

# THE ROLE OF ICT IN SCAFFOLDING COLLABORATIVE WRITING

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## ABSTRACT

Collaborative writing is an increasingly popular practice in today's classrooms due to the benefits of social constructivism, which is the theoretical basis of the activity. Ideally, students' writing skills grow when they scaffold on each other's strengths and produce a collaborated piece of writing together. However, some students take this opportunity to "free-ride" so work is not done fairly. Due to culture or individual personality, some domineering students decide to finish most parts of the work, leaving very little to the passive ones. Students dividing sections of the essays for team members to work on also discourage collaborative discussions and make the work non-coherent. This paper offers an alternative to handling these issues by using Information Communicative Technology (ICT) as a scaffold to foster individual accountability and positive interdependence, for monitoring and assessment needs and as a platform for revising writings collaboratively.

Keywords: Collaborative writing, ICT, social constructivism, scaffold, monitor

## Introduction

Among the four language skills which are reading, writing, listening and speaking, writing is proven to be the highest order skill as it demands a student's cognitive skills and the ability to reproduce an idea correctly in a language (Beck, 2011). To improve a student's writing ability, much attention is usually needed from the teacher as approaches to teaching writing often requires more personal attention where monitoring and scaffolding input can be given by the teacher (Leki & Carson, 1994). This is fiscally impractical as a teacher with an average classroom has about 30 students to handle. Therefore, many teachers opt to make their students do collaborative writing to solve the logistics burden. Although some teachers may not be aware, collaborative writing has lots of benefits (Kessler et al., 2012; Leki, 1993; Storch, 2005). However, there are problems which come together with the benefits of collaborative writing. This paper aims to discuss the problems and how ICT functions as a tool to rectify those problems.

***Collaborative Writing: Theoretical basis, benefits and issues***

Due to a pedagogical shift from teacher centered lessons to student centered lessons, the teaching of writing has also shifted in its lesson design to collaborative writing in ESL classrooms (Ellis, 2001; Li et al., 2012). Collaborative writing can take many forms: a simple basic five paragraph essay, a story board presentation, a novel, a documentary, a blog or even a website. Collaborative writing is founded on the pedagogy of social constructivism by Vygotsky (1978). Vygotsky's (1978) Social Constructivism Theory postulated that all learning stems from social interaction and meaning is socially constructed through communication, activity and interaction with others. In the theory, Vygotsky brings up two important concepts which is the "More Knowledgeable Other" (MKO) and the "Zone of Proximal Development" (ZPD).

The MKO refers to a person with more competence and understanding of the subject. The MKO may be a teacher, an older adult or even a peer who is more experienced and advanced in the area of writing. In collaborative writing, the MKO refers to the "expert writer" of the group, a person who is more proficient in the English language and even a person who has more ideas and experiences about the subject matter. By engaging with the MKO through social learning in class, the learner will learn faster. This brings us to Vygotsky's second concept, which is the ZPD.

Vygotsky (1978) claimed that learning will only take place in the Zone of Proximal Development. This zone bridges the gap between what is known and what can be known through the help of expert-novice peer collaboration. A mixture of "expert" writers and "novice" writers in a team creates scaffolding. These two groups get to learn from each other the various writing strategies employed. Sasaki (2000) claimed that experts tend to be global planners in essay writing, laying out the big picture before focusing on the details; experts' plans are more elaborate whereas novices' plans are more localized. Often struggling with translation from L1 to L2, ideas are often simplified to be expressed correctly.

In Storch's (2000, 2001) studies on groups of two, different kinds of pairing in teams produce different kinds of dynamics. She discussed that if both students in the team are dominant, they create an active collaboration and contribution from both parties whereas a dominant and passive pair would have the dominant leading and the passive, who has little contribution, following his lead. The same goes in the collaborative writing scenario; the expert will lead and direct the novice. Swain et al. (2002) claim that with these kinds of peer assistance, co-

construction, knowledge transference and language development (grammatical accuracy and new lexis) is created in the process.

Collaborative writing makes students in the group more mindful of the writing processes due to the awareness of “audience” reading their text. Based on Hayes and Nash's (1996) theories of writing, writing processes can be categorized into three types of activities such as planning, formulating or translating and revising. The revising process happens more as they have the “audience” in mind (Erkens et al., 2005). In Storch's (2005) study, essays produced by collaborative writing achieve greater grammatical accuracy and linguistic complexity. The presence of another writer other than the individual acts as a monitor to revise the work done. Many studies done on L2 collaborative writing show that in the process of co-authoring an essay, much consideration is made not only on grammatical accuracy and lexis but also discourse and language appropriateness (Donato, 1988; Storch 2002). Storch (2005) explains that students are very receptive to feedback as they are responsible for the collaborative writing.

Although collaborative writing tasks promise a lot of benefits, students often do not automatically meet lesson objectives as ideally as expected. Very often when a collaborative writing task is given in class, some students will perceive this as a free time given by the teacher. Strijbos et al. (2004, p.10) call this the “free-riders” effect in which some members avoid effort all together or contribution to the group. In group tasks such as collaborative writing, social loafing (Weldon et al., 2000) are bound to happen. Some students take this time to chat about irrelevant subjects and not focus on the work at hand. Conversely, when productive members of the group begin to feel there are too many free-riders, they decide to slow down in their efforts and contributions (Kerr, 1983). If the collaborative writing exercise is made into an assessment, it would be very difficult for the teacher to give grades as this shared authorship does not directly translate itself to shared effort. Unlike what Storch (2000, 2001) has described about the group dynamics of a dominant-passive pair in which the dominant leads and the passive follows, these idealized dynamics do not always happen. In a group of more than two, sometimes the dominant takes the easier routes by handling the task individually and totally not delegating or discussing any work with the passive. The passive then ends up taking out something unrelated like Maths exercises to do.

Interestingly, according to Carson and Nelson (1994) most Asians perceive writing as an individual task and students from a collectivist culture would rather let the dominant have their way than “criticize or make suggestions about their work, being fearful that doing so would disrupt the group or create tension” (p.27). Sometimes, the act of questioning and challenging a group members’

opinion can be viewed as intimidating and offensive instead of constructive, thus defeating the very basis of what this whole collaborative writing task is built upon – social constructivism. Alternatively, to make things “work”, students often divide the tasks among themselves so to form job parameters of what is under their autonomy and what is not. So, work divided becomes “cooperative writing” instead of “collaborative writing” in which one person does the introduction, the other the second paragraph, the other the third and finally another, the conclusion. Collaboration is “a process by which individuals negotiate and share meanings relevant to the problem-solving task... (collaboration) is a mutual engagement of participants in a coordinated effort to solve the problem together” (Roschelle & Teasley, 1995, p. 70).

Dillenbourg (1999) explains “cooperation” as group members split work, solve sub-tasks individually and then assemble the partial results into the final output. In collaborative writing, the aim is not just its final product but the aim is meaning construction together to reach the final product. The process of revising and editing together is integral to the learning process. The most practical solution teachers use to rectify such arrangements is to monitor students’ discussions by eavesdropping on them. However, with as many as 6 or 7 groups discussing in one classroom, it is quite impossible for the teacher to effectively do so. As to date, there is not much research done on how to such problems can be solved.

### **ICT Used in Collaborative Writing Fosters Individual Accountability and Positive Interdependence**

Many studies have pointed out that if group work is not effectively executed by the teacher, students will not take it seriously, socialize more instead of working, allocate most work to a team member, complete the activity superficially and not engage themselves with the learning process (Clark, 2003). For a group interaction to work, two important principles involved in this is individual accountability and positive interdependence (Lamberigts, 1988; Slavin, 1997; Wang, 2009). It is a match between managing oneself at an intrapersonal level and also working with the team at an interpersonal level. Kessler and Bikowski (2010) explain that there is some form of autonomy working in a collaborative team as the learner learns how to use the language to contribute personal meanings to the group and interpersonal strategies to work with team members. Working in groups requires a special dynamic as one has to be independent enough to handle one’s own work, yet dependent and contributing at the same time towards others for feedback and information.

Taking ownership and autonomy of one's learning is a very important component in learning. Krashen (1992) claims that for one to learn the language, one should explore and immerse oneself in the language. For writing, practice is an important element as it frees one from writing apprehension and the inhibitions of exploring further. Language learning, especially writing, heavily depends on doing. Based on the activity theory (Kolb et al., 2001), one cannot learn if one does not do. Basically, "individual accountability" is to take ownership of one's own learning (Wang, 2009, p. 1139). As discussed earlier, collaborative writing which takes place in the traditional classroom sometimes fails due to too much social loafing in a face-to-face setting.

Rainer and Matthews (2002) explain that ownership cannot be fostered unless conditions or strategies are provided to encourage students to take initiative in their own learning. Research shows that small talk and irrelevant chatter are minimized when the discussion happens online. Schellens and Valcke (2005) state that in online discussions, interactions stay task-orientated and reflects higher phases of knowledge construction. Besides that, due to the awareness that the teacher is watching the online discussion, students are more motivated to show up online and participate. These discussion threads are already a documented proof of how much a student is contributing and participating (Wang, 2010). Therefore having an online device like the Computer Supported Collaborative Learning (CSCL), wiki or even chat rooms reinforces this individual accountability.

Secondly, is the issue of positive interdependence. Based on Carson and Nelson's (1994) research, poor writers reported that they felt intimidated doing collaborative writing with their inadequate command of the language. This would somehow threaten the concept of positive interdependence when students feel they are unable to contribute. Damon and Phelps (1989) explain that the concept of "equality" is important strategy in group dynamics because when team members are perceived as "equal" in their abilities to contribute in terms of abilities and resources, then members become more willing to interact with each other, thus creating a more positive atmosphere. In this case, the Internet gives poor writers an outlet to contribute by researching and sharing online resources with their teammates as part of the planning process. Collazos et al. (2003) discuss that positive interdependence can be fostered through the delegation of roles and duties in the team such as, discussion leaders, organizers, recorders and spokespersons. This kind of role play helps students feel important in a team and thus want to fulfill their duties well. After all, positive interdependence is making, "each member feel willing to work hard to make sure that the whole group is successful" (p. 368).

Researching and brainstorming for ideas also contribute to the learning process where multimodal learning is taking place as there are lots of reading, critical reading, comparing and exploring material going on to choose the right points to be included in the writing product. Reading is part of a writer's development. Stotsky (1983) claims that there is a correlation between good readers and good writers. He states that "better readers tend to produce more syntactically mature writing than poorer readers" (p.636). This process inevitably builds research skills in students, which is part of the 21<sup>st</sup> century skills. The Internet today is replacing peers as the "More Knowledgeable Other" (MKO) in the real life context. To allow this online scaffold at hand would only be relevant and authentic to the students' learning context. Teachers and students however have to be aware of the vastness of the Internet and which websites are more trusted than the others. A form of digital literacy and awareness has to be taught to the students prior any activities which employ ICT. It is important that students are aware of the different web sources which may present different points of view and not everything found in the Internet is the whole truth. In a group setting, teachers can encourage their students to share articles and web sources and read critically as a group to create a wholesome discussion for the writing task.

Online collaborative writing is very relevant to students today as it allows some gap and time for reflection and thinking before getting engaged in a certain discussion. Palloff and Pratt (2001, p. 108) indicate that ICT benefits those who "need time to think and reflect before responding to questions and ideas". With the scaffold of online materials available and time to work at their own pace, students would feel more empowered to share and contribute to the planning of the essay, instead of just relying solely on their "prior knowledge" in a traditional classroom setting.

## **ICT Used For Monitoring and Assessment Needs in Collaborative Writing**

In student centred lessons where these collaborative writing tasks are found, there is a paradigm shift from the teacher being the sole source of knowledge to the teacher as a facilitator. Meaning is not given to the students as straightforward as it used to be in teacher centred classrooms (Piccinin, 1997). However, students cannot be completely left on their own lest they do not perceive prior instructions correctly, or sway from the objectives of the lesson, just as discussed previously how collaborative writing can become cooperative writing when parts of the essay are delegated separately to different members. Therefore, the teacher must play their part as a facilitator to monitor students' progress in the collaborative activity. The teacher playing the role of the

facilitator online can also remain in the three common practices of orchestrating classroom discourse like “asking questions or posing problems to begin a discussion, monitoring student participation during discussion, and responding to student ideas” (Grossman et al., 2009, p. 13). A teacher can monitor students online by asking students to allow them or add them into the discussion groups. Having access to their groups, the teacher is then aware of their progress, the speed of their progress and their participation. If an online discussion is taking place during class time in the classroom itself, teachers are then able to monitor the students in person. They could walk around or sit behind the class to make sure the students are viewing task orientated material.

Monitoring is an important process in conveying instruction and making sure the students are on the right track. However, often in a traditional face-to-face classroom, teachers are incapable of following 6 or 7 groups of discussion at the same time. Therefore, an online scaffold allows the teacher to access the chatroom and follow the discussion threads at a more effective, faster way than walking around the classroom and eavesdropping. Macfayden and Dawson (2010, p. 598) claim that by just monitoring the students’ online network activities, educators can access a “comprehensive representation of how the student learning community is progressing, even in very large classes.” Teachers can correct a certain misconception or even applaud someone’s efforts in contributing to the group.

Vonderwell and Zachariah (2005, p. 131) claim that in a collaborative setting, “monitoring student participation and patterns of participation closely can help instructors identify student needs and scaffold learning accordingly.”- Affirming is a positive action as it gives the student a morale boost and encourages other members to contribute as well. Yunus et al. (2013) have brought up issues regarding students using ICT for writing classes. They claim that the use of online language and abbreviations is more prevalent in online discussions. Educators can then monitor the language use by observing their discussions. However, abbreviations in the process of discussing the content of writing should not be a problem. The final product should present itself free from online language and abbreviations.

Besides being a window for the teacher to facilitate writing groups, ICT also functions as a documentation tool (Jermann et al., 2004; Wang, 2010). Even when the teacher is not closely monitoring a group’s development and progress, because the discussions are documented, there is a form of self-monitoring going on. According to Akyol and Garrison (2011), this online metacognitive monitoring involves students’ judgments of their own learning and online products. It is something like self-censorship due to the awareness of audience

other than their peers reading the threads. So students are more careful (Warschauer, 1995) and serious in their discussions to impress the evaluator. This documentation also functions for the teacher to evaluate students' contributions more objectively. Although the writing product is that of shared authorship, students can also take credit in their efforts done to write a good collaborative essay.

On the other hand, the ability of teachers monitoring the students through ICT may not be omnipotent. Although students do not get that much distraction from their peers in the team, they may also get distracted by other websites found in the web, online games or even social media which they naturally gravitate to. Yunus et al. (2013) add that the presence of ICT in classrooms may also make students very distracted during class time and class control difficult to control. However, focusing on the product students manage to produce in the time frame will be telling of their productivity of their online discussions whether they are really working at it or doing a fair bit of cyber-loitering. Plagiarism is also another issue which is out of the teacher's control unless students are found out. Information being so freely available on the Internet, to plagiarize is a very tempting thing to do especially when one struggles with proficiency in the language yet desires to present his or her ideas clearly in the writing product. Tan et al. (2010) suggests that plagiarism can be avoided if teachers educate students about the dangers of plagiarism and how to use online information in an honest manner.

### **ICT Used As a Tool for Revising Writings Collaboratively**

Peer feedback is at the heart of collaborative writing (Chisholm, 1990). Rollinson (2005) claimed that such feedback creates potentially a high level of response and interaction among peers thus encouraging a collaborative feedback of a two way dialogue. Peer feedback is beneficial to the development of a writing product as it monitors one's presentation of ideas at the same time demonstrates how writers of the same level (not teachers or expatriates) react towards a certain challenge. Rollinson (2005) believes that peer audiences are more sympathetic, understanding and less judgmental as compared to teacher audience. This gives room to peer facilitation where meanings are constructed together in comparing notes and communicating what they understand with each other (Brookfield, 1986). This creates a lot of confidence and lowers writing apprehension.

Kessler (2009) postulates that technology aids the process of peer feedback because it allows many-to-many communication influence, plan and engage in collaborative writing task. In Li et al's (2012) study of students' perceptions,



they find that technical advantages enable them to do revisions of the collaborative text whenever they like it, even after school hours. It gives the group members a lot of flexibility as compared to face-to-face discussions in class. Dysthe et al. (2010) add that the benefits of technology for peer review process in collaborative writing is massive, indicating that it acts as an interaction artifact in writing processes and contributes to make the interaction process transparent. Consequently, Warschauer's (1995) study also found students using language which is lexically and syntactically more formal and complex in electronic discussions than face-to-face interactions.

### **Conclusion and Directions for Future Research**

This paper has discussed how ICT functions as a scaffold for collaborative writing in writing tasks. ICT can be the MKO, the resource tool, the documentation tool, the platform for revision, monitoring and assessment. Its advantages are immense. However not many studies have been done on online collaborative writing although there is a lot of research on collaborative learning using ICT. Woo and Reeves (2007) indicate that there is little research on what type of feedback will best contribute to improving student's writing performance, especially in the collaborative online learning environment. The component of ICT integrated in the learning of writing has added a whole new meaning to the pedagogy of teaching writing. Most research is centred on CSCL, wiki, Facebook or the Web 2.0 as a whole although these tools work interdependently like team members of the collaborative group. Future studies should also include how ICT as a whole scaffolds the collaborative writing process. This paper has brought up a number of issues, thus, outlining potential research areas such as ways the teacher is able to monitor their student's writing progress online, how students can be motivated to remain ethical and plagiarism free while using ICT as a scaffold or even how to develop writers through using online peer feedback.

## References

- Akyol, Z., & Garrison, D. R. (2011). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education, 14*(3), 183-190.
- Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond*. New York City, NY: Guilford Press.
- Brookfield, S. (1986). *Understanding and facilitating learning*. San Francisco, CA: Jossey-Bass.
- Carson, J. G., & Nelson, G. L. (1994). Writing groups: Cross-cultural issues. *Journal of Second Language Writing, 3*(1), 17-30.
- Chisholm, R. M. (1990). Coping with the problems of collaborative writing. *Writing Across the Curriculum, 2*, 90-108.
- Clark, I. L. (2003). *Concepts in composition theory and practice in the teaching of writing*. London, UK: Lawrence Erlbaum Associates.
- Collazos, C. A., Guerrero, L. A., Pino, J. A., & Ochoa, S. F. (2003). Collaborative scenarios to promote positive interdependence among group members. In proceedings of *Groupware: Design, Implementation, and Use* (pp. 356-370). Grenoble-Austrans, France: Springer Berlin Heidelberg.
- Damon, W., & Phelps, E. (1989). Critical distinctions among three approaches to peer education. *International Journal of Educational Research, 13*(1), 9-19.
- Dillenbourg, P. (1999). What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and computational approaches* (pp. 1-19). Oxford: Elsevier.
- Donato, R. (1988). Beyond group: A psycholinguistic rationale for collective activity in second-language learning. Unpublished doctoral dissertation. Newark: University of Delaware.
- Dysthe, O., Lillejord, S., Vines, A., & Wasson, B. (2010). Productive e-feedback in highereducation – Some critical issues. In S. Ludvigsen, A. Lund, I. Rasmussen, & R. Säljö (Eds.), *Learning across sites: New tools infrastructures and practices* (pp. 243–259). Oxford: Pergamon Press
- Ellis, A. (2001, December). Student-centred collaborative learning via face-to-face and asynchronous online communication: What's the difference. In *Proceedings 18th ASCILITE Conference Melbourne* (pp. 9-12).
- Erkens, G., Jaspers, J., Prangmsma, M., & Kanselaar, G. (2005). Coordination processes in computer supported collaborative writing. *Computers in Human Behavior, 21*(3), 463-486.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: theory and practice, 15*(2), 273-289.

- Hayes, J. R., & Nash, J. G. (1996). On the nature of planning in writing. On the nature of planning in writing. In C.M. Levy and S. Ransdell (Eds.), *The Science of Writing: Theories, Methods, Individual Differences, and Applications* (pp. 29 - 55). Mahwah, NJ: Lawrence Erlbaum.
- Jermann, P., Soller, A., & Lesgold, A. (2004). Computer software support for CSCL. In J. W. Strijbos, P. A. Kirschner, & R. L. Martens (Eds.), *What we know about CSCL* (pp. 141–166). Norwell, MA: Kluwer Academic Publishers.
- Kerr, N. (1983). The dispensability of member effort and group motivation losses: free-rider effects. *Journal of Personality and Social Psychology*, 44, 78–94.
- Kessler, G. (2009). Student initiated attention to form in autonomous wiki based collaborative writing. *Language Learning & Technology*, 13(1), 79–95. Retrieved from <http://llt.msu.edu/vol13num1/kessler.pdf>
- Kessler, G., & Bikowski, D. (2010). Developing collaborative autonomous language learning abilities in computer mediated language learning: Attention to meaning among students in wiki space. *Computer Assisted Language Learning*, 23, 41-58. doi:10.1080/09588220903467335
- Kessler, G., Bikowski, D., & Boggs, J. (2012). Collaborative writing among second language learners in academic web-based projects. *Language Learning & Technology*, 16(1), 91-109.
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2001). Experiential learning theory: Previous research and new directions. *Perspectives on thinking, learning, and cognitive styles*, 1, 227-247.
- Krashen, S. D. (1992). *Fundamentals of language education*. Laredo Publishing Company.
- Lamberigts, R.A.J.G. (1988). Cooperatief leren. *Onderwijskundig Lexicon*, II, C1300-1 –C1300-19.
- Leki, I. (1993). Reciprocal themes in reading and writing. In J. Carson & I. Leki (Eds.), *Reading in the composition classroom: Second language perspectives* (pp. 9–33). Boston, MA: Heinle & Heinle.
- Leki, I., & Carson, J. G. (1994). Students' perceptions of EAP writing instruction and writing needs across the disciplines. *TESOL Quarterly*, 28(1), 81-101.
- Li, X., Chu, K., Ki, W. W., & Woo, M. M. (2012). Using a wiki-based collaborative process writing pedagogy to facilitate collaborative writing among Chinese primary school students. *Australasian Journal of Educational Technology*, 28(1), 159-181.
- Li, X., Chu, K., Ki, W. W., & Woo, M. M. (2012). Using a wiki-based collaborative process writing pedagogy to facilitate collaborative writing among Chinese primary school students. *Australasian Journal of Educational Technology*, 28(1), 159-181.

- Macfadyen, L. P., & Dawson, S. (2010). Mining LMS data to develop an “early warning system” for educators: A proof of concept. *Computers & Education*, 54(2), 588-599.
- Palloff, R. M., & Pratt, K. (2001). *Lessons from the Cyberspace Classroom: The Realities of Online Teaching*. San Francisco: Jossey-Bass Publishers.
- Piccinin, S. (1997). Making our Teaching More Student-Centred. *OPTIONS*. 1 (5)[online]. Retrieved on June 20, 2012 from [http://www.uottawa.ca/academic/cut/options/Dec\\_97/Student\\_centred.htm](http://www.uottawa.ca/academic/cut/options/Dec_97/Student_centred.htm)
- Rainer, J. D., & Matthews, M. W. (2002). Ownership of learning in teacher education. *Action in Teacher Education*, 24(1), 22-30.
- Rollinson, P. (2005). Using peer feedback in the ESL writing class. *ELT journal*, 59(1), 23-30.
- Roschelle, J., & Teasley, S. D. (1995, January). The construction of shared knowledge in collaborative problem solving. In *Computer supported collaborative learning* (pp. 69-97). Springer Berlin Heidelberg.
- Sasaki, M. (2000). Toward an empirical model of EFL writing processes: An exploratory study. *Journal of Second Language Writing*, 9(3), 259-291.
- Schellens, T., & Valcke, M. (2005). Collaborative learning in asynchronous discussion groups: What about the impact on cognitive processing?. *Computers in Human Behavior*, 21(6), 957-975.
- Slavin, R.E. (1997). *Educational Psychology: theory and practice* (5th ed.). Needham Heights, MA: Allyn & Bacon.
- Storch, N. (2000, December). Is pair work conducive to language learning? The nature of assistance in adult ESL pair work and its effect on language development. In *Conference on Scaffolding and Language Learning in Educational Contexts: Socio-cultural Approaches to Theory and Practice*. Centre for Language and Literacy, University of Technology, Sydney, Australia.
- Storch, N. (2001). *An investigation into the nature of pair work in an ESL classroom and its effect on grammatical development* (Doctoral dissertation, The University of Melbourne).
- Storch, N. (2002). Patterns of interaction in ESL pair work. *Language Learning*, 52(1), 119–158.
- Storch, N. (2005). Collaborative writing: Product, process, and students’ reflections. *Journal of second language writing*, 14(3), 153-173.
- Stotsky, S. (1983). Research on Reading/Writing Relationships: A Synthesis and Suggested Directions. *Language Arts*, 60(5), 627-642.
- Strijbos, J. W., Martens, R. L., & Jochems, W. M. (2004). Designing for interaction: Six steps to designing computer-supported group-based learning. *Computers & Education*, 42(4), 403-424.

- Swain, M., Brooks, L., & Tocalli-Beller, A. (2002). Peer-peer dialogue as a means of second language learning. *Annual Review of Applied Linguistics*, 22(1), 171-185.
- Tan, K. E., Ng, M. L., & Saw, K. G. (2010). Online activities and writing practices of urban Malaysian adolescents. *System*, 38(4), 548-559.
- Vonderwell, S., & Zachariah, S. (2005). Factors that Influence Participation in Online Learning. *Journal of Research on Technology in education*, 38(2), 213-230.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wang, Q. (2009). Design and evaluation of a collaborative learning environment. *Computers & Education*, 53(4), 1138-1146.
- Wang, Q. (2010). Using online shared workspaces to support group collaborative learning. *Computers & Education*, 55(3), 1270-1276.
- Warschauer, M. (1995). Comparing face-to-face and electronic discussion in the second language classroom. *CALICO journal*, 13(2&3), 7-26.
- Weldon, M. S., Blair, C., & Huebsch, P. D. (2000). Group remembering: Does social loafing underlie collaborative inhibition? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26(6), 1568.
- Woo, Y., & Reeves, T. C. (2007). Meaningful interaction in web-based learning: A social constructivist interpretation. *The Internet and Higher Education*, 10(1), 15-25. <http://dx.doi.org/10.1016/j.iheduc.2006.10.005>
- Yunus, M. M., Nordin, N., Salehi, H., Embi, M. A., & Salehi, Z. (2013). The Use of Information and Communication Technology (ICT) in Teaching ESL Writing Skills. *English Language Teaching*, 6(7), 1-8.