Analysis of Socio-Technical Interactions in Computer Supported Intercultural Collaboration

A Study Combining Interactional and Micro-Genetic Analysis on Three Kinds of Cultural Dyads to Reveal that Socio-Technical Interactions in Computer Supported Intercultural Collaboration is Culture Impermeable

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Abstract

Time and time again, myriad of research studies have proven social behavior, communication, cognitive process, design interface, work hierarchies and literally every nook and corner contains a taint of culture and yet, interestingly, an increasing number of researchers are still in the primitive stages in identifying socio technical interactions in computer supported intercultural learning and are yet to profile these interactions according to separate cultural dyads supported by sound research findings. Building on previous trails of research studies, the theoretical base for this study entails affordances, culture and technological intersubjectivty. This strong theoretical structure leads to two methodological approaches which were utilized to analyze and unearth socio technical interactions in computer supported intercultural collaborative learning; interactive and micro genetic analysis on three kinds of cultural dyads of over thirty participants namely American-American, Chinese-Chinese and American-Chinese. These findings were aligned with similar research studies and their research hypothesis. A handful of these findings seemed statistically significant but failed to have a sound research backing, and a handful of these findings seemed to have a sound research backing but failed to see light due to lack of statistical significance. The final outcome derived from the study claims that the cultural differences evident in the collaborative processes does not, by any means, hinder or influence the learning outcome showcased in the computer supported interface, and thereby, stamps a new claim that computer supported intercultural learning is *Culture Impermeable.*

Acknowledgements

In the name of Allah, most gracious and the most merciful.

I would like to express my gratitude and humbleness to Dr. Ravi K. Vatrapu, my guru who introduced me to the subject of CSCL and was generous in providing ample opportunities such as offering me a PhD level course, give me desk space at the ITM to work on my thesis, observe the academic milieu by inviting me to weekly CSCL meetings and giving me personal advice and suggestions. Many would deem a person's words as a motivation, but Dr. Vatrpu's attitude is motivating and contagious. I am forever grateful for him.

My parents, M.M.M.Samsheer and Roshan Samsheer, and siblings for their untiring words of motivation and morale support when life seemed nothing but days filled with analysis.

Last but not least, I am forever in debt to Copenhagen Business School for providing me with the scholarship to purse my master's degree, and provide me with the education on which I was able to leverage onto my career.

Sincerely,

Shafak Ahamed Mohamed Samsheer
November 15th, 2013

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Chapter 1: Introduction

From childbirth to computer supported interactions; collaboration is an integral part for learning and achieving the end goal. Empirical studies have revealed that collaborative learning leads to deeper level learning, critical thinking, shared understanding, and long term retention of the learned material (Johnson, Johnson, & Stanne, 1989; Garrison, Anderson, & Archer, 2000) and further research shows the positive effects of social interaction for learning and development of social and communication skills, development of positive attitudes towards co-members and learning material, and building social relationships and group cohesion (Johnson, Johnson, & Stanne, 1989; Light & Littleton, Social processes in children's learning, 1999; Light, Littleton, & Joiner , Social and communivative process in computer based learning, 1994).

In a globalizing world where technology has enabled communication across the globe with literally with a click away, technology has enabled companies to nurture intercultural collaborations where the synergies have skyrocketed simple startups to stardom. Hence, intercultural collaboration is identifiable as a competitive advantage. From researchers to rocket scientists; harnessing intercultural collaboration through computers presents a sea of benefits; a few of such benefits could be where companies can increase its productivity by delegating tasks across the globe to leverage on the different time zones, avoid duplication and instant knowledge sharing through synchronous and asynchronous computer interfaces.

Interestingly, an increasing number of researchers are in the primitive stages in identifying interactions features between participants in computer supported collaborations and correlating the participants into cultural dyads. This track within computer supported collaborative learning is vital in understanding learning and cognition amidst different cultures so that one can optimize or work best with the participants and harness their strengths and is made aware of potential weaknesses. Although myriad of research studies have proven that culture influence social behavior (Hampden-Turner & Trompenaars, 1998), cultural influence communication (Hall, 1977), cultural influence cognitive process (Dimaggio, 1997; Nisbett & Norenzayan, 2002). In addition to these theoretical backgrounds, in the realm of Human Computer Interaction (HCI); user deign interface (Fernandes, 1995) web design (Marcus &

Gould, 2000) usability evaluation (Vatrapu & Pérez-Quiñones, 2006) , and even gender importance have been researched designing end-user programming environments under Gender HCI (Beckwith & Burnett, 2004).

However, cultural theories related with HCI are more in focus of the process oriented in the collaborative work and does not focus on constructing cultural profiles of those who are involved in the collaborative work and their activities. Hence, the purpose of this thesis is to analyze socio technical interactions in computer supported intercultural collaboration.

The primary contribution of this thesis is by using a combination of interactional analysis and micro genetic analysis on a set of selected cultural and gender dyads to demonstrate any systemic cultural or gender variation in the phenomena of technological intersubjectivity and appropriation of affordances in socio-technical environments where it would reveal to one that members of different cultures appropriated the resources of the interface differently in their interaction, and formed differential relations with and impressions of each other. However, the cultural differences evident in the collaborative processes does not, by any means, hinder or influence the learning outcome showcased in the computer supported interface which led me to coin a new word; *Culture impermeable*. This term would be introduced and discussed in Chapter 5. Chapter 2 would lay out a theoretical grounding followed by a methodological framework in Chapter 3 to support any significant findings in Chapter 4 where two methods of analysis would be used to reveal these findings, which would be followed by an in-depth discussion to disseminate any key findings in Chapter 5.

1.1 Delimitation

This thesis topic can often diverge into addressing cultural differences in a work setting (physical office) such as individual cultural traits in personal interaction, and thereby, when looking into computer supported collaborative learning, one may mistakenly view this from a work place standpoint or stereotypical assumptions based on their personal interactions with people from different cultures. Hence, I wish to delimit cultural study in work setting for only theoretical inspirations and will not delve into work environments beyond computer supported collaboration.

Chapter 2: Literature Review

This chapter addresses topics which have been identified as influential cruxes toward the research edifice; Affordance, Culture, and Technological Intersubjectivity – are introduced and briefly discussed along with their relevance to this research.

2.1 Affordances

An affordance relates attributes of something in the environment to an interactive activity by an agent who has some ability, and ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance (Gibson, 1979; Greeno, 1994) and according to Gaver, 1991,"…affordance *per se* are independent of perception" and he further states that affordances exist whether the perceiver cares about them or not.

Probing into technological based affordances, the notion of affordances in relation to technology is defined as a way of focusing on the strengths and weaknesses of technologies with respect to the possibilities they offer the people that might use them (Gaver, 1991).

Combining Gibson's concept of affordances with Gaver's concept of affordances in technology, this dawns us a hope that cultural nuances should be traceable in the technological affordances which goes hand in hand with Bradner, 2001 and her definition of social affordances as *the relationship between the properties of an object and the social characteristics of a given group that enable particular kinds of interaction among members of that group* (Bradner, 2001).

2.2 Culture

On the surface, culture seems to be the most easily identifiable element due to its distinctive nature, and as simple as it may seem, the complex it gets. In 1952, Alfred Kroeber and Clyde Kluckhohn identified 164 definitions of culture (Kroeber & Kluckhohn, 1952) and for discussion purposes, the definition of culture in this research is derived from Kaufmann and Clément(2006) where culture consists of *attentional commonalities that mediatize the*

perception, qualification and recognition of salience define what information is relevant in which situation, and inhibit opportunities for action.

Since this research is based on unearthing any significant findings in Computer Supported Intercultural Collaborative Learning, it is important to identify how and what aspects does culture influence, and four distinct lines of empirical research has revealed that:

- *Culture influences social behavior* (Hampden-Turner & Trompenaars, 1998; Hofstede, Hofstede, & Minkov, 2010; House, Hanges, Javidan, Dorfman, & Gupta, 2004)
- *Culture influences communication* (Gudykunst, Matsumoto, Ting-Toomey, Nishida, & Heyman, 1996; Hall, 1977)
- *Culture influences cognitive process* (Ross, 2004; Nisbett & Norenzayan, 2002; Dimaggio, 1997; Han & Northoff, 2008)
- *Culture influences interacting with computers* *User Interface* (Woiciechowski & Zakrzewska, 2006) *Web Design* (Marcus & Gould, 2000) *Usability Evaluation* (Vatrapu & Perez-Quinones, 2006; Clemmensen, Hertzum, Hornbæk, Shi, & Yammiyavar, 2009)

This study uses Hofstede's definition of culture where he defines culture as *"the collective programming of the mind which distinguishes the members of one group or category of people from one another."* The following are brief descriptions of the five cultural dimensions presented by Hofstede. As the analysis would contain data set from American and Chinese cultural dyads, examples would follow where appropriate.

Dimension	Explanation
Power Distance (PDI)	Definition: Extend to which the less powerful members of intuitions and organizations within a country expect and accept that power is distributed unequally. A country such as China which ranks high in PDI indicates that its society believes that inequalities amongst people are acceptable. On the other hand, a country such as USA which ranks quite low in the PDI indicates that inequalities amongst people are unacceptable, and focuses on equal rights in all aspects of the society.
Individualism (IDV)	Definition: The degree of interdependence a society maintains among its members. A country such as China which ranks low in IDV indicates that it is a collectivist society. On the other hand, a country such as USA which ranks high in the IDV indicates that it is an individualistic society
Masculinity (MAS)	Definition: fundamental concept which focuses on what motivates people, wanting to be the best (masculine) or liking what you do (feminine). MAS figures from both countries (China and US) indicate that they are a masculine society; success oriented and driven, although US figures are slightly below China.
Uncertainty Avoidance (UAI)	Definition: The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these. A country such as China ranks very low on UAI in comparison to US. This indicates that people in the Chinese society are less prone to follow stringent rules and laws, and are more flexible in order to suit the situation whereas US society tends to be a bit more stringent and people tend to follow rules and laws, and less often bend the laws to suit the situation.

Long Term Orientation (LTO)	Definition: The extent to which a society shows a pragmatic future oriented perspective rather than a conventional historical short-term point of view. A country such as China is on the high end of the LTO score which indicates that the society is more persistent and perseverant. Investment plans are often project for long term unlike in US where the society scores very low on LTO and hence, measure performance on a short term, quick basis. There is also a need to have "absolute truth" in all matters.

Table 1: Five Cultural dimensions by Hofstede

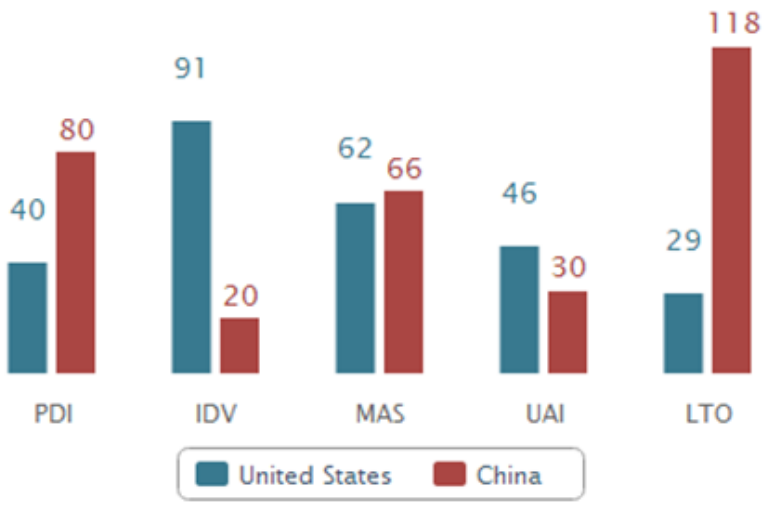


Figure 1: Hofstede's Cultural Dimension comparison chart between America and China

2.3 Technological Intersubjectivity

Technological intersubjectivity (TI) refers to a technology supported interactional relationship between two or more participants (Vatrapu & Suthers, 2009). According to Vatrapu (2008), the actors' subjective presence is more salient than the mediating technology, and hence, utilizing the concepts of technological intersubjectivity; there is great potential to categorize cultural and gender dyads based on their interactions with myriads of technologies and can further

contribute towards building culture/gender specific technological interfaces to enrich the technological usage experience. Such an experience is supported by information and communication technologies (ICT) which fosters computer-mediated communication tools (CMC), computer supported cooperative work (CSCW) and supported collaborative learning environments (CSCL) (Vatrapu R. K., 2008).

In this research, TI focuses on the phenomenal experiential aspects of being together such as American vs. Chinese, and Male vs. Female participants and draws inspiration from the study designed by Vatrpu and Suthers (2009) on TI.

Chapter 3: Methodology

Perusing through voluminous literature and coherently addressing them in review of literature in the previous chapter, it points out to the there is very limited research available to facilitate the understanding of socio-technical interaction in computer supported collaborative learning. The main objective of utilizing this data set from a previous study was with the intent to analyze and unearth socio-technical interactions in computer supported intercultural collaboration under motifs such as culture, gender and inter and intra cultural dyads.

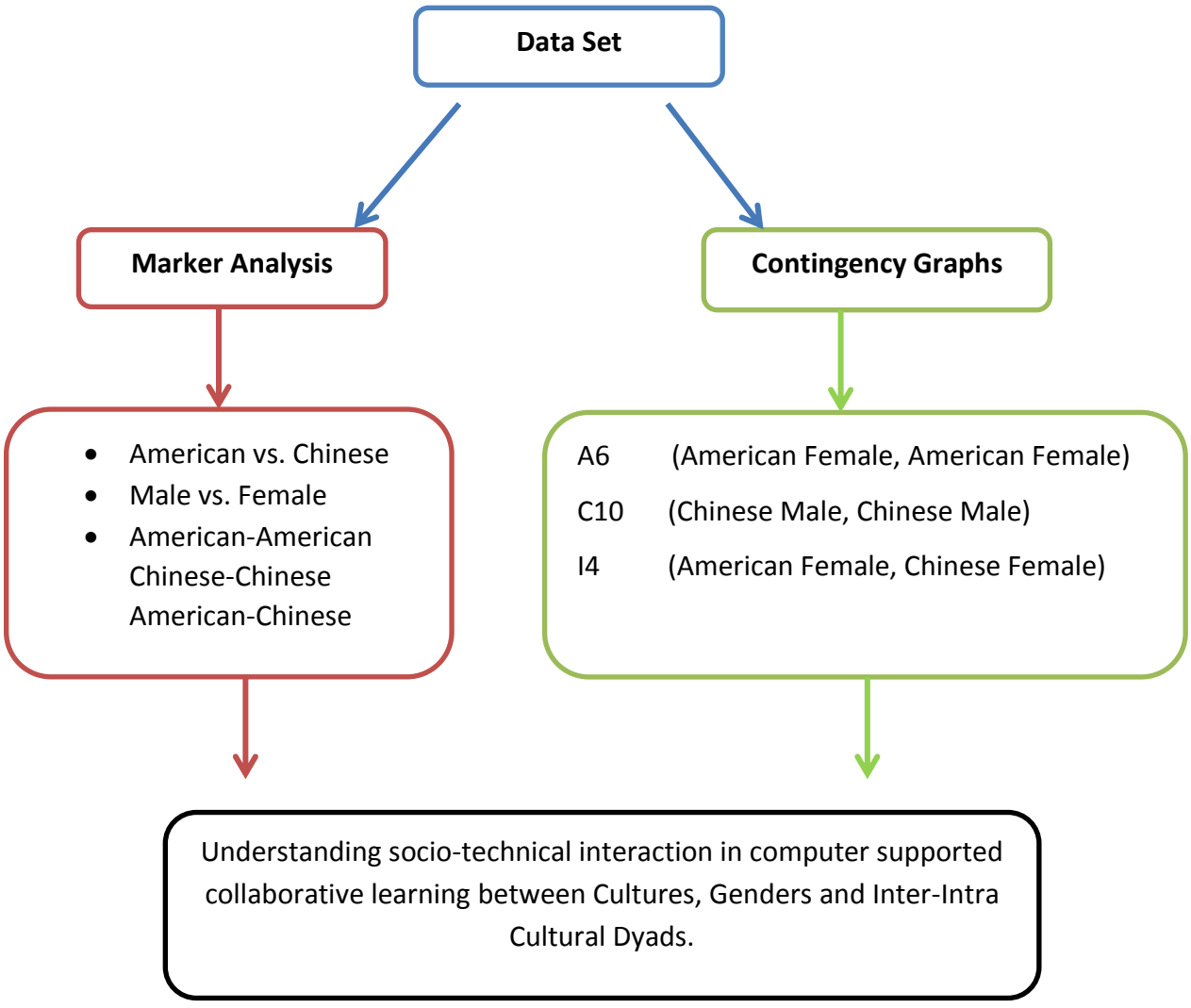


Figure 2: Methodological Framework

3.1 Data Set

Data set was obtained from the research carried out by Vatrapu (2008). Thesis direction and inspiration for constructing the methodology for understanding the socio-technical interaction in CSCL were built on the following journal publications by distinguished professors:

Authors	Publication
Ravi K. Vatrapu	Cultural Considerations In Computer Supported Collaborative Learning
Ravi.K Vatrapu Daniel Suthers Richard Medina	Notational Effects on Use of Collaboratively Constructed Representations During Individual Essay Writing
Ravi K. Vatrapu Dan Suthers	Intra-and Inter-Cultural Usability in Computer Supported Collaboration
Dan Suthers Nathan Dwyer Richard Medina Ravi K. Vatrapu	A Framework for Conceptualizing, Representing, and Analyzing Distributed Interaction

Table 2: Authors and their respective publications

For the purpose of this analytical paper, only the main study from Vatrapu (2008) was utilized amidst other data available data such as surveys and questionnaires which were deemed irrelevant for the context of the paper. The main study focuses on the collaborative knowledge map construction between the participants in each session followed by individual essay writing.

3.2 Participants

All participants were recruited from the graduate student community at the University of Hawai'I at Mānoa and each participant was compensated $75 for their time and participation. The average age of the participants were 28.20 years, where the youngest being 22 and the oldest being 45 years of age respectively.

3.3 Equipment

3.3.1 Hardware and Software

Participants were given standalone desktop computers running Microsoft XP™ and the participants were provided with a computer supported learning environment which consisted of an Information Viewer on the top left of the screen , Threaded Discussion panel on the bottom left of the screen.

Tetris™ was incorporated into the study so that after each game of Tetris™, a participant would be able to obtain each of the four reports encrusted into the study. In addition Tetris™ being utilized to obtain reports, it was used in the study based on the report that playing Tetris leads to thicker cortex and may also lead to brain efficiency (Webber, 2009).

Participants were required to use Notepad™ to write their essays whilst being able to switch back and forth from their CSCL software environment.

Software Configuration	**Functionalities**
Information Viewer	Materials relevant to the sessions (materials are exclusive to each participant).
Information Organizer	Acts as a workspace used for constructing knowledge.
Threaded Discussion	Acts as a discussion tool where a participant can discuss/share ideas or information.
Participant Video-Audio	This window captures the upper body of the participant and could be used to analyze any visual or audible cues during the study

Table 3: Software and their functionalities used in this research

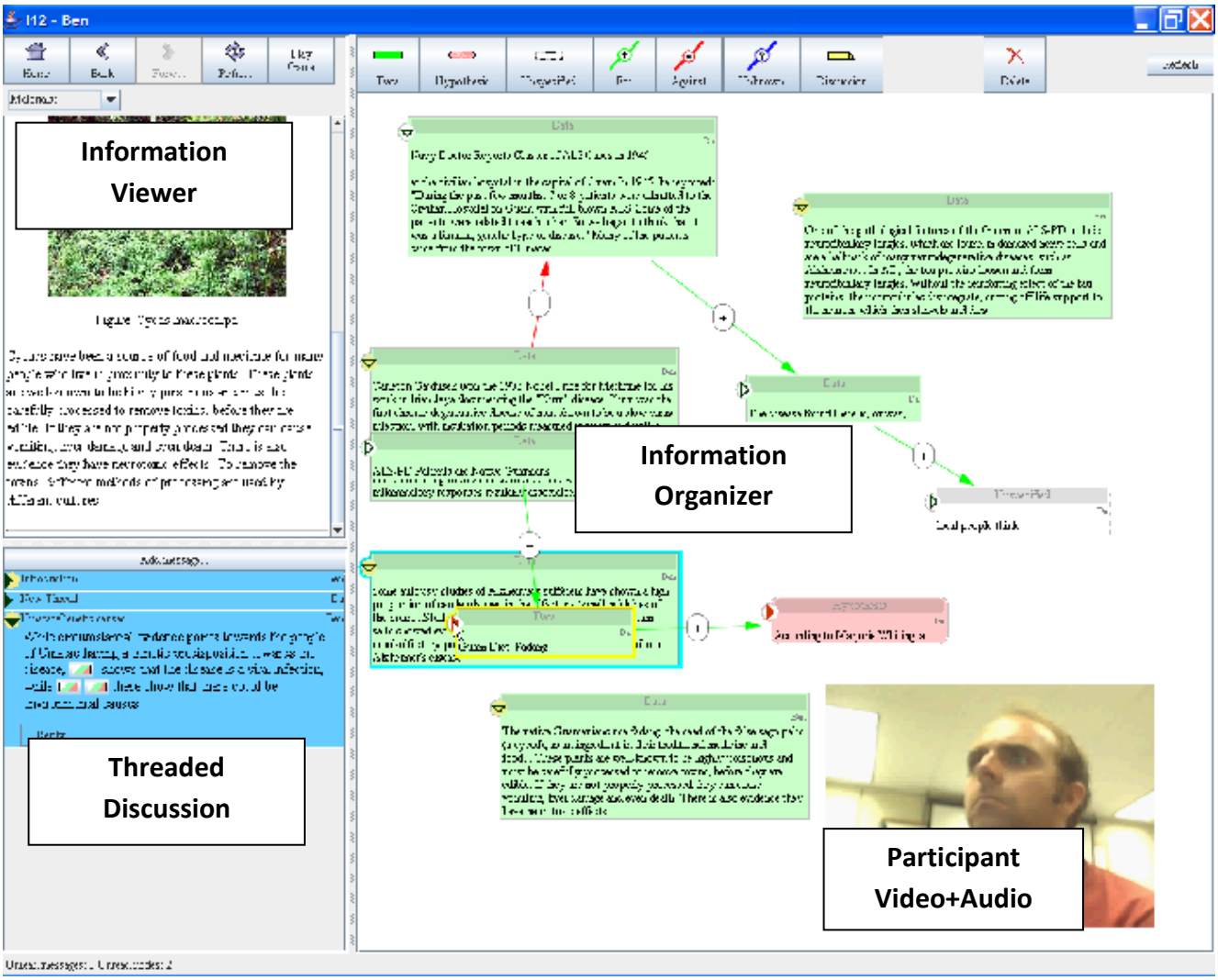


Figure 3: Components of the CSCL environment

In order to simulate asynchronous online interaction, the actions of each participant was queued, rather than displayed. Participants were able to obtain a new report only when they played a game of Tetris™, and Tetris™ was chosen as it presents a different sensory-motor perceptual task than primary experimental study task of collaborative knowledge map co-construction and simulates taking a break from the studies in real-worlds asynchronous learning settings (Suthers et al,2008).

On the other hand, the software environment permitted synchronous conversation where on participant could post and receive an immediate reply. This was facilitated by a *Refresh* button which enabled participants to get all updates to that point in time when triggered.

3.4 Data Collection

Morae™ recording software was utilized to capture the participants screen along with a webcam sized image of each participants along with audio.

3.5 Procedure and Task

Two students were paired in each session, and the sessions were held classified into:

- American – American: where both participants were Americans and could be of the same gender or mixed.
- Chinese – Chinese: where both participants were Chinese and could be of the same gender or mixed.
- America – Chinese: where one participant was an American and the other was a Chinese, and could be of the same gender or mixed.

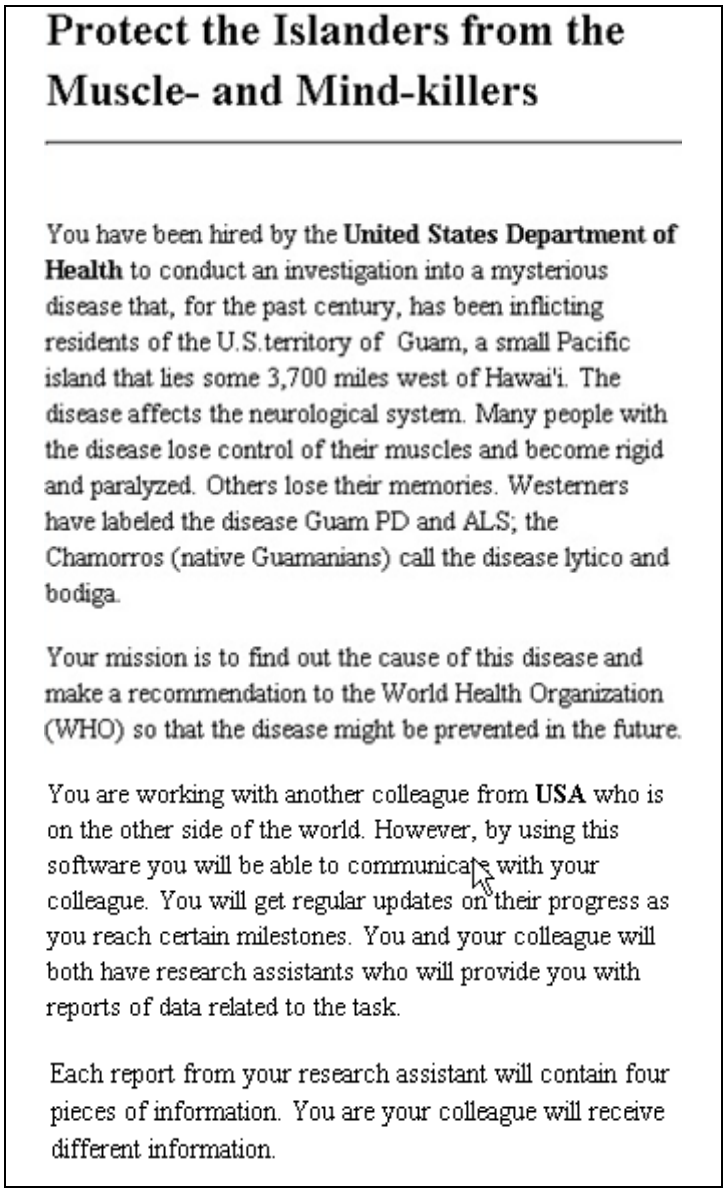
A total of thirty six experimental sessions were conducted involving sixty six participants. However, only thirty three sessions were utilized as six pilot studies were excluded, and three sessions were discarded due to a software crash, missing screen recording and disqualification.

The entire experimental session including filling of the survey forms, software demonstration, actual study (including essay writing) and questionnaire lasted about three and half hours on average. Since this analytical paper focuses on the collaborative knowledge map construction between the participants and individual essay writing, each relevant sessions spanned between 1.5 – 2.5 hours. .

The following briefly explains the study presented to the participants:

The participants were required to solve a science problem which requires each pair of participants to collaboratively work on the problem by sharing information via the computer supported collaborative learning environment and identify the cause of a disease known as Amyotrophic Lateral Sclerosis-Parkinsonism/Dementia (ALS-PD). ALS-PD is a widespread disease on the island of Guam and has been under investigation for over 60 years as it shares symptoms

Participant 1 & 2 were presented with the following identical set of instructions which was displayed in the material section in the software environment:



Protect the Islanders from the Muscle- and Mind-killers

You have been hired by the **United States Department of Health** to conduct an investigation into a mysterious disease that, for the past century, has been inflicting residents of the U.S.territory of Guam, a small Pacific island that lies some 3,700 miles west of Hawai'i. The disease affects the neurological system. Many people with the disease lose control of their muscles and become rigid and paralyzed. Others lose their memories. Westerners have labeled the disease Guam PD and ALS; the Chamorros (native Guamanians) call the disease lytico and bodiga.

Your mission is to find out the cause of this disease and make a recommendation to the World Health Organization (WHO) so that the disease might be prevented in the future.

You are working with another colleague from **USA** who is on the other side of the world. However, by using this software you will be able to communicate with your colleague. You will get regular updates on their progress as you reach certain milestones. You and your colleague will both have research assistants who will provide you with reports of data related to the task.

Each report from your research assistant will contain four pieces of information. You are your colleague will receive different information.

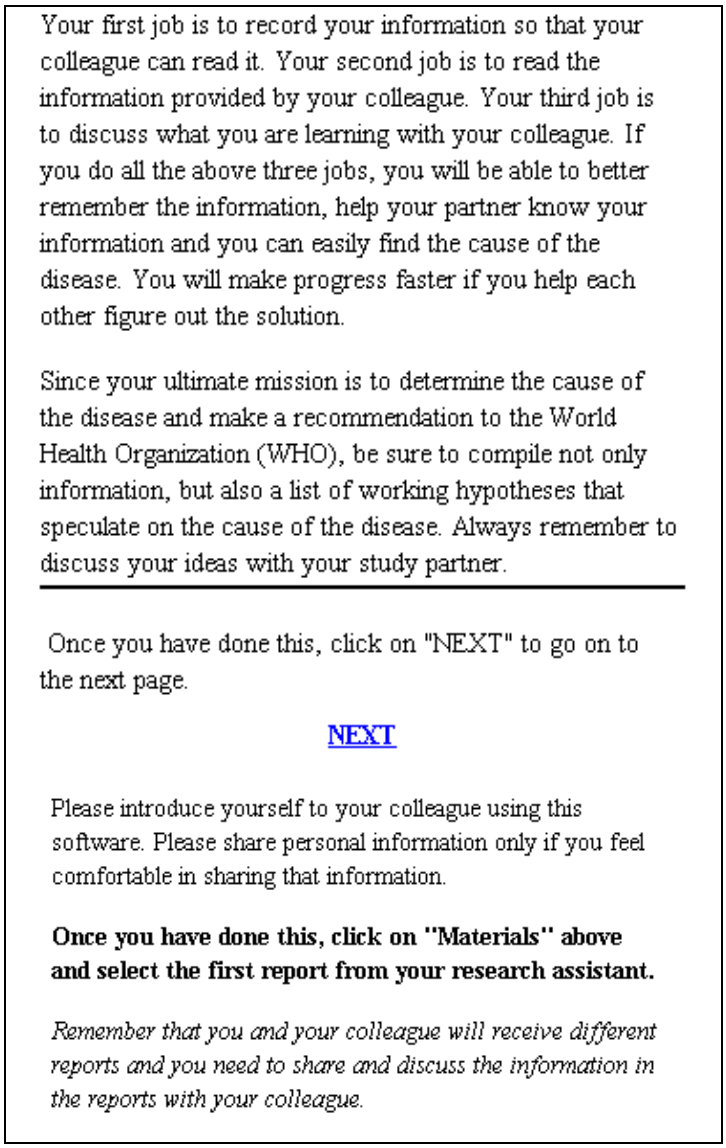


Figure 4: Task Instruction

3.6 Methodology for Data Analysis

Obtained data set was bifurcated into two analytical methods:

1. Interactional Analysis using Marker Analysis
2. Micro Genetic Analysis using Contingency Graphs

These two analytical methods in unison with their respective findings would be discussed in Chapter 4.

Chapter 4: Data Analysis & Results

The Data analysis was carried out in two parts in order encapsulate the nuances from two sessions; collaborative construction of knowledge maps with the partner followed by the essay writing session which was carried out individually.

4.1 Interactional Analysis using Marker Analysis

Data set was obtained from a previous study carried out by Dr.Ravi K.Vatrapu. Session one of the experiment consisted of participants who were randomly assigned to either the intra-or the inter-cultural profiles and the same or different gender dyads as discussed in the methodology section. Experimental studies consisted of a total of 33 sessions which involved 66 participants.

4.1.1 Method

Each of the 66 participants was stringently analyzed through *Marker Analysis*, and the primary motivation to carry out the market analysis was to identify any socio-technical affordances in computer supported collaborative learning. Coding and counting the markers were done using software aid. The counters were both alphabetically and color coded.

Figure 5: Video timeline with color coded markers

Figure 5 illustrates a screen shot of the colour coded markers, followed by the explanation of each marker below.

Data

Data Creation (C)	This marker was placed each time a participant created a new Data node in the information organizer workspace.
Data Writing (F)	This marker was placed each time a participant wrote text into the Data node. This could be either by writing into a new Data node or an

	existing node. Data writing also includes writing in a Data node created by the partner. Data writing does not include any Copy+Paste into the Data node.
Data Access (D)	This marker was placed each time a participant clicker or hovered over to view a Data node. The Data node could be either participants own Data node or partners Data node.

Table 4: Explanation of Data markers

Hypothesis

Hypothesis Access (H)	This marker was placed each time a participant clicker or hovered over to view a Hypothesis node. The Hypothesis node could be either participants own Hypothesis node or partners Hypothesis node.
Hypothesis Writing (I)	This marker was placed each time a participant wrote text into the Hypothesis node. This could be either by writing into a new Hypothesis node or an existing node. Hypothesis writing also includes writing in a Hypothesis node created by the partner.
Hypothesis Creation (J)	This marker was placed each time a participant created a new Hypothesis node in the information organizer workspace.

Table 5:Explanation of Hypothesis markers

Notes

Notes Writing (K)	This marker was placed each time a participant wrote text into the Notes node. This could be either by writing into a new Hypothesis node or an existing node. Hypothesis writing also includes writing in a Hypothesis node created by the partner.
Notes Creation (L)	This marker was placed each time a participant created a new Notes node in the information organizer workspace.
Notes Access (N)	This marker was placed each time a participant clicker or hovered over

	to view a Hypothesis node. The Hypothesis node could be either participants own Hypothesis node or partners Hypothesis node.

Table 6: Explanation of Notes markers

Unspecified Node

Unspecified Node Access (U)	This marker was placed each time a participant clicker or hovered over to view an Unspecified node. The Unspecified node could be either participants own Unspecified node or partners Unspecified node.
Unspecified Node Creation (V)	This marker was placed each time a participant created a new unspecified node in the information organizer workspace.
Unspecified Node Writing (Y)	This marker was placed each time a participant wrote text into the Unspecified node. This could be either by writing into a new Unspecified node or an existing node. Unspecified writing also includes writing in an Unspecified node created by the partner.

Table 7: Explanation of Unspecified Node markers

Threaded Discussion

Threaded Discussion Writing (Q)	This marker was placed each time a participant wrote text into the Threaded Discussion. This could be either by writing into a new Threaded Discussion or an existing node. Threaded Discussion writing also includes writing in a Threaded Discussion created by the partner.
Threaded Discussion Reply (R)	This marker was placed each time a participant created a new Threaded Discussion or initiated a reply to a threaded discussion created by a partner.
Threaded Discussion Access (T)	This marker was placed each time a participant clicker or hovered over to view a Threaded Discussion. The Threaded Discussion could be either participant's own Threaded Discussion or partners Threaded Discussion.

Table 8: Explanation of Threaded Discussion node markers

General

Refresh (A)	This marker was attributed each time a participant clicks on the *Refresh* button in workspace to obtain information/updates from his partner at any time.
Node Organizing (B)	This marker was attributed each time a participants arranges nodes by dragging and repositioning the nodes within the information organizer workspace either during knowledge map creation or essay writing.
Graph Navigation (G)	This marker was placed each time a participant scrolled horizontally or vertically using the scroll bar to view different nodes, or scroll without intent.
Material Access (M)	This marker was placed each time a participant viewed reports or scrolled through the Material section in the software environment.
Node Deleting (O)	This marker was placed each time a participant deleted any node. This could be either when the participant deletes their own node or partner's node.
Copy+Paste (P)	This marker was placed each time a participant copy+pasted data from Material section, Threaded Discussion, Notes, Data Nodes, Unspecified Node or Hypothesis node into each other.
Tetris (Z)	This marker was attributed each time a participant clicks on the *Play Game* button to play a game of Tetris™, a participant can obtain new material updates (4 reports) only by playing the game.

Table 9: Explanation of General node markers

4.1.2 Tools

The tools utilized to carry out the marker analysis consisted of:

- Morae™ Manager

- Sony 4K TV courtesy of the CSSL at the ITM Department, Copenhagen Business School.

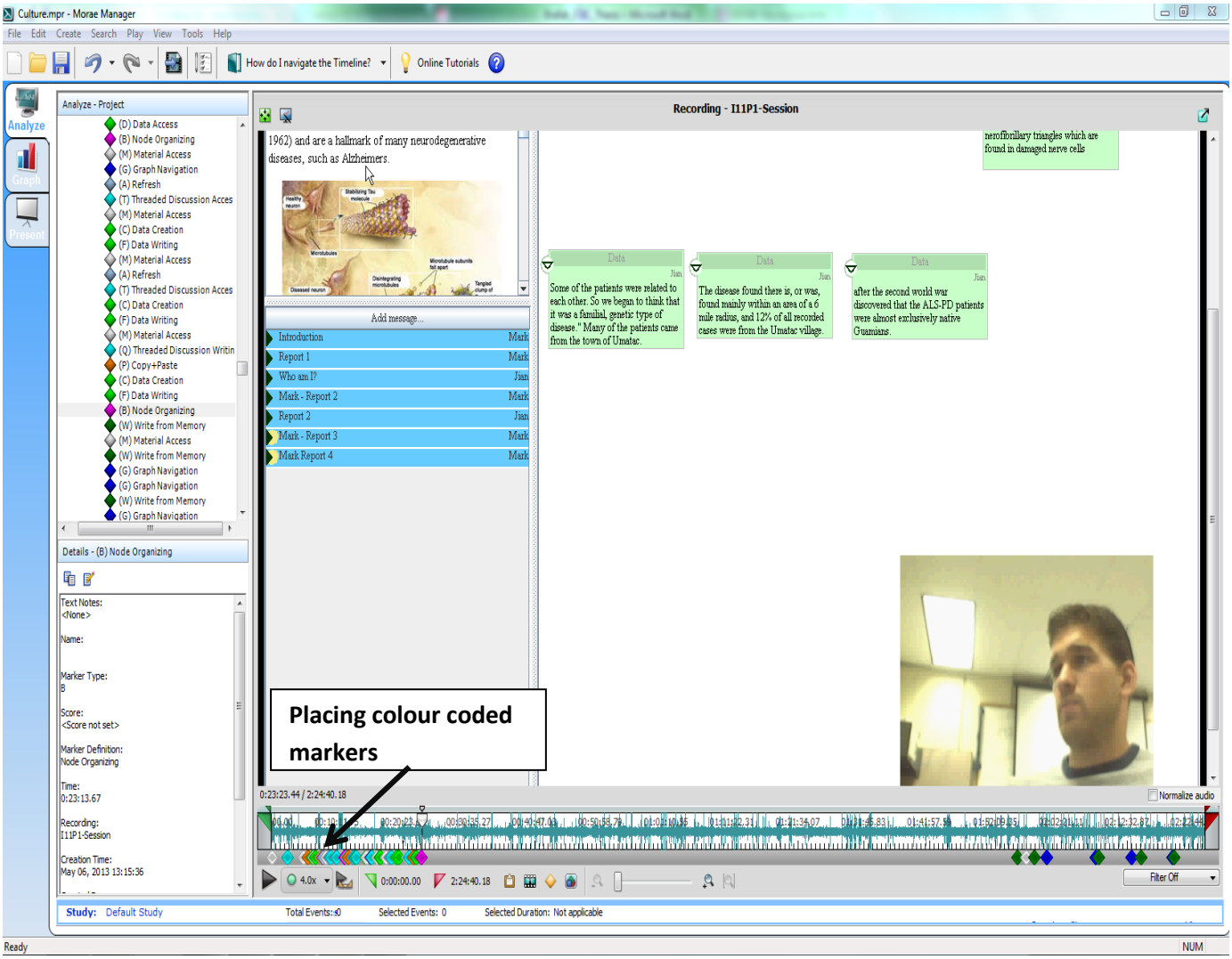


Figure 6: Screen shot from Morae™ used to carry out marker analysis on I11P1 session.

4.1.3 Findings

Upon completion of the marker analysis, key findings were categorized into the following groups.

- **Culture** – American vs. China
- **Gender** – Male vs. Female
- **Inter vs. Intra** – AA vs. CC vs. AC

4.1.3.1 Culture

General Nodes

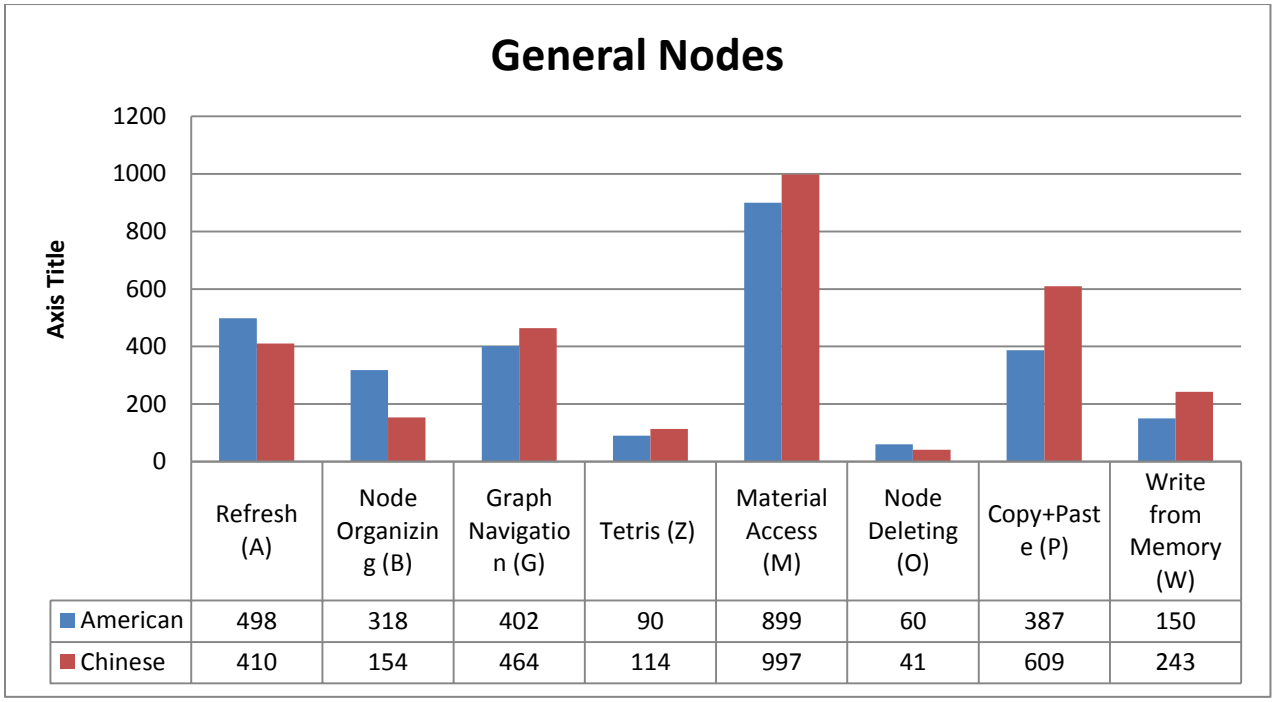


Figure 7: General Nodes counters between American and Chinese

Refresh

Marker analysis on number of times refresh button was clicked by both cultural groups revealed that American participants clicked 17.7% more than Chinese participants.

Node Organizing

Marker analysis on number of times participants arranged nodes by both cultural groups revealed that American participants organized 51.6% more than Chinese participants.

Graph Navigation

Marker analysis on number of graph navigations by both cultural groups revealed that Chinese participants navigated 15.4% more than American participants.

Tetris™

Marker analysis on number of times Tetris™ was played by both cultural groups revealed that Chinese participants arranged 26.7% more than American participants.

Material Access

Marker analysis on number of times participants accessed material section by both cultural groups revealed that Chinese participants accessed 10.9% more than American participants.

Nodes Deleting

Marker analysis on number of times participants deleted nodes by both cultural groups revealed that American participants deleted 31.7% more than Chinese participants.

Copy+Paste

Marker analysis on number of times participants used copy+paste by both cultural groups revealed that Chinese participants copied 57.4% more than American participants.

Write from Memory

Marker analysis on number of times participants wrote from their memories by both cultural groups revealed that Chinese participants wrote 62% more than American participants. Since the marker analysis was carried out on the whole study, it would be interesting to focus on each segment such as knowledge construction phase versus essay writing.

Data Nodes

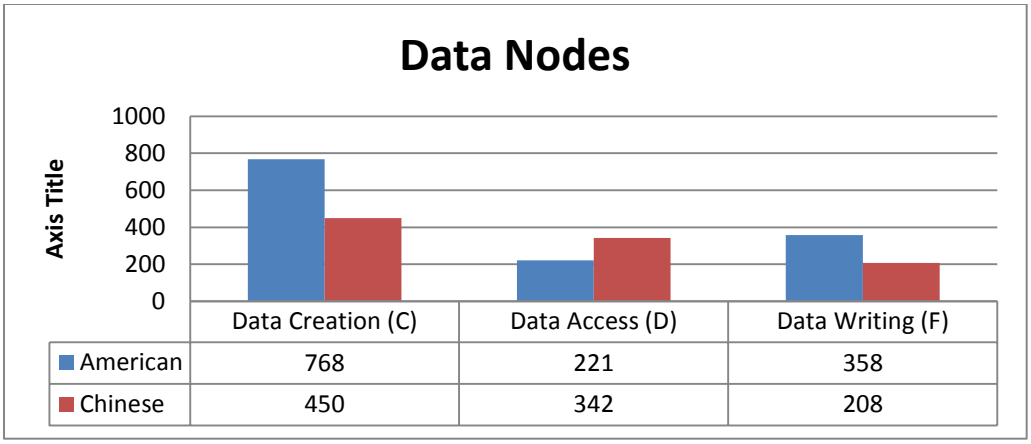


Figure 8: Data nodes counters between American and Chinese

Data Writing

Marker analysis on number of Data nodes written by both cultural groups revealed that American participants wrote 41.9% more than Chinese participants.

Data Creation

Marker analysis on number of Data nodes created by both cultural groups revealed that American participants created 41.4% more than Chinese participants.

Data Access

Marker analysis on number of times Data nodes were accessed by both cultural groups revealed that Chinese participants accessed 54.8% more than American participants.

Hypothesis Nodes

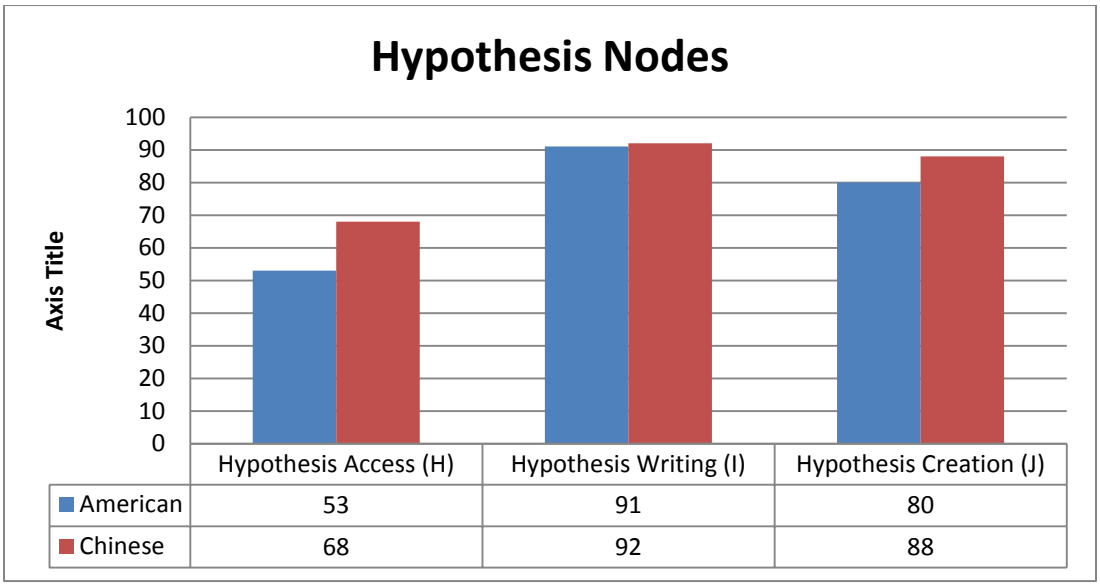


Figure 9:Hypothesis node counters between American and Chinese

Hypothesis Writing

Marker analysis on number of times participants wrote in a Hypothesis node by both cultural groups revealed that Chinese participants wrote 1.1% more than American participants. No significance noted.

Hypothesis Creation

Marker analysis on number of times participants created a Hypothesis node by both cultural groups revealed that Chinese participants wrote 10% more than American participants.

Hypothesis Access

Marker analysis on number of times participants accessed Hypothesis nodes by both cultural groups revealed that Chinese participants accessed 28.3% more than American participants.

Notes Nodes

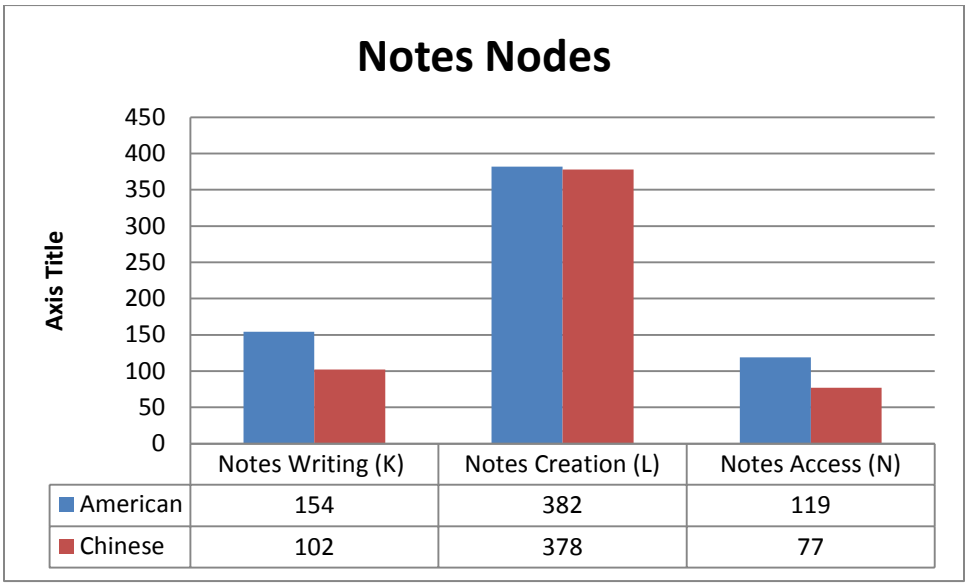


Figure 10: Notes nodes counters between American and Chinese

Notes Creation

Marker analysis on number of times participants created a Notes Node by both cultural groups revealed that American participants wrote 1.0% more than American participants. No significance noted.

Notes Writing

Marker analysis on number of times participants wrote in a notes node by both cultural groups revealed that American participants wrote 33.8% more than Chinese participants.

Notes Access

Marker analysis on number of times participants accessed notes node by both cultural groups revealed that American participants accessed 35.3% more than Chinese participants.

Threaded Discussion Nodes

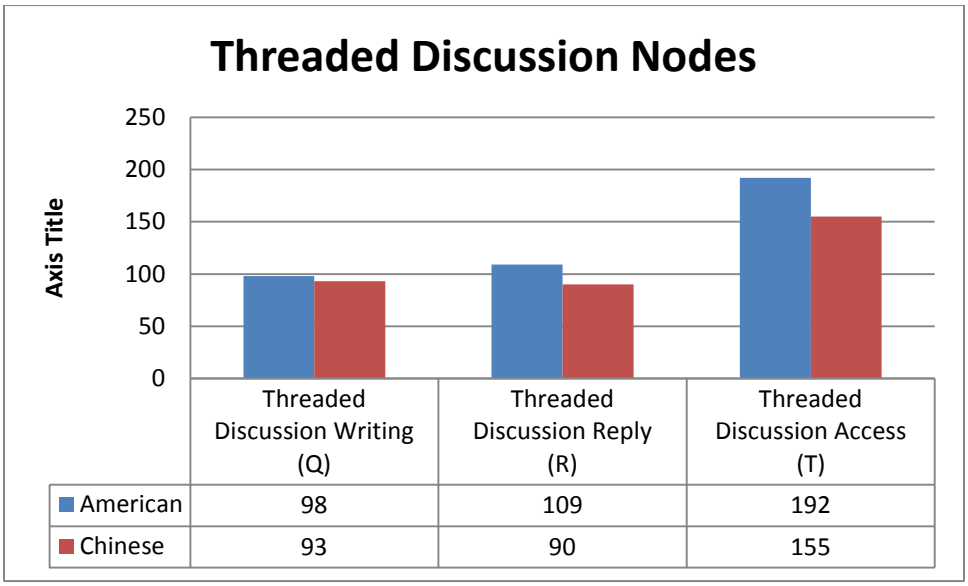


Figure 11: Threaded discussion nodes counters between American and Chinese

Threaded Discussion Writing

Marker analysis on number of times participants wrote in a threaded discussion by both cultural groups revealed that American participants wrote 5.1% more than Chinese participants.

Threaded Discussion Reply

Marker analysis on number of times responded a threaded discussion in both cultural groups revealed that American participants responded 17.4% more than Chinese participants.

Threaded Discussion Access

Marker analysis on number of times threaded discussion nodes accessed by both cultural groups revealed that American participants accessed 19.3% more than Chinese participants.

Unspecified Nodes

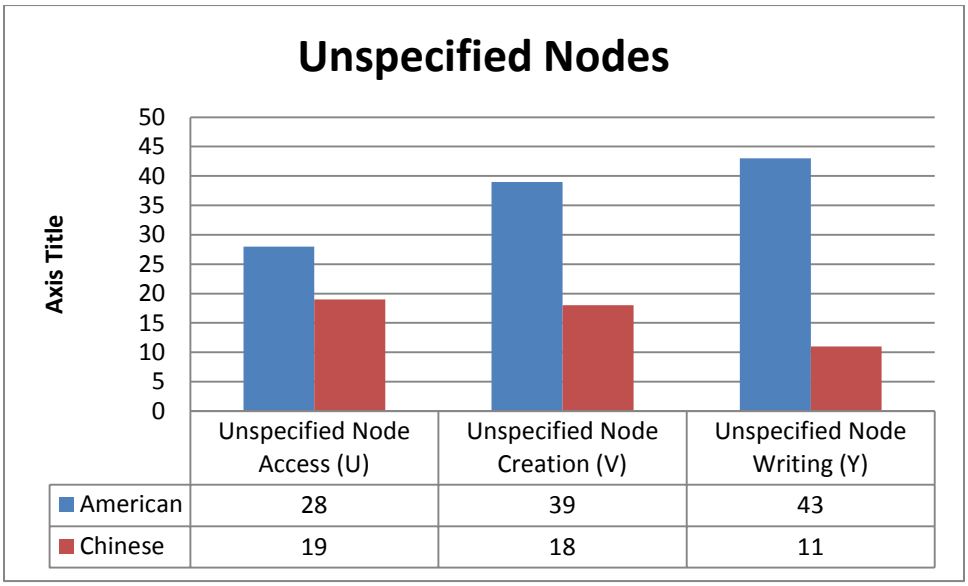


Figure 12: Unspecified Nodes counters between American and Chinese

Unspecified Node Access

Marker analysis on number of times unspecified nodes were accessed by both cultural groups revealed that American participants accessed 32.1% more than Chinese participants.

Unspecified Node Creation

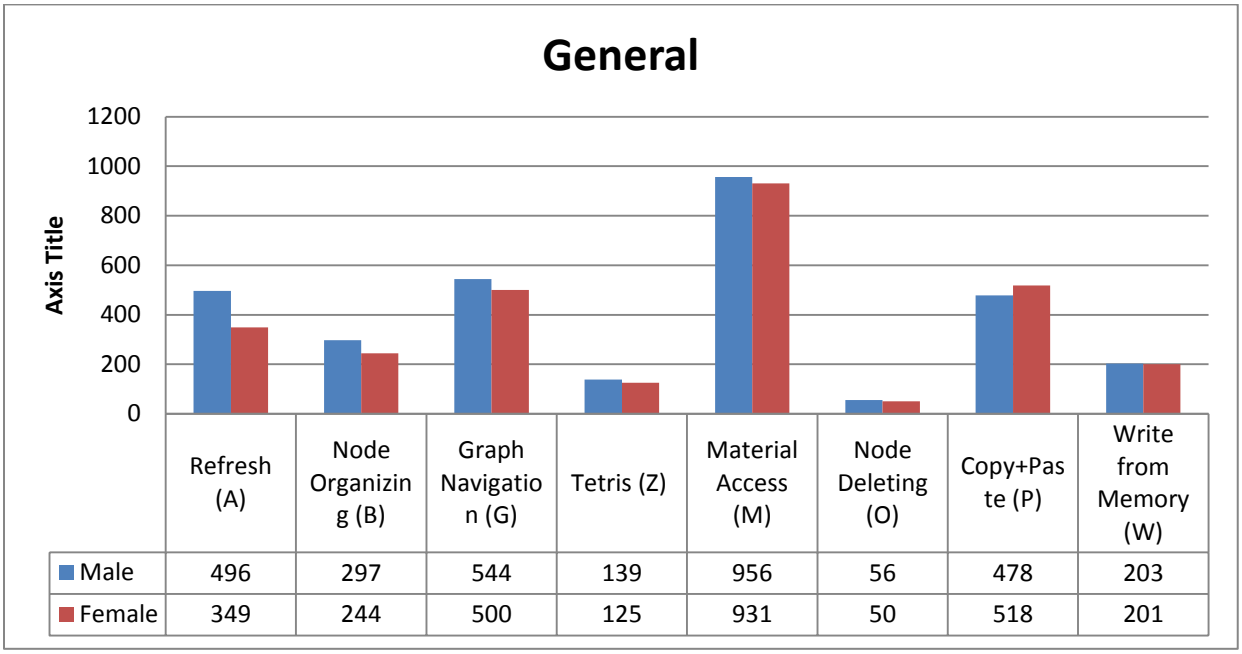
Marker analysis on number of times unspecified nodes were created by both cultural groups revealed that American participants wrote 53.8% more than Chinese participants.

Unspecified Node Writing

Marker analysis on number of times unspecified nodes were written by both cultural groups revealed that American participants wrote 74.4% more than Chinese participants.

4.3.1.2 Male / Female

General



	Refresh (A)	Node Organizing (B)	Graph Navigation (G)	Tetris (Z)	Material Access (M)	Node Deleting (O)	Copy+Paste (P)	Write from Memory (W)
Male	496	297	544	139	956	56	478	203
Female	349	244	500	125	931	50	518	201

Figure 13: General Nodes counters between Males and Females

Refresh

Marker analysis on *Refresh* clicks between the genders revealed that males have refresh 29.6% more than females.

Node Organizing

Marker analysis on Node organizing between the genders revealed that males click refresh 29.6% more than females.

Graph Navigation

Marker analysis on number of times both genders navigated their graphs revealed that males navigated 8.1% Data nodes more than females.

Material Access

Marker analysis on number of times material section was accessed by both genders revealed that males accessed 2.6% times more than females.

Node Deleting

Marker analysis on number of times nodes were deleted by both genders revealed that males deleted 10.7% times more than females.

Copy+Paste

Marker analysis on number of times copy+paste was done by both genders revealed that females copy+paste 8.4% times more than males.

Write from Memory

Marker analysis on number of times each gender wrote a node or essay section off their memories revealed males wrote 1% more than females. No significance in this finding.

Tetris

Marker analysis on number of times Tetris™ was played by both genders revealed that males played 10.1% times more than females.

Date Nodes

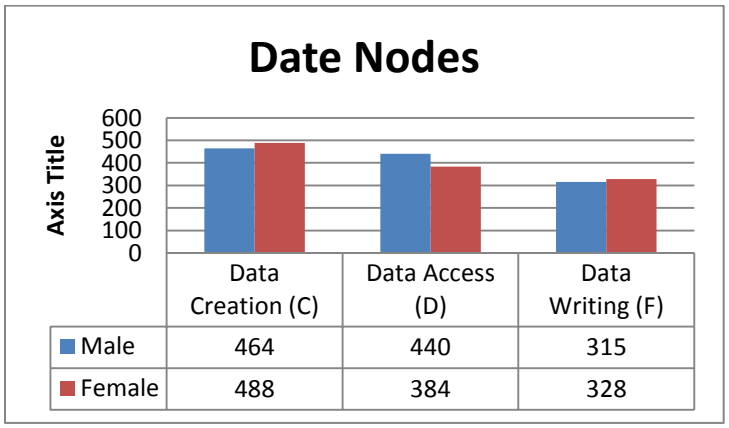


Figure 14: Date nodes counters between Male and Females

Data Creation

Marker analysis on number of Data nodes by both genders revealed that females create 5.2% Data nodes more than males.

Data Access

Marker analysis on number of times Data nodes were accessed by both genders revealed that males create 12.7% Data nodes more than males.

Data Writing

Marker analysis on number of times Data nodes were accessed to write by both genders revealed that females wrote 4.1% times more than males.

Hypothesis Nodes

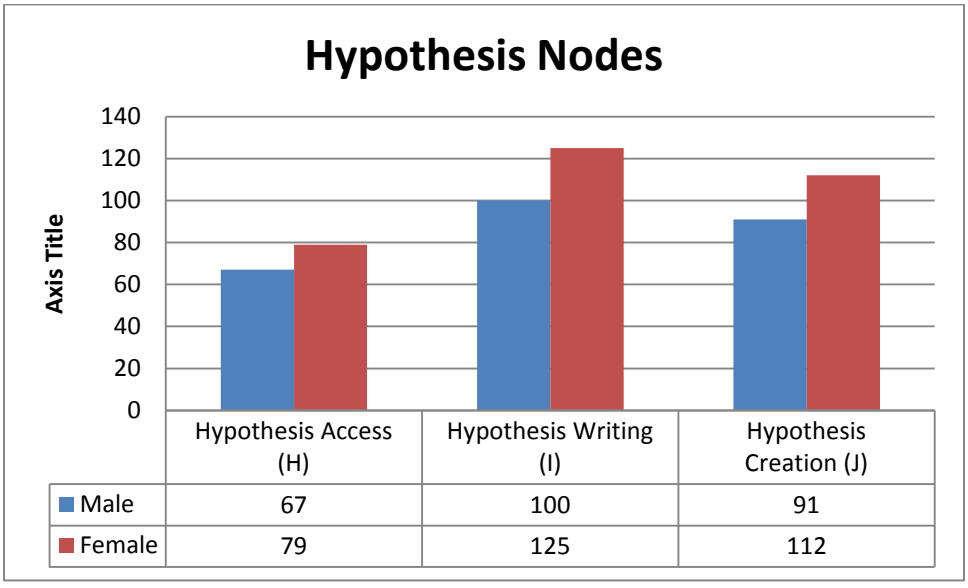


Figure 15: Hypothesis nodes counters between males and females

Hypothesis Access

Marker analysis on number of times Hypothesis nodes were accessed by both genders revealed that females accessed 17.1% times more than males.

Hypothesis Writing

Marker analysis on number of times hypothesis nodes were accessed by both genders revealed that females accessed 17.9% more than males.

Hypothesis Creation

Marker analysis on number of Hypothesis created nodes by both genders revealed that females created 23.1% more Hypothesis nodes than males.

Notes Nodes

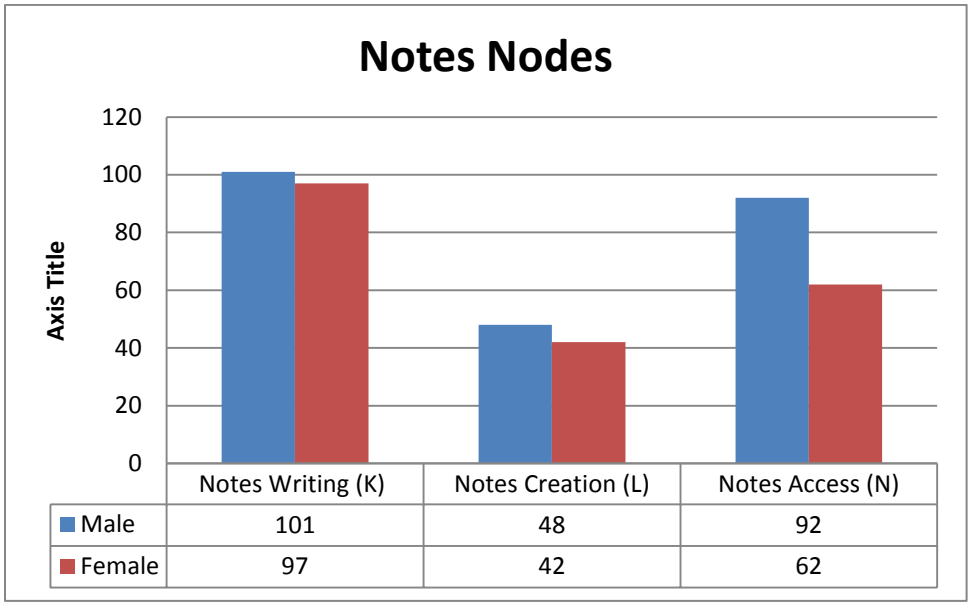


Figure 16: Notes nodes counters between males and females

Notes Writing

Marker analysis on number of Note writings by both genders revealed that males write 4.0% more than females.

Notes Creation

Marker analysis on number of notes created by both genders revealed that males create 12.5% more than females.

Notes Access

Marker analysis on number of times notes section was accessed by both genders revealed that males accessed 2.6% times more than females.

Threaded Discussion Nodes

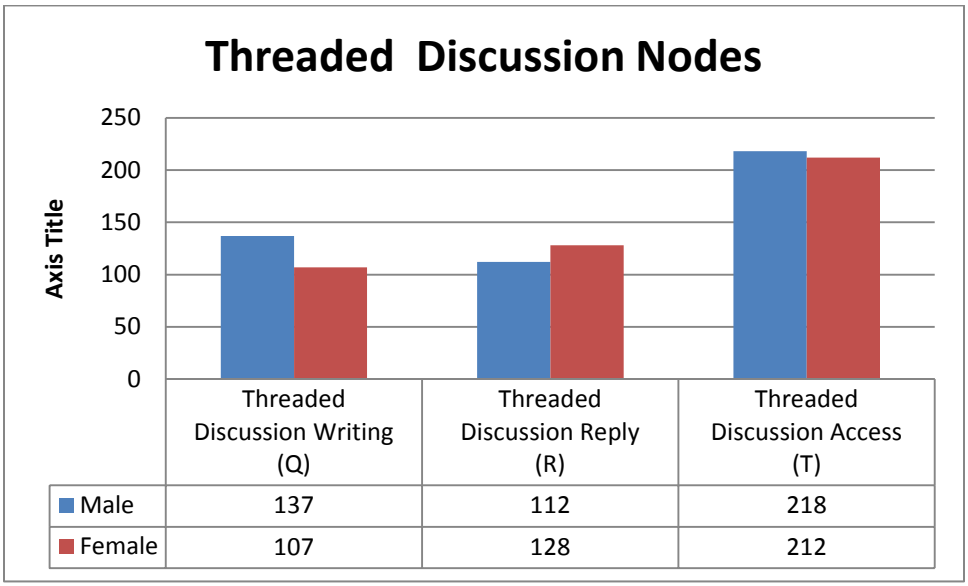


Figure 17: Threaded discussion nodes counters between Males and Females

Threaded Discussion Writing

Marker analysis on number of threaded discussion was initiated by both genders revealed that males initiated 21.9% times more than females.

Threaded Discussion Reply

Marker analysis on number of threaded discussion responses by both genders revealed that females responded 14.3% times more than males.

Threaded Discussion Access

Marker analysis on number of times material section was accessed by both genders revealed that males accessed 2.6% times more than females.

Unspecified Node Nodes

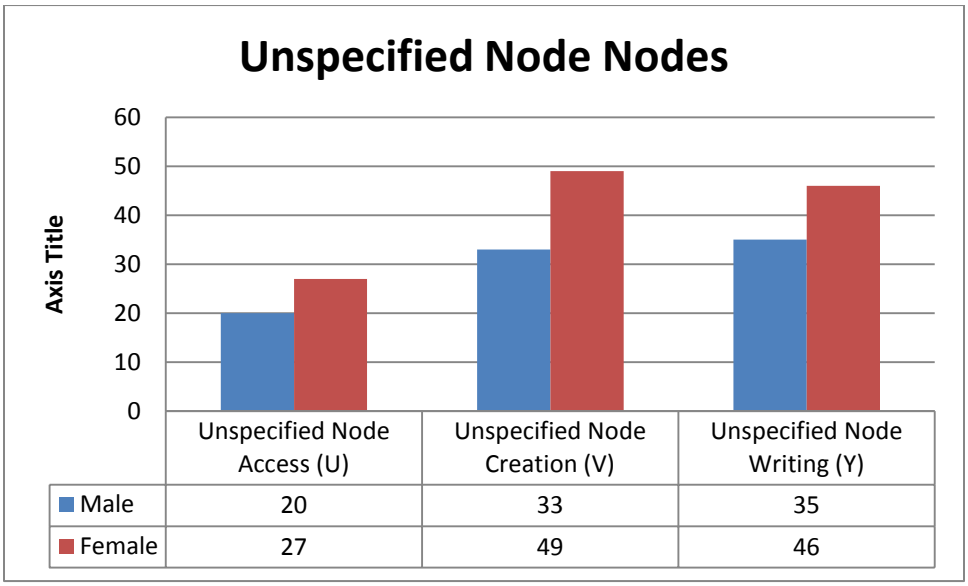


Figure 18: Unspecified Nodes counters between Males and Females

Unspecified Node Access

Marker analysis on number of times Unspecified nodes were accessed by both genders revealed that females accessed 35% times more than males.

Unspecified Node Creation

Marker analysis on number Unspecified Nodes created by both genders revealed that females created 48.5% times more Unspecified nodes than males.

Unspecified Node Writing

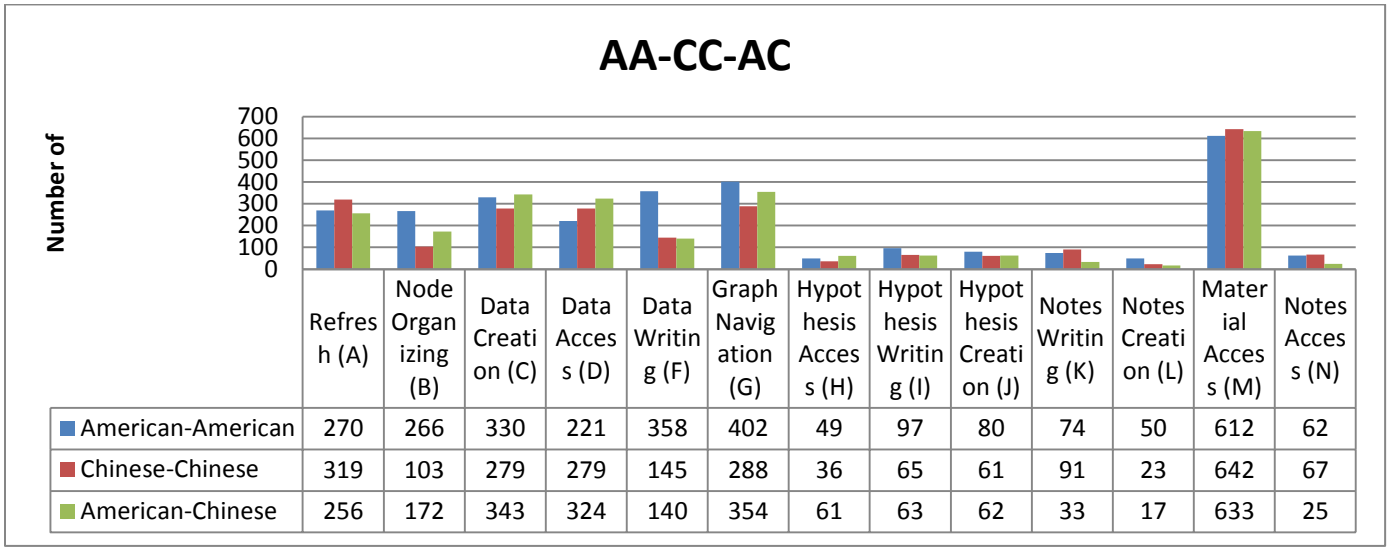
Marker analysis on number of times Unspecified Nodes were written (question or a reply) by both genders revealed that females wrote 31.4% times more than males.

4.3.1.3 American-American/ Chinese-Chinese/ American-Chinese

Eyeballing through the results and re-analyzing the videos, it was concluded that no analysis would be carried on American-American/Chinese-Chinese-American Chinese dyads comparison side by side. It was deemed that a sophisticated and a much time consuming analytical method

is required to capture cultural nuances and their influences in this computer supported collaborative exercise, especially within American-Chinese sessions.

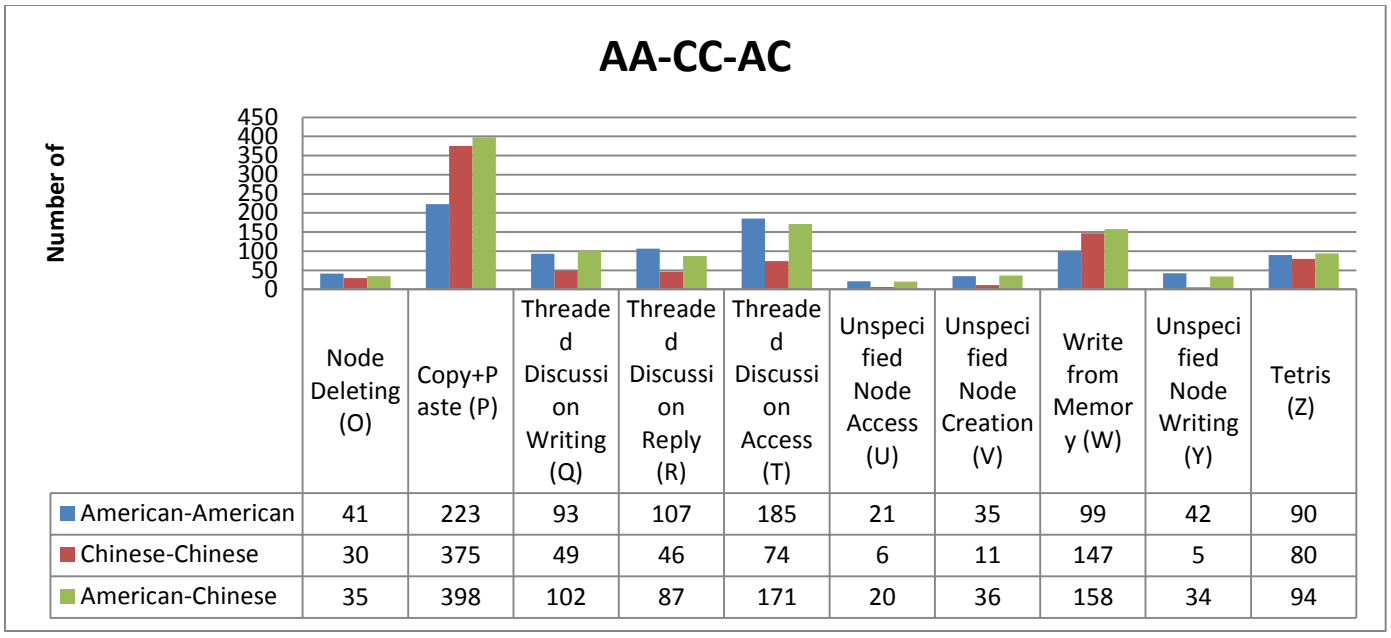
Section 1



	Refresh (A)	Node Organizing (B)	Data Creation (C)	Data Access (D)	Data Writing (F)	Graph Navigation (G)	Hypothesis Access (H)	Hypothesis Writing (I)	Hypothesis Creation (J)	Notes Writing (K)	Notes Creation (L)	Material Access (M)	Notes Access (N)
American-American	270	266	330	221	358	402	49	97	80	74	50	612	62
Chinese-Chinese	319	103	279	279	145	288	36	65	61	91	23	642	67
American-Chinese	256	172	343	324	140	354	61	63	62	33	17	633	25

Figure 19: List of nodes and counters for American-American, Chinese-Chinese & American-Chinese

Section 2



	Node Deleting (O)	Copy+Paste (P)	Threaded Discussion Writing (Q)	Threaded Discussion Reply (R)	Threaded Discussion Access (T)	Unspecified Node Access (U)	Unspecified Node Creation (V)	Write from Memory (W)	Unspecified Node Writing (Y)	Tetris (Z)
American-American	41	223	93	107	185	21	35	99	42	90
Chinese-Chinese	30	375	49	46	74	6	11	147	5	80
American-Chinese	35	398	102	87	171	20	36	158	34	94

Figure 20: List 2 of nodes and counters for American-American, Chinese-Chinese & American-Chinese

4.2 Micro Genetic Analysis using Contingency Graphs

Data analysis above through marker analysis was undertaken by coding and counting, and marker analysis solely was not able to directly analyze the accomplishments in intersubjectivity learning (Stahl et al, 2006). Hence, Micro genetic analysis was carried out to examine the video recordings in great detail.

4.2.1 Method

Since the data set contained videos and transcripts of the participants, an ethno methodological tradition deemed more suitable for descriptive case analysis which aid in uncovering methods by which groups of participants accomplishments learning tradition (Koschmann et al., 2006; Koschmann et al., 2003; Stahl, 2006).

One session was randomly selected from each of the three dyads and contingency graphs were constructed for each session. The analysis adapts the *Uptake Analysis Framework* developed by Suthers et. al, 2009 where the framework is layered to make certain distinctions in analytic practice explicit (cite). The following sessions are selected:

A6 (American Female, American Female)

C10 (Chinese Male, Chinese Male)

I4 (American Female, Chinese Female)

4.2.2 Tools

The tools utilized to carry out micro genetic analysis of the obtained data were

- Microsoft Visio™ - Create the Contingency Graphs.

- Morae™ Manager and Sony 4K TV courtesy of the CSSL at the ITM Department, Copenhagen Business School.

4.2.3 Findings

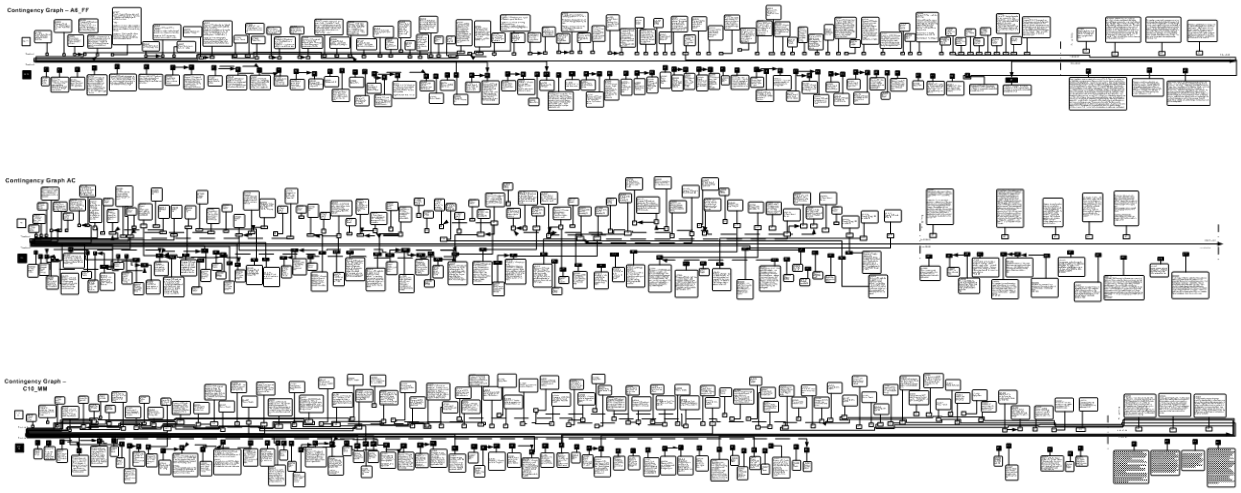


Figure 21: Complete uptake analysis mapping of 3 randomly drawn sessions.

Due to the length of the contingency graphs, the link of these graphs can be found below in the footnotes [1]

4.2.3.1 Introductory Phase

One way in which people suggest whether they are individualist or collectivist is in how they introduce themselves (Storti, 2011). Below are fragments from the contingency graph exemplifying how each participant/dyad introduced themselves.

It is noteworthy to be aware that participants were not coerced nor given rules on how they should introduce themselves. They only instruction pertaining to introduction was as follows:

"Please introduce yourself to your colleague using this software. Please share personal information only if you feel comfortable in sharing that information".

[1] https://www.dropbox.com/s/6pgyrmftc2ztzcs/ContigencyGraph_Shafak.vsd

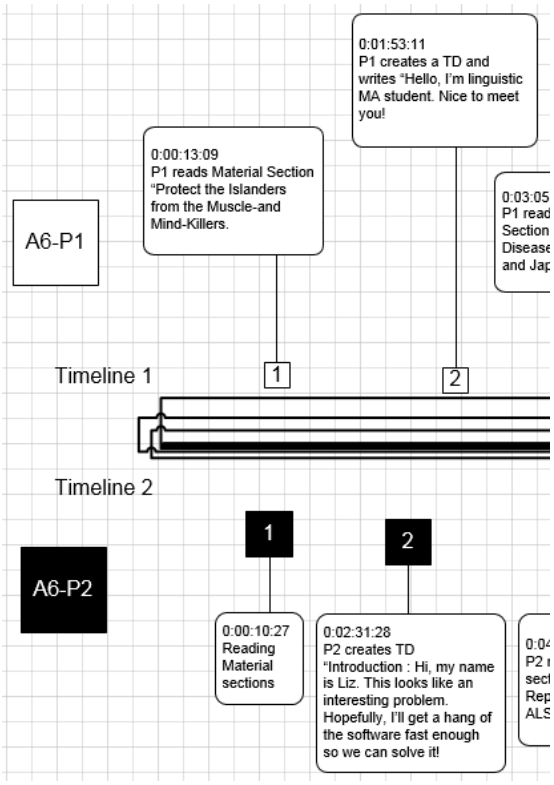


Figure 22: Section of A6P1 and A6P2 Introduction

Figure 22 is a fragment from the contingency graph constructed for A6 session where both the participants were Americans. Participants in session A6 introduced themselves where A6P1 writes *"I'm a linguistic MA student, nice to meet you"*, she did not write here name. On the other hand, participant A6P2 wrote *"Hi, my name is Liz. This looks like an interesting problem. Hopefully, I'll get a hang of the software fast enough so we can solve it!"*

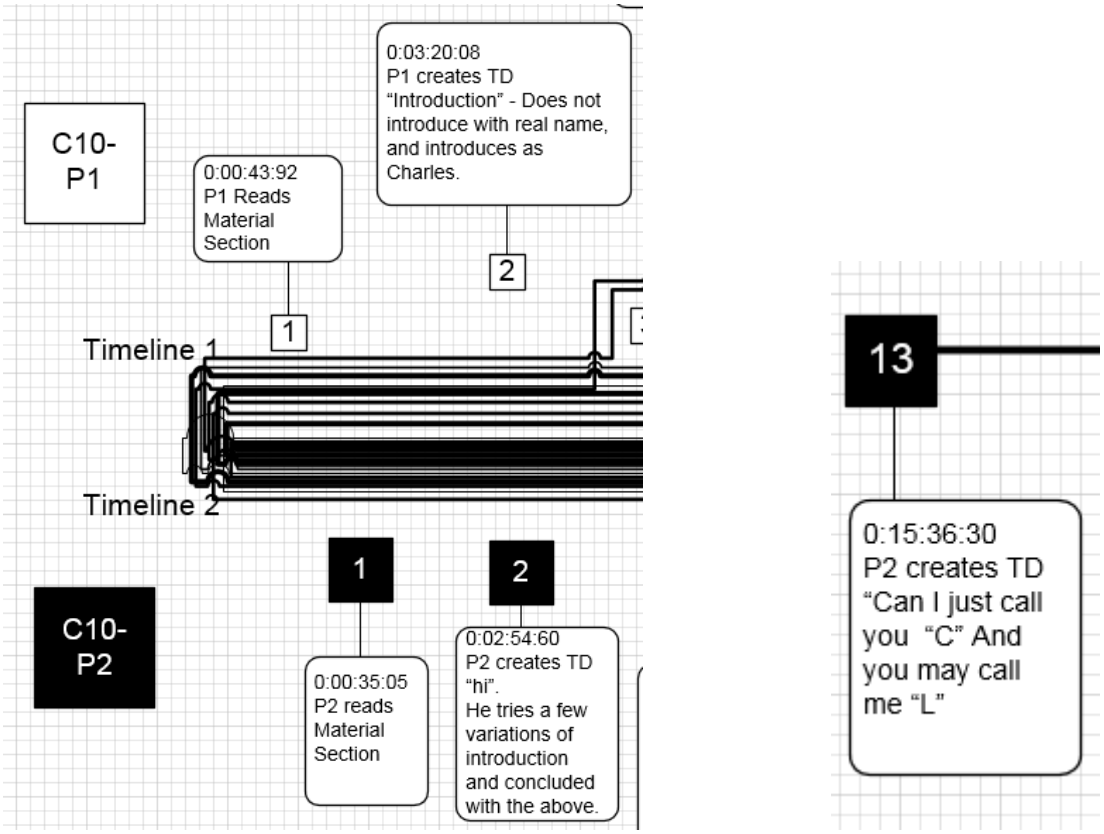


Figure 23: Section of C10P1 and C10P2 Introduction

Fig 23 is a fragment from the contingency graph constructed for C10 session where both the participants were Chinese. Participants in session C10 introduced themselves where C10P1 writes "*hello, this is charles*". On the other hand, C10P2 firstly writes "*hi, you buster:)"*, "*hi, can I call you"* and he finally writies "hi". Around the 15.36 minute mark, C10P2 writes "*Can I just call you "C" And you may call me "L"".*

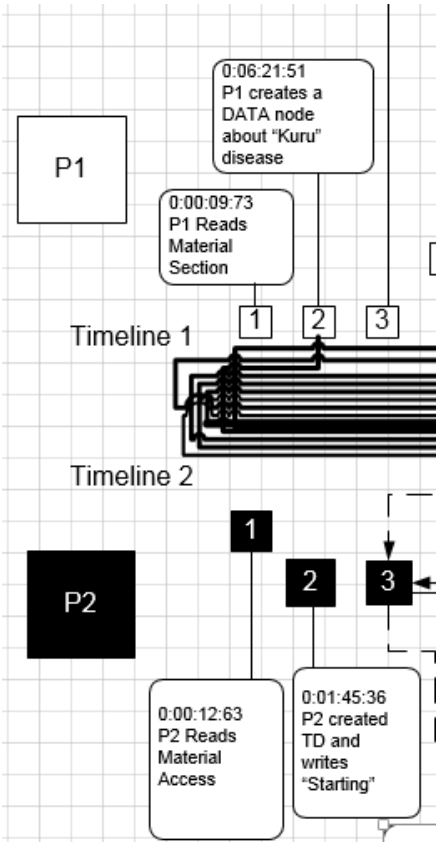


Figure 24: Section of P1 and P2 Introduction

Fig 24 is a fragment from the contingency graph constructed for I4 session where Participant 1 (P1) was a Chinese female and Participant 2 (P2) was an American female. Interestingly, neither of the participants wrote an introduction of themselves at any given point during their collaboration to construct the knowledge maps.

4.2.3.2 Report 1,2,3,4

Perusing through the four reports, there were no noteworthy events amongst the three chosen dyads although the number of references, writing and refreshes differed, they were not deemed to be significant or unique to a particular culture.

4.2.3.3 Essay Writing Phase

Each essay writing phase lasted about thirty minutes on average. The quality of essay writing is not measured since the quality of the essay is linked to the cognitive ability is attributed and unique to each individual and cannot be linked to a specific cultural dyad as a whole.

Chapter 5: Discussion, Implications and Conclusion

5.1 Discussion

The rule of 10s is considered when determining the findings obtained from aggregation of the market analysis. If the analysis shows any statistical or theoretical significance, the findings would be explicitly mentioned in relation to the appropriate theory. On the other hand, if there are no statistical or theoretical significance, it would also be noted, and if any reasoning is speculated, it would be clearly mentioned that it is a speculation.

I would like iterate a handful of research hypothesis from Vatrapu and Suthers (2009) in order better facilitate the discussion section driven by my findings in Chapter 4.

5.1.1 Culture

American participants organized 51.6% more than Chinese participants (Node Organization). This cultural difference can be tied to the findings from an experimental study carried out by Masuda and Nesbitt (2001) where the findings revealed that Japanese were more attentive to relationships in the field than Americans whereas on the other hand, Americans were more accustomed to analysis of a focal object in the environment and to orienting the self in relation to the object (Ji & Nisbett). In the CSCL environment used for our analysis, the focal objects can be referred to the different kind of nodes participant's constructed (Data nodes, Hypothesis Nodes and Notes Nodes) and as an example, Threaded Discussion could be considered as relationship aspect in the CSCL.

When these focal objects were investigated, American participants created 41.4% more Data nodes and wrote 41.9% more in Data nodes than Chinese participants. This correlates to the research hypothesis presented by Vatrapu and Suthers (2009) (RH2): A*nglo-American participants will make more individual (self-directed) contributions to the study partner than the Chinese participants.*

However, Chinese participants accessed Data nodes 54.8% times more than Americans which is in line with theoretical claim that East Asians are more field dependents, and should find it more difficult than Americans to isolate and analyze an object while ignoring the field in which

it is embedded (Masuda & Nisbett, 2001; Witkin, Dyk, Faterson, Goodenough, & Karp, 1974). This finding contradicts to Vatrapu and Suthers (2009) research hypothesis (RH3): *Chinese participants will make more collective contributions than Anglo-American participants* since Chinese participants did not contribute (measure in terms of nodes created) and instead, accessed the Data nodes almost twice more than their American counterpart (accessed Data nodes 54.8% times more than Americans), and this could lead way into the reason why Chinese Copy+paste more than Americans, and not due to *Power Distance* which was initially used to hypothesize. Copy+Paste analysis would be taken as a separate discussion topic in this section.

Perusing through the results obtained from the marker analysis on Culture, the following nodes showed no statistical or theoretical significance although percentage differences may seem significant; Refresh Nodes, Graph Navigation, Tetris™, Material Access, All Hypothesis nodes, All Notes Nodes, and Node Deletion. However, a speculation on the results of Nodes Deletion and Copy+Paste node follows.

It is possible to speculate further about salient features of culture in socio-technical interaction and affordances

Node Deletion : Since the American participants are more attentive to the focal object (Masuda & Nisbett, 2001), which in our research refers to the nodes through where participants construct the knowledge maps, their percentage of nodes deletion is 31.7% more than Chinese participants due to more time organizing the nodes (51.6%) more than the Chinese, and hence, American participants may assume power (hint of individualism perhaps) to delete nodes which may seem irrelevant in the process of constructing the knowledge maps.

Copy+Paste : When looking into the market analysis of Copy+Paste, Chinese participants copied 57.4% more than American participants. This finding can be tied to Hofstede's Power Distance Index where China ranks high with a score of 80, and adherence to rules and regulations tend to be flexible. However, aligning the findings to a previous study yielded by Vatrapu(2007), Copy+Paste instances did have a significant count, but failed to have any

statistical significance or a strong theoretical backing although the hypothesis were built upon Hofstede's Power Distance Index as we have attempted above.

Probing into evidence outside the realm of CSCL, a sea of information is gatherable it terms of Chinese and quote and quote *Copying*. For instance, it was reported that five Chinese architects walked around the medieval square of Halstatt, Austria in incognito, snapped photographs and returned to Boluo, China where they build the exact town square in high speed. In addition to copying town layouts, a professor reported to the National Public Radio that about 30% percent of submissions to the Journal of Zheijian University were drawn from heavily plagiarized research (Tatlow, 2012). These instances of copying can be perhaps traced back to historic emphasis on copying where back in the first century, Hsieh Ho, a Chinese figure painter framed six rules for painting, and the last of the six rules is "to convey and change by patterned representation" which can be translated as "transmit by copying" (Museum). Hence, unlike in the West where copying is looked down upon, it is speculated that the Chinese culture embodies these practices in their day to day life. One could speculate that the reason why Chinese participants copy+pasted significantly was because they feel that imitating the original document deemed better than writing on their own.

Although a myriad of instances documented point to Chinese being synonymous with copying, there is no solid theoretical grounding. Hence, there is no strong case to proceed with Copy+Paste as it does not have any significance amidst the two cultural dyads.

5.1.2 Gender and Inter Vs. Intra

Perusing through the results obtained from the marker analysis on Gender, none of the nodes showed any statistical or theoretical significance although percentage differences may seem significant between the two genders.

Despite all these differences, as shown in previous papers, there were no differences in the quality of essay when sifting it through micro genetic analysis.

There are multiple interactional pathways, which makes the CSSL environment provided in the study unique to other environments. Participants could make a verbal argument or create a

link. For instance, 14P1 can say data does not support your hypothesis and could either unlink or delete (which would then exhibit non-verbal argument).

5.1.3 Discussion on Micro-Genetic Analysis

The intent of running a micro genetic analysis was to unearth subtle features which could not been picked up by the marker analysis.

Introduction : There were notetable differences in the way participants introduced themselves but unfortunately, they cannot be deemed to be of any importance. Some participants introduced themselves in detail, some participants did not make any introduction and dived into the task, some participants spent few minutes formulating their introduction and some participants had unique introduction methods. However, these differences were not salient or recurring in each of the three cultural dyads throughout all sessions.

4 Reports : Perusing through the micro genetic analysis carried out on the four reports and how each participant perused through these reports, once again, no salient features were noticed. It was evident in all cultural dyads that report sections were copied and pasted into nodes, and it was difficult to point out towards the Chinese dyad based on Hofstede's Power Distance and other observations on Chinese behavior towards replicating a building structure from Austria(as discussed in analyzing marker analysis). Linguistic capabilities were not tested as these participants have been screened for their English competencies through their official score, and given the fact that all these participants were currently residing in Hawaii, USA for the educational programs.

Essay Writing : Probing into the essay writing section, participants approached this section in various methods. Some participants wrote the whole section off their memory without even having to refer back to the nodes, some participants read back on their nodes whilst writing their essay, some participants copy pasted chunks of nodes into the essay and edited them, and interestingly, one participant in particular accessed the essay files of other participants and pasted them in his notepad file, and ironically, the participant was Chinese. Iterating the hypothesis tested by Vatrapu, and other research pointing out that Chinese participants tend to copy+paste items more often than their American counter part, only a taint

of evidence is available through research, and there is no significant data to back this claim.

5.2 Recommendations

This study has been approached from an academic perspective, and in this section, it will cover the business perspective, and what are the practical implications for global business organizations and how will this study contribute to the business arena.

In order to better facilitate this section; let us take Nano Disk; a leader in diabetes care as a case company to better illustrate the benefits of this study. This is a fictional company and examples are hypothetical; purely for explanatory purpose.

Below is a figure explaining two of the many benefits and their potential contribution to the company.

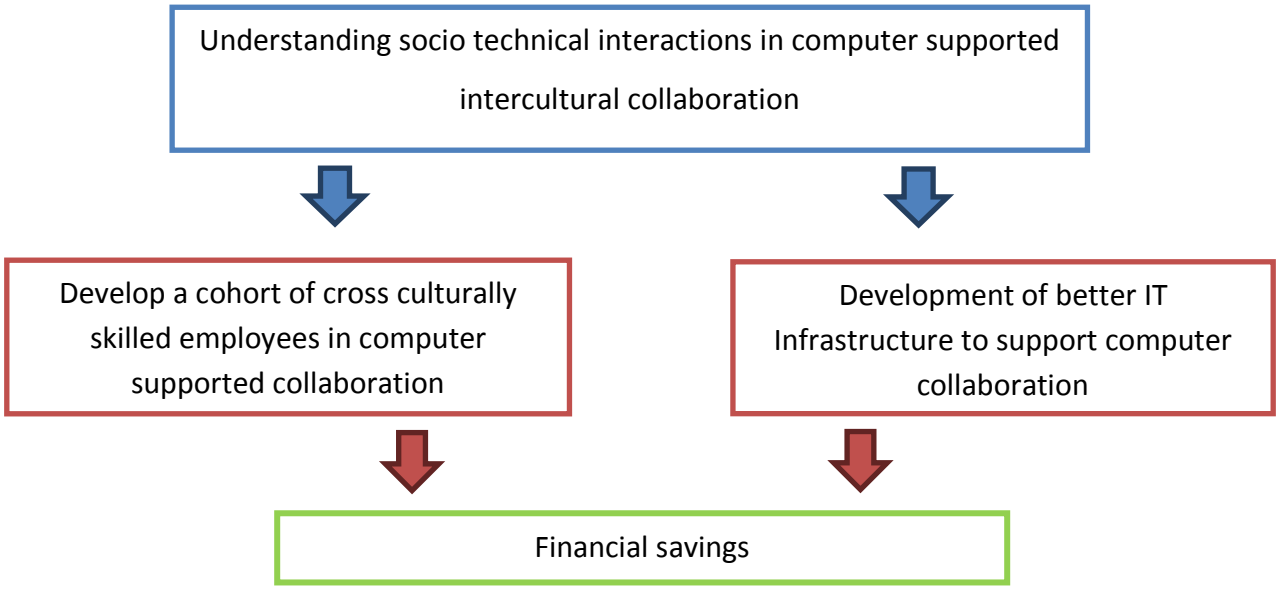


Figure 25: Benefits derived from Understanding socio technical interactions in computer supported intercultural collaborations

Develop a cohort of cross culturally skilled employees : By understanding socio technical interaction profiles, employees gain invaluable skills where they can literally sit in their office cubicle in United States and collaborate with their research counterpart in China and carry out

complex research with the aid of asynchronous computer interface to beat the time and logistical barriers. Let us take the following case to better illustrate this benefit.

Case

An employee in Nano Disk(United States) has a need to share laboratory results to his Chinese counterpart to prepare Phase III clinical trials scheduled in their Chinese laboratory, and in return, the Chinese would provide sufficient data back to the employee in United States to obtain results in order to facilitate the clinical trials successfully. Data and results are being transferred via a computer supported interface similar to the one used in our study (asynchronous). Both employees have a window of two hours to carry out the analysis, request and transmit the data and results. It is to be assumed that each employee must carry their own research and analysis and these data and analysis information is unique to each of the employee. Collaboration is the key to a successful phase III clinical trial preparation.

Scenario BEFORE understanding socio technical interaction cultural profiles

Employees from United States are profiled to be detail oriented, and employees in China focus in just communicating the information and hence, may leave out details (Nisbett & Norenzayan, Culture and Cognition, 2002). The American scientist would be providing detailed information required by the Chinese scientist, but, on the other hand, the Chinese scientist would be copying and pasting (Vatrapu R. K., Cultural Consideration in Computer Supported Collaborative Learning, 2008) data obtained from the lab tests without any details explanations which could both delay the progress of American scientist and frustrate him since there are no clear details to progress with the research further and could cause significant delays. On the hand, the Chinese scientist would be left clueless why the American scientist was frustrated.

Scenario AFTER understanding socio technical interaction cultural profiles

Since the American scientist understands how the Chinese interacts within computer supported collaborations, he could perhaps explicitly ask for details every time he transfers his data findings, and the Chinese scientist would clearly understand the requirements of the American scientist, and thus, the research progress would undergo a smooth process as they both are aware of each other's expectations.

If Nano Disk A/S focuses on training all their employees who use computer systems to collaborate both locally and globally in understanding cultural profiles in computer supported collaboration, they would be gearing themselves with a cohort of cross culturally skilled employees.

Development of better IT Infrastructure

One can easily assume that the only few "cultural" implementation in IT systems are either an operating system which supports both English and the native language of the user or a keyboard supporting local language. These implementations do not foster successful intercultural collaborations. Indeed, the language of collaboration is usually in English but the problem still exists in the computer collaborative tool; it does not address or build to support culture specific interactions. Hence, having sound cultural profiles according to socio technical interactions can help with the building new IT systems which support/facilitate collaboration across all cultures.

Referring to the case in this chapter, if the IT infrastructure developers are aware on how the American and Chinese scientists work with each other, they could perhaps create a form-like collaborative platform since the Chinese are high in power distance (Hofstede, Hofstede, & Minkov, 2010) and they respect authority and are more likely to conform to the requirements in the form. Based on this, the form will enable the American IT developers to be explicit and clear of what they require from their Chinese counter parts, and the Chinese scientists would find it much easier to communicate.

Financial savings

As cliché as it sounds, companies would not take a second glance if something does not have a tangible or an intangible value contributing to its triple bottom line. If research succeeds in

culture-profiling the socio technical interactions in computer supported intercultural collaborations, it will help the company save significantly in man-hours contributing to significant financial savings. For instance, an efficient collaborative tool saves time which allows employees to focus on other tasks, and be productive; thereby being efficient and saves money.

Let us assume the scientists are able to save half-hour by effective collaboration enabled by the new system per testing session, and this testing is required bi-weekly. The following illustration shows the financial saving for Nano Disk A/S for any given calendar year.

([2] Calculation of Salary)

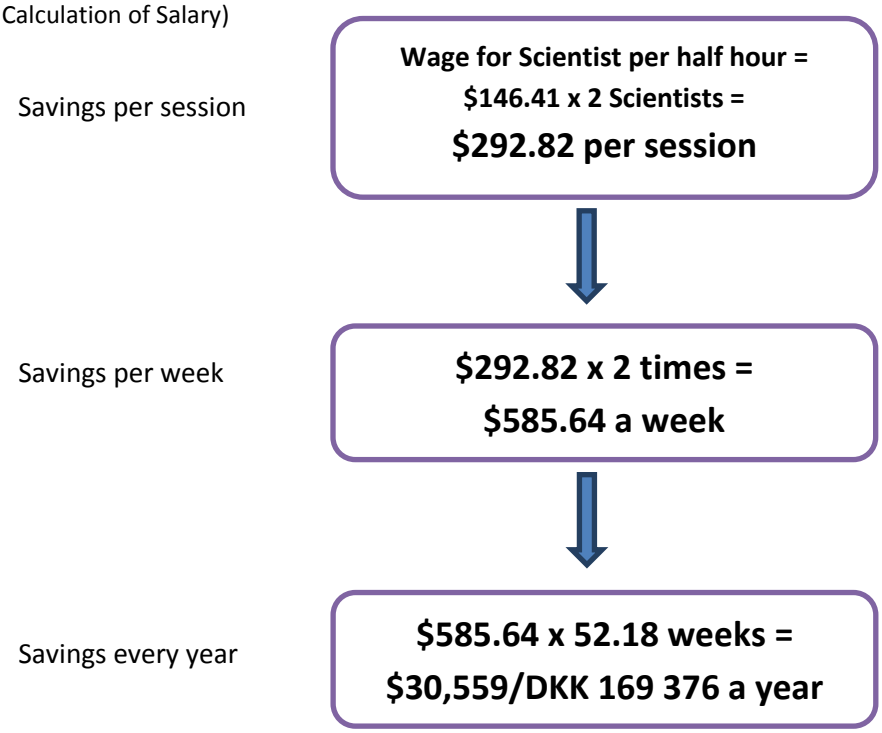


Figure 26: Calculation of Savings

A saving of $30,559 can be converted to DKK 169 376 a year. Assuming the testing process is carried out across five production sites per product, and the company has 3 products in their initial phase every year, the savings amount to a DKK 2 540 640. It is safe to assume that a saving of DKK 2.5 million would get the attention in the boardroom.

[2] Based on yearly salary of $102,000, $292.82 per hour based on 37 hours per week
*http://www.indeed.com/salary/Scientist.html

5.3 Conclusion

Religiously watching through sixty plus videos each averaging an hour and a half in length, and countless revisiting the videos in a belief to find any significant cultural differences did not only leave my puzzled, but stumped. There were no significant cultural nuances evident. Hence, in my analysis of socio technical interactions in computer supported collaborative learning, I concluded that socio technical interactions in computer supported intercultural collaboration is **Culture impermeable**.

The term Culture Impermeable is a new contribution introduced by me to the field of HCI (Human Computer Interaction). This means that during a computer supported intercultural collaboration, there would be no cultural influences influencing the interaction between participants active in the collaboration. Indeed, the findings could be tied to traditional cultural theories such as Hofstede's cultural dimensions but these theories did not provide a sound reasoning to profile them into unique cultural dyads.

It is by no surprise that the wave of culture analysis has been applied across computer supported collaborative learning since culture has been a hot topic with the increasing change in demographics around the world, but I urge one to think of computer supported intercultural collaboration beyond culture limited to a country. Let us take the United States as an example. There is a large population of Chinese immigrants who are living in the US spanning over generations. The question lies on how should the son of a third generation Chinese immigrant categorized as? A. American B. American Chinese or C. Chinese? Adding insult to injury, the future entails an influx of Generation Z where those born in this generation grow up with highly sophisticated media and computer environment. So, what factors could then be used to determine a Generation Z participant from America and China in a CSCL?

Furthermore, the data collected for this study was from an asynchronous, controlled setting in an academic milieu. Frankly, nowadays, the lines of cognitive abilities are blurred with high tech support in a synchronous environment. Unlike this study, the learning interface is often in a real time setting complemented with audio and video support depending on the urgency and

resources available. Perhaps a new study should be carried to reflect new collaborative tools in a live setting rather than a controlled setting.

Another point that I would like to address in my conclusion is that the collaborative milieu in this study required the participant to multitask. For instance, the participant should read the reports, initiate communication across an asynchronous media with the other participant, play Tetris™, create nodes, read nodes, figure out the structure of the nodes being arranged, and all these tasks whilst having to write an essay which requires a significant cognitive activity from each participant. However, a study by Stanford led by Clifford Naas revealed that media multi-taskers pay a mental price; damaging their cognitive ability (Ophir, Nass, & Wagner, 2009). Indeed, technology has sprouted many creative communicative and collaborative methods; more than what our fingers could count, but does it mean we should integrate everything into one interface such as this study. It would have been interesting to have audio/video incorporated as a part of the study to identify any cultural and efficient collaborative practices.

In a nutshell, the question we have to ask ourselves is: Do we really have to probe into culture and analyze socio technical interactions in computer supported collaborative learning? Time and time after, research has proven culture to be culture impermeable, and moving forward, it is without a doubt that we all are shipping knowledge globally within a blink of an eye; both consciously and unconsciously. The focus should be embedded in computer supported intercultural collaboration in the Generation Z cohort alongside with their collaborative best practices whilst culture remains impermeable; at least for the time being.

Learning Reflections

I consider myself very fortunate to have landed this thesis under the guidance of Dr. Vatrapu and the following are priceless experiences and lessons I gained throughout the process of my writing my master thesis.

Collaboration : This was the first thing I began to notice; crafting great journal articles and successful social media campaigns are the result of good collaboration. Indeed, one yearns for recognition and fame, but this could be easily achieved if one shares his passion and collaborates with other like-minded individuals. For instance, CSSL recently supported the Elton John Aids Social media campaign and Ravi bought in the CSSL team together when working with the campaign, and the result: a successful social media analytical experience. Even when perusing through the works my Dr.Vatrapu, his articles are written in collaboration with noted scholars which is why Dr. Vatrapu is a well-recognized and cited scholar in his field.

Patience : Whilst analyzing through gigabytes of videos collected by Dr.Ravi Vatrapu during his PhD in Hawai, I realized the importance of patience both in academic and personal setting. Academically, it is important to have patience when collecting and organizing the data which may or may not be of any use. I though only the business world has many uncertainties, but realized it exist in the academic world and you are still a winner; churn a journal paper at the end of the day. This thesis is a result of patience; sitting through two long months watching videos and analyzing them.

Time Management : Going through the process of analyzing data and writing my thesis, I realized the true value of time management and how it can do wonders if one masters it. I also learnt the importance of having an agenda to conduct meetings in a productive and time efficient manner. Furthermore, through observation, many professors maintain a calendar and are well structured. I replicated this practice into my own personal life and I feel more productive and control of my time.

Work-Life balance : I was, and still I am in finding out the key to a successful work-life balance. I was observing Ravi and other PhD students on how they juggled their scheduled. I

realized that it was important to maintain your own agenda, be your own boss and time-keeper of your own tasks since no one will come behind you. Most importantly, the balance was important so you do not forget to pick your kid in day care or fail to turn in the proposal for the grant you have been eyeing for months.

Thank you for reading my thesis.

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Links to Contingency Charts:
(https://www.dropbox.com/s/6pgyrmftc2ztzcs/ContigencyGraph_Shafak.vsd)