TECHNOLOGY SUPPORTED FACE-TO-FACE COLLABORATIVE KNOWLEDGE BUILDING

ABDUL RAHIM BIN HAJI SALAM

UNIVERSITI TEKNOLOGI MALAYSIA

TECHNOLOGY SUPPORTED FACE-TO-FACE COLLABORATIVE
KNOWLEDGE BUILDING

ABDUL RAHIM BIN HAJI SALAM

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Doctor of Philosophy (Teaching English As a Second Language)

Faculty of Education
Universiti Teknologi Malaysia

JUNE 2012

DEDICATION

To my beloved mother Hajjah Ara Marzuki, my beloved wife Muslina Mohimin and my beloved children Leena Ardini, Izz Ammar, Emir Haziq and Umair Danish.

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful

ABSTRACT

This study explores the collaborative knowledge building (CKB) among ESL (English as a Second Language) teacher trainees during lesson plan discussion activity in a Microteaching course through technology supported face-to-face (TF2F) collaborative discussion. This hybrid network-based microteaching or TF2F CKB represents a learning environment where trainees are co-located and at the same time communicate face-to-face and use technology concurrently to collaborate. Loopholes have been identified in text based asynchronous or synchronous Computer Supported Collaborative Learning (CSCL) and Computer Mediated Communication (CMC) discussion in contributing to the natural settings of how interaction should take place, thus affect optimum efforts in discussion and knowledge construction. TF2F could reflect its potential contribution to be one of the most important elements in closing that gap. Collaborative cognitive involvement in discussing a lesson plan prior to the real teaching is probably crucial to ensure optimum knowledge sharing among ESL teacher trainees. This study presents and suggests framework architecture of TF2F CKB classroom activity phases integrating specific transformative conversation process representation that results in evidence of collaborative knowledge building among ESL teacher trainees. By looking at activity as the unit of analysis in a TF2F environment and minimal conversational analysis technique, this study explored how TESL trainees as a group could assist each other towards building pedagogical knowledge. Through interpretive process of qualitative method, Transana software was used to aid in transcribing, coding and categorizing audio captures of trainees' assistance. The outcome of discussion reflected phases of knowledge building (on lesson planning) during the discussion. With digitized documentation of work evidence and trainees' personal impression, this study indicated a promising method of learning and knowledge building. This may suggest a potential move towards a credible framework for a hybrid network based environment. Theoretically and methodologically, the study specifically provides some implication to the ESL teacher training instruction and to the field of SLA in general. This study manages to enhance the current face-to-face learning without compromising the alternative method of learning using technology to collaborate.

ABSTRAK

Kajian ini meninjau pembinaan pengetahuan secara kolaboratif (CKB) di kalangan guru pelatih yang mengambil pengkhususan Pengajaran Bahasa Inggeris sebagai Bahasa Kedua (ESL). Kajian ini dilaksanakan di dalam kursus Pengajaran Mikro melalui kaedah perbincangan kolaboratif yang menggabungkan secara serentak di antara komunikasi bersemuka berserta dengan bantuan teknologi (TF2F CKB). Aktiviti yang berasaskan rangkaian hibrid in mewakili persekitaran pembelajaran di mana pelatih berada dilokasi dan masa yang sama untuk berkomunikasi secara bersemuka dan menggunakan teknologi untuk bekerjasama berbincang seterusnya membina ilmu pengetahuan. Kelemahan ketara dalam membina pengetahuan telah dikenal pasti pada komunikasi yang bergantung hanya kepada perbualan menerusi teks secara langsung masa sebenar mahupun yang bertangguh. Pengajaran Kolaboratif Berbantukan Komputer (CSCL) dan juga Komunikasi Berperantaraan Komputer (CMC) tersebut tidak menyumbang kepada ketetapan semula jadi sebagaimana interaksi sebenar harus berlaku. Ini sekali gus menjejaskan hasil usaha yang optima dalam perbincangan ke arah pembinaan pengetahuan. TF2F berpotensi untuk menjadi satu elemen yang paling penting dalam menutup jurang tersebut. Penglibatan kolaborasi kognitif dalam aktiviti diskusi rancangan pengajaran dianggap penting dalam memastikan perkongsian ilmu pedagogi yang optima di kalangan guru pelatih ESL. Kajian ini membentangkan dan mencadangkan fasa rangka kerja operasi aktiviti TF2F CKB dalam bilik darjah yang mengintegrasikan perbualan khusus proses transformasi yang membawa kepada bukti pembinaan pengetahuan secara kolaboratif di kalangan guru pelatih ESL. Dengan melihat aktiviti sebagai unit analisis dalam persekitaran TF2F dan teknik analisis perbualan yang minimum, kajian ini meneroka bagaimana pelatih TESL sebagai satu kumpulan boleh membantu satu sama lain ke arah membina pengetahuan pedagogi. Melalui proses tafsiran kaedah kualitatif, perisian Transana telah digunakan untuk membantu dalam aktiviti menyalin "transkrip", membuat kategori dan juga kod ke atas rakaman audio perbincangan di antara pelatih. Hasil yang diperolehi dari perbincangan tersebut dapat mencerminkan fasa pembinaan pengetahuan (berkenaan perancangan pengajaran). Dengan adanya dokumentasi digital, hasil kerja dan pandangan peribadi pelatih, kajian ini dapat menunjukkan satu kaedah yang cerah dalam pembinaan pembelajaran dan ilmu pengetahuan. Ini juga merupakan satu langkah yang berpotensi ke arah rangka kerja yang berwibawa untuk persekitaran rangkaian berasaskan hibrid. Secara teori dan metodologi, kajian ini secara khusus menyediakan beberapa implikasi ke atas pembelajaran dalam latihan perguruan dan bidang SLA secara umum. Kajian ini berjaya meningkatkan kaedah semasa pembelajaran bersemuka tanpa menjejaskan kaedah alternatif pembelajaran menggunakan teknologi untuk berkolaborasi.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.0   Introduction

This chapter begins with an overview of the entire research before explaining briefly the rationale and potentials of conducting the study.   The elaboration includes the prerequisite and practicability of this study, the background of the problem, the significance of the research as   well as research questions.   Besides that, related theories are also briefly mentioned to guide and strengthen the conceptual framework of the study.   This chapter initiates not only the idea of customized computer networked classroom environment or rather Computer Supported Collaborative Learning (CSCL) environment but most importantly the necessity to integrate face-to-face communication among English As a Second Language (ESL) teacher trainees towards knowledge building that is termed in this study as Technology Supported Face-to-Face (TF2F) Collaborative Pedagogical Knowledge Building (CPKB).   This term shall later be established as a hybrid network-based environment that co-locates trainee teachers in an online technology supports and face-to-face mode of collaborative learning.

1.1   Overview of Study

Having a specific framework or guideline for a TF2F CPKB is seen by the researcher as crucially necessary considering the relevant transformation of education and computer technology on knowledge building. In fact, there is a high

probability that tomorrow's learning will still take place in schools where learners meet face-to-face to collaborate, discuss and solve problems but with the inclusion of computer technology in a co-located classroom session. With the advent of technology, it is possible that this study could appropriately support knowledge building among learners or specifically, in this case, teacher trainees. In this hybrid classroom, the result would not merely be providing the guidelines and considerations in conducting a technology supported face-to-face (TF2F) collaborative learning but could also potentially close the gap in understanding knowledge building that occurs during interaction. This element of face-to-face communication that represents the natural turn-taking is somehow ignored by the online synchronous and asynchronous learning. The question in the quality of utmost natural turn-taking of an interaction could perhaps be answered with the concurrent combination of face-to-face and technology conducted in this study.

Specifically, this study does not only provide a guideline to the necessary phases of TF2F CPKB activity but also explores the process of assistance or simply cognition development among TESL trainees during their response to lesson plan discussion activity. The phases are both vital as a prerequisite to the process of TF2F CPKB and also to the overall architecture framework of the study activity. Relying on activity as the unit of analysis, the infrastructure of technology that supports face-to-face discussion activity has been identified and set up for the purpose of this study. Upon setting up, the equipment available in this hybrid network-based environment is piloted to see if it is able to assist communication, manage and prepare digitized materials and online resources as well as create and store cases or classroom profile. All these are connected and accessible in a local area network classroom. Through this mode, the researcher notices that collaborative knowledge building in computer supported environment could take place effectively when discussing about a lesson plan prior to the real teaching. This is probably crucial to ensure fruitful sharing of knowledge among Teaching English as a Second Language (TESL) trainees in a microteaching course. The contribution would be vital towards the practice of teaching and learning and specifically, in this case, the development of pedagogical content knowledge among the trainees. Through the process of assistance emerging from CPKB, teacher trainees contribute ideas and co construct knowledge towards ways and strategies to teach in an ESL classroom such as ways

to ensure achievability of learning objectives, ways to attract learners at the beginning of a lesson, ways to appropriately end the lesson, considerations of teaching materials as well as strategizing the whole lesson. Experiencing classroom sessions featuring a co-located face-to-face discussion and supported by technology, trainees manage to successfully display development of pedagogical knowledge. In other words, this kind of technology support could provide a specific platform for subjects to display and record their F2F conversational turns while concurrently improvising and tracking individually their group cognition of negotiated perspectives on their similar shared screen. With the readily available and downloadable resources in the networked classroom, students could have the opportunity to get involved in the collaboration.

Apparently, the pedagogical knowledge that emerges from the collaborative discussion through TF2F mode could generate some sort of proof of its applicability. Thus, to provide evidence on how TF2F works towards knowledge building, an appropriate method or technique has been adapted or used. This is particularly important when it comes to respondents' verbal interaction. As applied by Koschmann, T., & Suthers, D. (2006) and Stahl, G. (2009), the assistance of conversation scrutinization technique via CSCL environment should be an appropriate tool to explore how learners, in this case, TESL trainees as a group could contribute to the building of pedagogical knowledge in lesson planning. In addition, the role played by Computer Assisted Qualitative Data Analysis (CAQDAS); Transana has helped in providing painless method to the rigorous work of transcribing and categorizing the interaction. Transana appears able to assist in going through the interaction which occurs in this hybrid network-based environment of combining face-to-face and technology support.   With its features, the interaction could be transcribed and interpreted more accurately so as to see the conversational verbal process when assisting each other throughout the phases of CKB group discussion activity. With the facility of time coding in transcribing, the time code of verbal utterance time appeared on excerpts should prove its natural conversational turn taking. This is far than possible for the synchronous CMC (SCMC) chat able to do. As mentioned earlier, the researcher is focusing on the orientation of teaching within the idea of pedagogical knowledge building that emerges during the TF2F discussion activity.

The discussion activity in most CSCL research is focusing on the individual cognition but little has been emphasized on group cognition (Stahl, 2009). The researcher feels that standards are not yet established regarding the integration of F2F in CSCL setting for peer interaction during the discussion of lesson plans which could be significant for knowledge development in teacher training. Hence, this study is tailored to meet the necessary alternative method of knowledge building using CSCL environment which may guide towards the TF2F framework. This approach does not substitute the traditional classroom learning but acts to complement the traditional face-to-face method during microteaching phase which can offer a lot of advantages, such as the increase in the availability and access to knowledge. In fact, by exploring face-to-face collaboration at close proximity with computer in the ESL classroom, we will be contributing to an area of CALL that is seriously under-researched despite the potential that providing the learners with two powerful mediational tools in combination, computer and language-in-collaboration. Through this collaborative sharing of information, opinion and feedback could enhance the building up of knowledge in teaching approach. The trainees are not only able to discuss and at the same time access digital material and produce work via computer network but can also record as well as retrieve the recorded discussion/interaction anytime easily. By using the accessible IT software equipment, trainees' movements and activities are automatically being monitored. A dedicated server stored all recorded data and each subject was assigned a specific folder for journal reflection entries after each session been conducted. The evidence of transformative process of trainees' shared knowledge was tracked in digitized work. In addition, TF2F learning experience is also taken into consideration to ensure the involvement of triangulation of sources.

Therefore, through the guidance of activity theory and solid underpinning of Vygotsky's sociocultural theory (SCT), this study manages to formulate a framework that represents activities in a hybrid network-based environment that results in significant ideas towards important considerations geared towards classroom teaching and learning among ESL teacher trainees and thus, resulted in some representations of transformative process towards pedagogical knowledge building. Unlike blended learning, the researcher would like to re-emphasize in this particular

study that these teacher trainees were co-located, interacting face-to-face and discussing ideas to teach English Lessons together as a group with the support of technology. The collaboration towards building pedagogical knowledge among the trainees is seen to be successful through communicating face –to-face and advocating technology. In other words, with the support of technology and group interaction, the combination of all these seem appropriate in today's digital era where educational transformation and challenges are expected.

1.1.1 Educational Transformation and Challenges in Digital Era

Education could be perceived globally as an area that experiences frequent transformation. This has been the focus of thought by prominent organization around the world. In October 2008, the Division of Higher Education United Nations Educational, Scientific and Cultural Organiation (UNESCO) realized that transformation seemed inevitable in this digital era. During the fifth Eden Research Workshop held in Paris by UNESCO, Patru (2008) stated that globalization, largely driven by Information Communication Technology (ICT) coincides with a fundamental transformation to knowledge-based societies. Hence, she stressed that new training demands need to be met in order to prepare for new competitive challenges that emerge in terms of governance, organizational structures and modes of operation. Certainly, changes in education training might occur throughout this process of globalization that is driven by technology. Specifically, for that reason, she further clarified that there would be new challenges for countries to develop strategies, policies and resources to prepare and retain the teachers necessary to meet the educational demands of the 21st century society. The challenges she refers to is the updating of knowledge and skills of the existing teaching force which includes new content, new pedagogies and technology tools for learning. This is especially true to the teacher training community that seems to be the key to quality education and according to her, it is a challenge in which the world needs to pay attention to.

This challenge to provide quality education seems to be taken up positively by Malaysia. ICT is not alien to this country as it has been given emphasis especially

at the tertiary education level. Computer facilities provided by the government in enhancing the quality of teaching and learning have been profusely delivered. All these are executed for the sake of inculcating excellent human capital for teaching and learning in this digital era. The focus and seriousness of the government to see education in this country being at par with the development of digital era is clearly shown in the investment made on technology facility for tertiary level. It is anticipated that government could rely on technology application in terms of exploring new knowledge of the new era in building knowledge at this tertiary level. To show its commitment, RM12 billion has been allocated in 2008 budget specifically for various implementation of the Higher Institutional Strategic Planning projects to produce first class human capital (Star Online September 7, 2007: Budget Speech 2008, paragraph 56, page 25). This worthwhile expense would be aligned with the development of universities of a world class status in the country. However, this monetary investment merely provides the digital infrastructure for the Institute of Higher Learning and it would be in vain without proper exploration of theory and practice advocating TF2F relevant to transcending learning towards achieving world class equivalence.

1.1.2 Advocating Technology Supported Face-to-Face (TF2F) Collaborative Knowledge Building (CKB) of Small Groups Learning

It seems apparent that the development of learning theory in a technology based or supported classroom has really been a matter of experimenting new ideas during its era. The researcher observed that traditional face-to-face learning has now shifted to student centered approach which advocates individual learning experience derived from the contribution of face-to-face collaborative effort of small group learning. This collaborative face-to-face small group learning has enhanced innovatively towards technology based assistance and online learning. Overdijk and Diggelen (2006) displayed a variety of computer applications that has been developed to support small-group learning. According to them, the assistance of technology could stimulate specific cognitions and behaviors that are expected to be beneficial for learning. They distinguished two small-group learning situations for

computer support *(Figure 1.1)* below that organized around a problem-solving discussion.
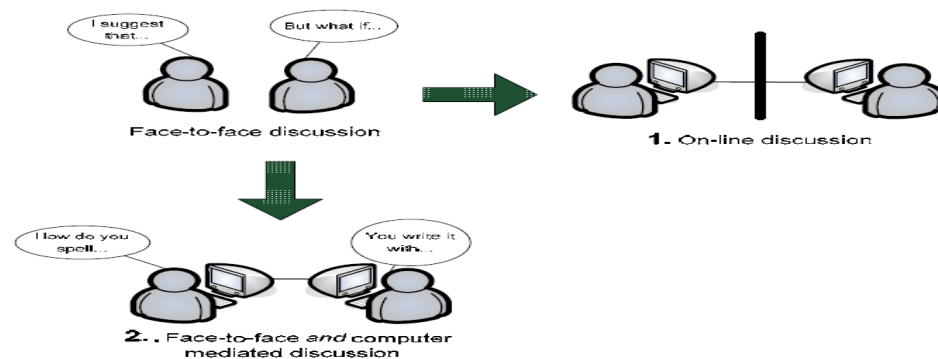
Figure 1.1: Situations of computer support for small group learning (Overdijk and Diggelen, 2006)

The first situation (upper right corner) refers to the use of computers to connect students who are dispersed in time and/or space. The majority of CSCL research focuses on this type of situation where all the interactions are mediated by the technology. This is clearly elaborated by Overdijk and Diggelen (2006). According to them, for many researchers, this represents the typical CSCL research context. However, the second situation has a fundamentally different orientation. The situation has two distinctive features: 1) students are in the same room in close proximity and 2) they communicate face-to-face. In other words, it represents a learning environment where students are co-located and at the same time communicate face-to-face and simultaneously use technology to collaborate. It means that one part of their communication is face-to-face (F2F), while the other part is computer-mediated.

The similar idea of environment should be further enhanced in this study so that the technology supports could provide a specific platform for subjects to display and record their F2F conversational turns while concurrently tracking, annotating and improvising their group cognition of negotiated perspectives on their similar individual shared screen. With the readily available and downloadable resources in the networked classroom, students could have the opportunity to get involved in the collaboration. All those could perhaps be possible from the support of communication tool (for subjects to focus on listening and engaging in the

conversation turns), networked computers (for subjects to transfer the cognitive input or ideas from the conversation onto individual computer screen) and relevant classroom software (for subjects to be grouped "online" which then allows them to share and access similar materials that are readily available and downloadable to appear on their individual computer screen). In order to study the "dynamics" of such "techno-support collaboration", the researcher feels that it is necessary for all those technology supports activity to concurrently occur for knowledge building or learning to take place meaningfully. This joint activity situation is the object of this study.

Parallel to this particular situation, a special classroom is needed. This kind of infrastructure is not similar to the established online learning situation of joint activity among learners who are separated by different location and time. Suggestively instead, a customized classroom is necessary for learners to co-exist via online at one location with computer technology supported as in a traditional classroom setting for learning purposes. Computer integrated classroom (CiC) is a concept proposed by Hoppe et.al (1993) and advocated by Baloian et.al (2000 and 2008) could well be a suitable venue for the implementation of small group joint activity. Is there really a suitable infrastructure which will support this activity?

Computer integrated classroom (CiC) could be looked upon as the future pedagogical practices in schools and higher institutions. CiC could perhaps be seen as a way to integrate face-to-face in a Computer Supported Collaborative Learning setting (CSCL) . What happens in this environment is similar to a typical classroom situation where a group of learners sit together to discuss a topic. In other words, it is a learning environment where students communicate face-to-face and simultaneously use a collaborative technology. The assumption is that these collaborative situations can be improved with the appropriate collaborative technology. Overdijk and Diggelen (2006) stated that "studying this complex interplay within a collaborative classroom setting has hardly been addressed in educational research and practice." In fact there is a high probability that tomorrow's learning will still take place in schools where learners meet face-to-face to collaborate, discuss and solve problems. One programme has been planned and in

progress to bring an innovative model of technology support to Malaysian secondary schools with CiC concept. The Ministry of Education, the Multimedia Development Corporation, and Generation Youth and Educators Succeeding (YES) are partnering towards that purpose. This Malaysian Student Technology Leaders (MySTL) Catalyst Schools Program is an effort by the government to instill technology literacy providing their fellow students and teachers with the support they need to use 21st century technologies in education. This shows that this study is parallel with the direction taken by the government in providing the opportunity to improve education through technology by using a student-centred, activity-based approach to learning via CiC.

In 2005, Universiti Teknologi Malaysia (UTM) advocated this CiC idea through a RM5.3 million loan financed by the Islamic Development Bank (IDB) project. This was stipulated in a contract document dated February, 28th 2005. The university transformed four classrooms into digital language laboratory system. The system consists of infrastructure that could allow small groups to have joint activities with digitized verbal recording of interactions via local area network (LAN) in the classroom. With a click of a button, students can be selected individually before linking them to small groups. Apparently, this learning environment may lead to a new hybrid network-based classroom for small groups' activity collaboration. Collaboration of the future will be more complex than just chatting verbally or electronically with a friend. The computational power of personal computers can lend a hand here; software can support the collaboration process and help to manage its complexity. It can organize the sharing of communication, maintaining both sociability and privacy. It can also personalize information access for different user perspectives. However, this idea has yet to be explored further. According to Stahl (2006), computer support can help us transcend the limits of individual cognition. It can facilitate the formation of deep knowledge building in small groups' engagement. It can empower these groups to construct higher level group cognition that exceeds what the group members could achieve as individuals. Software functionality can present, coordinate and preserve group discourse that contributes, constitutes and represents shared understandings, new meanings and collaborative learning that is not attributable to any one person but is achieved in group interaction. This kind of support by technology, the researcher thinks is the epitome of group

collaboration and interaction. Unfortunately, most of computer support collaborative studies do not look at this small group interaction.

The idea of collaborative or a small group joint activity is considered as very relevant in the context of English as a Second Language (ESL) trainees especially with the inclusion of computer support in their educational training. This could perhaps be the answer to the issue of strengthening and improving the quality of pedagogical knowledge in English Language Teaching skills among trainees. The researcher feels that the trainees should experience the CiC in order to harness their utmost pedagogical knowledge through sharing and constructing. Perhaps, one way to establish this is to explore a research on efforts of collaboration which could enhance teacher trainees' way of sharing knowledge through the discussion of lesson plans. It is anticipated that these trainees will collaboratively work with their peers for shared

understanding as well as meaning making through intense discussion in a suitable infrastructure of a hybrid networked-based classroom.

Koschmann (2002) proposes a new paradigm for a distinctive form of educational research. He focuses on the micro-level practices that need to be studied in comparison to a larger social contexts advocated by Yrjö Engeström (1999) who considers groups to interact with other groups to produce learning. Koschmann (2002) puts forward this explanation for the CSCL domain:

> *"CSCL is a field of study centrally concerned with meaning*
> *and the practices of meaning making in the context of joint*
> *activity, and the ways in which these practices are mediated*
> *through designed artifacts."*

Koschmann (2002, p.17)

It is clear that "meaning and the practices of meaning making" need to be public, observable and shared through interaction. This has foundational implications for CSCL research. According to Stahl (2002), CSCL is a human science, concerned with the subjects' own interpretations of their ideas and behaviors. Therefore, CSCL requires qualitative studies of learning practices such as

detailed descriptions that incorporate and explore the understanding of the participants in collaborative learning. As public phenomena, the meanings (learning) generated in collaboration processes can be studied directly, particularly with the help of computer logs and digitized recordings, rather than just being inferred from post-tests. This is exactly what the researcher intends to explore in the study.

The description of CSCL as concerning "the practices of meaning making in the context of joint activity" is not so much looking at individuals' practices in social settings as it focuses on the essentially social practices leading to joint meaning making. Thus, Stahl (2006, p.221) states that even when conducted by an individual in isolation, meaning making is a social act and oriented toward a potential public audience. Simply, when it comes to learning, the interactional work of a group portrays that vivid process.

Koschmann's view on CSCL also includes the study of "the ways in which these (meaning-making) practices are mediated through designed artifacts." He refers here to CSCL technology as a 'mediational' artifact; as software objects designed to support collaborative learning. But this formulation raises the question of how meaning making is mediated by artifacts. He emphasizes that this is an extraordinarily broad issue, as all human activity is meaning making, and everything in our physical, intellectual and cultural world can be considered an artifact: physical tools, linguistic symbols, cultural entities, cognitive mechanisms or even social rules. It is quite astonishing that such a fundamental issue has been so little explored. How do these artifacts mediate the creation, sharing, teaching and preserving of meaning? This could perhaps be answered by further venturing into the important elements that could exist in the hybrid network-based environment during a microteaching lesson plan preparation which could lead to pedagogical knowledge development represented by group interaction mechanisms.

1.1.3   Microteaching to Prepare for Pedagogical Content Knowledge

An important aspect of this study is to link the development of a group's cognition with the trainees' pedagogical content knowledge. The researcher thinks it

is important to prepare trainees with the assistance of computer technology tools and network space available in CiC to share ideas collaboratively. Probably, with the integration of this technology, essential microteaching activities could be better implemented for ESL teacher training programme . Allen & Ryan (1969:1) defined microteaching as "*a training concept that can be applied at various pre-service and in-service stages in the professional development of teachers.*" Cruickshank and Metcalf (1993:87) provide a more recent definition of microteaching as a "scaled-down teaching encounter in which pre-service teachers demonstrate their ability to perform one of several desirable teacher abilities to a group of 3-5 peers during a short time period". A number of studies reported that microteaching is an effective means of improving pre-service teachers' teaching skills (Borg, Kellenbach, Morris & Friebel, 1969; Davis & Smoot, 1970; Yeany, 1978). Two associated components are critical in the implementation of effective microteaching: videotaped micro lessons and feedback which includes instructors' and organized peer groups' feedback (Mills, 1991; Metcalf, 1993; Cruickshank & Metcalf, 1993; Benton-Kupper, 2001). Metcalf (1993) reported that organized peer feedback may be as effective in encouraging positive outcomes during microteaching as feedback provided by the instructors. Understandably, these are all important aspects why microteaching should take place. Specifically, the researcher thinks that the preparation of lesson plans emphasizes on what is considered as the foundation and guidelines for trainees on how teaching should be executed. In a way trainees' creative ideas can be exhausted on this planning platform. It is important not only as a planning strategy for teachers but it is also required by schools' administration later on. Again, perhaps with the practice of peer collaboration and sharing of knowledge could help the trainees experience the process of knowledge building as a small group. This may act as a solution to Idling and Klemm (1997) observation that pre service teachers often have difficulty clearly narrowing down and specifying what they will do in the preparation prior to carrying out a plan of instruction. Considering all these, a peer response to lesson plan activity could be very relevant to provide specific cognitive process on what happens during the discussion. Perhaps, with the assistance of CiC, the collaborative pedagogical knowledge building may become a new hybrid network-based approach to facilitate microteaching class.

1.2   Statement of Problem

The involvement of CSCL environment that will merge traditional approach of face-to-face conversation turn via network technology among the co-located trainees in a networked classroom is an area that could be explored further.   This could perhaps fill up the loopholes, justify and complement what has been missing in CSCL environment: problems in media richness or lacking natural conversational elements in a collaborative situation.   This will definitely affect the utmost potential of knowledge delivery and richer development of ideas during a joint activity collaborative work.

The combination of face-to-face and computer-mediated communication is largely ignored by the CSCL community.   CSCL research mainly focuses on situations like distance collaboration, online learning and virtual teaching where the support is considered as a means to bridge time and space between the students. Overcoming time and space limitations has a direct added value, but it also leads to a specific focus.   It considers group interaction, in its broadest sense, as the main determinant for collaboration and learning.   However, research into distance learning indicates that it is extremely difficult to facilitate the full range of group interactions by collaborative technologies.   Computer-mediated interactions are often restricted to those interactions that mirror the cognitive processes in a group (Kreijns, Kirschner and Jochems, 2003).   An enrichment of the information flow may improve online collaborative learning: for example, students may use multiple tools simultaneously to enrich their communication, or they may use an awareness tool that provides them with detailed information about their performance. Problems in terms of the special nature of computer-mediated communication embedded in the CSCL environment (e.g. text-based, e-mail, forums, and chat) affects the type of messages exchanged and how the messages are interpreted (Lengel and Daft, 1988).   While these transcripts may help us to better understand the nature of learners' interactions, they are essentially one-dimensional in that they are linear and text-based.   In other words, probability of relying on printed transcripts alone when reporting, evaluating, and interpreting learner interactions does not allow one to study cognition or coordinate

learners' utmost verbal ability (utterances; vocal expression or intonation) with the language they create during interactions. This could be due to limited time to type or even poor typing skills that they possess. Unlike face-to-face mode where turn taking and interaction among trainees come naturally, relying on linear "chatscripts" in synchronous computer mediated communication (SCMC) research is particularly problematic given the nature of CMC turn-taking patterns. For example, since SCMC messages are only sent to the interlocutor after the return key is hit, it seems that some potentially important information occurring during the message construction phase may be lost. This information may relate to important factors such as learning and communication strategy use. Looking at this problem, there is a need to integrate face-to-face discussion via CSCL to invoke the natural setting of trainees' utmost thinking ability as well as not to defy the advantages of using computer technology tools. This could be mostly relevant in looking at the microteaching lesson planning activities that provide helpful discussion for teacher trainees' to develop group cognition pedagogically.

Undoubtedly, what happens in discussions among ESL teacher trainees requires further cognitive processing exploration. This is because evidence from previous research shows that by nature, CSCL has not really represented its utmost capability to really record learners' utmost cognitive process of responses or feedback. Media richness : "the *medium's capacity for immediate feedback, the number of cues and senses involved, personalization, and language variety*" (Rice, 1993, pp.452-453) appears to be missing in asynchronous and synchronous mode of interaction in CSCL and this shows that they still need a setting which complement face-to-face with respect to media richness. Learners rate text-based CMC as low in media richness, because it constrains both their vocabulary for being expressive and the direct communication for accomplishing certain tasks such as decision making. According to Lengel and Daft (1988), learners rated face-to-face communication to be the most media rich and unlike text-based CMC that has media-poor impacts in the level of communication and, thus, social interaction. In this case, the integration of CSCL with face-to-face communication is of great relevance to be studied.

There is a possibility that lacking media richness might not be enough to invoke a sense of openness and honesty for genuine response and feedback to occur.

Rourke (2000) remarks that "if students are to offer their tentative ideas to their peers, if they are to critique the ideas of their peers, and if they are to interpret others' critique as valuable rather than as personal affronts, certain conditions must exist. Students need to trust each other, feel a sense of warmth and belonging, and feel close to each other before they will engage willfully in collaboration". Thus, the inclusion of elements in face-to-face peer response is necessary to address the issue.

Diggelen.and Overdijk (2007, pg. 728) stated that "studying this complex interplay within a collaborative classroom setting has hardly been addressed in educational research and practice." Since there is a high probability that tomorrow's learning will still take place in schools where learners meet face-to-face to collaborate, discuss and solve problems in the presence of computers, specific framework to complement the environment is really necessary to provide guidelines for further CSCL research area.

The technology supported face-to-face collaborative (TF2F) learning should perhaps be considered to explore knowledge building among trainees and this situation can be realized in a microteaching course. In preparing the trainees, the process of lesson planning is significantly crucial to be conducted as a small group joint activity between peers. ESL trainees ought to be given the opportunity to experience the integration of traditional classroom learning with the computer supported assistance in developing their pedagogical knowledge for future preparation. A research in this area could indicate a significant outcome for a promising effort to justify the government intention in achieving facilitative human capital with the involvement of network technology support for the traditional classroom. This is parallel to Koschman (2002) statements made in keynote talks at the University of Colorado for the conference of CSCL 2002 that CSCL should also be concerned with face-to-face (F2F) collaboration. Computer support for learning does not always take the form of an online communication medium; the computer support may involve, for instance, a shared interactive representation. In this case, the collaboration focuses on the construction and exploration of the knowledge development. Alternatively, a group of students might use a computer to browse through information on the network and to discuss, gather and present what they found collaboratively. This TF2F collaboration, the researcher thinks could

contribute to the emergence of a unique group learning process provided that appropriate technology tools and infrastructure are available and accessible for assistance.

Accessibility of CSCL infrastructure for F2F peer response is necessary as to complement what has been missing in CSCL to enhance knowledge building process. Problems found in other CSCL that focus on merely online internet medium of chat interaction have not exploited the utmost emergence of cognitive processing which could significantly represent the existence of knowledge building in discourse activities. However, probably by having a suitable infrastructure such as computer integrated classroom (CiC), what lacks in CSCL in terms of its cognitive richness could be complemented with further research exploration. The ideas of exploring activities that involve a natural face-to-face response during the microteaching lesson planning activity through the integration of CSCL could provide a significant contribution to the learning community. In other words, integrating technology of traditional face-to-face learning could be introduced to enhance the normal CSCL contribution towards knowledge building. Certainly, with the accessibility of the infrastructure, this study can fill the gap of making CSCL as media rich as F2F, thus expanding its research further. These statements bring about the idea that more studies in CSCL area with the integration of face-to-face elements are necessary to find out the extent of cognitive development activity elements the learners (teacher trainees) use during peer discussion in a lesson plan activity. Is it really possible to integrate face-to-face in CSCL? This would require a proper planning to set up the appropriate network environment and implementation. If that is possible, can the technology supported F2F really benefit the ESL teacher trainees in their lesson planning? Specifically, how does TF2F CKB peer interaction that take place in lesson plan activities contribute to the construction of pedagogical knowledge? How does assistance take place during the interaction? Can group cognition really occur? How exactly will the process look like during that interaction? The answers to these questions would lead towards the formulation of a hybrid network based environment for English teacher trainees.

1.3   Research Questions

In formulating a framework for TF2F CPKB activity; this study examines face-to-face interaction in technology supported environment among ESL teacher trainees lesson plan joint activity discussion in a microteaching course. The purpose is not merely to characterize the procedure of "technologising" F2F but more importantly to explore peer interaction activity in situations in which adult ESL teacher trainees collaboratively build knowledge. This is conducted through discussion process with an aim toward identifying evidence of group collaborative knowledge building through conversational process of their interaction in TF2F environment. Further, this analysis may identify the extension of cognitive process representation that determines phases of knowledge construction. The research questions are formulated as follows:

1. How do ESL teacher trainees assist each other in TF2F pedagogical knowledge episodes (PKEs)?

2. What evidence of knowledge development is present in TF2F pedagogical knowledge episodes (PKEs)?

In dealing with the questions of identifying how assistance take place among trainees in TF2F CPKB, the researcher must first address the necessary prerequisite configuration and implementation features of the environment by systematically looking into the procedures and roles played by participants involved in the activities. Evidence of knowledge development will then emerge. Significantly, that could act as a framework or guideline in promoting continuous learning system.

1.4   Significance of the Study

The significant contribution of this study lies in the fact that the researcher is combining face-to-face teaching/learning approach in CSCL environment to study how it impacts knowledge building. It is as an attempt to identify and provide

possible framework for a hybrid approach to learning in this techno-savvy era. Issues of CSCL have been studied mainly from online synchronous or asynchronous perspective which leaves a gap in understanding knowledge building that occurs during interaction. The lack of focus on the value of face-to-face features has questioned the quality of utmost natural turn-taking of an interaction. This study is important to extend the idea that face-to-face setting that invokes the natural element of media richness can really fill the gap when supported in CSCL. According to Stahl (2006), it is argued that high-level thinking and other cognitive activities take place in group discourse, and that these are most appropriately analyzed at the small-group level unit of analysis. In this way, the focus on mediation of group cognition is presented more explicitly and will provide insights on implications for theory, methodology, design, and future research generally. Thus, researchers need to continuously analyze the social and cognitive processes that take place during successful collaboration; and continue theorizing about the nature of collaborative learning, working and acting with the assistance of technology in a co-located face-to-face traditional classroom.

In addition, with the capability of CSCL environment in this study, respondents are able to get its benefit personally and academically. As mentioned earlier, the infrastructure of CSCL portrayed in CiC for this study enables teacher trainees to provide feedback, record, access as well as retrieve whatever information anytime that they find necessary by themselves. Besides that, personally, trainees can have their own folders in the server which they can personalize for their usage. Academically, all the sources, materials and input whether in the form of audio or video can be created and retrieved as required by them. In a way, this can develop an autonomous learning which is considered important in education. This study constitutes a way to identify aspects of group work that contribute to gains in lesson planning activities for ESL teacher trainees which is an important goal of microteaching. With the assistance of a customized CSCL infrastructure, face-to-face pedagogical tools and networked computers in the classroom, this could contribute to the development of activities that promote media richness of collaborative learning in ESL teacher trainees' classroom.

It is also significant that the development of group cognition can be manifested. When students have the opportunity to work in small groups, they can contribute to a common understanding, as well as developing verbal and social abilities. Peers work in a common context; therefore, they may have insight into other learner's needs, their focus, and the best way to explain (Lave & Wenger 1991; Rogoff & Lave 1984). Recipients benefit from peer supported learning because they get the opportunity to experience new approaches to thinking. On the other hand, contributors benefit because when they explain their ideas to others, they have to verbalize their understanding, making explicit the difference in what is in his/her mind and his/her utterance, and by doing so obtain a clearer perspective of the topic (Gillies 2006).

The researcher examines how the interaction has helped in knowledge building in which adult ESL teacher trainees respond to a lesson plan prepared by their peers and this will be addressed in their discussions. By discussing lesson plans with their peers in small groups, language learners activate higher mental processes that, according to the constructivism theory, will lead to internalization (i.e. learning and development) (Vygotsky, 1978). Thus, with the identification of evidence from technology and peer-supported discussion process of knowledge development, the study could contribute to an effective method to develop cognition for learning. It is worth to mention that the purpose of the study is not to compare CSCL to other forms of lesson plan learning method. The researcher does not intend to claim superiority of any particular method.

1.5 Conceptual Framework

For this particular study, the researcher will take the approach of Stahl (2006) who incorporates insights from several CSCL theories with the inclusion of knowledge building concept and thematic ideas that relates to pedagogical content knowledge concepts, thus assist to properly guide in structuring the study.

The nature of this study involves the integration of traditional face-to-face (F2F) with the support from classroom technology infrastructure which is represented by few components as shown in **Figure 1.2**.
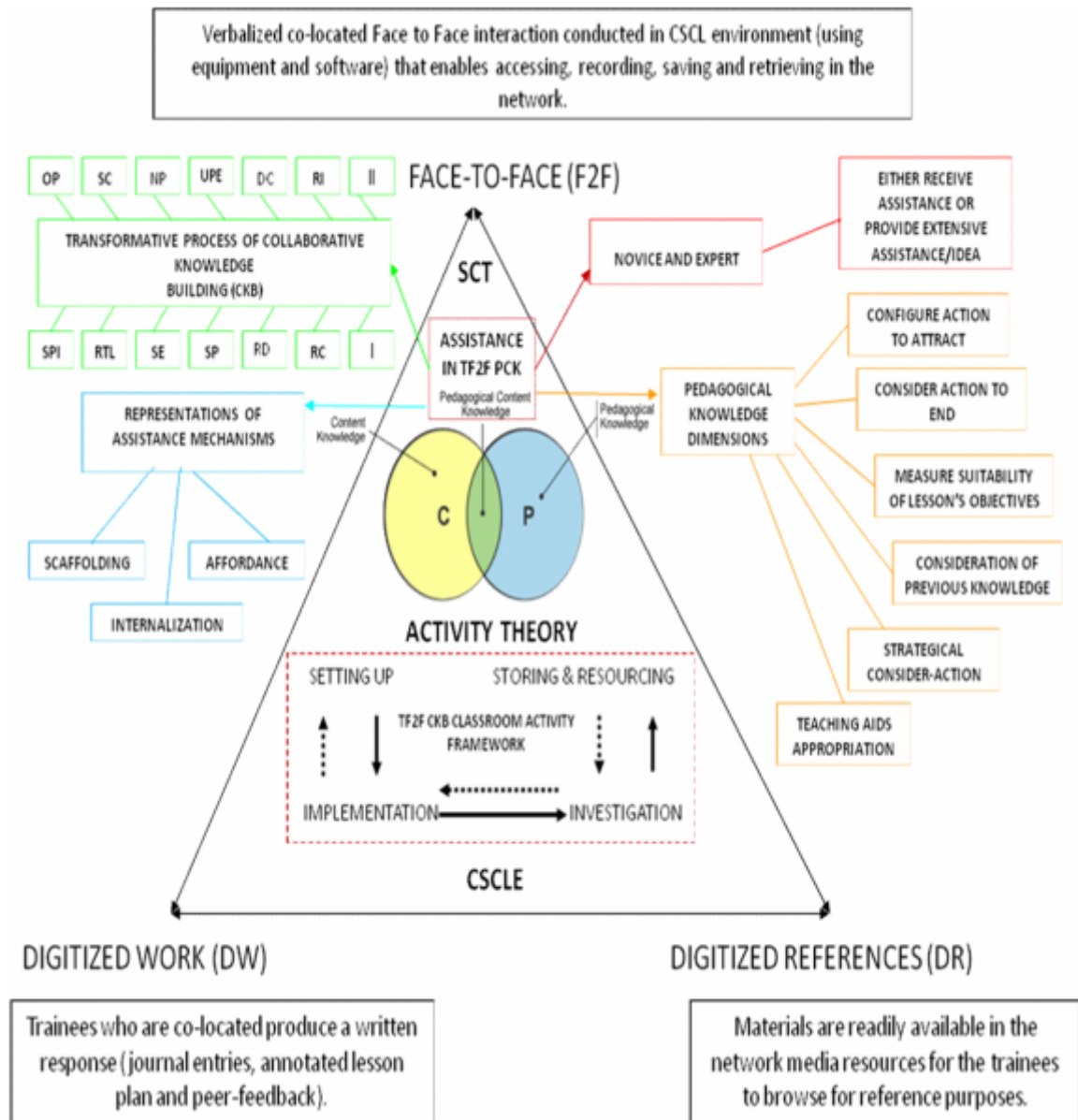
Figure 1.2: Conceptual Framework of the Study

The complete triangle shape corresponds to the environment of CSCL (CSCLE) activity that could lead to group cognition within the concept of pedagogical (P) content (C) knowledge focusing on the orientation of teaching during the lesson

planning activity. The process of assistance takes place within the merging of (C) and (P) in the diagram. In other words, the "content" of "pedagogical" knowledge is developed or co-constructed through the involvement of assistance in TF2F. The assistance leads to the emergence of experts and novices and the mechanisms and several transformative processes applied during the collaborative effort. Certainly, these are further explained and strengthened by the underpinning theories of Vygotsky's socio-cultural (SCT) that seem to be the gist of social interaction; activity theory to guide the activity as well as mediation of group for the collaborative knowledge building. 3 systematic phases of activity are guided by activity theory involving the setting up, implementation, investigation which finally contributes to managing the profiles and resources of the hybrid classroom in the future. All these levels are crucial towards the frameworking of technology supported face-to-face learning (TF2F) or alternatively called hybrid network based learning. This hybrid network based diagram consists of three elements; namely, F2F, Digitized reference (DR) and Digitized trainees' work (DW). Each element further elaborated in chapter 3 involves actively during the study so as to promote, contribute and enhance learning. In this case, the development of small group knowledge building is expected from the assistance in the interaction that occurs in this technology supported face-to-face network based collaborative pedagogical knowledge building (CPKB) framework.

1.6   Operational Definition of Terms

The term Computer Supported Collaborative Learning environment (CSCLE) will be used interchangeably with Network Based Learning environment. Similarly, Computer Supported Collaborative Face-to-Face Learning Experience (COSOFL), Technology Supported Face-to-Face (TF2F) Collaborative Pedagogical Knowledge Building (CPKB) experience or Hybrid Network Based Classroom experience is also used interchangeably. The term Pedagogical Content Knowledge (PCK) refers only to the content considerations of appropriate teaching steps and strategic moves executed for a classroom lesson plan. To provide a basis for discussion, the following definitions are used in this study:

Technology Supported Face-to Face: Technology software supports that provide a specific platform for subjects to display and record their face-to-face conversational turns while concurrently tracking, annotating and improvising their group cognition of negotiated perspectives on their similar individual shared screen. With the readily available and downloadable resources in the networked classroom, students could have the opportunity to get involved in the collaboration.

Collaborative Pedagogical Knowledge Building (CPKB): the development or process of pedagogical content knowledge in relation to the assistance process of ESL teacher trainees' lesson planning activities.

Lesson Plan: An organized written preparation for teaching strategies completed by teachers and teacher trainees as a teaching prerequisite.

Microteaching: A prerequisite academic course that provide opportunities for ESL teacher trainees to practice and prepare themselves for actual teaching. Preparing a good lesson plan is considered the most basic part in microteaching.

Peer Response: ESL teacher trainees' verbal feedback, interaction as well as written of journal entries during the discussion of lesson plan activities.

Group: the focus is on small groups of teacher trainees working together to achieve a similar goal of completing a workable lesson plan. .

Cognition: the ideas derive from activity of constructing new understanding and meaning within contexts of instruction and learning to develop a lesson plan.

Computer support: the learning does not take place in isolation, but with support and appropriate deployment of computer-based tools (communication software, media resource manager and classroom management) to suit the task at hand.

Building: trainees assist each other to construct useful and meaningful knowledge relevant to the task at hand and not merely with the transmission of known facts.

Collaborative: the interaction of participants involves systematic efforts to work and learn together in a lesson plan joint activity.

Knowledge: the orientation is not to drill and practice of specific elementary facts or procedural skills, but to discussion and consenting to reach understanding and decision making.

Artifacts: Medium that leads to meaning/learning such as physical tools, language, cognitive mechanisms or even social rules.

Networked classroom: A classroom that is characterized by state-of-the-art technologies that enable the integration of face-to-face that is supported by computer (hardware and software communication tools) or refers as Computer integrated classroom (CiC)

Networked learners: Learners who participate in learning activities that involves the use of computer as a medium of communication.

Collaborative Learning: This refers to learning that involves completion of task towards a similar goal (in this case, discussing and responding to a lesson plan prepared) in pairs or small groups.

CiC: Computer integrated classroom. A classroom that is equipped with hardware and software to assist teaching and learning via Local Area Network.

CSCLE: Computer Supported Collaborative Learning Environment. It refers to the environment where the implementation of collaborative learning using or with the assistance of computers and software technology.

CMC: Computer Mediated Communication. It refers to the mode of communication using computer.

Cognitive Processing: elements represent the process of knowledge construction (cognitive activity and verbal patterns).

ESL Learner: Refer in this study as learners who use English as medium of interaction to discuss.

Collaborative Knowledge Building (CKB): the group process of knowledge development in relation to peer response to ESL teacher trainees' lesson planning activities.

Conversation Analysis (CA): It refers as a tool to analyze the data of reciprocal utterance that allows understanding of the sequence of events in the interaction among participants and their relevance to the development of knowledge.

Interaction: As defined by Wagner in 1994 is "reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (Wagner, 1994, p. 8).

1.7   Summary

This chapter denotes the fundamental and conceptual ideas of this study. It is quite challenging to actually implement this type of qualitative research area which requires not only appropriate infrastructure for support but also incorporation of established learning theories to sustain its significance. Important information has been mentioned regarding the needs of technological support within traditional classroom setting for a collaborative learning. Having teacher trainees to interact face-to-face like a traditional classroom and at the same concurrently complete tasks in an online joint activity could perhaps enrich their interaction better which then leads to the development of pedagogical knowledge building.

REFERENCES

Allen & Ryan (1969). *Microteaching*. Reading, Massachusetts: Addison-Wesley Publishing Company.

Almarza, G. G. (1996). Student foreign language teacher' knowledge growth. In D. Freeman & J. Richards (Eds.), *Teacher learning in language teaching* (pp. 50–78). New York: Cambridge University Press.

Angel LMS (2007). *Angel*, retrieved March 30, 2008 from http://www.angellearning.com/products/lms.

Artzt, A. F., & Armour-Thomas, E. (1992) Development of a cognitive-metacognitive framework for protocol analysis of group problem solving in Mathematics. *Cognition and Instruction*, 9(2), 137-175

Aspden, L., & Helm, P. (2004). Making the connection in a blended learning environment. Educational Media International, 41(3), 245–252.

Bailey, K., & Ochsner, R. (1983). A methodological review of the diary studies: Windmill tilting or social sciences? In Bailey, K; Long, M.H., & Peck (Eds.). *Second language acquisition studies* (pp.188-198). Rowley, MA: Newbury House.

Bailey, K. (1990). The use of diary studies in teacher education programs. In Richards, J.C., & Nunan, D. (Eds.), *Second language teacher education* (pp.215-226). New York, USA: Cambridge University Press.

Baloian, N.; Pino, J.A & Hoppe (2000). A Teaching/ Learning Approach to CSCL. *Proceedings of the 33rd Hawaii International Conference on System Sciences* . Institute of Electrical and Electronics Engineers.

Baloian, N., Pino, J. A. & Hoppe, H. U. (2008). Dealing with the Students' Attention Problem in Computer Supported Face-to-Face Lecturing. *Educational Technology & Society*, *11* (2), 192-205.

Bannon, L., and S. Bødker (1991). Beyond the interface: Encountering artifacts. In J. Carroll, ed. *Designing Interaction: Psychology at the Human Computer Interface* (pp. 227–253). New York: Cambridge University Press.

Barrows, H. (1994). *Practice-based learning: Problem-based learning applied to medical education.* Springfield, IL: SIU School of Medicine.

Basturkmen, H., Loewen, S., & Ellis, R. (2004). Teachers' stated beliefs about incidental focus on form and their classroom practices. *Applied Linguistics*, *29*, 243–272.

Bereiter, C. (2002). *Education and mind in the knowledge age.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Berg, Bruce L. (1989). *Qualitative Research Methods for the Social Sciences*. Needham Heights, MS: Allyn and Bacon

Berliner, D.C. 1987: Ways of thinking about students and classrooms by more and less experienced teachers. In Calderhead, J., editor, *Exploring teachers' thinking*. London: Cassell, 60-83.

Binnie-Smith, D. (1996). Teacher decision making in the adult ESL classroom. In D. Freeman & J. Richards (Eds.), *Teacher learning in language teaching*(pp. 197–216). New York: Cambridge University Press.

Blumenfeld, P., Soloway, E., Marx, R., Krajcik, J., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist, 26*, 369-398.

Borg, S. (1998). Teacher's pedagogical systems and grammar teaching: A qualitative study. *TESOL Quarterly*, *32*, 9–38.

Borg, Kellenbach, Morris & Friebel, (1969) Videotape feedback and microteaching in a teacher training model. *Journal of Experimental Education*, 37, 9-16.

Breen, M. (1991). Understanding the language teacher. In R. Phillipson, E. Kellerman, L. Selinker, M. Sharwood-Smith, & M. Swain, (Eds.), *Foreign/second languagepedagogy research* (pp. 213–233). Clevedon: Multilingual Matters.

Brown, A. & Campione, J. (1994). Guided discovery in a community of learners. In K. McGilly (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 229-270). Cambridge, MA: MIT Press.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science, 2* (1), 40-57.

Bruce, B.C., & Rubin, A.D. (1993). *Electronic quills: A situated evaluation of using computers for writing in classrooms.* Hillsdale, NJ: Erlbaum.

Bullough, R.V., Jr., Knowles, J.G. and Crow, N.A. 1991: *Emerging as a teacher*. London: Routledge.

Burns, A. (1992). Teacher beliefs and their influence on classroom practice. *Prospect 7*(3), 56–66.

Chan, C. (2011). CSCL Theory-Research-Practice Synergy: The Hong Kong Experience of Implementing Knowledge Building in Classrooms. *International Journal of Computer-Supported Collaborative Learning.* 6(2)

Chandler, D. (1994). *The transmission model of communication.* Available at: http://www.aber.ac.uk/media/Documents/short/trans.html .

Clandinin, D.J. 1986: *Classroom practice: teacher images in action.*London: The Falmer Press.

Clandinin, D.J. 1992: Narrative and story in teacher education. In Russell, T. and Munby, H., editors, *Teachers and teaching: from classroom to reflection.* London: The Falmer Press, 124-37.

Clark, C.M. and Peterson, P. 1986: Teachers' thought processes. In Wittrock, M.C., editor, *Handbook of research on teaching.* New York: Macmillan, 255-96.

Clark, C.M. and Yinger, R.J. 1977: Research on teacher thinking. *Curriculum Inquiry* 7: 279-304.

Clarke R. (2005) *'Hybridity - Elements of a Theory'.* Xamax Consultancy Pty Ltd, April 2005, at http://www.rogerclarke.com/SOS/HAHTh050S.html, accessed 2 June 2011

Crotty, (1998). *The Foundations of Social Research: Meaning and Perspective in the Research Process.* Sage, London (1998).

Cole, M. (1996). *Cultural psychology.* Cambridge, MA: Harvard University Press.

Collins, A., & Stevens, A. R. (1983). Goals and strategies of inquiry teachers. In R. Glaser (Ed.), *Advances in instructional psychology.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Connelly, F.M. and Clandinin, D.J. (1987). Teachers' personal knowledge: what counts as personal in studies of the personal. *Journal of Curriculum Studies* 19(6): 487-501.

Connelly, F.M. and Clandinin, D.J. (1988). *Teachers as curriculum planners*. New York: Teachers College Press.

Connelly, F.M. and Clandinin, D.J. (1996). Teachers' professional knowledge landscapes: teacher stories--- stories of teachers -- school stories --- stories of schools. *Educational Researcher* 25(3): 24-30.

Connelly, F.M., Clandinin, D.J. and He, M.F. (1997). Teachers' personal practical knowledge in the professional knowledge landscape. *Teaching and Teacher Education* 13(7): 665-74.

Creswell, J. 1994. Research design: Qualitative and quantitative approaches. London: Sage.

Creswell, J. W. (2005). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (2nd ed.). Upper Saddle River, NJ: Pearson.

Cruickshank and Metcalf, (1993). Cruickshank, D.R., & Metcalf, K.K.(1993). Improving pre-service teacher assessment through on-campus laboratory experiences: Theory Into Practice. *Teaching and Teacher Education* 32(2), 86-92.

Daft, R. L., & Lengel, R. H. (1986). *Organizational information requirements, media richness and structural design.* Management Science, 32(5), 554–571.

Davis & Smoot, (1970). Effects on verbal teaching behaviors of beginning secondary teacher candidates' participation in a program of laboratory teaching: Laboratory observation schedule and record. *Educational Leadership*, 28, 165-169.

de Laine, M. (1997). *Ethnography: Theory and application in health research*. Sydney: MacLennan and Petty.

Denzin, N. K and Lincoln, Y.S. (1998). Introduction: Entering the field of qualitative research. N.K. Denzin and Y.S. Lincoln (Eds.) *Strategies of Qualitative Inquiry. Thousand* Oaks,CA: Sage.

Denzin, N. K./Lincoln, Y. S. (eds.), Handbook of Qualitative Research, Thousand Oaks: Sage Publications 1994.

Denzine, N. K. (1989). *Interpretive Interactionism.* Newbury Park, CA: Sage

Dewey, J. (1991). Logic: The theory of inquiry. In J. A. Boydston (Ed.), *John Dewey: The later works, 1925-1953* (Vol. 12, pp. 1-5). Carbondale, IL: Southern Illinois University Press.

Dewey, J., & Bentley, A. (1991). Knowing and the known. In J. A. Boydston (Ed.), *John Dewey: The later works, 1925-1953* (Vol. 16). Carbondale, IL: SIU Press.

Dillenbourg, P. (1999). What do you mean by 'collaborative learning'? In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches* (pp. 1-16). Amsterdam, NL: Pergamon, Elsevier Science.

Dillenbourg, P., Baker, M., Blaye, A., & O'Malley, C. (1996). The evolution of research on collaborative learning. In P. Reimann & H. Spada (Eds.), *Learning in humans and machines: Towards an interdisciplinary learning science* (pp. 189-211). Oxford, UK: Elsevier

Donald, M. (1991). *Origins of the modern mind: Three stages in the evolution of culture and cognition*. Cambridge, MA: Harvard University Press.

Donath, J., Karahalios, K., & Viegas, F. (1999). Visualizing conversation. *Journal of Computer Mediated Communication, 4* (4). Retrieved from

http://www.ascusc.org/jcmc/vol4/issue4/donath.html.

Donato, R. (1994). Collective scaffolding in second language learning. In J.P Lantolf and G. Appel (Eds.), *Vygotskian approaches to second language research* (pp. 36-56). Norwood, NJ: Ablex.

Dysthe, O. (2002) The Learning Potential of a Web-mediated Discussion in a University Course. *Studies in Higher Education*, 27, 3, pp. 339 – 352

Ellis, R. (2010). Second Language Acquisition, Teacher Education and Language Pedagogy. Language Teaching, 43(2), 182–201.

Elrod, et al.(1992) LiveBoard: a large interactive display supporting group meetings, presentations, and remote collaboration. *Proceedings of the ACM Conference on Human Factors in Computing Systems CHI'92 Monterrey,. New York: ACM*. pp. 599-607.

Elbaz, F. 1991: Knowledge and discourse: the evolution of research on teaching. *Journal of Curriculum Studies* 23(2): 1-19.

Engeström, Y. (1987). Learning by expanding: An activity-theoretical approach to developmental research. Helsinki: Orienta-Konsultit.

Engeström, Y. (1999). Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen & R.-L. Punamäki (Eds.), *Perspectives on activity theory* (pp. 19-38). Cambridge, UK: Cambridge University Press.

Farrell, T. S. (1999). The reflective assignment: Unlocking pre-service English teachers' beliefs on grammar teaching. *RELC Journal 30*, 1–17.

Fawcett, L. M., & Garton, A. F. (2005). The effect of peer collaboration on children's problem-solving ability. *British Journal of Educational Psychology*, 75, 157–169.

Fielding, N. G. & Lee, R. M. (1991) *Using Computers in Qualitative Research.* London: Sage.

Fiske, John (1982): *Introduction to Communication Studies.* London: Routledge

Fjuk, A., Berge, O., Bennedsen, J. & Caspersen M.E (2004). Learning Object-Orientation through ICT-mediated Apprenticeship. *ICALT 2004*, Joensuu, Finland.

Florman, J. (Fall, 2003). *Psychological & quantitative foundations: Researching classroom seating arrangements.* Retrieved October 4, 2009, from The University of Iowa, College of Education Web site: http://www.education.uiowa.edu/edatiowa/fall03/department/pandq/index.html

Flynn, E. Pine, K. J. & Lewis, C. (2006) The microgenetic method: Time for change? *The Psychologist, 19,* 3, 152 - 155.

Fraenkel, Jack R.; Wallen, Norman E. (2006). *How to Design and Evaluate Research in Education. p.446.* Boston: McGraw-Hill.

Freeman, D. & Johnson, K. (1998). Reconceptualizing the knowledge base of language teacher education. *TESOL Quarterly*, *32*, 397–418.

Freeman, D. & Johnson, K. (2005). Response to Tarone and Allwright. In D. Tedick (Ed.), *Second language teacher education: International perspectives* (pp. 25–32). Mahwah, NJ: Lawrence Erlbaum.

Freeman, D. and Richards, J.C. editors, (1996). *Teaching learning in language teaching*. New York: Cambridge University Press

Full Text of PM's Budget 2008 speech. (2007, September 7). *The Star Online*. Retrieved January 17, 2008, from http://thestar.com.my/news

Gánem Gutiérrez, G.A. (2006). Sociocultural Theory and Its Application to CALL: A Study of the computer and its relevanceas a mediational tool in the process of collaborative activity. *ReCALL* **18** (2): 230-251. Cambridge University Press

Gatbonton, E. (2008). Looking Beyond Teachers' Classroom Behaviour: Novice and Experienced ESL Teachers' Pedagogical Knowledge. *Language Teaching Research.* 12,2 ; pp. 161–182

Gatbonton, E. (1999). Investigating Experienced ESL Teachers' Pedagogical Knowledge. *Modern Language Journal*, *83*(1), 35–50.

Geddis, A. N. (1993). Transforming subject-matter knowledge: The role of pedagogical content knowledge in learning to reflect on teaching. *Int. J. Sci. Edu., 15*, 673-683.

Gess, Newsome, J. (1999). Pedagogical content knowledge: An introduction and orientation. In J. Gess-Newsome & N.G. Lederman (Eds.), *Examining Pedagogical Content Knowledge: The Construct and its Implications for Science Education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Gillies, R. M. (2006). Teachers' and students' verbal behaviors during cooperative and small-group learning. *British Journal of Educational Psychology*, 76, 271–287.

Golombek, P. R. (1998). A study of language teacher's personal practical knowledge. *TESOL Quarterly*, *32*, 447–464

Grossman, P.L. (1990). *The Making of a Teacher: Teacher Knowledge and Teacher Education*. New York: Teachers College Press.

Grossman, P. L., Wilson, S. M., & Shulman, L. (1989). Teachers of substance: Subject matter knowledge for teaching. In M. C. Reynolds (Ed.). *Knowledge base for the beginning teacher* (pp. 23-36). Oxford: Pergamon Press.

Gruber, S., Peyton, J. K., & Bruce, B. C. (1995). Collaborative writing in multiple discourse contexts. *Computer-Supported Cooperative Work, 3*, 247-269.

Guba, E., & Lincoln, Y. (1989). *Fourth Generation Evaluation*. Beverly Hills, CA:Sage

Gudmundsdottir, S. (1987). *Pedagogical content knowledge: teachers' ways of knowing.* Paper presented at the Annual Meeting of the American Educational Research Association. Washington, D.C. (ERIC Document Reproduction Service NO. ED 290 701)

Hakkarainen, K., & Sintonen, M. (2001). The interrogative model of inquiry and computer-supported collaborative learning. *Science & Education, in press*.

Hall, J. K. (1997). A consideration of SLA as a theory of practice: A response to Firth and Wagner. *The Modern Language Journal, 81*, 301-306.

Hammersley, M. (1995). Theory and evidence in qualitative research. Quality and Quantity, 29(1), 55-66.

Hawkins, M. (ed.) (2004). *Language Learning and Teacher Education: A Sociocultural Approach.* Clevedon: Multilingual Matters.

Holland, D., and J. Lave (2001). 'Introduction', in D. Holland and J. Lave (eds.), *History in Person: Enduring Struggles and the Practice of Identity* (Albuquerque: School of American Research Press): 3-33.

Hoppe, H. U., Baloian, N., & Zhao, J. (1993). Computer support for teacher-centered classroom interaction. *Paper presented at the ICCE '93*, December 15-17, 1993, Taipei, Taiwan.

Hsieh and Shannon (2005). *Qualitative Health Research*, Vol. 15, No. 9, 1277-1288.

Hutchby, I & Woffitt, R (1998). *Conversation Analysis: principles, practices and applications.* Polity Press.

Idling and Klemm (1997). Peer Response to Lesson Plan for Pre service Teacher. *Instructional Development Project Report for 1995/96.* Unpublished Report.

Ilyenkov, E. V. (1977). *Dialectical logic: Essays on its history and theory*. Moscow: Progress.

Janesick, V. (2000). The choreograph of qualitative research design: Minuets, improvisations and crystallization. In N.K Denzin & Y.S. Lincoln (Eds.)*, Handbook of qualitative research* (2nd Ed.)(pp.391-394). Thousand Oaks, CA: Sage.

Johnson, K.E. (1992). Learning to teach: instructional actions and decisions of preservice ESL teachers. *TESOL Quarterly* 26(3): 507-35.

Johnson, K. (1996). The vision versus the reality. In Freeman & Richards (Eds.) *Teacher learning in language teaching*. New York: Cambridge University Press.

Johnson, K. (Ed.) (2005). *Expertise in second language learning and teaching* (pp. 167–189). New York: Palgrave Macmillan.

Johnson, K.E. and Golombek, P.R. (2002). Inquiry into experience: teachers' personal and professional growth. In Johnson, K.E. and Golombek, P.R., editors, *Teachers' narrative inquiry as professional development*. Cambridge: Cambridge University Press, 1-14.

Johnston, B., & Goettsch, K. (2000). In search of the knowledge base of Language teaching: Explanations by experienced teachers. *Canadian Modern Language Review* 56, 437–468.

Kaptelinin, V. (1992). Human computer interaction in context: The activity theory perspective. In J. Gornostaev, ed.,*Proceedings of EWHCI'92 Conference*. Moscow: ICSTI.

Karlsson, G. (2012). *Instructional Technologies in Science Education Students' Scientific Reasoning in Collaborative Classroom Activities*. Unpublished Doctoral Dissertation. Department of applied Information Technology University of Gothenburg SE-412 96 Göteborg Sweden.

Kelle, U. (1995) *Computer-Aided Qualitative Data Analysis: Theory, Methods and Practice.* London: Sage.

Koschmann, T. (2002). Dewey's contribution to the foundations of CSCL research. In G. Stahl (Ed.), *Computer support for collaborative learning: Foundations for a CSCL community: Proceedings of CSCL 2002* (pp. 17-22). Boulder, CO: Lawrence Erlbaum Associates.

Koschmann, T. (1996). Paradigm shifts and instructional technology. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum

Koschmann, T., Stahl, G., & Zemel, A. (2006). The video analyst's manifesto (or the implications of Garfinkel's policies for the development of a program of video analytic research within the learning sciences). In R. Goldman, R. Pea, B. Barron & S. Derry (Eds.), *Video research in the learning sciences*. Retrieved from
http://www.cis.drexel.edu/faculty/gerry/publications/journals/manifesto.pdf.

Kreijns, K., Kirschner, P., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior*, 19, 335–353.

Kuutti, K. (1996). Activity theory as a potential framework for human computer interaction research. In Nardi, B. A. (Ed.), *Context and consciousness: Activity theory and human-computer interaction,* 17-44. Cambridge, MA: The MIT Press

Lackney, J., & Jacobs, P. (2002). *Teachers as placemakers: Investigating teachers' use of the physical learning environment in instructional design* (Report No. EF006078). (ERIC Document Reproduction Service No. ED463645).

Lantolf, J. P. (Ed.). (2000). *Sociocultural theory and second language learning.* Oxford: Oxford University Press.

Lantolf and Appel (1994) *Vygotskian approaches to second language research.* Norwood, NJ: Ablex.

Lengel, R.H. and Daft, R.L. (1988). The Selection of Communication Media as an Executive Skill. *Academy of Management Executive*, 2(3), 225-232.

Larsen-Freeman, D. (1991). Consensus and divergence on the content, role, and process of teaching grammar. In J. Alatis (Ed.), *Georgetown University Roundtable on Language Linguistics 1991: Linguistics and language pedagogy.* (pp. 259–262). Georgetown, Washington, DC: Georgetown University Press.

Larsen-Freeman, D. and Long, M. (1991). *An introduction to second language acquisition research.* New York: Longman

Latour, B., & Woolgar, S. (1979). *Laboratory life.* Thousand Oaks, CA: Sage Publications.

Lau, F. and Inkpen, K. (2004). *Ubiquitous Computing for Face-to-Face Collaboration.* Eprints Kfupm .

Lave, J. (1991). Situating learning in communities of practice. In L. Resnick, J. Levine & S. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 63-83). Washington, DC: APA.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lewins & Silver (2007). *Using Software in Qualitative Research: A Step-by-Step Guide*. Los Angeles: Sage, 283 pages, ISBN 978-0-7619-4923-7

Lewins, A. & Sil;ver, C (2009). Choosing a CAQDAS Software Package. A working paper. *CAQDAS Networking Project.* Retrieved from internet 13 January 2009: http//.cue.berkeley.edu/qdaarticl.pdf

Lincoln, Y.S. (1995). Emerging Criteria for Quality in Qualitative and Interpretive Research. *Qualitative Inquiry*, *1*, 275-289.

Lincoln, Y.S. & Guba, E.G. (1985). *Naturalistic Inquiry*. Beverly Hills, CA: Sage Publications.

Lipponen, L., Hakkarainen, K., & Paavola, S. (2004). Practices and orientations of CSCL. In J.-W. Strijbos, P. Kirschner & R. Martens (Eds.), *What we know about CSCL: And implementing it in higher education* (pp. 31-50). Dordrecht, Netherlands: Kluwer Academic Publishers.

Lund University (2007). *Luvit System*, retrieved March 30, 2008, from http://www.luvit.com.

Magnusson, S., Krajcik, J., & Borko, H. (1994). Teaching complex subject matter in science: Insights from an analysis of pedagogical content knowledge. *Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Anaheim*. CA.

Magnusson, S., Krajcik, J., & Borko, H. (1999). Nature, sources and development of pedagogical content knowledge for science teaching. In J. Gess-Newsome & N.G. Lederman (Eds.), *Examining Pedagogical Content Knowledge: The Construct and its Implications for Science Education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Malandrino, D. and Manno, I. (2006). *Peer-to-peer Face-to-face collaboration. Paper presented at the European Conference on Technology Enhanced Learning.* October 1-2, 2006, Crete, Greece.

Markee, N. (2000). *Conversation Analysis*. Mahwah, NJ: Lawrence Erlbaum Associates.

Marks, R. (1991). Pedagogical content knowledge: From a mathematical case to a modified conception. *Journal of Teacher Education, 41*(3), 3-11.

McNeill, D., Cassel, J., and McCullough, K. (1994). *Research on Language and Social Interaction, 27*, 223-237.

Mendoza, M.B., and Lucas, T. (2002). Studying Construction of Word Meaning through Conversation Analysis. *Paper presented at the Southeast Regional TESOL Conference, Atlanta, GA.*

Merriam, S.B. (1998): *Qualitative Research and Case Studies Applications in Education*. San Francisco: Jossey-Bass Publications.

Metcalf, K.K.(1993). Critical Factors in on-campus clinical experience. *Teaching Education*, 5, 164-174.

Mills, R.F.(1991). *Micro-peer teaching: Organization and benefits.* Education, 111, 559-562.

Mitchell, R. and Myles, F. (1998). *Second language learning theories*. New York: Arnold.

Mohd Aizaini, Abd Samad, Mazleena, Rashidah and Anazida (2007). Optimization of Computer Labs Usage in School : A Case Study of Smart School. *Project Report (Vot 71660).* Universiti Teknologi Malaysia.

Mohd Azul and Norizan Razak (2006). The Use of Communication Tools to Promote Hybrid Learning. In Muhammad Kamarul Kabilan, Norizan Razak and Mohamed Amin Embi (Ed.): *Online Teaching and Learning in ELT.* Penerbit Universiti Sains Malaysia Pulau Pinang.

Mory, E.H. (2004). Feedback Research Revisited. In D.H. Jonassen(Ed.), *Handbook of Research on Educational Communication and Technology* (pp. 745-783). Mahwah, Nj: Lawrence Erlbaum.

Morse, J.M. (1994): "Emerging from the data": the cognitive processes of analysis in qualitative inquiry. In Morse, J.M. (Ed.): *Critical Issues in Qualitative Research Methods*. London: Sage Publications.

Mwanza-Simwami, Daisy (2011). Activity Oriented Design Method (AODM) as a framework and model for characterising learner experiences with technology. Journal of e-Learning and Knowledge Society (Je-LKS), 7(3), pp. 75–85.

Nardi, B. (1996). Concepts of Cognition and Consciousness: Four Voices. Invited paper. *Australian Journal of Information System. 4, 1. 64-79. September.* Reprinted in *ACM Journal of Computer Documentation, February, 1998.*

Nicolopoulou, A., & Cole, M. (1993). Generation and transmission of shared knowledge in the culture of collaborative learning: The fifth dimension, its playworld and its institutional contexts. In E. Forman, N. Minnick & C. A. Stone (Eds.), *Contexts for learning: Sociocultural dynamics in children's development*. New York, NY: Oxford University Press

Norman, D. A. (1993). *Things that make us smart*. Reading, MA: Addison-Wesley Publishing Company.

Nunan, D. 1992: The teacher as decision-maker. In Flowerdew, J.Brock, B. and Hsia, S., editors, *Perspectives on second language teacher education*. Hong Kong: City Polytechnic of Hong Kong, 135-65.

O'Hare, M. (1998). Classroom design for discussion-based teaching. *Journal of Policy Analysis and Management, 17* (4), 706-720. Retrieved October 4, 2009, from JSTOR database.

Ochoa, S.F., Guerrero, L.A., Fuller, D., & Herrera, O. (2002). Designing the Communication Infrastructure of Groupware Systems. *Lecture Notes in Computer Science, 2440*, 114-133.

Ochoa, S.F., Pino, J.A., Baloian, N., & Fuller, D. (2003). ICESEE: A Tool for developing Engineering Courseware. *Computer Applications in Engineering Education, 11* (2), 53-66.

Ohta, A. S. (2000). Rethinking interaction in SLA: Developmentally appropriate assistance in the zone of proximal development and the acquisition of L2 grammar. In J.P. Lantolf(Ed.), *Sociocultural theory and second language learning* (pp. 51-78). Oxford: OxfordUniversity Press.

Ohta, A. S. (2001). *Second Language Acquisition Processes in the Classroom: Learning Japanese*. Mahwah, NJ: Lawrence Erlbaum Associates.

Overdijk, M. and Diggelen, W. van (2006). Technology Appropriation in Face-to-Face Collaborative Learning. *EC-TEL Workshops.* October 1-2, 2006 Crete, Greece.

Overdijk, M. and Diggelen, W. van (2007). Small-group face-to-face discussions in the classroom: a new direction of CSCL research. *CSCL 2007. July* 16-21, 2007, Rutgers University 727-736

Pandit, N. R. (1996). The Creation of Theory. A Recent Application of the Grounded Theory Model. In: *The Qualitative Report, 2(4), December 1996*.

Patru, M. (2008). *Attaining Quality Education for All.* Fifth EDEN Research Workshop 20-22 October *2008*, *UNESCO*, Paris. Mariana *Patru*. Division of Higher Education. UNESCO.

Patton, J., Snell, J., Knight, W., & Florman. (2001). *A survey study of elementary classroom seating designs* (Report No. SP040068). Washington, DC: National Association of School Psychologists. (ERIC Document Reproduction Service No. ED454194).

Patton, M.Q. (2002). *Qualitative Research and Evaluation Methods*. Thousand Oaks, CA: Sage.

Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.

Peacock, M. (2001). Pre-service ESL teachers' beliefs about second language learning: A longitudinal study. *System, 29*, 77–196.

Pejabat Bendahari (2005). *Contract Document No : UTM/IDB/11/2004 (package D) – Volume I*. Universiti Teknologi Malaysia.

Proshansky, E., & Wolfe, M. (1974). The physical setting and open education. *The School Review, 82*(4), 556-574. Retrieved October 4, 2009, from JSTOR database.

Raviv, A., Raviv, A., & Reisel, E. (1990, Spring). Teachers and students: Two different perspectives? Measuring social climate in the classroom. *American Educational Research Journal*, *27*(1), 141-157. Retrieved September 17, 2009, from the JSTOR database.

Rice, (1993). Media appropriateness: using social presence theory to compare traditional and new organizational media. *Human Communication Research* **19,** pp.452-453.

Richards, J. (2006). *Setting the Stage for Student Engagement.* Kappa Delta Pi Record. (ERIC Document Reproduction Service No. EJ724640).

Richards, J.C. (1994). *Research report no. 38: The sources of language teachers' instructional decisions*. Hong Kong: Department of English, City University of Hong Kong.

Richards, J.C (1998). *Beyond training*. Cambridge: Cambridge University Press.

Richards, T., & Richards, L. (1994). Using Computers in qualitative analysis. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (pp.445-462). Thousand Oaks, CA: Sage.

Richardson, L. 1994. Writing: A method of inquiry. In N.K Denzin & Y.S. Lincoln (Eds.)*, Handbook of qualitative research* (2nd Ed.)(pp. 522-523). Thousand Oaks, CA: Sage.

Rogoff, B., & Lave, J. (1984). *Everyday cognition: Its development in social context*. Cambridge, MA: Harvard University Press.

Rommetveit, R. (1979). On the architecture of intersubjectivity. In R. Rommetveit and R. M. Blakar (Eds.), *Studies of language, thought, and verbal communication* (pp. 93-107). New York: Academic Press.

Rourke, B. (2000). *A Network-based Tool for Organizing Second-Language Vocabulary*. Paper presented at the ED-Media/ED-Telecom, Freiburg

Rovai, A. P., & Jordan, H. M. (2004). Blended learning and sense of community: a comparative analysis with traditional and fully online graduate courses. International Review of Research in Open and Distance Learning, 5(2).

Sarantakos, S 1997, *Social Research*, Macmillan Education Australia Pty Ltd, Melbourne.

Sato, K. and Kleinsasser, R. C. (1999.) Communicative language teaching (CLT): Practical understandings. *Modern Language Journal*, *83*, 494–517.

Scardamalia, M., & Bereiter, C. (1991). Higher levels of agency in knowledge building: A challenge for the design of new knowledge media. *Journal of the Learning Sciences, 1*, 37-68.

Scardamalia, M., & Bereiter, C. (1994). Computer support for knowledge-building communities. *The Journal of the Learning Sciences,* 3(3), 265-283.

Scardamalia, M., & Bereiter, C. (1996). Computer support for knowledge-building communities. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 249-268). Hillsdale, NJ: Lawrence Erlbaum Associates.

Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. In B. Smith (Ed.), *Liberal education in a knowledge society* (pp. 67–98). Chicago: Open Court. Scardamalia, M., Bereiter.

Scholar360 (2007). *Scholar 360*, retrieved March 30, 2008, from http://www.scholar360.com.

Scott, J. (1991). *Social network analysis: A handbook*. Thousand Oaks, CA: Sage.

Shannon, C., & Weaver, W. (1949). *The mathematical theory of communication*. Chicago, 1l: University of Illinois Press.

Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-22.

Singh, G. and Richard, J.C (2006). Teaching and Learning in the Language Teacher Education Course Room: A Critical Sociocultural Perspective. *RELC Journal,* 37(2) 149-175. SAGE Publications.

Southworth, J.H.(1988). The Hawaii Global Teleclass Project And Multimedia Computer-Based Educational Telecommunication (CBET). In Ambron, S. & Pennington, R. (Ed.), *Toward A Seamless Society: Networking In Education, (pp.* 273-294). Apple Education Advisory Council Cupertino, CA.

Stahl, G. (2000) Collaborative information environments to support knowledge construction by communities, AI &Society, 14, pp. 1-27. Available at: http://www.cs.colorado.edu/~gerry/publications/journals/ai&society/.

Stahl, G. (2002). Rediscovering CSCL. In T. Koschmann, R. Hall & N. Miyake (Eds.), *CSCL 2: Carrying forward the conversation* (pp. 169-181). Hillsdale, NJ: Lawrence Erlbaum Associates. Retrieved from http://www.cis.drexel.edu/faculty/gerry/cscl/papers/ch01.pdf.

Stahl, G. (2006). *Group cognition: Computer support for building collaborative knowledge.* Cambridge, MA: MIT Press. Retrieved http://www.cis.drexel.edu/faculty/gerry/mit/.

Stahl, G., Koschmann, T., & Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. In R. K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 409-426). Cambridge, UK: Cambridge University Press.

Stahl, G. (2009). *Studying Virtual Math Teams.* CSCL Book Series. New York : Springer

Stahl, G. (2011). Social Practices of Group Cognition in Virtual Math teams. In S. Ludvigsen, A. Lund, I. Rasmussen and R. Saljo (Eds.), *Learning Across Sites: New Tools, infrastructures and Practices.*(pp.190-205). New York, NY: Routledge. Accesible at: http://GerryStahl.net/pub/cmc.pdf.

Stefik , et al (1987). Beyond the chalkboard: Computer support for collaboration and problem solving in meetings. *CACM*, vol. 30 (1). pp. 32-47, 1987.

Stone, C. A. (1993). What is missing in the metaphor of scaffolding?. In E. A. Forman, N.Minick, and C.A. Stone (Eds.). *Contexts for learning: Sociocultural dynamics in children's development.* New York: Oxford University Press.

Strauss, A.L., & Corbin, J.M (1998). *Basic of qualitative research: Techniques and procedures for developing grounded theory.* Thousand Oaks, CA: Sage Publication.

Strong-Wilson, T., & Ellis, J. (2007). *Children and place: Reggio Emilia's environment as third teacher.* Montreal, Quebec: Theory Into Practice. (ERIC Document Reproduction Service No. EJ755994)

Susi, F. D. (July, 1989). The physical environment of art classrooms: A basis for effective discipline. *Art Education, 42*(4), 37-43. Retrieved October 4, 2009, from JSTOR database.

Suthers, D. (2005). *Technology affordances for intersubjective learning: A thematic agenda for CSCL.* Paper presented at the international conference of Computer Support for Collaborative Learning (CSCL 2005), Taipei, Taiwan.

Swain, M. (1995) Three functions of output in second language learning. In G. Cook & B. Seidlhofer (eds), *Principles and practice in the study of language .* Oxford: Oxford University Press.

Swain, M. (1997). Collaborative dialogue: Its contribution to second language learning. *Revista Canaria de Estudios Ingleses, 34*, 115-132.

Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J.P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97-114). Oxford: Oxford University Press.

Tarone, E. and Allwright, R. (2005). Second language teacher learning and student second language learning: Shaping the knowledge base. In Tedick, D. (Ed.) *Second language teacher education. International perspectives (*pp. 5–24). Mahwah, NJ: Lawrence Erlbaum.

Teasley, S. (1995). The role of talk in children's peer collaboration. *Developmental Psychology,* 3(2), 207–220.

Tesch, R. (1991). *Qualitative Research: Analysis Types & Software Tools.* Bristol, PA: The Falmer Press.

Trenholm, S.(1986). *Human Communication Theory.* Prentice-Hall, New Jersey

Tsui, A. B. (2003). *Understanding expertise in teaching*. New York: Cambridge University Press.

Tsui, A. B. (2005). Expertise in teaching: Perspectives and issues. In Johnson, K. (Ed.), *Expertise in second language learning and teaching* (pp. 167–189). New York: Palgrave Macmillan.

University of British Columbia (2007). *The WebCT system*, retrieved March 30, 2008, from http://www.webct.com.

van Lier, L. (2000). From input to affordance: Social-interactive learning from an ecological perspective. In J.P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 245-259). Oxford: Oxford University Press.

Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: The Massachusetts Institute of Technology.

.

Vygotsky, L.S.(1978). *Mind In Society: The Development Of Higher Psychological Processes*. Harvard University Press.

Warschauer, M. and Kern R.(2000). Theory and Practice of Network-based Language Teaching. In Warschauer, M. and Kern R, (Ed.*), Network-based Language Teaching : Concepts and Practice,* p 13 . Cambridge University Press.

Wagner, E. D. (1994). In support of a functional definition of interaction. *The American Journal of Distance Education*, 8(2), 6–29.

WBTSystems (2007). *TOPCLASS*, retrieved March 30, 2008, from http://www.wbtsystems.com.

Weinstein, C. (1977, Summer). Modifying student behavior in an open classroom through changes in the physical design. *American Educational Research Journal, 14*(3), 249-262. Retrieved October 4, 2009, from the SAGE database.

Wenger, E.(1998). *Communities of Practice: Learning, Meaning and Identity.* Cambridge: Cambridge University Press).

Wertsch, J.V. (1998). Mind as action. Oxford University Press.

Wolfinger, N.H. (2002) *On Writing Fieldnotes: Collection Strategies and Background Expectancies*, Qualitative Research 2(1): 85–95.

Woods, D. (1996). *Teacher cognition in language teaching*. Cambridge: Cambridge University Press.

Wood, D., Bruner, J. S. and Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology, Psychiatry, and Allied Disciplines, 17*, 89-100.

Woods, D.K. (2008). *Transana Manual.* Wisconsin Center for Education Research. The Board of Regents of the University of Wisconsin System.

Wright, T. (2005). *Classroom Management in Language Education.* London: Palgrave Macmillan.

Yeany, R.(1978). Effects of microteaching with videotaping and strategy analysis on the teaching strategies of pre-service science teacher. Science Education. 62 (2), 203-207.

Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage Publishing.