 12 weeks. This permits the researchers' experiences in the school setting to guide the data collection as new themes and patterns emerged. An interview is also conducted with pupils and teachers towards the end of the programme to triangulate with the observation and artefact data in the areas of pupils practice and beliefs in the creative writing process. The data is transcribed to text and coded. The resulting profiles of the learning and teaching interactions and behaviour are then analyzed for patterns and themes related to interactions between effective feedback processes and pupils beliefs and practices in learning creative writing.

4 Findings

A key aspect in one of the Maplenima lesson unit was to enable pupils to articulate and demonstrate how to make a narrative story interesting. The ongoing discussion and questioning between teacher and pupils mirroring the formative feedback described by Freeman and Lewis (1998) and Black *et al.* (2003) was observed to be key in helping pupils to understand their performance and ways to bridge it.

During the iterative writing task and class critique sessions, the initial feedback from the pupils on their peers' story ideas was generally monosyllabic in nature and Socratic Questioning was used to good effect in eliciting and shaping pupils' thinking and understanding of a particular performance criterion on interesting narratives. This was often followed by a more detailed explanation of what that criterion meant. These forms of open-ended iterative discussion had allowed for continuous elicitation of pupils' ideas; elaboration and transformation of pupils' raw ideas into a criterion that the pupils could claim ownership of (Black, 1988). This is demonstrated through an extract of a dialogue between the teacher and pupils:

Pupil A: Some of the ideas are not very good.

Teacher: Why are they not very good? Some of you say that they are not very good .. what's the reason? What makes you think that they are not very good? ...If we look at the big ideas, are we agreed that they are at best average?

Pupil B: Still ok.

Teacher: Still ok? Average means still ok, passable .. I can read the story, I can also don't read the story kind of level .. ok? Now tell us, what is lacking in his ideas?

Pupil A: Not funny ... This is Singapore ...

Teacher: Ok, there might be a lack of a sense of humour ... Ok ... in other words, some of you are thinking that the story idea is kind of boring.

Pupil C: Yah."

Teacher: When you first read it, it doesn't make you laugh. Now, that's what I want you to be able to say .. When you say that something is not very interesting for example, .. K .. you could be referring to the fact that the story idea has .. is not funny. It has a sense of humour ... That is a very good answer. That is what I call being able to explain what is being interesting or exciting. Now, can someone else tell me what is not so nice about the title?

Pupil E: Not exciting.

Teacher: Not exciting in what ways? It's lacking a sense of humour, it's not funny ... K, when you read something funny, it will catch your attention right? Then, you'll want to read some more .. Would you want to read a story or watch a movie when you already know the ending?

Pupil E: I know already .. you know handphone got game when you play, got suspense one

To sharpen pupils' assessment ability based on the criteria discussed, the teacher also showed the pupils an exemplar machinima title, "What I get for doing someone else's homework?", and brought the class through another round of reflection and provision of feedback by the same criterion. The pupils were allowed time to improve on their first round of story ideas and generate a second round of story ideas that demonstrated their understanding of what the criteria of an interesting narrative was. An extract from one of the group's story idea is given:

"FD and LF dances on the first level. The first attempt didn't work because the dance was not exciting to distract King Slime. As a result, HJ and WC were injured. On our second attempt, FD and LF caught King Slime's attention with a weird dance. WC and HJ attacked King Slime at this moment. We keep this going for a moment and King Slime died."

Pupils' assessment of whether their peers' Maplenima narrative stories were interesting and had sufficient descriptions to elicit the emotional engagement in the reader was also facilitated in other sessions:

Teacher: ... there's a lot of attention to details. We talk about how the character is, how the surrounding is, and other details for example, how the characters respond to the situation. ... Okay, if you think that it is important to say that Devita was terrified, she stood rooted to the ground, so you want to put that description in...

Teacher: ... So xxx as the main writer, will now go through the script with you. If you have things to ask about the script, that means missing details, just go ahead and ask...

...

Pupil K: So how come? You said just now that she run away. What is the point of protecting her if she was the one running away?

Pupil M: What about the ladder? ...

Pupil S: There's nothing interesting about what?

Teacher: ... But think of the details your friends want to know, for example, let's say, if your friend asks how can the big boss communicate with the spy? Then you realised that, oh, actually for your whole story you miss out the part about how the big boss communicate with the spy. Then that is the detail that you need to put into your story later on.

Teacher: Go back to SCAMPER, if you try to substitute something. A safe journey, with a person who is protecting xxx, what can you substitute? ...It is just like Harry Potter, every time they have a problem, they don't solve it the same way. ...they don't always say that there is a magical spell to kill the wizard.... Or sometimes she is very very brave, when she wants to find the red snail, she is very brave. But whenever she sees the blue one, she will always run away. You know combine ideas of a character to make the story a bit more interesting.

As pupils thought about their peers' questions, it made explicit the gaps in their own stories. These questions should indicate to the pupils how the readers (their peers) experienced the story as it was read. Such questions would help pupils make sense of the effects of their writing. We note that the teacher's use of peer reader response strategy in the form of pupil questioning and the *SCAMPER* creative tools (Eberle, 1997) for pupils to negotiate possible improvements is an important first step in supporting pupils' self evaluation of the kind of experiences reader would have on their own narratives and what they need to do to improve that experience.

Both sets of pupil and teacher interview data demonstrated the impact of the observed formative feedback learning and teaching processes on pupils' development of creative writing strategies and self-belief.

A group of pupils highlighted their insights on why their story was interesting. *"because it is a mystery...because someone kidnapped her... or lost...or die."* This shows that pupils are learning to create a lot of possibilities in the story line for the reader to want to pursue. The pupils also articulated their use of *Combine* tool in *SCAMPER* to improve their stories. *"...the idea of a monster. Melissa say kidnap. Then I put the monster and kidnap together."*

When the pupils were asked on what they thought was the most mysterious part of their story, Pupil S responded *"...The second clue, we are at the temple...The clue lies behind the leaves."* This pupil's response somewhat reflects her ability to self evaluate the story mysterious characteristics. It also exhibits her creativity to frame the clue location behind some unsuspecting leaves that possibly can lead the reader to fail in their expectation.

When pupils were asked on the writing strategies they had learnt, some pupils commented *"Asking questions... Is the story predictable? ... Does it make sense?... how to keep the reader in suspense?"*. Of special note is Pupil S response of *"To be confident in writing"*. When prompted on how they had become more confident in writing, Pupil J said *"Able to be more creative"* whilst Pupil S said *"Learn teamwork"*.

When we cross checked with the teacher on Pupil S learning profile, it was found that she had very low self-esteem in learning and had told a subject teacher that “*I don’t like xxx, I can’t understand anything.*” It is therefore not unreasonable to suggest that learning designs that incorporates effective formative feedback practices can promote creative behaviour and teamwork which in turn can support pupils’ development of self-belief and confidence in writing. This is consistent with Goldsmith and Matherly’s (1988) finding that students’ self-esteem is positively correlated with their creativity.

We were also encouraged by the teacher’s comment on pupils’ learning “*They have a lot of fun, trust me, they are the kind of pupils that don’t want to go home maybe to play the game, but there are also pupils who stay back because they want to continue to act out the stories in their game play. I have pupils who hand in to me really bad compos but they gave me such a good script that I’m surprised. So the motivation, the process is so different that you really see a change in the pupils.*”.

The following observations from our implementation had also informed the revision of the Maplenima design:

- pupils’ attention span tended to wane over the six weeks that they were working on their machinima based on a single story idea;
- on a related note, many pupil groups had to make numerous changes to the original story idea throughout the six weeks;
- the actual lessons seldom followed the linear lesson workflow that we had envisaged prior to classroom implementation. Rather, it was found that pupils could multi-task and achieve two or three lesson outcomes simultaneously within the same lesson.

Adopting the Understanding by Design (UbD) framework, we re-examined the goals that we are hoping to achieve with Maplenima, the meaningfulness of previously planned activities in terms of how they are aligned to our established goals and the national English Language (EL) curriculum requirements. This instructional design process has yielded two key changes to the lesson design. First, three skill areas are identified namely, EL narrative writing skills, Maple Story game skills, ICT skills to lend clarity to the type of proficiencies that we are helping students to acquire over the duration of the lesson unit. The delineation of the three skill areas also enables us to structure lessons such that pupils progressively acquire proficiency in all skill areas; mirroring the concept of “just in time” training in digital game play, which is a more flexible design that will enable us to better scaffold the pupils’ learning experience.

The other major revision is to adopt an episodic approach to EL narrative machinima production, where pupils will work on smaller video episodes and eventually progressing to producing a larger machinima collaboratively. This stands in contrast to our pilot implementation where the pupils were only concerned with the production of one major machinima episode throughout the entire unit.

It is hoped that the combined effect of the revisions will foreground the EL narrative writing process more prominently as compared to our pilot implementation, where this crucial part of planned learning was overshadowed by the pupils’ enthusiasm in game play and the learning of ICT skills for producing the machinima.

5 Conclusions

This study has demonstrated that we cannot over emphasize the importance of effective formative feedback processes to bring about the kind of learning in our pupils. Notwithstanding recent developments in the areas of technology supported formative feedback such as Assisted Marking Tool, the formative feedback interactions between teachers and students is still an important first step to develop students' self-regulation skills to make productive learning improvements from the system generated feedback.

References

- Black, P. & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education*, 5(1), 7–74.
- Black, P., Harrison, C., Lee, C., Marshal, B. & Wiliam, D. (2003) *Assessment for learning: putting it into practice*. Maidenhead, Open University Press.
- Bransford, J., Brown, A., & Cocking, R. R. (Eds.). (1999). *How people learn: Brain, Mind, Experience and School*. National Research Council.
- Butler, R. (1988). Enhancing and undermining intrinsic motivation: the effects of task-involving and ego-involving evaluation on interest and involvement. *British Journal of Educational Psychology*, 58, 1–14.
- Butler, R. & Neuman, O. (1995). Effects of task and ego-achievement goals on help-seeking behaviours and attitudes. *Journal of Educational Psychology*, 87(2), 261-271.
- Collins, A., Brown, J.S., & Newman, S. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser*. Hillsdale, NJ: Erlbaum.
- Dweck, C. (1999). *Self-theories: their role in motivation, personality and development*. Philadelphia, PA, Psychology Press.
- Eberle, B. (1997). *SCAMPER*. Texas: Prufork Pr.
- Englert, C. S., & Raphael, T. E. (1988). Constructing well-formed prose: Process, structure and metacognitive knowledge. *Exceptional Children*, 54 (6), 513-520.
- Englert, C. S., Raphael, T. E., & Anderson, L. M. (1992). Socially mediated instruction: Improving students' knowledge and talk about writing. *The Elementary School Journal*, 92, 411-449.
- Freeman, R. & Lewis, R. (1998). *Planning and implementing assessment*. London, Kogan Page.
- Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York: Palgrave Macmillan.

- Goldsmith, R. E., & Matherly, T. A. (1988). Creativity and self-esteem: A multiple operationalization validity study. *Journal of Psychology*, 122, 47–56.
- Hounsell, D. (1997). Contrasting conceptions of essay-writing, in: F. Marton, D. Hounsell & N. Entwistle (Eds) *The experience of learning* (2nd edn). Edinburgh, Scottish Academic Press.
- MISHRA, P., & KOEHLER, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, 108(6) 1017-1054.
- Murray, J. H. (1997). *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. New York: The Free Press.
- National Writing Project (1989). *Writing and Learning*. Walton-on-Thames: Thomas Nelson.
- National Writing Project (1990). *Writing and Learning*. Walton-on-Thames: Thomas Nelson.
- Orsmond, P., Merry, S. & Reiling, K. (2002). The use of formative feedback when using student derived marking criteria in peer and self-assessment. *Assessment & Evaluation in Higher Education*, 27(4), 309–323.
- Rust, C., Price, M. & O'Donovan, B. (2003). Improving students' learning by developing their understanding of assessment criteria and processes. *Assessment and Evaluation in Higher Education*, 28(2), 147–164.
- Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, 18, 119–144.
- Shaffer, D. W. (2007). *How computer games help children learn*. New York: Palgrave Macmillan.
- Scardamalia, M., & Bereiter, C. (1986). Research on written composition. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 778-803). New York: Macmillan.
- Shulman, L. (1986). Those who understand: knowledge growth in teaching. *Educational Researcher*, 15(1), 4-14.
- Vincent, J. (2007). Writing and Coding: Assisting Writers to Cross the Modes. *Language and Education*, 21(2), 141-157.