Malaysian MOOCs: Students' Patterns of Interaction

Nuraihan Mat Daud[1*], Lilisuriani Abdul Latif@Bapoo[2], Nor Shidrah Mat Daud[3]

[1]Kulliyyah of Languages and Management,
International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur.
nuraihan@iium.edu.my
[2] Kulliyyah of Languages and Management,
International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur.
lilisuriani@iium.edu.my
[3]Akademi Pengajian Bahasa, Universiti Teknologi MARA,
40200 Shah Alam, Selangor, Malaysia
norshidrah@salam.uitm.edu.my
[*]Corresponding Author

ABSTRACT

Massive Open Online Courses (MOOCs) provide an interactive avenue for an unlimited number of participants to interact and collaborate on joint projects. Realizing the potential of MOOCs in accommodating more and diverse learners, four MOOCs were introduced by the Malaysian Ministry of Education in 2014. These courses allowed students from all Malaysian public higher educational institutions to benefit from the shared content. They were expected to discuss issues related to their field of studies and share their experiences. Postings sent were analyzed to study their patterns of interaction particularly the number of postings, threads and patterns of turn-taking. The contents of the messages were also analyzed to determine if they reflected effective learning. The study found that there was not much evidence of collaborative learning and co-construction of knowledge. There was a high percentage of greetings and sharing of 'words of wisdom' compared to discussions on issues related to the lessons taught. It was also observed that they wrote much more in the reflection page than in the discussion forum.

Keywords: MOOC, interaction pattern, collaborative learning, knowledge co-construction

INTRODUCTION

Online courses are gaining popularity among higher education students as they offer flexibility, convenience and accessibility (Croxton, 2014). Online communication enhances learning both in distance and blended learning contexts. Participants who are some distance away, introverts or extroverts and of mixed abilities can all meet in a virtual learning environment to co-construct knowledge. Well-designed online courses can be as effective as face-to-face classes (Muilenburg & Berge, 2005). Despite their good designs, students' personal characteristics and abilities have been identified as among the barriers to effective adoption of this innovation. Factors such as motivation and aptitude may influence students' willingness to participate in such a course. The less motivated and the weaker ones are likely to drop out of the course (Levy, 2007).

For effective online learning to take place, both students and teachers have to change the way they interact to suit the online environment (Picciano, 2002). This involves their readiness to communicate in a non-linear manner (handling several discussions progressively and simultaneously), their willingness to share ideas, to collaborate, to handle information overload and to filter misinformation (Mackay, 1989; Picciano, 2002; Ruberg, Taylor & Moore, 1996; Sproull & Kiesler, 1991).

Members of a discussion group can join the online forum anytime and anywhere. They may respond to a specific idea or issue and stay within the thread. They may also start a new thread. Studies have found that this mode of communication can be disjointed since participants can choose to join, withdraw or ignore the 'conversation' (Stodel, Thompson & MacDonald, 2006; Thomas, 2002). Often the quality of postings made by students does not meet the objectives of the online activities which are supposed to mediate critical inquiry and produce a community of inquiry. "Keeping the discussion threads lively and informative is [indeed] a challenge" (Wishart & Guy, 2009, p.130).

PROBLEM STATEMENT

In a Massive Online Open Course (MOOC) environment where the interactions can involve thousands of participants, a long thread is expected with a myriad of views on any given subject. This provides a good opportunity for the participants to co-construct knowledge collaboratively. The large number of strangers communicating online can, however, make it more challenging to form a supportive bond of interaction (Yang et al., 2013). The lack of structure and support is said to limit the potential for learning (Mackness, Mak, & Williams, 2010). Maurino (2006) also reported that online discussions did not help to develop higher order thinking skills. Yet, more MOOCs are being developed including MOOC Malaysia which is the initiative of the Malaysian Ministry of Higher Learning. This is unique because all Malaysian public universities which offer common courses are expected to use the materials on MOOC as part of the course teaching materials. This study hopes to determine the extent to which the online discussions on these MOOCs promote collaborative learning and thus, co-construction of knowledge among the participants. Even though there have been a number of studies on the quality of interactions on online courses, more reports on the patterns of these interactions among Malaysian students are deemed necessary.

OBJECTIVES OF RESEARCH

Thus, the objectives of this research are:

1. to study students' pattern of interaction on four Malaysian MOOCs; and

2. to determine if the students' postings reflect effective learning.

BACKGROUND OF THE STUDY

MOOC was introduced to the students of the Malaysian public universities in Semester I, 2014/2015 starting from September 2014. Four universities were selected to offer the MOOC courses and these were:

1. Universiti Putra Malaysia (UPM) - Islamic and Asian Civilizations (*Tamadun Islam dan Tamadun Asia)*;

2. Universiti Teknologi MARA (UiTM) - *Introduction to Entrepreneurship*

3. Universiti Kebangsaan Malaysia(UKM) - Unity and Ethnic Relations (*Kesepaduan dan Hubungan Etnik)* ; and

4. Universiti Malaysia Sabah (UMS) - *Information and Computer Technology (ICT) Competencies*.

These are common courses at all Malaysian public universities (except for the International Islamic University, Malaysia). Thirty percent of the above courses were offered on the MOOC platform which covered five weeks of the semester. All faculty members at the 20 public universities who were teaching these courses were urged to use these resources to support their lessons.

Collaborative Learning via Social Networks

The mass of literature praises collaborative learning (either face-to-face or technology-aided) over individual learning for its educational benefits. This includes its potential to promote deep learning and higher thinking (Gokhale, 1995; Reeves, Herrington & Oliver, 2004; Garrison & Cleveland-Innes, 2005; Schellens & Valcke, 2005). Students play a more active role as they are made to be more responsible for their own learning (Soller, 2001; Veldhuis-Diermanse, 2002; Roschelle & Pea, 2002; Blasco-Arcas, Build, Hernandez-Ortega & Sese, 2013). Working collaboratively with peers in small groups, each member shares a common academic goal. The success of the group relies very much on the contribution of each individual in the group (Gokhale, 1995; Trentin, 2009; Judd, Kennedy & Cropper, 2010). Students are given more control and leeway to determine what and how to learn (Panitz, 1999; Estes, 2004) especially with the changing role of the teacher from the authoritative figure to a facilitator in the learning process (Sormunen, Alamettälä & Heinström, 2013).

With the advent of Computer Supported Social Networks (CSSNs), more interaction can be encouraged. Asynchronous communication via

social networks enables more participation as participants are free to contribute whenever they are ready. Despite all the benefits, Inaba and Mizoguchi (2004) contend that it is the quality of interaction among learners, which is greatly dependent on a learner's knowledge and/or cognitive states, that determines the educational benefits that the learner gets through the collaborative learning experience.

Co-construction of Knowledge via Social Networks

Co-construction of knowledge involves individuals internalizing knowledge from socially mediated group discourse or activities (Vygotsky, 1978; 1986). The co-construction of knowledge among diverse participants is further heightened by Computer Supported Social Networks (CSSNs). Computer mediated communication can be accessed and elaborated on by others at different times and places in a manner not possible with face-to-face communication. It would give the impression that the dispersed group members are actually together. In other words, members feel the "social presence" of other individuals even though they are not physically together. The social networks support information exchanges, thus offering the conditions for treating knowledge as an object of inquiry. "People can easily post a question or comment and receive information in return. Broadcasting queries through CSSNs increase the chances of finding information quickly and alters the distribution patterns of information. It gives those working in small or distant sites better access to experienced, skilled people" (Wellman, 1996, p.2).

Hence, a point to remember, for co-construction of knowledge to occur via the social networks, dialogues elicited in the computer-mediated learning environment should have potential for result in activities, and reflection on these activities is viewed as development. Knowledge building according to Scardamalia and Bereiter (1996) requires that participants work on the creation and improvement of ideas. Thus, exchanges of meaningful ideas are sought as they constitute quality discussion threads that promote critical thinking and self-regulatory learning (Vonderwell, Liang & Alderman, 2007; Rizopoulos & McCarthy, 2008-2009). The role of a moderator should then be "…one that structures initial problem tasks for the group, and continually follows group discussions, ready to respond to participants when the time is appropriate for them to move to higher levels of engagement" (Hull &

Saxon, 2009, p.627). Participants, on the other hand, are to put significant thought and effort into the discussions by posing good questions and responding with clarity to help reinforce their own understanding and that of their peers (Maurino, 2006; Zingaro, 2012).

Collaborative Knowledge Construction Interactions

An online forum is said to be very useful in encouraging participating learners to actively engage in discussions and collaboratively construct their knowledge with their peers and instructor (Roschelle et al., 2000; Knowlton, 2001). Anderson and Kanuka (1997) argued that online forums can be a useful medium for group collaboration. Thanasingam and Soong (2007) also reported higher mental functions and better understanding of concepts as students critically asked and answered questions, expressed opinions, stated disagreements, provided clarification comments and negotiated knowledge.

There are also some findings which indicated higher phases of co-construction of knowledge though online collaboration was difficult to achieve. Sing and Khine's (2006) content analysis of students' online interactions revealed that the students did not aggressively respond to challenge or negotiate knowledge but were more actively asking/answering clarification questions and suggesting ideas for improvement. Similar findings were also found in studies by Schellens and Vackle (2005) and Zhao and Rop (2001).

Culture and Online Interactions

Students' cultural background can also influence their manner of interacting online (Yang et al., 2014). Chinese students for instance have been found to be concerned with maintaining their own "face" or status in social settings and thus, would choose to be quiet until they were sure that they were correct (Hwang, 1987; Tarone & Yule, 1989; Liu & Littlewood, 1997, Yang et al., 2014). They would also make sure that they preserved other's face. Consequently, they would avoid public criticism. Kim and Bonk (2002) who studied asynchronous discussions of students from Korea, America and Finland discovered similar findings. They reported that the Koreans were more social compared to the Americans and Finnish students. Lampert and Ball (1999) explained that due to culture, some online course

participants tend to offer mostly nice comments as they tried to avoid anything perceived to be disrespectful or confrontational. Effects of culture on interactions can only be overruled by an individual's personality (Neyer & Harzing, 2008).

METHOD

This study analyzed the messages posted on the first four Malaysian MOOCs. The units of analysis for synchronous discussion forums vary from messages, paragraphs and sentences to illocutions (Rourke et al., 2001). In order to evaluate the knowledge construction process, Pena-Shaff and Nicholls' (2004) instrument was used in this study. The theoretical framework for this instrument is based on the social constructivist learning theory. According to them, statements of clarification, interpretation, conflict, assertion, judgment and reflection are more directly related to the process of knowledge construction. Pena-Shaff and Nicholls (2004) also claimed that, "By posing questions, elaborating on the ideas presented, debating and interpreting their own statements and those of others, students explored the course topics, reaching their own interpretations about the social, psychological and ethical issues related to CMC." (p.252)

Participants

The participants of the study consisted of students who participated in the first four MOOCs that were offered by the four selected universities. In many cases, it was not known which university they belonged to since only their names appeared on the screen. As of 25th April 2015, the total number of students who registered for these MOOCs was 25,896 for *Islamic and Asian Civilizations;* 24,111 for *Unity and Ethnic Relations;* 13,201 for *Introduction to Entrepreneurship;* and 6,961 for *Information and Computer Technology (ICT) Competencies*. The duration of this study for each of the subjects is given in Table 1 below:

Table 1: Duration of Study

	Subjects	Duration of Study
1.	*Introduction to Entrepreneurship*	14/9/2014 – 31/3/2015
2.	*Unity and Ethnic Relations*	28/2/15 – 1/4/2015
3.	*Islamic and Asian Civilizations*	25/3/2015 - 31/3/2015
4.	*Information and Computer Technology (ICT) Competencies.*	23/3/2015 - 31/3/2015

Data Collection

Data for this study consisted of the postings on the selected MOOCs particularly to gather information on discussion threads and knowledge construction indicators.

FINDINGS OF STUDY

The postings on *Introduction to Entrepreneurship* were analysed from 14/9/2014 – 31/3/2015. Since these lasted for nearly two semesters, two cohorts of students from each of the universities were involved in the study. This course was observed for a longer period of time because the course was compulsory in all the twenty public universities in Malaysia. Though about 13,000 students registered for the course, only 1,680 participated in the online forum. All greeted the rest using various forms of greetings which included 'Hi!' and '*Assalamualaikum*'. Out of 1,680 prompts, there were only 300 responses, and out of these, only 164 lead to discussion threads. However, only nine of the discussion threads were organized around the lessons. Others fall under what Pena-Shaff and Nicholls (2004) categorise as *'Other'*, which were messages that were difficult to categorize and social statements. These would include social comments not related to the discussion such as greetings and jokes. There were no elements of interpretation, conflict, assertion, judgment and reflection in the whole period of discussions.

Although this course was taught in English, most of the discussions were held in Malay. One of them asked:

S411 -..... now I do not doubt yet...atau ada sesiapa lagi yang nk meyakinkan saya.....please reply...kenapa ye dia guna dalam bahasa inggeris? sedangkn belajar dlm bahasa melayu, betul tak?...make me feel so confused…

(S411 in response to S514 – Note nobody responded to this question)

Just as the above, many of the questions were not responded to. There were very few inquiries, and yet nobody responded to the inquiries. One of them was:

hello..just wanna ask..how do we know if our lecturer give an assignment? until now i cant found anything

(StudentS542)

An almost similar pattern was observed in *Unity and Ethnic Relations* MOOC. Language seemed to be an issue as well, as mentioned by a few participants:

Table 2: Language Issue

Prompt		Reply
Assalamualaikum dn salam sejahtera... nk tanya knp subjek hubungan etnik xde dalam bahasa inggeris????? Bila lg nk memperkasakan bahasa Inggeris kalau mcmnie (Peace be upon you…would like to know why Ethnic Relations subject is not in English? When are we going to improve our English?	S1	kalau semua nk guna bahasa inggeris..bahasa melayu nk guna buat ape (if English is used in all aspects…what are we going to do with Malay language?)
	S62	bahasa melayu just utk komunikasi jela.....subjek etnik biar dlm bahasa inggeris...bru perkasa (Malay language is just for communication…Let Ethnic Relations be in English… then it can be strengthened)

As in the *Entrepreneurship* course, very few of the discussions threads were seriously on the lessons. Less than ten of them were related to the course. The content did not require any interpretation, and there were no elements of conflict, assertion, consensus building and judgment. Some

comments were cynical and government service tax (GST) seemed to be an issue of interest to them. They seemed to share the same feeling on certain issues which included GST.

Table 3: Current Issues in the *Entrepreneurship* Course

No.	Prompt	Reply
1.	"Rakyat didahulukan, Pencapaian diutamakan". Apakah slogan selepas GST? ("People first, achievement is prioritized". What is the slogan after GST?)	Politik! Politik! Politik! (Politics, Politics, Politics)
		kita hidup mesti politik aa kawan. Hahaha (We cannot live without Politics, my friend. Ha…ha…ha…)
		Apa nie? Nk berpolitik ke? (What is this? Are you politicking?)
		nak tau pendapat je pung. Hahaha (Just would like to know your view.)
		bahya ni ada bau2 politik..kne tngkap t..hahaha (This is dangerous… there are elements of politicking…you will be caught).
		hahaha.... problem besar dh nie!!!!! (…this is a big problem)
		hahahaha
2.	Lagi 3 hari akan bermula sistem GST di Malaysia ini, makanya saya ingin bertanya sedikit kepada rakan-rakan disini, apakah pandangan rakan-rakan terhadap GST dan bagaimana GST dapat membantu menaikkan sumber ekonomi Malaysia? (The GST system will be implemented in 3 days. So I would like ask fellow friends, what is your opinion on GST and how does GST help to improve Malaysian economic resources?)	Tapi di Malaysia negara yg mempunyai petroleum, sawit, getah dan segala mcm sumber tapi rakyat tetap kena GST. Ini sbb rasuah, ketirisan dan kronisme yg tinggi di Malaysia dan yg tanggung adalah rakyat. Harga kereta mahal, rumah mahal, pendidikan tidak percuma, harga barang mahal dan semua benda mahal. Hutang negara hampir mencecah 500 bilion ringgit. Cukai GST menjadikan yg kaya semakin kaya yg miskin mcm gua ni semakin miskin. Sbb itu kita patut tolak GST (But in Malaysia we have petroleum, palm oil, rubber and many other resources and yet the people still have to pay the GST. This is because of bribery, lack of integrity and cronyism in Malaysia and the people have to bear the cost. Cars and houses are expensive. Education is not free, the price of goods is expensive and everything is expensive. The country's debt amounted to RM500 billion. The GST makes the rich richer and the poor like me poorer. That is why we have to reject GST.
		Saya fikir sumber ekonomi Malaysia akan meningkat kerana cukai merupakan salah satu sumber ekonomi negara. Walau bagaimanapun, cukai akan menaikkan harga barangan itu sudah pasti dan apabila harga barang meningkat, rakyat yang hidup susah akan bertambah susah (I feel that the Malaysian source of income will increase because tax is one of the country's income. However, tax will surely increase the price of goods and the poor will be poorer.)
		belilah iphone sekarang..hehehehe (Better buy a iphone now.... hehehehe)

The nature of discussions on *Information and Computer Technology (ICT) Competencies* course was different from the first two MOOCs in that many videos were uploaded to explain certain topics and the discussions were more in the form of quizzes rather than interactions.

Table 4: Responses to an Uploaded Video

Prompt	Reply
Part 1: What is Open Source?	good explanation
	good
	smooth explanation
	reasonable explanation and analogy
	good
	good
	nice one
	nice
	good

In the *Islamic and Asian Civilizations* course, more Arabic greetings/replies were utilized, which included "*Assalamualaikum*" and "*Waalaikumussulam*". The discussion was more serene in nature, with more quotable quotes and words of wisdoms being uploaded. The participants were in agreement with each other on most of the issues. The following are some of the examples of the discussions:

Table 5: A Discussion on Religion

No.	Prompt	Reply
1.	Jika hati tertoreh, bukan darah yg mengalir tetapi Air mata yg mengalir.. hebat ciptaan Nya... (: (If your feelings are hurt, it is not blood that flows but your tears will drop.. How great is His creation)	subhanAllah (Glory be to Allah)
		subhanaallah... (Glory be to Allah)
		btol tuu..subhanallah..^_^ (That is right. Glory be to Allah)
		Btl2..mukin air mata lagi laju mngalir dr darah yg mengalir...(That is right, maybe eye drops flow faster than blood)
		Luka dalaman lagi parah dari luka luaran juka x dirawat... chewahh..m :D (Internal bleeding is worst than external bleeding if not treated)
		^_^
		ngantukkk…(I feel sleepy)
		Tidur… (Sleep)

DISCUSSION OF FINDINGS

The results show that there were very few complex threads of discussions. Unlike Pena-Shaff and Nicholls' (2004) findings, not many of the threads extended over several days or several weeks. The lack of depth in the discussions could be one of the reasons for the lack of interest in discussing the issues at hand. One thing that the students exhibited in common was the importance of saving one's face in their culture. This might have inhibited them from debating a topic openly in a public forum. This seems to be in line with Yang et al.'s (2014) proposition that students' cultural background influences the way they interact online.

It was also observed that the sentences or rather the messages were short and there were elements of textisms where spellings were abbreviated. 'Proper' English was hardly used, and this could be due to students' lack of proficiency in the language. As stated by Levy (2007) their personal characteristics and abilities may be the barriers to effective learning. The minimal elements of co-construction of knowledge could also be due to the lack of effort to 'adjust' the formal interactions to suit the online learning environment (Picciano, 2002).

CONCLUSION

The fact that all the public universities were willing to share their resources by offering them on MOOC mode was an important milestone for the institutions involved. It also reflects a changing trend in Malaysian higher education. This calls for a paradigm shift in the way learning is approached. However, the study has revealed that the online activities have, so far, failed to initiate, mediate, or sustain higher phases of co-construction of knowledge. The postings analyzed in this study hardly reflect effective collaborative learning and critical thinking. In order to produce a community of inquiry there is a need for a greater involvement of the instructors and curriculum designers to ensure that the discussions are well crafted to maximize co-construction of knowledge at higher levels of thinking. In order for students to take the activity seriously, the assessments and evaluation process of their online activity must be factored into the process as students are known to be very concerned about their evaluation and this may trigger more higher level, subject oriented discussions.

REFERENCES

Anderson, T., & Kanuka, H. (1997). On-line forums: New Platforms For Professional Development And Group Collaboration. *JCMC,* 3(3), [online]. Available: http://www.ascusc.org/jcmc/vol3

Blasco-Arcas, L., Build, I., Hernandez-Ortega, B., & Sese, F. J. (2013). Using Clickers In Class. The Role Of Interactivity, Active Collaborative Learning And Engagement In Learning Performance. *Computers & Education*, *62*, 102-110.

Croxton, R.A. (2014).The Role of Interactivity In Student Satisfaction And Persistence In Online Learning. MERLOT *Journal of Online Learning and Teaching.* 10(2), June 2014.

Estes, C. A. (2004). Promoting Student-Centered Learning In Experiential Education. *Journal of Experiential Education*, *27*(2), 141-160.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating Cognitive Presence In Online Learning: Interaction Is Not Enough. *The American Journal of Distance Education*, *19*(3), 133-148.

Gokhale, A. A. (1995). Collaborative Learning Enhances Critical Thinking. *Journal of Technology Education*. 7(1). Retrieved from http://scholar.lib.vt.edu/ejournals/JTE/v7n1/gokhale.jte-v7n1.html?ref=Sawos.Org

Hull, D. M. & Saxon, T. F. (2009). Negotiation of Meaning and Co-Construction of Knowledge: An experimental analysis of asynchronous online instruction. *Computers & Education*, 52(3), pp. 624-639.

Hwang, A. (1987), "Face and favour: The Chinese power game", *The American Journal of Sociology, 92* (4), 944-974.

Inaba, A., & Mizoguchi, R. (2004, January). Learners' Roles And Predictable Educational Benefits In Collaborative Learning. In *Intelligent Tutoring Systems,* pp. 285-294, Springer Berlin Heidelberg.

Judd, T., Kennedy, G., & Cropper, S. (2010). Using Wikis For Collaborative Learning: Assessing Collaboration Through Contribution. *Australasian Journal of Educational Technology*, *26*(3).

Kim, K.-J., & Bonk, C. J. (2002). Cross-Cultural Comparisons Of Online Collaboration. *Journal Of Computer-Mediated Communication*, 8 (1), 2.

Knowlton, D.S. (2001). *Promoting Durable Knowledge Construction Through Online Learning*. The Proceedings of the Mid-South Instructional Technology Conference. Murfreesboro , TN : Middle Tennessee State University. http://www.mtsu.edu/~itconf/proceed01/11.html

Lampert, M., & Ball, D. L. (1999). Aligning Teachers Education With Contemporary K-12 reform visions. In DarlingHammond, L. & Sykes, G. (Eds.), *Teaching as the Learning Profession: Handbook of Policy and Practice*. pp. 3-32San Francisco, USA: Jossey-Bass.

Levy, Y. (2007). Comparing Dropouts And Persistence In E-Learning Courses. *Computers & Education*, 48(2), 185-204. doi:10.1016/j.compedu.2004.12.004

Liu, N., & Littlewood, W. (1997). Why do many students appear reluctant to participate in classroom learning discourse. System, 25, 371-384.

Mackay, W.E. (1989) Diversity in The Use of Electronic Mail: A Preliminary Inquiry." *ACM Transactions on Office Information Systems*, 6(4), 380-397.

Mackness, J., Mak, S. and Williams, Roy (2010) The Ideals and Reality of Participating in a MOOC. In Dirckinck-Holmfeld, L., Hodgson, V., Jones, C., De Laat, M., McConnell, D. and Ryberg, T. (Eds.), *Proceedings of the 7th International Conference on Networked Learning 2010*. University of Lancaster, Lancaster, pp. 266-275.

Maurino, P. S. M. (2006). Looking for Critical Thinking In Online Threaded Discussions. e-Journal of Instructional Science and Technology. 9(2). Retrieved from http://ascilite.org/archived-journals/e-jist/docs/vol9_no2/papers/full_papers/maurino.htm

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. Distance Education, 26(1), 29-48.

Neyer, AK & Harzing AW. (2008). The Impact of Culture on Interactions: Five Lessons Learned From The European Commission. *European Management Journal*, May 2008.

Panitz, T. (1999). The Case For Student Centered Instruction Via Collaborative Learning Paradigms. Retrieved from http://files.eric.ed.gov/fulltext/ED448444.pdf

Pena-Shaff, J. B., & Nicholls, C. (2004). Analyzing Student Interactions And Meaning Construction In Computer Bulletin Board Discussions. *Computers & Education*, 42, 243–265.

Picciano, A.G. (2002) Beyond Student Perceptions: Issues Of Interaction, Presence, And Performance In An Online Course.*JALN*, 6(1).

Reeves, T. C., Herrington, J., & Oliver, R. (2004). A Development Research Agenda For Online Collaborative Learning. *Educational Technology Research And Development*, *52*(4), 53-65.

Rizopoulos, L. A. and McCarthy, P. (2008-2009). Using Online Threaded Discussions: Best Practices For The Digital Learner, *Journal of Educational Technology Systems,* 37(4), 373-383.

Roschelle, J., & Pea, R. (2002). A walk on the WILD side: How Wireless Handhelds May Change Computer-Supported Collaborative Learning. *International Journal of Cognition and Technology*, 1(1), 145-168.

Roschelle, J.M., Pea, R.D., Hoadley, C. M. Gordin, Douglas N. & Means, B.M. (2000). Changing How And What Children Learn In School With Computer-Based Technologies. http://www.sri.com/policy/ctl/assets/images/RoschelleEtAlPackard2000.pdf

Rourke, L., T. Anderson, D.R. Garrison, W. Archer (2001). Methodological Issues In The Content Analysis Of Computer Conference Transcripts,*International Journal of Artificial Intelligence in Education*,12, pp. 8–22.

Ruberg, L. F., Taylor, C.D., & Moore, D.M. (1996). Student Participation And Interaction On-Line: A Case Study Of Two College Classes: Freshman Writing and Plant Science Lab. International *Journal of Educational Telecommunications*, 2(1), 69-92.

Scardamalia, M. & Bereiter, C. (1996). Rethinking Learning. In Olson, D. R. & Torrance, N. (Eds.), *The Handbook of Education and Human Development*: *New Models of Learning, Teaching and Schooling*, Cambridge, MA: Basil Blackwell, 485-513.

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.

Sing, C.C. & Khine, M.S. (2006). An Analysis Of Interaction And Participation Patterns In Online Community. *Educational Technology & Society*, 9 (1), 250-261.

Soller, A. (2001). Supporting Social Interaction In An Intelligent Collaborative Learning System. *International Journal of Artificial Intelligence in Education (IJAIED)*, *12*, 40-62.

Sormunen, E., Alamettälä, T., Heinström, J. (2013). The Teacher's Role As Facilitator Of Collaborative Learning In Information Literacy Assignments. In:Kurbanoğlu, S., Grassian, E., Mizrachi, D., Catts, R., Špiranec, S. (Eds.), *Worldwide Commonalities and Challenges in Information Literacy Research and Practice.* Springer, Heidelberg, pp. 499-506.

Sproull, L.S. & Kiesler, S. (1991) *Connections: New Ways Of Working In The Networked Organization*. Cambridge, MA: MIT.

Stodel, E. J., Thompson, T. L., & MacDonald, C. J. (2006). Learners' Perspectives On What Is Missing From Online Learning: Interpretations Through The Community Of Inquiry Framework. *International Review of Research in Open and Distance Learning,* 7 (3), 1-24.

Tarone, E. & Yule, G., 1989. *Focus on the language learner*. Oxford: Oxford University Press.

Thanasingam, S. & Soong, S. K. A. (2007) *Interaction Patterns And Knowledge Construction Using Synchronous Discussion Forums And Video To Develop Oral Skills*. Proceedings Ascilite Singapore.

Thomas, M. J. W. (2002). Learning Within Incoherent Structures: The Space Of Online Discussion Forums. *Journal of Computer Assisted Learning, 18*(3), 351-366.

Trentin, G. (2009). Using a Wiki To Evaluate Individual Contribution To A Collaborative Learning Project. *Journal of Computer Assisted Learning*, *25*(1), 43-55.

Veldhuis-Diermanse, A. E. (2002). *CSC Learning?: Participation, Learning Activities And Knowledge construction in Computer-Supported Collaborative Learning in higher education*. Wageningen Universiteit.

Vonderwell, S., Liang, X., & Alderman, K. (2007). Asynchronous Discussion and Assessment of Online Learning.*Journal of Research on Technology in Education, 39*(3), 309-328.

Vygotsky, L. S. (1978). Interaction between Learning And Development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), *Mind in society* (pp. 52-57). Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1986). *Thought and Language*. Cambridge, MA: The MIT Press.

Wellman, B. (1996). For a Social Network Analysis Of Computer Networks: A Sociological Perspective On Collaborative Work And Virtual Community. Center for Urban and Community Studies, University of Toronto,Canada. http://courses.ischool.utexas.edu/Turnbull_Don/2008/fall/INF_385Q/readings/Wellman-1996-ForASocial.pdf.

Wishart, C., & Guy, R. (2009). Analyzing Responses, Moves, And Roles In Online Discussions.*Interdisciplinary Journal of E-Learning and Learning Objects 5,* 129-144. Available http://ijello.org/Volume5/IJELLOv5p129-144Wishart658.pdf

Yang, D., Sinha, T., Adamson, D., & Rose, C. P. (2013). Turn on, Tune in, Drop out: Anticipating student Dropouts in Massive Open Online Courses, NIPS Data-Driven Education Workshop. http://lytics.stanford.edu/datadriveneducation/papers/yangetal.pdf

Zingaro, D. (2012). Student moderators in asynchronous online discussion**:** A question of questions. *MERLOT Journal of Online Learning and Teaching*, 8(3), 159-173.

Zhao, Y., & Rop, S. (2001). A critical review of the literature on electronic networks as reflective discourse communities for in service teachers. Education and Information Technologies, 6 (2), 81-94